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Effect of Nickel on Different Physiological Parameters of Raphanus Sativus

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Abstract- To check the activity of nickel sulphate (0, 10, 20 and 30 mM) on radish seedlings through Foliar medium, whole soil culture experiment was performed in the wire house of old Botanical Garden, University of Agriculture Faisalabad. In this study it was noticed that nickel sulphate act as suppressor on growth of the plant and it also decreased the content of carotenoids and chlorophyll contents (Chlorophyll-a, b). Statistical analysis was achieved after collection of data by using appropriate computer software such as ANOVA. All morphological changes were observed to collect the data for the biochemical analysis. A marked reduction in chlorophyll a and chlorophyll b was noticed with slight elevation of carotenoid.

I. INTRODUCTION

Radish (Raphanus sativus L.) belongs to genus Raphanus, family Cruciferae that is mostly found in the central and south Asia (Thamburaj and Singh, 2005). Epidermis outer covering protects plants against stress (Raza et al., 2019). Being the cheapest source of natural protective minerals, the consumption of vegetables plays protective role against various diseases. The per day consumption of vegetables decided by dietitians is 300 g that includes 125 g of green leafy vegetables, 175 g of roots and other vegetables and its recommended availability should be 145 g per day (Salaria, 2009). Nutraceuticals obtained from plants have basic health benefits (Usman et al., 2019).

Radish has spicy taste as well as have anti-cancer activity due to presence of rich amount of chemical substances such as myrosinase, glucosinolate, and isothiocyanate. Some varieties of plants designed for experimental determination of molecular studies (Ahmad et al., 2019, Ahsan et al., 2019). A variety of plants products used for herbal treatments (Naeem et al., 2019). A selective study was done in Germany in 2009 in which 11,405 male participated that showed the relation between nutritional intake of glucosinolate and the high risk of prostate cancer (Steinbrecher et al., 2009). Apoptosis of cancer cells in human lung is mediated by 4-Methylsulfinyl-3-butenyl isothiocyanate that is present in radish (Wang et al., 2014).Some of the plants contained materials that identify as DNA barcodes (Naeem et al., 2019).

Recently a study has revealed that sulforaphane (isothiocyanate) that is present in radish, has inhibitory role against proliferation of cancer cells in breast (Pawlik et al., 2017). A variety of climate and soil conditions and suitable nutritional amount and agro-techniques have great effect on the optimum growth and production of radish. Cadmium toxicity may affect various parts of plants (Shafiq et al., 2019). Soil fertility and various agro-climatic conditions mostly depends on nutritional requirement. Plants have opening called stomata and epidermis is the outer layer of cells (Naeem et al., 2019). The root of radish has rapid growth rate at very short duration of time. The optimum growth of radish can easily be achieved by adding essential organic and inorganic fertilizers (Dhanajaya, 2007). Different herbs are used for medical purposes (Usman et al., 2019).

II. MATERIALS AND METHODS

To check the activity of nickel on radish seedlings, an experiment was carried out in jar by applying the nickle in the solution form by using Foliar application in various concentration ranging from 0-30mM to the early seedling afterward 2 weeks of germination.

Sowing and culture medium:

Plastic pots with underneath hole filled with 2.5 kg of sand were used for directly sowing of seeds of radish genotype Mooli Day-40 that were purchased from Ayyub Agriculture Research Institute (AARI) Faisalabad and then these pots were covered by cotton cloth. Before starting of my experiment, I waited for germination of seedlings by maintaining the 5 plants per pot of equal size through thinning and then, I applied Nickle to check its effect.

3.2. Treatments and Source:

To make the one litter solution of nickle sulphate, I used simple water taken from the filler plants present in the University of Agriculture, Faisalabad and nickle sulphate was taken from botany department. Then the solution was applied to the plants.

1- Normal water or 0mMNickel solution
2- 10mMNickel solution
3- 20mMNickel solution
4- 30mMNickel solution

3.3. Harvests:
Before harvesting, plants were treated with solution for 45 days by following the parameters. 

**Photosynthetic pigments:**

To evaluate the amount of carotenoids and chlorophyll a and b, methodology of Arnon (1949) was used. 0.10g of leaf samples were collected through cutting and soaked them into a beaker containing 10ml of 80% acetone then these sample were centrifuged after 24 hours at 10,000 rpm for 5min and then spectrophotometer was used to check the supernatant’s absorbance 480, 645 and 663 nm(Hitachi-U2001, Tokyo, Japan).

**Statistical Analysis:**

For statistical analysis of collected data, I applied CO-state and draw the Anova tables, through filling of tables.

III. RESULTS AND DISCUSSION

**Root fresh weight (g)**

The analysis of collected data from fresh weight of radish’s roots that were grown under controlled conditions is presented in table (Table 4.4, Fig 4.4). Nickle sulphate act as suppressor that bring the reduction in growth as well as weight of fresh root (P≥0.001). Under controlled conditions maximum reduction was observed as compared at 30mM Nickel sulphate that was applied in Foliar medium (Fig 4.4).

**Chlorophyll a (mg/g fresh weight)**

The analysis of collected data from radish’s chlorophyll a that were grown under controlled conditions is presented in table (Table 4.4, Fig 4.6). Nickle sulphate act as suppressor that bring the reduction in growth as well as chlorophyll α (P≥0.001). Under controlled conditions maximum reduction was observed as compared at 30mM Nickel sulphate that was applied in Foliar medium (Fig 4.6).

**Chlorophyll b (mg/g fresh weight)**

The analysis of collected data from radish’s chlorophyll b that were grown under controlled conditions is presented in table (Table 4.4, Fig 4.7). Nickle sulphate act as suppressor that bring the reduction in growth as well as chlorophyll b (P≥0.001). Under controlled conditions maximum reduction was observed as compared at 30mM Nickel sulphate that was applied in Foliar medium (Fig 4.7).

<table>
<thead>
<tr>
<th>SOV</th>
<th>Df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>P</th>
</tr>
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<tr>
<td>Treatment</td>
<td>3</td>
<td>2.806</td>
<td>0.935</td>
<td>5.506</td>
<td>.0240*</td>
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<td>1.359</td>
<td>0.169</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

***, **, * = significant at 0.001, 0.01 and 0.05 probability levels respectively, ns= non- significant
Fig 4.4: Influence of exogenously applied nickel sulphate on Root fresh weight of radish genotype grown under control and Nickel sulphate effect conditions

<table>
<thead>
<tr>
<th>SOV</th>
<th>Df</th>
<th>SS</th>
<th>MS</th>
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<th>P</th>
</tr>
</thead>
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<tr>
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<td>2.112</td>
<td>34.771</td>
<td>.0001***</td>
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<td>8</td>
<td>4.860</td>
<td>6.075</td>
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</tbody>
</table>

***, **, * = significant at 0.001, 0.01 and 0.05 probability levels respectively, ns= non-significant
Fig 4.5: Influence of exogenously applied Nickel sulphate on Root dry weight of radish genotype grown under control and nickel effect conditions.

Fig 4.6: Analysis of Variance of data for chlorophyll a of radish(Moli Day-40) under Nickel sulphate effect.

<table>
<thead>
<tr>
<th>SOV</th>
<th>Df</th>
<th>SS</th>
<th>MS</th>
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<th>P</th>
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</thead>
<tbody>
<tr>
<td>Treatment</td>
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<td>54.874</td>
<td>.735*</td>
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<tr>
<td>Error</td>
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<td>0.009</td>
<td>0.001</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

***, **, * = significant at 0.001, 0.01 and 0.05 probability levels respectively, ns= non-significant
Fig 4.6: Influence of exogenously applied nickel sulphate on Chlorophyll \( a \) of radish genotype grown under control and nickel sulphate effect conditions.

![Graph showing chlorophyll a (mg/g fresh weight) for different treatments](image)

Fig 4.7: Analysis of Variance of data for chlorophyll b of radish (Moli Day-40) under Nickel sulphate effect

<table>
<thead>
<tr>
<th>SOV</th>
<th>Df</th>
<th>SS</th>
<th>MS</th>
<th>F</th>
<th>P</th>
</tr>
</thead>
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<tr>
<td>Treatment</td>
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<td>1.721</td>
<td>0.573</td>
<td>45.120</td>
<td>.993*</td>
</tr>
<tr>
<td>Error</td>
<td>8</td>
<td>0.102</td>
<td>0.012</td>
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</tr>
</tbody>
</table>

***, **, * = significant at 0.001, 0.01 and 0.05 probability levels respectively, ns= non-significant

IV. CONCLUSION

To check the activity of nickle sulphate (0, 10, 20 and 30 mM) on radish seedlings through Foliar medium, whole soil culture experiment was performed in the wire house of old Botanical Garden, University of Agriculture Faisalabad (Raphanus sativus). The amount of nickle sulphate given during experiment were as 0 mM Nickel sulphate +1liter H2O, 10mM Nickle sulphate +1liter H2O, 20 mM Nickel sulphate +1liter H2O and 30 mM Nickel sulphate+1liter H2O. Consistent amount of nickel was applied. In this study it was noticed that nickle sulphate act as suppressor on growth of the plant and it also decreased the content of carotenoids andchlorophyll contents (Chlorophyll-\( a \), b). Moreover, the Imposition of nickel sulphate also cause the accumulation of carotenoids in plants. The statistical analyses by using ANOVA also showed the significance and non-significance in the traits of radish plants. In all this study Moli Days-40 showed the satisfying results in control and showed lower result in 30 mM Nickel sulphate concentration.

REFERENCES


AUTHORS

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Exploring and Analyzing Students’ Algebraic Misconceptions and Errors

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Abstract

This research based paper presents the exploring and analyzing students’ algebraic misconceptions and errors (M/Es). Along with minute observation of students’ classroom tasks and their peer groups’ algebraic activities, the exploration of students’ M/Es was carried out by conducting in-depth interview with students (based on their work sheets). The study had analyzed misconceptions and errors of the students of grade eighth. It was carried out especially in the area of algebraic content. This study has revealed altogether 63 different types of M/Es which have been framed up into seven categories. While diagnosing the origin, nature, patterns and causes of M/Es, some non-cognitive causes of M/Es have also been traced out. The study showed that diagnosis of students’ M/Es on time should be the fundamental system of teaching/learning (T/L) school algebra.

Keywords: Exploring, analyzing, misconceptions, errors, causes, patterns, constructivism, fallibilism

I. INTRODUCTION

The mathematics education is a body of knowledge and area of science with its own terminology, symbolism, contents, theorems and T/L methodology. Students must know the mathematical language with lots of mathematical concepts, theories, and relations with its own syntax, grammar, words, phrases, sentences, symbols, graphs, visuals, models etc. But most of the students pass their time by listening and reading instead of writing, thinking, analyzing and using the mathematical language. As a result, they miss the logical power and cannot develop a creative power to think.

In this situation, students follow rote learning, and their mathematical knowledge is developed with a lot of misconceptions. For example, students start solving a problem but cannot reach the end with correct answer as they are lost somewhere in the middle of the process where they are misguided due to misconceptions and hence produce errors. When students study and explain incorrect skills, they directly meet misconceptions and are likely to maintain incorrect ways of thinking about problems (Warren & Cooper, 2006). If such misconceptions are not addressed as early as possible before they get matured, students integrate useless new information into their immature conceptions which cause further misconceptions and errors.

Piaget’s (1970) fundamental assumption is that knowledge is a process, not a state. So, misconceptions are acquired during students’ learning process. Actually, conceptions and misconceptions grow together, side by side. Students construct their misconceptions through their own experience. The intuitive interpretation based on a primitive, limited and unrelated individual
experience disturbs learning process and distorts correct conceptions which cause misconceptions (Fischbein, 1994). They occur while obtaining, processing, retaining and reproducing the information along with assimilating and accommodating new conceptions into existing conceptions. Since M/Es are emotionally attached with students, they are not easy to dislodge and remove (Egodawatte, 2011).

To err is human; however, the main point is concerned with what conclusions are drawn and learnt from errors. If errors are committed, it is said that they arise because the children are thinking and not because they are careless. The teacher should generate an environment of engaging students for the correction of errors with reasons instead of correcting them mechanically. Thus, teachers have to accept students’ errors for the purpose of analysis.

The analysis of error pattern provides us an effective and efficient method for pinpointing the specific misconceptions and problems that students are having while solving problems. By investigating students’ M/Es, the teacher can provide instruction targeted to their area of need. In this regard, Upadhyay (2017) claimed that if one could find out weaknesses and misconceptions of students, more than half of the problems of T/L tasks are done. Similarly, Ausubel (1968) said that if he had to reduce the entire body of knowledge in the field of educational psychology to just one principle, he would say: The most important single factor influencing learning is to ascertain what the learner already knows, and teach him/her accordingly. It shows the crucial role of M/Es in a whole learning process.

Students’ errors are the symptoms of misconception like fever for the disease. So, it was imperative to identify students’ conceptions, procedures, reasoning, and how students’ wrong responses and errors expose their misconceptions. Further, it was more important to carry out such a research in algebraic area as it is a gate keeper for all branches of mathematics. However, a clear understanding is needed as regards how to identify, diagnose and address students’ M/Es so that students would have a learning algebra meaningfully. For these reasons, I had conducted the study with two major research questions.

II. RESEARCH QUESTIONS

The study was conducted to bestow the answers of the following two major questions.

(i) What are the students’ algebraic misconceptions and errors?
(ii) What are the causes of students’ algebraic misconceptions and errors?

III. THEORETICAL FRAMEWORK OF THE STUDY

One of the main things that makes human being different from other animals is the human’s ability to learn very complex behaviors and skills. Though, the knowledge constructing routes are very complicated and often include backward and forward movements, suggesting that frequently making errors may be an unavoidable part of the learning process which does not mean that a learning strategy got unsuccessful (Campbell, 2009, cited in Kshetree, 2015). Further, he added that errors are logically consistent and rule-based rather than random. Thus, exploring errors presents an opportunity for uncovering the mental representations with mathematical reasoning and misconceptions. For this, the researcher considered different perspectives of constructivism such as
neural network, psychological, generate and degenerate, and buggy algorithm in learning algebra. They provided the various root causes of originating M/Es.

In addition, the different scholars and mathematicians have considered the nature of mathematics and its ontology, epistemology and axiology differently (Ernest, 1995). Platonist philosophers on the extreme right conclude that mathematics is objective, unhistorical, unchallengeable truth existing independent of consciousness. But the fallibilist philosophers argue that mathematics is subjective; socio-cultural, M/Es prone, and no mathematical truth can exist outside what learners have consciously constructed in their minds. Along with these different philosophical lenses, the researcher has used especially fallibilist view to study students’ algebraic learning ways, committing M/Es including their remedy.

Actually, it is important to understand student’s inclination towards different mathematical philosophies (though they may not clearly express them) to find out their M/Es particularly while interviewing them. Their views enable teachers to help students more as the teachers make world-view of mathematics from the student’s point of view. Sometimes, there may be the need for modification in the learner’s philosophies if they are found to be unhelpful.

While students are constructing concepts, they sometimes construct incomplete, immature, alternative and transitional concepts (Makonye, 2013, cited in Kshetree, 2015). Those concepts constructed by students may be fully correct or partially correct or completely wrong. In this way, the students’ construction of algebraic concepts is a fallible process. Though students used intuition and trial and error process while guessing mathematical results and checking them, fallibilist approach was the main philosophy adopted in this research study with the assumption that the students construct algebraic concepts in their own endeavors.

In this way, out of five major mathematical philosophies, fallibilism was taken as a guiding philosophy for this research study. In order to study, analyze and diagnose the nature, origin, causes and different forms of M/Es, the theoretical foundations considered in this study included constructivism through different perspectives such as neural network, psychological, generate and degenerate, and buggy algorithm.

IV. CONCEPTUAL FRAMEWORK OF THE STUDY

As per the nature of the study, the researcher followed the qualitative research design. The qualitative information was collected through in-depth interview based on students’ test and class-work copies, which was supported by the information gathered from classroom observations of T/L practices and field notes. After reviewing theoretical and empirical literatures, the exploration of students’ M/Es was planned to carry out through the fallibilism and constructivism theories whereas they were analyzed through thematic approach by using critical judgment process. In this way, for the exploring and analyzing students’ misconceptions and errors, the blue print of the researcher’s mental map was sketched in the form of a ‘conceptual framework’ for this study.
V. METHODOLOGY

Research Design

As per the nature of information and data of the study, the research design adopted was qualitative. Creswell (2012) claims that interviewer gains holistic picture in qualitative research by analyzing words and phrases, reporting the views of the informants in detail, and carrying out research in a natural setting. Regarding collecting and processing method of data, the researcher collected and analyzed the data for the purposes of obtaining a deeper understanding of the phenomenon. The researcher was not limited in interview rather he was interacted with the students based on their class works and some tests in addition to tracing regular observations and making field notes. The notes were also made with reference to discussion held with mathematics teachers and students. Further, he combined these research strategies which were found to be mutually reinforcing.

Population and Sampling

As per the disposition of the study, a single visit and contact with students could not work well, so the researcher needed to have field work for a long time. Thus, the researcher had to be confined in few of the schools of Kathmandu Valley. So, the population of the study was all the community schools of the Valley.

At first, the researcher purposively made a list of seven schools then he visited and observed those schools. In the visits, he consulted the head teachers, teachers, and students for their consent, interest and cooperation. Then he selected four from those seven schools. Out of altogether 95 students, the study analyzed the test scores of only those 80 students who were regular and took part in the tests, interaction and interviews taken, time and again.

Selection of students’ standard. Regarding selection of T/L class, the researcher had reviewed some relevant literatures. According to Booth (1988), the learning of algebra has received more attention at the lower secondary level school which is the critical stage of transition from arithmetic to algebra. Kieran (2007) claimed that most algebra studies have targeted learning of school algebra. Ginsburg (1997, cited in Kshetree, 2015) added that the results of the study of school algebra apply more to the students younger than high school age. So, it was important to know the M/Es that middle school students commit. Compared with the goal of arithmetic which has to find the answer, the focus of algebra was to find the general method and use algebraic symbols to express them in a general form. Further, Booth (1988) claimed that the structural representation, symmetric and transitive character means understanding equation as object which should become the goal of school algebra at the end of Basic Education level (eighth grade). That is why, the study was conducted among the students of eighth grade.

Development of Research Tools

In order to collect the required data for this study, the researcher prepared, standardized and intervened important research tools which include: Observation forms, field notes, test items, and interview guideline. Then, the researcher consulted with senior researchers, subject experts, trainers and teachers for feedback, suggestions and necessary modifications. Some of the tools were adapted from other researches with some modifications as per the need of the research.

Observation checklist for exploring M/Es

http://dx.doi.org/10.29322/IJSRP.10.01.2020.p9703
The researcher had to observe the practices of students’ algebraic knowledge and understanding translated into problem solving skills even in the peer groups. For this, out of three types of observation (informal observations, structured observations and interactive observational assessment), the researcher had followed the modality of interactive observational assessment. While observing group work activities, six behaviors of mathematization were captured as suggested by Millory (1992, cited in Upadhyay, 2001) which include; explaining something to the group, taking some action over task, engaging in reflection, offering some arguments for verification, appraising some works critically and acting as a more able peer.

Thus, in order to explore students’ misconceptions and errors, an observation checklist based on Newmann’s Error Analysis Tool (1983), Perso’s Diagnostic model (1991) and Blessing’s testing (2004) was prepared and used it by the researcher while observing classroom T/L practices. While observing class works of the students, an attention was given for groups’ discussion, exchanging the peer groups’ work, and allowing the students to reform their peer groups. After the class is over, it used to have review meetings among teachers and researcher. A field note was also updated appropriately to collect all the relevant information explored while observing class works and discussion taken with the students and teachers.

Field notes

The field notes contain the ongoing data that were being collected. They consisted of the descriptions of what was being experienced and observed, the observer's feeling and reactions to what were observed, and field-generated insights and interpretations as claimed by Newman (1983). In the same manner, the researcher had observed and experienced the different types of representations such as strategic solutions to the given problems, the way of content of the algebra transmitted, and appropriateness of the use of T/L aids including the response of teacher when a student gives a wrong answer to a question. The field notes were taken lively on T/L classroom practices and activities where researcher traced his insight regarding making meaning upon what students observe, hear, communicate, and take part in peer works. In this way, the field notes strengthened and systematized the classroom observation tasks.

Development of test items

In order to identify and locate students’ M/Es, the researcher developed and standardized the test tools. For this, he prepared the test items by using textbook, specification grid-chart, curriculum and teacher’s guidebook developed and prescribed by the Curriculum Development Center (CDC). The specific misconceptions could easily be dealt with if algebra was seen through generalizing, forming and solving equations, and working with formulae. In this way, the test items were prepared based on Perso’s
Diagnostic Test(1991) and Blessing’s Algebraic Thinking Content Knowledge Test(2004). The test model was prepared on the basis of seven categories of students’ M/Es. The test items included three categories of questions (knowledge for concepts, comprehension for process and application for academic skills) as per the Bloom’s Taxonomy.

**Interview guideline**

In order to explore and fix the students’ algebraic M/Es with reference to their test copies, an interview guideline was prepared and administered among the students of the sampled schools. The guideline was prepared being based on the conceptual understanding of the algebraic concepts, problem solving procedure and application of the knowledge in required steps of solving problems.

The interviews of the students were taken by the researcher himself. The interviews enabled the researcher to examine and obtain valid and reliable information about students’ knowledge and understanding held in each test item of pre-test. More importantly, in order to explore students’ M/Es, the interviews were used to follow up unexpected results or to validate other methods or to go deeper into the understanding of their reasons. For this purpose semi-structured open-ended questions were developed on the basis of the results of the test.

In order to know students’ thinking patterns, conceptual status, constructions, interpretations and arguing ability, sequential questions were asked on the basis of their response in each stage. Further, unstructured interview with semi-structured questions was used as its purpose was to obtain a free flow of information, move forward and backward in the process of interviewing to clarify points, go over earlier points and again raise fresh questions, and create an atmosphere where the interviewee would feel free to come out with subjective and personal information. So, the interviews proceeded ahead more like a normal conversation, but with a purpose of locating students’ M/Es.

**Real interview**

Before starting each interview, every student used to be informed about what was the objective of interview including expectation from the student. The initial conversation used to begin with, “I am going to ask you some of the questions based on your test answer-sheet. I would like you to try and explain to me your thinking while you are working. What I am interested in is how you are going to arrive at your answers. Sometimes I may ask you some short questions for further clarifications”.

Further, the researcher made clear that it was quite acceptable to make any errors in the interview since the learners’ thinking underlying their errors was more important than answers. Further, they were made to understand that the primary goal of this exercise was not to evaluate them or to offer them a mark. The interviews were taken on the basis of their answer sheets of test in order to identify their misconceptions in each typical and non-common answer. The interviews were also taken even in the correctly answered...
questions in order to ensure their answer and confirm their existing knowledge. The duration of the interview was largely dependent on the responses given during the interview but did not last longer than thirty minutes.

In order to make them comfortable in delivering their opinion without any hesitation, a liberty of sitting two friends at a time for the interview was also permitted. As expected, the students were found more confident and comfortable in the interviews taken with pair of friends chosen by them. Actually, it was an idea developed in interview sites as seeing the weak students could not put their conceptual understanding clearly. In addition, two separate informal group discussions were also conducted among 7 students of one school and 9 students of another school. In the discussion, students were presented with their own test copies so that their ideas and arguments could be compared and exchanged among their friends. Further, few of the students were also interviewed informally while observing their group works.

In each interview, the researcher was interested in how students’ incorrect responses could expose their M/Es. It helped further to explore their M/Es. In the end of each interview session, students’ work sheets used in interview process were also collected. Further, each interview was audio taped and later transcribed and analyzed.

VI. ANALYSIS AND INTERPRETATION OF THE DATA

In order to identify students’ common patterns of M/Es, it was taken in-depth interviews of the students based on their test and class work copies. Also at the time of observation, students’ experiences were drawn by making them discuss and interact in peer groups, present each group’s work in whole classroom, and notice teachers’ guidance and support. The students were encouraged to put forth their reasons individually so that each one could explain how s/he arrived at the solution. Doing so was important than showing their answer sheets to the teacher in order to explore and verify students’ M/Es identified from test-based interviews.

In order to organize the qualitative information systematically and standardize the supporting system through theorizing the findings of research, the thematic approach with critical judgment was applied. In this context, the study was focused on three areas of M/Es: Sources, causes and categories. The analysis of qualitative information obtained from the interviews, classroom observations of individual and peer groups’ activities, and field notes was carried out with reference to theory of mathematical fallibilism, constructivism and findings of the previously carried out related researches. The M/Es were diagnosed based on the tools developed by Perso (1991), Blessing (2004) and Newmann (1983). Further, the data were categorically analyzed and interpreted as per their three levels of cognitive domain (conceptual, procedural, and application).

In this way, the students’ M/Es were explored and triangulated through five different ways:
(i) Examination of test copies of all students,
(ii) In-depth interviews of the students based on their test answer sheets,
(iii) Scanned copies of class work and their analysis,
(iv) Field notes on observed peers’ group tasks, interaction, and discussion,
(v) Reviewed researches and literatures

VII. FINDINGS OF THE STUDY

The findings regarding exploration and diagnosis of students’ 63 different M/Es have been put forth in sequential order on the basis of their seven categories such as (i) building block of algebra, (ii) mis-manipulations, (iii) application, (iv) solving problems by patterns, (v) translation of word problems, (vi) generalization of algebraic concepts, and (vii) dealing symbolic expressions and equations. In addition, there were some miscellaneous prototype M/Es and their non-cognitive causes. The categorical findings have been specified, turn by turn, as follows.

Regarding the M/Es based on basic building block of algebra about the use of letters, symbols and variables, it was found that the students had few misconceptions such as: variables always have the same meanings and interpretations even in different contexts and situations, one variable is for one specific value only, variables are used to label name of words and objects, letters are meaningless symbols, and there is one-to-one correspondence of English alphabets with positive integers.

The M/Es related to mis-manipulation of algebraic symbols were mainly the perceiving incomplete answers as far as they see operating signs, taking equal sign as step maker, and missing some parts of terms and signs in the lack of comprehending procedural skills.

Incorrect application of rules and formula was another category of M/Es which consists of overgeneralization of rules, thinking backward in arithmetical way, and misuse of order of operations which forces to adopt inconsistent procedures.

With reference to use of numerical pattern and predictable visual to solve problems; the students were found misled by superficial structure of some algebraic formula and expressions, lacking discrimination ability of similar concepts, and having low confidence level in attempting given algebraic problems.

The common practices of M/Es with regard to solving word problems were related to understanding the problem, transformation of given language into algebraic equations, solving the problem correctly, and even encoding the solution. Further, they also had a problem in finding the relationship of variables to form equations; as a result, sometimes they guessed the answers and used trial and error method.

The overall image that emerged out from the findings of M/Es related to generalization of algebraic concepts was that students have lack of required concepts in formulation and use of general rules. Similarly, they had inter-subject messy concepts and even lack of the idea about where and how to start solving the problem.
Regarding the category of M/Es in solving problems using symbolic expressions, mainly three types of difficulties were found which caused M/Es. They were: lack of making the learning meaningful as a result following mechanical drill and practice, running through several steps to reach the so-called final step any way, and indulging into many mish-mashing concepts which deviated them from getting correct conceptions.

Furthermore, it was explored that students’ M/Es were based on some psychological matters such as anxiety, hurriedness, poor attention, rigid thinking, recalling problem, nervousness, and time pressure including some technical parts like slips and carelessness. It was also observed in peer groups that some of the M/Es were based on students’ own incomplete ideas, hazy instructions provided by teachers, some unclear sharing of ideas among friends, and use of own irrelevant life experience. However, students’ M/Es were based on lack of conceptual clarity, low ability in comprehending procedural steps, and applying incorrect schemas in solving problems.

VIII. IMPLICATIONS OF THE STUDY

This study has drawn many prominent implications which can be used primarily by students and teachers in daily T/L practices of algebra. Further, the implications have been identified for subject experts and institutions as well.

For students, the study is much useful since the exploration of students’ M/Es is based on their pre-existed knowledge and practices. Similarly, it identifies their learning schema and shortcomings, required treatments and determines its dose as per the nature of their M/Es which are essential ingredients to make the learning meaningful.

For teachers, they provide inputs as per the students’ M/Es, ability, and interest where they encourage students to talk inside out and share with teachers. In this approach of T/L system, the role of teachers changes from talking to listening, describing to feed backing, relaying information to using creativity, being teacher centric to students centric, and as a whole lecturing system to facilitating the learning.

At expert level, it is expected to be equally applicable to policy makers of school education reform, curriculum developers, training package designers, examination experts, teacher educators, book writers, and trainers to name few of the representative professionals of education sector. This new approach of T/L through exploring and diagnosing students’ M/Es can be a training material for pre-service and in-service mathematics teachers as well.

For institution, with regard to the intervention of this new approach in Nepalese classroom and context, the institutes will get overall conducive environment and tremendous improvements not only in mathematics but also in other subjects if they follow this approach of T/L system. However, it recommends some pre-requisites such as training for the teachers, specific lesson plans, and improved classroom situation. In this way, this new approach to T/L system did not only connect teachers and students for their betterment but also showed much significant benefits in the favor of institutions as a whole.

IX. CONCLUSION

The students and teachers together must reach the schemata of students to explore their M/Es. Teachers should not be anxious of students’ M/Es because their wrong answers can guide reach to the origin of M/Es that they may be the best tools for crafting their learning experiences. The teachers’ belief system in mathematics as absolute knowledge needs to be changed into
mathematical knowledge guided by fallibilism philosophy and human conscience. As a result, teachers could give importance to every reasoning of the students as the construction of knowledge needs own way, pace, experience, context and culture. Thus, exploring and analyzing students’ misconceptions and errors should be the fundamental system of T/L algebra. Further, the study has also set up a norm in mathematics education like ‘prevention of students’ M/Es is better than their treatment’. Similarly, it has established a new knowledge as ‘determine the ways and dose of treatment on the basis of students’ diagnosed M/Es’ in order to make T/L algebra meaningful.

X. ACKNOWLEDGEMENT

I express my sincere thanks to my supervisor Prof. Dr. Hari Prasad Upadhyay for his outstanding guidance, suggestions and scholarly touch in every corner of this study. My appreciation goes to those sample schools’ teachers and students who provided me excellent working environment for this study. Similarly, I am thankful with my all senior professors and colleagues of the Department of Mathematics Education for their kind cooperation and genuine feedbacks provided while carrying out this study.

XI. REFERENCES


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Uses, Advantages and Opportunities of Kanban methods in Mechanical Engineering and Product Manufacturing

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Abstract- Whenever we talk about any product development or manufacturing process then it becomes very important that the process be perfect and premature, every process needs to be flexible. In today's era, agile is one of the ways. "Kanban" is a similar method that not only makes the production process flexible but also gives the best results through continuous monitoring. Although both Agile and kanban processes are used in the software industry, kanban is being used extensively in the field of mechanics. Kanban is not an entirely new way, but it is a means to further improve an already running process incrementally. In this article, the authors have mentioned about the history, experiments, and benefits of kanban.

Index Terms- Agile; Kanban; Software; Mechanical; Production

I. INTRODUCTION

Today’s need for any business environment is headed by speed and agility. The main pressure that today’s company face is to deliver the products fast and enhance the quality of the products. The flexible and rapid nature of development through agile has increased its importance and use in various industries. Not only in IT Industries for software development but also the product manufacturing in mechanical engineering is started through the agile development process. Kanban is used as an effective approach in the software development cycle as well as in production and inventory control. [1]

It is a framework whose idea behind the development came from a grocery store. The Toyota industrial engineer Taiichi Ohno was once passing by a supermarket he saw the workers refilling the shelves as the customer picks up the item to keep up demand. Similarly, he thought inventory in production could also be maintained. Kanban is based on a lean concept whose main aim is to increase the efficiency of production and optimizes it. Continuous delivery of the products is done through the kanban method. The meaning of this term is signal or card. It works as a mediator between stages of the production and signals the demand of various components required during the manufacturing of the product.

A. Preparation of a Kanban Board

The kanban board provides full transparency about the distribution of work and any kind of bottlenecks in the system. It is made by drawing a table on a whiteboard and dividing it into four columns. Each card on the board represents a specific task. [2]

• Mark the first column as To Do it will capture all the new items that are to be done.
• The second column is marked as In Progress it contains the list of all those items upon whom the work is going on.
• Items after the development are sent for testing. This column maintains the record of all those.
• Finally, the last one shows the list of all those work which are finished.

B. Working using kanban

The new work is added to the “To Do” column in the form of cards or written through markers. Once we are ready to work the item is dragged from the “To Do” column to ‘In Progress’. After its completion, the card is dragged to the testing phase and finally, it is moved to “Done” after its completion.

C. Review your board

The tasks are dragged from one column to another based on priority. It keeps an eye on the tasks that are to be done, those that take much time and those that are at a halt.

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II. LITERATURE REVIEW

The authors in reference [1] have conducted a detailed literature survey of various kanban frameworks that are proposed by many authors. Kanban framework worries about the utilization of signals. Deciding the actual signal number is an important factor in the case of Kanban based manufacturing system. The authors have described the various optimization techniques used while designing the kanban system.

Kanban technology plays an important role in production units. In reference, [13] the authors have reviewed the implementation of kanban methodology on swing liver assembly of Bajaj Steels. Their main objective was to reduce the ideal time of resources and maximize productivity. The authors concluded that the proper use of the kanban system helps in improving the flexibility of production.

The authors in reference [12] address the impact of Kanban in industry and how it helps in producing cost-effective products. They discussed the multi-stage kanban and the role of kanban size in planning and manufacturing. Their main focus is on the use of digital and e-Kanban. They also described a case study where the kanban system helps in minimizing logistics and operational issues.

Ahmad Naufal and Ahmed Jaffar in [9] discussed the development of the kanban system at the local manufacturing company of Malaysia. They deployed the kanban system at the company by following the major three steps. First is to gather the relevant parameter, after that calculations related to kanban are done and finally pull mechanism and rule is established.

In the paper [11], the authors have described the implementation of lean manufacturing in the leading autocomponent manufacturing industry of south India. Value stream mapping is the tool that authors have described. This tool is used to find the sources of waste and ways to reduce the amount of waste. They used three types of kanban-move kanban, production kanban, and supplier kanban.

III. KANBAN FOUNDATION PRINCIPLES

Kanban technology is based on few major pillars:

1) Visualize the flow of work
The first step while implementing the kanban is to visualize the steps that are currently being used to deliver the services and work to the customer. [5] According to the complexity of the process and number of products being produced the board changes from simple to elaborate.

2) Reduce work in progress
It aims to make the mindset of the team to complete the work in hand before new ones are started. The work in progress must be finished and should be moved to the done column. This enhances the amount of production in the system.

3) Manage flow
Inspite of various bottlenecks that arise at various stages of the process at one point of time to another, this ensures that work is done as fast as possible.

4) Make Policies Explicit
Along with visualizing the workflow the rules and guidelines that are followed must also be clearly stated. So that all the participants clearly understand how to do any type of work.

5) Implement feedback loops
Kanban board provides a feature of feedback loops and reviews at various stages which provides continuous feedback and gives an idea about the wrong track of any work. It ensures that the right product is delivered to the customer in the shortest possible time.

6) Improve Collaboratively
The kanban method of agile helps to evaluate the process constantly and improve continuously gradually at a pace.

Fig2: Kanban board following various principles

IV. USE IN INDUSTRIES

Kanban was originated on an industry floor to enhance the management of the supply of products. Kanban inventory management system is cost-effective, so it is widely used in many diverse industries. Management of inventory via the Kanban system results in many benefits. Manufacturing through kanban is advantageous as it applies an upper limit to the flow of work, prevents overproduction, and provides a progress report. Refilling of the inventory is done only after the depletion. This helps the company decide which products are more in demand than others. The feedback loops and reviewing feature improves lead time and prevents overcapacity. Cost in buying the surplus item gets reduced and space for storing large inventory also reduces. It provides continuous improvement in the business. Some of the industries are as follows:

1) RFID Kanban systems market analysis of medicines
The RFID kanban system is derived from the increasing demand for asset tracking, drug stock-outs in medication supply. The development of new products and an increased number of stockout cases, over inventory, has boosted up the use of the RFID kanban system. In this, the colored cards are replaced by RFID tags. The [6] software is attached to it which directly sends messages to purchase inventory in case of storage of any medicine. This reduces the risk of non-availability of the drugs at the hospital. Fig 3 shows the growing demand for RFID tags in the world by 2020.

![Fig 3: Global RFID kanban systems market, by region, 2012 - 2020 (USD Million)](http://dx.doi.org/10.29322/IJSRP.10.01.2020.p9704)

2) **Electronics company to satisfy orders**

Milwaukee Electronics, a manufacturing company producing parts of medical, industrial and aerospace clients. [7] The company started small volume production of screaming circuits which are internet-based. They utilize the kanban system in their industry to meet customer demands. The company maintained the inventory of two weeks and gave a lead time of two weeks to the supplier so that they will run out of parts in any case.

3) **Toyota production system**

The Toyota Company has two major features “Pull System” and “Just in Time Production”. [8] In the pull system, the production takes place according to the demand of the customer. Inline production takes place each process produces each component and passes to the other finally the product obtained is delivered to the customer. The business becomes linear by this concept. Just in time production maintains the stock level of raw material, components, and finished goods. Modern manufacturing companies use this kanban method to plan production in each production of the time. Toyota gives essential rules for kanban implementation:

- Shortening of setup time
- Minimize the production of defective items
- Defective items are not sent down the process
- Process standards are monitored regularly

4) **DYNISCO SENSOR MANUFACTURERS**

They are the leaders of the plastic extrusion processing and manufacturing. They were having issues with lead time and quality. To resolve the issues they incorporated the Kanban inventory system and SyncKanban for automation. Switching to this method the company reduces its inventory cost of about 40%.

5) **ORAL-B TOOTHBRUSH COMPANY**

Oral-B company is the largest producer of toothbrushes in the world. The main problem that they were facing is of packaging because they produce a large number of brushes as well as they are in different colors and styles. [12] That’s why they have to follow a different packaging line for each product. They divided the number of workers into three teams. First controls the movement of logistics, second the movement of materials from production to finished goods and third is for providing the data for these two. Finally, they concluded that implementing the e-Kanban brings more flexibility in their company towards meeting the changing demands of customers and also in the optimization of the process.

6) **Bajaj Steels Pvt. Ltd**

The Total time a swing liver takes in full completion is 22.11 minutes as per company records. [13] The need of kanban in the industry arises due to the inappropriate locations of various assembly and production areas. Drilling is done in some corners while assembling the parts is in another corner. Each time the product has to be carried manually this takes a lot of time and sometimes oversupply of products. The implementation of the kanban card system eliminates the oversupply of products and the use of a conveyor belt helps in quick transferring of parts.

7) **BLM Cylinder head cover manufacturers**

This company produces cylinder headcovers for the proton model. They use inline production and produces three product variants at a time. Once the product is completed it is moved towards the storage area. The forecasting of the demand is not done due to which the store occupies a large part of the floor. The company started facing difficulties in meeting the changing demand requirements and arranging the space for storage.

**CONCLUSION**

The kanban production system is very effective in terms of waste reduction. It also helps in the effective utilization of resources in the industry.extensions.

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Factors Influence on Usage of Information Systems in Small and Medium Sized Enterprises in Ambagamuwa Secretariat Division in Sri Lanka

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Abstract- Small and Medium Sized Enterprises (SMEs) do pivotal role in economy of a country. SMEs adapt to change business environments to overcome challenges faster than larger enterprises. The use of information systems (ISs) is very important factor to adapt in changing business environment. The majority of SMEs in Sri Lanka do not use ISs due to various reasons. Therefore, objective of this study is to identify factors influence on usage of ISs in SMEs. The research model was developed using independent variables of Manager Characteristics, Firm Characteristics, Cost, Infrastructure, External Pressure, Legal & Regulations and dependent variable of Use of ISs in SMEs. The administrative questionnaire was developed and data were collected from 100 SMEs in Ambagamuwa Secretariat Division in Sri Lanka using purposive sampling. The results revealed that Manager Characteristics, Firm Characteristics, Legal & Regulation and Cost were statistically significant on influence to use of ISs by SMEs while the Infrastructure Facilities and External Pressure were not statistically significant. SMEs have to be enlightened the advantages of use of ISs. The cost of technology has to be reduced. Further, the government has to consider the legal and regulation factors to influence the use of ISs by SMEs in Sri Lanka.

Key Words- Small and Medium Sized Enterprises, Manager Characteristics, Firm Characteristics, Legal & Regulation, Cost

1. Background of the Study

SMEs are seen as critical components in the economic growth of developing countries because they are a major source of income, promote entrepreneurship and provide employment. For this reason, considerable attention is paid to positioning SMEs to capture emerging business opportunities that have been created by the emergence of knowledge-based societies (Nandan, 2012). SMEs are considered key agents of social and economic growth and they are increasingly becoming the most vital part of the economy since they play a key role in fostering growth, creating jobs and reducing poverty (Namani, 2009).

ISs support the decision-making process of SMEs. ISs can provide a strategic role through using modern information technology to assist in the creation and growth of creative and unique products to SMEs that are hard to emulate. Activating the strategic role of ISs are important for providing organizational and technical requirements for information requirement of strategic information planning as an important resource to provide hardware and sophisticated systems ready for such strategic planning, like decision support systems (Zafar, Almaleh, Alshahri, Alqahtani, & Alqahtani, 2015).

SMEs adapt to the changing business environment and innovate to overcome challenges faster than larger enterprises, while being quick to change directions if the economic conditions change. However, it is difficult to retain these capabilities more and more without the adoption of Information and Communications Technologies (ICT) to support their business processes. It has been often said that ICT empower SMEs to overcome the competitive disadvantages that they face due to small size, limited resources, geographical locations and access to market (Bose, 2011).

In spite of the potential benefits of ICT, found that the adoption and use of these technologies have been challenging and slow (Bose, 2011). The study of Munasinghe (2015) emphasize that use of ISs are not success in every context due to various reasons. Further, the study stated that the reasons of use of ISs are not clear due to various reasons. More, Munasinghe & Munasinghe (2015) mentioned that the growth of SMEs with the technology is in Sri Lankan context unclear. Therefore, knowing the reasons of not using ISs by SMEs are important for an economy of a country and hence the objective of the study is to find out the factors influence on usage of ISs in SMEs in Ambagamuwa Secretariat Division in Sri Lanka.

Next section of the study reviews the literature relating to the reasons of using ISs by organizations. Then it describes the methodology, which was used to do the study. Then provides the
results of data analysis in detail and final section conclude the study along with the implications of the study by providing avenues for the future research.

II. Literature Review

The study of Jayasinghe & Wijayayakhe (2013) mentioned that there is no universal definition for SMEs. SMEs definition can differ among different countries as well as within the country. There are mainly three criteria used to define SMEs that is Number of employees, Annual turnover and Asset value. Based on the research study of the Munasinghe and Munasinghe (2015) there were various kind of terms for address SMEs. They were rural enterprises, micro enterprise, Small and medium industries, small and medium activities cottage and small-scale industries etc. SMEs defined as variation of ways by several countries, various government agency, institutes and non-governmental organization (NGO) using different parameters; such as amount of capital invested, number of persons employed, amount of turnover, nature of business etc.

The World Bank define enterprise size in Sri Lanka based on the number of employees: those with fewer than 49 employees are small; those with 50-99 employees are medium sized; and those with more than 100 employees are large. A more recent World Bank survey on Sri Lanka records approximately one million people working in the manufacturing sector while the Survey of Industries finds around 400,000 working in establishments employing 25 or more workers. These numbers suggest that SMEs contribute substantially to employment and income generation (Kapurubandara & Lawson, 2006).

ICT has brought about changes in the way businesses are conducted among SMEs as they play a major role in storing, retrieving, processing and disseminating information. ICT tools can significantly assist SMEs by supplying the required infrastructure, which is necessary for providing appropriate types of information at the right time (Olise, Anigbogu, Edoko, & Okoli, 2014). Factors related to the CEO’s knowledge of ICT, innovativeness, experience and active participation in the implementation of significant systems in the firm. The factors identified for use of ISs were separated into two main categories: owner/manager characteristics, with the addition of return on investment as an influencing factor (Akkeren & Cavaye, 1999). Thong (1995) examined 166 small businesses that adopted ICT and found that managers who are highly innovative and have a positive attitude toward ICT together with a skilled ICT background are more likely to be successful in adopting ICT. In addition, the study describes two main categories of factors influencing ICT adoption in small businesses. They were individual characteristics (CEO innovativeness, attitudes towards adoption of ICT and ICT knowledge) and organizational characteristics (business size, competitiveness of environment, information intensity).

According Akkeren & Cavaye (1999) to financial issues were vitally important to owner/managers and often drive technology adoption in small firms. An innovative small business owner may recognize all the benefits to his firm in adopting ICT in terms of both a short or long-term investment. Bose (2011) highlighted of his study financial commitment includes both direct and indirect costs were important for ISs usage. Direct costs include initial cost of software and hardware, the cost of training personnel and maintaining the system. The indirect costs can have longer impacts and are often unforeseen by owner/managers of small businesses due to lack of experience with enterprise IT project.

The study of Ladokun, Osunwole & Olaoye (2013) revealed that infrastructure was one of the factors that inhibit ICT adoption by SMEs. Thong (1999) mentioned that Small businesses typically have less slack resources with which to absorb the shocks of an unsuccessful investment in ISs adoption. According to Kapurubandara & Lowson (2006) Lack of telecommunication infrastructure includes poor internet connectivity, lack of fixed telephone lines for end user dial-up access and the underdeveloped state of Internet Service Providers were the factors that hinder to adopt ICT in SMEs in developing countries. External pressure like pressure from business trading partners is one of the important predictor that has strong influence on adoption of ICT. Lacking of pressure from their trading partners, the business owner may perceived the technology as a waste of resources (Thong, 1995). Environmental factors include markets, competitive pressures, government rules and regulations, external ICT advice, and pressure from suppliers, vendors, partners and customers make reasons not to adopt ISs by SMEs. The adoption and utilization of ICT increases if trading partners and customers use the new technology (Elbeltagi & Elsetouhi, 2013).

According to Ladokun, Osunwole & Olaoye (2013) government should enabling environment for SMEs to integrate ICT into their operations in order for them to access global markets. According to Namani (2003) the commitment of the government is reflected in its steadily increasing investment in information technology. The government should be involved in providing environment to support and help SMEs to better use of information technology and increase the countries competitiveness, productivity and growth through investment in information technology, e-business and new business models.

Alam and Noor (2009) examined the relationship between ICT adoption and its five factors, which were perceived benefits, perceived cost, ICT knowledge, external pressure and government support. According to Kapurubandara & Lawson (2006) revealed that the SMEs were hesitant to invest probably due to fear of changing policies to suit changes of government. The study of Munasinghe (2015) highlighted that the factors behind the use of ISs were information quality, system quality and user quality that are factors of ISs.

Based on the above literature review the study identified the factors that influences to use ISs were Owner/Manager Characteristics, Firms’ Characteristics, Cost, Infrastructure, External Pressure and Legal & Regulations. Further, the study focuses the following research model with the six hypotheses (H1 to H6).

H1: There is a positive effect of Manager Characteristics to Use of ISs by SMEs in Ambagamuwa divisional Secretariat area.

H2: There is a positive effect of Firms’ Characteristics to Use of ISs by SMEs in Ambagamuwa divisional Secretariat area.

H3: There is a negative effect of Cost to Use of ISs by SMEs in Ambagamuwa divisional Secretariat area.

H4: There is a positive effect of Infrastructure to Use of ISs by SMEs in Ambagamuwa divisional Secretariat area.

H5: There is a positive effect of External Pressure to Use of ISs by SMEs in Ambagamuwa divisional Secretariat area.

H6: There is a negative effect of Legal & Regulation to Use of ISs by SMEs in Ambagamuwa divisional Secretariat area.

III. Methodology

The researcher first read the relevant literature regarding ISs usage of SMEs and found that many SMEs do not use ISs at a satisfactory level. Then, the research model was developed considering empirical support of previous research studies and six hypotheses were formulated accordingly. A comprehensive questionnaire was developed getting help from using previous research studies and data were collected using purposive sampling method from SMEs in Ambagamuwa secretariat division. SMEs were categorized into food and beverage, textiles and foot wares, furniture and statues, services and others. Sample size was selected as 100 SMEs. Researcher selected 47 food and beverage SMEs, 20 textiles and foot ware SMEs, 15 furniture and statues and 9 Services and 9 other SMEs.

The questionnaire consists of two sections to address the research objectives of the study. Part A consists of questions regarding demographic characteristics of position of the respondent, type of organization, type of the business, and number of employees, how long organization was established. Part B consists of questions relevant to the research variables as shown in the research framework. Pearson correlation analysis and multiple regression analysis were used to identify relationship between independent and dependent variables and to test the hypotheses. Demographic factors were analyzed using descriptive analysis. A statistical tool such as reliability test (Cronbach’s Alpha value) was used to measure the reliability.

IV. Results and Discussion

There were six independent variables were used to investigate the dependent variable of SMEs. Table 1 demonstrates Cronbach’s Alpha values of the research variables with the number of questions. All the alpha values are above seven (07) and ranging from 0.720 to 0.847. It indicates that the results of interpretations of the variables were reliable. The highest value is 0.847 for the independent variable Cost for the ISs usage and lowest value is 0.720 for Firm’s Characteristics of SMEs.

Table 1 - Cronbach's Alpha Values

<table>
<thead>
<tr>
<th>Variables</th>
<th>Cronbach’s Alpha</th>
<th>No. of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manager characteristics</td>
<td>0.831</td>
<td>5</td>
</tr>
<tr>
<td>Firm characteristics</td>
<td>0.720</td>
<td>7</td>
</tr>
<tr>
<td>Cost</td>
<td>0.847</td>
<td>4</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>0.744</td>
<td>3</td>
</tr>
<tr>
<td>External Pressure</td>
<td>0.782</td>
<td>3</td>
</tr>
<tr>
<td>Legal &amp; Regulations</td>
<td>0.840</td>
<td>3</td>
</tr>
<tr>
<td>Usage of ISs</td>
<td>0.748</td>
<td>4</td>
</tr>
</tbody>
</table>

The Table 2 describes descriptive statistics of responses of respondents related with independent and dependent variables of the study. Almost all the mean values of the research variables were relatively high and above three (3). The mean values of the variables were ranging from 3.863 to 4.733; the standard deviation values are ranging from 0.417 to 0.546. Maximum mean was having the External Pressure to use of ISs (4.733) and lowest mean value is having Firm Characteristics (3.863) to use of ISs by SMEs.

Table 2 - Descriptive Statistics for Research Variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manager Characteristics</td>
<td>4.632</td>
<td>0.444</td>
</tr>
<tr>
<td>Firm Characteristics</td>
<td>3.863</td>
<td>0.459</td>
</tr>
<tr>
<td>Cost</td>
<td>4.715</td>
<td>0.417</td>
</tr>
<tr>
<td>Infrastructure</td>
<td>4.240</td>
<td>0.536</td>
</tr>
<tr>
<td>External Pressure</td>
<td>4.733</td>
<td>0.418</td>
</tr>
<tr>
<td>Legal &amp; Regulation</td>
<td>4.467</td>
<td>0.447</td>
</tr>
<tr>
<td>Usage of ISs</td>
<td>4.245</td>
<td>0.546</td>
</tr>
</tbody>
</table>

Correlation and Regression Analysis of the Research Variables

According to Table 3, Pearson correlation values are 0.236, 0.314, -0.078, 0.013, 0.182, and -0.228 for the constructs Manager Characteristics, Firm Characteristics, Cost, Infrastructure, External Pressure, Legal & Regulation with the usage of ISs and significant values are 0.018, 0.001, 0.038, 0.900, 0.070 and 0.022 in respectively. The results represents that only the constructs Manager Characteristics, Firm Characteristics, Cost, and Legal & Regulation were statistically significant with use of ISs by SMEs in Ambagamuwa secretariat division in Sri Lanka. Therefore according to the Pearson
correlation values the hypothesis H1, H2, H3, H6 were accepted and H4 and H5 were rejected.

Table 3 - Correlation Analysis (Pearson Correlation Value, (Sig. value))

<table>
<thead>
<tr>
<th>Variable</th>
<th>MC</th>
<th>FC</th>
<th>C</th>
<th>I</th>
<th>EP</th>
<th>LR</th>
<th>UIss</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manager Characteristics</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Firm Characteristics (FC)</td>
<td>-0.110</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost (C)</td>
<td>0.491**</td>
<td>-0.069</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Infrastructure (I)</td>
<td>0.140</td>
<td>0.090</td>
<td>0.245*</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External Pressure (EP)</td>
<td>0.054</td>
<td>0.288*</td>
<td>0.033</td>
<td>-0.027</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Legal &amp; Regulation (LR)</td>
<td>-0.069</td>
<td>-0.172</td>
<td>-0.205*</td>
<td>-0.219*</td>
<td>-0.120</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Usage of ISs (UIss)</td>
<td>0.236*</td>
<td>0.314**</td>
<td>-0.078*</td>
<td>0.013</td>
<td>0.182</td>
<td>-0.228*</td>
<td>1</td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed)
* Correlation is significant at the 0.05 level (2-tailed)

Table 4 display the output of regression analysis. Hence, Adjusted R-Square value is 0.466, which means 46.6% of the variation in influence to use of information systems can be explained by the constructs of Manager Characteristics, Firm Characteristics, Cost, Infrastructure, External Pressure, and Legal & Regulation. The Durbin-Watson statistic of 1.585 is not too far from 2. The p-value from the ANOVA table is 0.000 which less than 0.001, which means that at least one of the six variables: Manager Characteristics, Firm Characteristics, Cost, Infrastructure, External Pressure, Legal & Regulation can be used to model use of ISs by SMEs. The VIF values are below 5, indicating that there is no problem of multicollinearity.

Table 4 - Regression Analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>B</th>
<th>Sig</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>3.413</td>
<td>0.005</td>
<td></td>
</tr>
<tr>
<td>Manager Characteristics</td>
<td>.490</td>
<td>.000</td>
<td>1.339</td>
</tr>
<tr>
<td>Firm Characteristics (FC)</td>
<td>.341</td>
<td>.003</td>
<td>1.152</td>
</tr>
<tr>
<td>Cost (C)</td>
<td>-.378</td>
<td>.006</td>
<td>1.419</td>
</tr>
<tr>
<td>Infrastructure (I)</td>
<td>-.044</td>
<td>.648</td>
<td>1.115</td>
</tr>
<tr>
<td>External Pressure (EP)</td>
<td>.079</td>
<td>.519</td>
<td>1.113</td>
</tr>
<tr>
<td>Legal &amp; Regulation (LR)</td>
<td>-.260</td>
<td>.026</td>
<td>1.120</td>
</tr>
</tbody>
</table>

Adjusted R Square = 0.466, ANOVA Sig. = 0.000, F = 5.615, Durbin-Watson = 1.585

Predictors: (Constant),MC, FC, C, I, EP, LR Dependent Variable: UIss

Table 5 - Summary of hypotheses testin

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Correlation Analysis</th>
<th>Regression Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1</td>
<td>Supported</td>
<td>Supported</td>
</tr>
<tr>
<td>H2</td>
<td>Supported</td>
<td>Supported</td>
</tr>
<tr>
<td>H3</td>
<td>Supported</td>
<td>Supported</td>
</tr>
<tr>
<td>H4</td>
<td>Not Supported</td>
<td>Not Supported</td>
</tr>
<tr>
<td>H5</td>
<td>Not Supported</td>
<td>Not Supported</td>
</tr>
<tr>
<td>H6</td>
<td>Supported</td>
<td>Supported</td>
</tr>
</tbody>
</table>

V. Conclusion and Recommendation

Role of SMEs is very important for economy of a country. Use of ISs improves the functions of SMEs in competitive and changing business environment. Most of SMEs do not use ISs at satisfactory level due to various reasons. Therefore, the study focuses the factors behind the influence to use of ISs in Ambagamuwa secretariat division in Sri Lanka.

The identified factors of the study to influence to use of ISs by SMEs were Manager Characteristics, Firm Characteristics, Cost, Infrastructures, External Pressure, Legal and Regulations. The research model was developed using above factors as independent variables and Use of ISs as dependent variable. Using an administrative questionnaire data were collected using purposive sampling. Among the factors, only Manager Characteristics, Firm Characteristics, Cost, Legal and Regulations were statistically significant to use of ISs by SMEs.
in Ambagamuwa secretariat division. SMEs have to be enlightened the advantages of use of ISs and the same time the cost for technology is to be used in SMEs has to be reduced by the relevant stakeholders. The government has to consider the legal and regulation factors to influence the use of ISs by SMEs in Sri Lanka.

According to the analysis, only a 46% explain the variances of independent variables by influence to use of ISs in Ambagamuwa secretariat division. This implies that more research variables such as perceived usefulness, perceived ease of use, information quality, system quality and user quality etc. have to be considered to identify the factors, which influence to use of ISs, by SMEs. Further, more samples have to be considered which are covering all secretariats divisional in Sri Lanka to generalize the results in local context.

VI. References


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The Relationship Between Homocysteine Levels With The Degree of Severity In Patients With Acute Phase Ischemic Stroke At Haji Adam Malik General Hospital Medan

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Abstract:

Background: Elevated homocysteine levels are an independent risk factor for ischemic stroke patients. Besides being an independent risk factor, homocysteine is also a factor that affects the prognosis of stroke, but the results are still controversial.

Objective: To Determine the relationship between homocysteine levels with the degree of severity in patients with acute phase ischemic stroke.

Methods: An analytical study with cross sectional design, involving 45 acute phase ischemic stroke patients who were hospitalized in the stroke corner room at Haji Adam Malik General Hospital, Medan. Homocysteine levels are grouped into 2 categories, namely high homocysteine levels (> 15 μmol / l) normal (≤15 μmol / l). The severity of acute phase ischemic stroke was examined using National Institute of Health Stroke Scale (NIHSS).

Results: Acute phase ischemic stroke patients have homocysteine levels of at least 4.4 μmol/l and maximum 24.1 μmol / l with average 11.5 μmol / l. 34 peoples (75,6%) suffers mild stroke and 11 people (24,4%) with moderate stroke. The logistic regression test results showed homocysteine levels were related to the severity of acute phase ischemic stroke. This means that acute phase ischemic stroke patients who have high homocysteine levels are estimated as predictors to increase the risk of acute phase ischemic stroke severity by 6,960 times compared to normal homocysteine levels (p = 0.005; OR = 6,960; 95% CI; 1,523-31,811).

Conclusions: Homocysteine levels show a strong relationship with the severity of acute phase ischemic stroke.

Index term- Homocysteine levels, acute phase ischemic stroke, NIHSS

I. Introduction
Stroke is a clinical sign that develops rapidly due to focal (or global) brain disorders with symptoms that last for 24 hours or more and can cause death without any other obvious cause other than vascular. Each year there are 795,000 peoples diagnosed with First or recurrent stroke. Approximately 610,000 of the population are patients with the first stroke and 185,000 are patients with recurrent stroke.

Countries in the Asian, Russian and Eastern European regions experience the highest mortality rates and disabilities due to stroke. In China, the incidence of stroke is expected to increase dramatically due to a combination of an aging population and high prevalence of smoking and hypertension.

Mortality rates in ASEAN countries are more varied. Data from the South East Asia Medical Information Center (SEAMIC) shows that stroke is the number four cause of death in ASEAN countries since 1992, number one is Indonesia, second are the Philippines and Singapore, third are Brunei, Malaysia and Thailand.

Data from Basic Health Research (Riskesdas) in 2007 showed that stroke is the leading cause of death at all ages with percentage of 15.4%. Every 7 people who died in Indonesia, 1 of them due to a stroke. Riskesdas (2013) data reported the prevalence of stroke in Indonesia was 7.0 per 1,000 population. This number has increased from 2007 with a prevalence of 6 per 1,000 population.

Patient who has stroke will experience a rapid decline in some functions of the brain because there is an interruption of blood supply to the brain. In general, NSA (National Stroke Association) USA divides the stroke into ischemic stroke and Hemorrhagic stroke. Ischemic stroke can be caused by three mechanisms, namely thrombosis, embolism, and reduction of overall systemic perfusion that causes hypoxia, where thrombosis and embolism are based on atherosclerotic plaque.

there are several conventional risk factors due to abnormalities in the brain vessel wall, including: genetic, stress, hypertension, smoking, hyperlipidemia, and Diabetes Mellitus (DM). In recent years there is independent risk factor that holds an important role in the occurrence of abnormalities of blood vessel walls, namely homocysteine. Homocysteine is an amino acid that has a sulfur group involved in the methionine cycle, namely in the remetilation pathway and the transulfuration pathway. The function of this cycle is to donate the required methyl groups to various body molecules and the synthesis of glutathione.

Total Normal Homocysteine concentration (tHcy) ranges from 5-15 μmol / L in the fasting state. Hyperhomocysteinemia (HHcy) are classified as moderate (plasma tHcy concentration 15–30 μmol / L), intermediate (plasma tHcy concentration 31–100 μmol / L), and high (plasma tHcy concentration > 100 μmol / L). genetic factors can have an impact on plasma tHcy. Sex, aging, smoking, impaired kidney function, and some drugs such as corticosteroids and cyclosporine are some examples of acquired causes. C677T homozygous mutation of 5.10 Methylene Tetra Hydro Folate Reductase (MTHFR) is the main genetic factor.

Several studies reported that high tHcy is a strong and independent risk factor for vascular disease including cerebral ischemic stroke in 109 young Asian adults (Chinese, Indian, and Malay) with ischemic stroke and had strong association between increased Hcy and ischemic stroke (OR = 5.17, 95% CI: 1.96–13.63, p = 0.001). Other studies of 120 Indian patients with acute ischemic stroke and reported that there was a significant relationship between HHcy and ischemic stroke (p = 0.001).

Research results in the Krishna District, Andhra Pradesh, India conclude that increased serum homocysteine is a strong and modifiable risk factor for cerebral ischemic stroke. Many studies show the importance of the development of complications such as cardiac vascular and cerebral ischemic stroke. The results of this study support the consideration of serum homocysteine as a marker of routine screening. The results from research in Iran, conclude that high levels of Hcy is an independent risk factor for ischemic stroke patients living in the Iranian province of Fars. In addition, there is a significant relationship between increased levels of Hcy and the risk of death.
Beside from being an independent risk factor, homocysteine is also investigated as a factor affecting the prognosis of stroke, but the results are still controversial and inconsistent.\textsuperscript{22,23}

The aim of this study is to determine the relationship between homocysteine levels with the degree of severity in patients with acute phase ischemic stroke at Haji Adam Malik General Hospital, Medan.

II. Method

This research is an analytic study with cross sectional design. The study was conducted from September to November 2018. The population were all patients suffering acute phase ischemic stroke who were hospitalized in the stroke corner room at the Haji Adam Malik General Hospital, Medan. The sample in this study is 45 people. Homocysteine serum were examined using Abbott Architect Plus C1 4100. The severity of ischemic stroke is examined using National Institute of Health Stroke Scale (NIHSS). Data were analyzed using logistic regression tests with confidence level 95\% (\(\alpha = 0.05\)).

III. Result

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Total</th>
<th>(%)</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>33-47 years</td>
<td>7</td>
<td>15,6</td>
<td>55,4</td>
</tr>
<tr>
<td>48-62 years</td>
<td>25</td>
<td>55,5</td>
<td></td>
</tr>
<tr>
<td>63-77 years</td>
<td>13</td>
<td>28,9</td>
<td></td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Woman</td>
<td>17</td>
<td>37,8</td>
<td></td>
</tr>
<tr>
<td>Man</td>
<td>28</td>
<td>62,2</td>
<td></td>
</tr>
<tr>
<td>Homocysteine Level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal ((\leq 15\ mmol/l))</td>
<td>34</td>
<td>75,6</td>
<td>11,5</td>
</tr>
<tr>
<td>High ((&gt; 15\ mmol/l))</td>
<td>11</td>
<td>24,4</td>
<td></td>
</tr>
<tr>
<td>Stroke Severity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mild Stroke (Skor 1-4)</td>
<td>34</td>
<td>75,6</td>
<td>4,6</td>
</tr>
<tr>
<td>Moderate Stroke (Skor 5-15)</td>
<td>11</td>
<td>24,4</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>45</td>
<td>100,0</td>
<td></td>
</tr>
</tbody>
</table>
IV. Discussion

The results found that patients with acute phase ischemic stroke have a minimum age 33 years and a maximum 77 years with average age 55.4 years (± 11.2). The largest age group is 48-62 years, which is 25 people (55.5%) then followed by the 63-77 years age group, which is 13 people (28.9%) and 6 people (15.6%) 33-47 years age group. The results of this study are not much different from the research in the Neurosurgery Inpatient at Dr. Kariadi Hospital Semarang, who concluded that the mean age of patients after ischemic stroke was 52.97 (± 10.2) years.24

The National Stroke Association says that stroke can happen to anyone, the incidence of stroke has almost doubled after passing the age of 55.25 This is due to the more oxidative stress and the wider process of atherosclerosis that occurs, thus weakening overall body functions mainly related to flexibility blood vessel. Entering the age of 50 years, the risk of stroke is doubled every age increases by 10 years.26 However, stroke can also occur at a young age one of the causes is the existence of cardiac abnormalities that result in embolization.27

Incidence of Patients with acute phase ischemic stroke is higher in men than woman, as many as 28 people (62.2%) are men, the rest are women, as many as 17 people (37.8%). The results of this study are not much different from the research at Dr. Kariadi General Hospital, Semarang, who concluded that the incidence of stroke in men was higher than in women.28

Patients with acute phase ischemic stroke have minimum homocysteine level of 4.4 μmol / l and a maximum of 24.1 μmol / l with average homocysteine level 11.5 μmol / l and there are 34 people (75.6%) with normal homocysteine level. Homocysteine levels more than 15 μmol / l were defined as hyperhomocysteinemia.

The results of this study are not much different from studies in Iran concluding that the mean serum homocysteine level of all patients was less than (12.99 ± 5.6 μmol / L) and only 27.6% hyperhomocysteinemia. Whereas studies in India found as many as 60.6% of stroke patients with hyperhomocysteinemia.23,30

Acute phase ischemic stroke were assesed by NIHSS, there are 34 (75.6%) peoples who has mild ischemic stroke and 11 (24.4%) with moderate ischemic stroke. Minimum NIHSS score were 2 and maximum score were 8 with mean of NIHSS score were 4.6.

The results of this study are not much different from the research at Dr. Moewardi General hospital Surakarta concluded that as many as 30 people (76.7%) had NIHSS score ≤ 6 (mild stroke). While 7 people (23.3%) had NIHSS score > 6 (stroke).31

Chi square test results obtained p value <0.05, this result shows that there is a relationship between homocysteine levels with the severity of acute phase ischemic stroke (OR = 1.8876; 95% CI = 0.968-3.639), this means that patients with high homocysteine levels (> 15 μmol / l) have estimated 1.88 times risk of suffering acute phase ischemic stroke. And logistic regression analysis found that acute phase ischemic stroke patients who have high homocysteine levels (> 15 μmol / l) increase the risk of stroke severity 6.960 times compared with normal homocysteine levels (p = 0.005; OR = 6.960; 95% CI 1.523 -31.811). OR =

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6.960 shows a strong relationship between the levels of homocysteine and the severity of acute phase ischemic stroke.

The results of this study are not much different with the results of a study of 109 Asian adults (Chinese, Indian, and Malay) finding a strong relationship between increased homocysteine levels and ischemic stroke (OR = 5.17, 95% CI: 1.96–13.63, p = 0.001).18 Meanwhile, the results of studies in India with 120 patients with acute ischemic stroke showed that there was a significant relationship between levels of homocysteine and ischemic stroke (p = 0.001).19

The limitation of this study is that the evaluation of homocysteine levels was not measured before the acute phase ischemic stroke occurs, so it cannot be compared with the acute phase ischemic homocysteine levels.

V. Conclusion

Homocysteine levels have strong relationship with the severity of acute phase ischemic stroke. This means that acute phase ischemic stroke patients who have high homocysteine levels are estimated to increase the risk of the severity of acute phase ischemic stroke 6,960 times compared with normal homocysteine levels (p = 0.005; OR = 6.960; 95% CI: 1.523–31.811). OR value = 6.960 shows a strong relationship between the levels of homocysteine and the severity of acute phase ischemic stroke.

VI. Reference


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Cloud Computing Adoption by Public Hospitals in Kenya: A Technological, Organisational and Behavioural Perspective

Billy Ogwel*, Gabriel Otieno*, George Odhiambo-Otieno*

* Department of Information Sciences, Rongo University

Abstract- Cloud computing has emerged as a technological paradigm to reduce Information Technology costs, foster collaboration while increasing productivity, availability, reliability, flexibility and minimizing response times. Despite cloud computing offering numerous benefits to the health sector, there are only few successful implementations. Adoption is slower in healthcare sector compared to other industries. Furthermore, there is little concerning the adoption and benefits of cloud computing in Kenyan healthcare sector. This study integrated the Technological Acceptance Model, Technology-Organization-Environment model and the Theory of Planned Behaviour to provide a richer theoretical lens for assessing factors affecting cloud adoption. This study sought to determine the influence of technological, organisational and behavioural contexts in cloud computing adoption. The target population for this study were 114 healthcare personnel (facility in-charges and health records and information officers) in Public hospitals. The study employed a cross sectional survey in one-time data collection using questionnaires from sampled personnel. Logistic regression was used to establish the correlation between the projected factors and adoption of cloud computing, and to show the strength of this relationship. The cloud computing adoption prevalence was at 58% among public hospitals. In terms of cloud computing service models among adopters, Software-as-a-Service was at 100%, followed by Platform-as-a-Service at 5% while none had implemented Infrastructure-as-a-Service. The study found out that technological readiness, service quality, expert scarcity, top management support, firm size, perceived usefulness, perceived ease of use and social influence have a significant effect on cloud computing adoption. The findings from this study will help healthcare organisations to better understand what affects cloud computing adoption and to guide them in the adoption process. Cloud computing providers can also use the findings of this work to address areas of concern thereby offering products and services that have the confidence of healthcare institutions in Kenya.

Index Terms- Adoption, Cloud computing, Hospitals, Kenya, Technology-Organization-Environment

1. INTRODUCTION

Organizations are under increasing pressure to cut on costs, increase profitability and improve productivity in order to remain relevant in a dynamic business environment [1]. The Healthcare industry is also evolving towards a consumer driven approach to care and the need for greater collaboration [2] [3]. Cloud computing has emerged as a major technological innovation to reduce information technology (IT) costs, foster collaboration while increasing productivity, availability, reliability, flexibility and minimizing response times [4] [5]. Cloud computing is therefore an effective platform for healthcare organizations to leverage so as to remain germane.

Cloud computing is the on-demand delivery of network access to a shared pool of configurable computing resources-data storage, networks, servers, applications and services-with minimal management effort or provider interaction [6]. The healthcare sector can greatly benefit from cloud computing. Healthcare organizations can use cloud computing to achieve cost saving and scalability. Cloud computing provides for pay-for-use computing resources that supports the shift from capital-intensive technology investments to operational costs. When a cloud infrastructure is introduced in an enterprise, majority of the IT tasks is shifted to providers, according to IBM IT labor costs is reduced by 50%. Energy costs for small business is also reduced by 90% [7]. Cloud computing can also be leveraged to support data driven healthcare delivery, enhance collaboration between different stakeholders and support patient and family-centered care models. Collaboration is vital to the healthcare industry; by allowing professionals to store and access data remotely; healthcare professionals around the world can gain access to patient data immediately and offer care immediately. In addition, cloud computing allows remote conferencing, up-to-the-second updates on healthcare developments and patient conditions; which enhance collaboration and care quality [8]. Data analytics has a great potential to support clinical decision-making, enhance patient safety and enable continuous learning process in the care delivery process. However, traditional IT network platforms may not easily fulfil the computational capabilities and flexibility it demands. Healthcare providers can turn to cloud computing for...
scalable storage capacity, greater processing power and timely access [9].

Cloud computing can therefore be an effective platform for healthcare organizations to leverage, in light of the evolution of healthcare industry towards a consumer driven approach to care and the need for greater collaboration. It has however not yet placed a significant footprint in the healthcare sector in Kenya and the decision to adopt a cloud-computing model is often complicated by challenges and uncertainties about the expected business value related to the new technology [10].

The global healthcare cloud computing market is expected to reach $9.48 billion by 2020 up from $3.73 Billion in 2015 [11].This market is expected to be dominated by North America, followed by Europe, Asia, and the Rest of the World. Cloud computing and storage infrastructure is growing at an annual rate of 33% worldwide [12]. Review of publications on cloud computing at the global scene has revealed that research on the Adoption aspect was only at 10% compared to the Technology aspect that stood at 85%; this was explained that cloud computing being a new paradigm is facing many technological challenges [13].However more research efforts are needed to address this worrying gap. Health Information Management Systems survey [14] found out that 83% of IT healthcare organizations in the USA are using cloud services with SaaS being the most popular service model at 67%; however an earlier survey found Healthcare sector to be ranked 7th out of Eight industries in cloud adoption, just ahead of State and local government.

Cloud computing, in Europe, has evolved substantially; becoming more robust, secure, open and interoperable. However, the uptake in the European Healthcare sector has been slow; mainly due to a fragmented regulatory framework and security concerns. The fragmented regulatory framework has led to significant differences among European Union (EU) countries concerning cloud computing adoption. Denmark, Sweden, Finland, Austria and Estonia have been much more open to remote storage and archiving of patient data than the Leading EU economies; France, Britain and Germany. Nordic countries lead in terms of cloud computing market maturity in the healthcare sector; the Netherlands, Estonia and Austria are in maturation phase while Belgium, France, Germany, Italy, Spain, Switzerland and Britain are emerging markets; each progressing at a different speed [9].The EU healthcare sector has a higher adoption in primary care and outpatient settings than in acute care. This is mainly due to the need to host basic IT functions like scheduling, administration and billing and patient records.

Researchers have indicated that actual adoption depends on sector and enterprise size because of the different features and security levels they need and that cloud adoption studies should be industry specific [15] [16] [17]. Healthcare sector has also been slower to adopt cloud computing compared with other industries as was seen in USA and Europe [9]. The adoption has been slowed by inadequate communication infrastructure, security concerns and a fragmented regulatory framework [9].Despite the growing interest in cloud computing in healthcare only, few successful implementations yet exist [18].

The prevalence of cloud computing in Kenya is at 48% for Medium and Large business [19].A survey by Communications Authority and Kenya National Bureau of Statistics found out that 35.6% of public sector institutions use cloud computing services compared to 22.9% of private ventures [20]. Despite the cloud computing adoption accelerating, majority of public institutions and private businesses are not on the cloud. The survey found out that most businesses and public sector did not have a cogent plan of adopting cloud computing. It further shows that the biggest drawback was lack of knowledge; 53.1% of public institutions not on the cloud and 37.1% of private businesses reported insufficient knowledge about cloud services. Cost, a poor regulatory framework and security concerns were also cited as hurdles.

As the quantity of electronically generated information in healthcare increases, so does the need to be able to store, access and share that data in an increasingly mobile world [21]. Deciding how and where to store healthcare information, while allowing secure, easy and shared access to that data, has been a persistent problem. The acceptance of a person-centered care model within healthcare has necessitated the need for shared access to the information in a person’s electronic health record.

Cloud computing adoption processes faces a number of challenges; technological uncertainty, software functionality, demand uncertainty, organizational influence, importance of IT applications and integration [22].Legal hurdles, the possibility of organizational transition, cost benefit evaluation drawbacks and the choice of cloud vendors are other impediments that have to be solved [23].There is need to understand the determinants, hurdles and challenges involved in the adoption of cloud computing. Cloud computing adoption in Kenya has been looked at in certain sectors; insurance companies in Nairobi [24], Kenyan Universities [25] and Tech industries in Nairobi [26]. However, there is limited research within the Kenyan healthcare sector and because of the sector specific-nature of cloud computing adoption, there exists a gap in the healthcare sector that this study sought to close by addressing the determinants of cloud computing adoption in the healthcare industry within Kisumu County. The aim of this study was to determine the prevalence of cloud computing and the factors (technological, organizational and behavioural) affecting cloud computing adoption among public hospitals in Kisumu county, western Kenya.

2. Literature Review
2.1 cloud computing
Cloud computing is offered using three standard models; Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure as a Service (IaaS) [27].SaaS entails the consumer using provider applications over a cloud infrastructure through either a program interface or a client interface like a web browser. PaaS involves the consumer deploying consumer created or acquired applications created using programming languages, libraries, tools and services supported by the provider over a cloud infrastructure managed by the provider. IaaS involves the consumer accessing, processing, storage, networks and other computing resources over which they can deploy and run software like operating systems and applications.
Cloud computing can be deployed as a Private cloud, Public cloud or Hybrid cloud. Private cloud refers to a cloud infrastructure run solely for an organization while a public cloud refers to cloud infrastructure rendered over a network that is open to the public and Hybrid cloud refers to a combination of two or more clouds offering the benefits of multiple deployment methods but remain distinct entities [28].

Cloud computing offers healthcare organizations an array of benefits; economic, operational and functional benefits. The economic benefits of cloud computing include cost flexibility and the potential for reduced costs. Heavy capital expenditure can be avoided, since IT; resources are acquired on demand as needed and paid for on a pay-per-use basis. Also, the cost of personnel resources required to deploy and maintain IT resources are included in the cost of cloud computing. Therefore, the need for additional healthcare provider skilled IT staff resources and related costs are reduced when using cloud services for IaaS and PaaS platforms but even more so for SaaS solutions where the cloud provider takes majority of the responsibility [29] [30].

From an operational outlook, cloud computing offers scalability and the ability to adjust to demand rapidly. Cloud computing offers better security and privacy for health data and health systems. Cloud service provider data centers are highly secure and well protected against outsider and insider threats using administrative, physical and technical methods implemented and maintained by expert professional staff. Cloud computing offers sophisticated security controls, including data encryption and fine-grained access controls and access logging. Medical systems built using cloud services can provide web access to data, avoiding the need to store information on client devices. The need for scarce IT security skills within the healthcare organization also is minimized. Cloud service providers typically operate on such a scale that they have all the necessary IT skills, with the costs of those skills spread across many customers [29].

In terms of functional perspective, cloud-based healthcare IT systems offer the potential for broad interoperability and integration. Healthcare cloud services are internet-based and generally use standard protocols, so connecting them to other systems and applications is typically straightforward. The critical capability of cloud computing to share information easily and securely enhances collaboration. Cloud computing offers remote access to applications and data via the Internet to enable access at anytime from anywhere [29].

2.2 Conceptual Framework
This study draws from the integrated Technology-Organization-Environment (TOE), Technological Acceptance Model (TAM) and Theory of Planned Behavior (TPB) frameworks to study the adoption of cloud computing by public hospitals in Kisumu, Western Kenya. Accordingly we looked at the influence of technological, organizational and behavioral contexts on the adoption of cloud computing. The TAM constructs of individual different factors, perceived trust and perceived service quality were integrated into TOE as well as the Behavior control and Social Influence to provide a richer theoretical lens for understanding cloud computing adoption as shown in Figure 1.

2.2.1 Technological context
Technological context refers to internal and external technologies that health organizations can use in their operations [31]. External technologies are those that are available in the market but are not used by the organization while internal technologies are those in use by the organization. Technological context has three constructs: technological readiness, service quality and expert scarcity.

Technological readiness refers to availability of infrastructure and human resource which influence adoption of new technology [31] [32]. Infrastructure refers to installed network technologies and enterprise systems that provide a platform on which cloud computing can be built while human resource refers to knowledge and skills needed to implement cloud computing. Service Quality refers to the customer’s perception of the overall quality or superiority of a service with respect to its intended purpose. It is a reflection of cloud computing in the eyes of the client’s. Expert Scarcity refers to lack of qualified and reputable IT professionals in the cloud service market.

2.2.2 Organisational context
The organizational context refers to the characteristics and resources of the organization. Organisational structure is important in technology adoption and has an impact on the social interaction among the company’s employees [33]. The constructs in organizational context are top management support, policy, firm size and individual difference factors.

Top management support has a role in initiating, implementing and adopting new technologies [34]. Top managers typically support initiatives and get involved in making decisions of adopting new technologies. Top managers set organizational strategy and establish direction for new technologies like cloud computing. Policy refers to principles, rules, and guidelines formulated to reach certain long-term goals and provide an enabling environment. Cloud computing transcends location, geography and involves cross border data hosting and outsourcing and because of this very nature several grey areas arise concerning privacy, security and intellectual property. Government regulation plays an important role in adoption of technological innovation and as such cloud computing adoption can be encouraged or discouraged by existing regulation [33] [35].

Firm size is a major factor affecting adoption of new technology and it acts as resilience for environmental shocks. [36]. Larger enterprises have extra resources that motivate innovation adoption. The uptake of internet and its infrastructures in business is slower in smaller than in larger firms indicating that financial constraints, lack of professional expertise and short term management perspectives are characteristics of small business, all these are hindrances to adoption of cloud computing. The individual difference factors can be measured by the education, experience, age and gender. The adoption of cloud computing is largely dependent on the individual difference factors of the decision makers. The Idiosyncrasy of an organization is dependent
on the decision maker’s cognitive assumptions concerning the future, alternatives and the consequences of these alternatives [37]. The strategic and tactical focus of an organization is shaped by the peculiarity of the decision makers’ minds.

2.2.2 Behavioural context

Behavioural context refers to psychological factors like emotional, cognitive, personal and social processes that drive human behavior [38]. It refers to psychological factors that determine the decision to adopt or not to adopt a given technology. Behavioural context can be discussed in terms of Perceived usefulness, Perceived ease of use, trust and social influence.

Perceived usefulness is the user’s subjective belief that using a new technology will improve operations. The probability of adopting new technology increases when a firm perceives a relative advantage in that innovation. Perceived Ease of use (PEOU) refers to prospective user’s assessment of mental capacity required to use the new technology [39]. Technologies that require less mental effort to use attract more adoption behaviour. Cloud computing offers cost reduction and flexibility but it also affects traditional security, trust and privacy mechanisms. Trust refers to the intention to accept the vulnerabilities based on the positive expectations of the intentions. Trust is broader than security as it includes subjective criteria and experience. Social influences move from functional to psychological motives of behaviour as they define other peoples’ opinions, superior influences and peer group opinions.

3. Methods

3.1 Study design and setting

This study used a quantitative approach. The quantitative approach involved a cross sectional survey that entailed a one time collection of data from sampled healthcare personnel in public hospitals using questionnaire. The study site is Kisumu County in western Kenya.

3.2 Target population and sampling

The study target population was facility in-charges and health records and information officers in Tier 3 to Tier 5 public hospitals in Kisumu, Kenya. The target population was 114 personnel (facility in-charge, Health records and information Officers) from 57 public hospitals of interest [40]. The sample size was calculated using Yamane formula for sample size: a simplified formula for sample size calculation with the assumption of a 95% confidence level and P=0.05 [41]. The sample size for this study was therefore 88 healthcare personnel (facility in-charge and health records and information officers) in public hospitals. The study used stratified random sampling method to draw the sample from the sampling frame.

3.3 Data analysis

Data analysis was done using Stata 14.0 and used both descriptive and inferential statistics. The data was screened for missing data, normality, linearity and multicollinearity. Descriptive statistics like median, Interquartile Range and frequency were used to evaluate demographic information such as age, experience and firm size. Wilcoxon rank sum test was used to test for difference in age and work experience between those who were aware of cloud computing and those who were not. Logistic regression was used to analyze the data to predict the probability of an outcome variable (adoption of cloud computing) from predictor factors.

4. Results

4.1 General Information

The study targeted 88 participants from public hospitals in Kisumu County, this included facility in-charge and health records and information officers. Out of the targeted 88 interviews, 80 interviews were completed successfully giving a response rate of 91%. 8 participants were not found in the facility after 3 attempts. Out of the 80 participants interviewed, 69 (86%) were aware of cloud computing while 11 (14%) had not heard of cloud computing as shown in figure 2. Those who had not heard of cloud computing were more likely to be facility in-charges than health records officers (11/47 (23%) vs 0/33 (0%), p=0.003) and were also likely to have had a longer work experience: median[IQR] 10(9-12) vs 7(4-11), p=0.0438.

Further analysis proceeds with the 69 who were aware of cloud computing.
4.1.1 Validity and Reliability
Validity and reliability are two measures that can be used to ascertain the quality and usefulness of the collected data. Cronbach alpha coefficient was used to measure the reliability of the questionnaire. The values of all indicators or dimensional scales below 0.5 are unacceptable [42]. Table I represents the Cronbach alpha coefficients for the independent variables. All the coefficients are well above the unacceptable value of 0.5.

<table>
<thead>
<tr>
<th>Variable</th>
<th>No. of Items</th>
<th>Cronbach’s alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technological factor</td>
<td>9</td>
<td>0.6760</td>
</tr>
<tr>
<td>Organisational setting</td>
<td>7</td>
<td>0.5819</td>
</tr>
<tr>
<td>Behavioural factor</td>
<td>9</td>
<td>0.6077</td>
</tr>
</tbody>
</table>

Table I. Independent variables Cronbach’s alpha

Logistic regression assumes lack of multicollinearity, therefore the independent variables were also tested for multicollinearity. Variance inflating factor (VIF) and tolerance were used to determine multicollinearity: a VIF greater than or equal to 10 and a tolerance less than 0.2 indicate that the variables are multicollinear [43]. Table II shows the results of the VIF’s and tolerance for the independent variables. From the results the VIF’s range from 1.36 to 1.86 well below the threshold of 10. The tolerance values also range between 0.538 and 0.735 well above 0.2. These results indicate that there is no evidence of multicollinearity.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Tolerance</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technological factor</td>
<td>0.538</td>
<td>1.86</td>
</tr>
<tr>
<td>Organisational setting</td>
<td>0.735</td>
<td>1.36</td>
</tr>
<tr>
<td>Behavioural factor</td>
<td>0.645</td>
<td>1.55</td>
</tr>
</tbody>
</table>

Table II. VIF and Tolerance for independent variables

4.1.2 Demographic Characteristics
Table III gives the demographic characteristics of the population; designation, gender, age, work experience and education level. In terms of designation, a slightly higher number were facility in-charge 36 (52%) followed by health records officers 33 (48%). This was explained by some tier 3 hospitals not having health records officers deployed to the facilities. The gender distribution was more or less the same; males 33 (48%) compared to females 36 (52%). The overall median age was 33[28-37] years. However, when stratified by designation facility in-charges were older than health records officers (36[33-39] vs 28[26-29], p=<0.0001). The overall median work experience was 7[4-11] years. However, when stratified by designation the facility in-charges had more experience than health records officers (11[9-15] vs 4[3-5], p=<0.0001). The differential in the age and work experience between the facility in-charge and health records officers can be explained by the fact that health records officers is a direct entry position while, to be a facility in-charge one is appointed after having served for some time.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N=69</th>
<th>n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Facility In-charge</td>
<td>36 (52)</td>
<td></td>
</tr>
<tr>
<td>Health Records Officer</td>
<td>33 (48)</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>33 (48)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>36 (52)</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median [IQR]</td>
<td>33[28-37]</td>
<td></td>
</tr>
<tr>
<td>Experience</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Median [IQR]</td>
<td>7[4-11]</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Certificate</td>
<td>1 (1)</td>
<td></td>
</tr>
<tr>
<td>Diploma</td>
<td>51 (75)</td>
<td></td>
</tr>
<tr>
<td>Bachelors</td>
<td>13 (19)</td>
<td></td>
</tr>
<tr>
<td>Masters</td>
<td>3 (5)</td>
<td></td>
</tr>
</tbody>
</table>

Table III. Demographic characteristics among those who were aware of cloud computing

The prevalence of cloud computing was at 58% as shown in figure 3. The cloud computing service models among hospitals that have adopted cloud computing is shown in Figure 4. Software-as-a-Service was the most common cloud computing service model at 100% followed by Platform-as-a-Service at 5% while none of the hospitals had Infrastructure-as-a-Service as a service model. This could be explained by ease of implementation of the services, constraining budgets and the expertise required to implement this service models.

4.1.3 Cloud computing Adoption

4.2 Technological context in cloud computing adoption
There were three indicators under technological context: technological readiness, service quality and expert scarcity. The
The results of the logistic regression predicting cloud computing adoption based on technological factor is shown in Table IV.

![Cloud Computing Service Model](image)

**Figure 4.** Cloud computing service models among Hospitals adopting cloud computing

Technological readiness was looked at in terms of being skilled in using cloud computing and having technological infrastructure. From the results, both sub-indicators of technological readiness influenced cloud computing adoption and were statistically significant. Those who were skilled in using cloud computing were more likely to adopt cloud computing compared to those who were not skilled (33/40[83%] vs 7/29[24%], odds ratio (OR) =14.82, 95% confidence interval (95%CI) [4.56-48.14], p<0.0001). Those who had the technological infrastructure were also more likely to adopt cloud computing compared to those that did not have (34/44[77%] vs 6/25[24%], OR=10.77, 95%CI [3.38-34.26], p<0.0001).

Service quality was looked at in terms of security, privacy of data, timeliness and personalized care. From the results only security and privacy had a statistically significant effect on cloud computing adoption. Those who believed that cloud computing offered secure services were more likely to adopt cloud computing compared to those who did not believe cloud services were secure (33/50[66%] vs 5/19[26%], OR=6.53, 95%CI [1.99-21.41], p=0.0010). Additionally, those who believed cloud computing upheld the privacy of data were more likely to adopt cloud computing compared to those who did not believe that the privacy of data was upheld (37/53[70%] vs 3/16[19%], OR=10.03, 95%CI [3.38-34.26], p<0.0001).

Expert scarcity was looked at in terms of availability of deployment experts, integration experts and security professionals. Out of the three sub-indicators, only two had a statistically significant effect on cloud computing adoption: availability of deployment experts and availability of integration experts. Those who agreed that IT professionals who guide deployment into the cloud were readily available were more likely to adopt cloud computing compared to those who did not believe such experts were available (21/27[78%] vs 19/42[45%], OR=4.24, 95%CI [1.42-12.63], p=0.0100). Additionally those who believed that IT professionals who manage integration with on-site systems were there in sufficient numbers were more likely to adopt cloud computing compared to those who did not believe such experts were available(18/22[82%] vs 22/47[47%], OR=5.11, 95%CI [1.50-17.42], 0.0090).

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Cloud Computing Adopted</th>
<th>Cloud computing not Adopted</th>
<th>Odds Ratio[95%CI]</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Technological Readiness</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skilled in using Cloud computing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>7/29 (24)</td>
<td>22/29 (76)</td>
<td>Ref</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>33/40 (83)</td>
<td>7/40 (17)</td>
<td>14.82(4.56-48.14)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td><strong>Technological Infrastructure</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>6/25 (24)</td>
<td>19/25 (76)</td>
<td>Ref</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>34/44 (77)</td>
<td>10/44 (23)</td>
<td>10.77(3.38-34.26)</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td><strong>Service Quality</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Secure services</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>5/19 (26)</td>
<td>14/19 (74)</td>
<td>Ref</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>35/50 (70)</td>
<td>15/15 (30)</td>
<td>6.53(1.99-21.41)</td>
<td>0.0020</td>
</tr>
<tr>
<td>Privacy of Data</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>3/16 (19)</td>
<td>13/16 (81)</td>
<td>Ref</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>37/53 (70)</td>
<td>16/53 (30)</td>
<td>10.03(2.51-40.06)</td>
<td>0.0010</td>
</tr>
<tr>
<td>Timeliness</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1/1 (50)</td>
<td>1/1 (50)</td>
<td>Ref</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>39/67 (58)</td>
<td>28/67 (42)</td>
<td>1.39(0.84-23.23)</td>
<td>0.8170</td>
</tr>
<tr>
<td>Personalized Care</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>8/14 (57)</td>
<td>6/14 (43)</td>
<td>Ref</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>32/55 (58)</td>
<td>23/55 (42)</td>
<td>1.04(0.32-3.42)</td>
<td>0.9440</td>
</tr>
<tr>
<td><strong>Expert Scarcity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Deployment Experts available</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>19/42 (45)</td>
<td>23/42 (55)</td>
<td>Ref</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>21/27 (78)</td>
<td>6/27 (22)</td>
<td>4.24(1.42-12.63)</td>
<td>0.0100</td>
</tr>
<tr>
<td>Integration Experts available</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>22/47 (47)</td>
<td>25/47 (53)</td>
<td>Ref</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>18/22 (82)</td>
<td>4/22 (18)</td>
<td>5.11(1.50-17.42)</td>
<td>0.0090</td>
</tr>
<tr>
<td>Security Experts available</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>22/44 (50)</td>
<td>22/44 (50)</td>
<td>Ref</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>18/25 (72)</td>
<td>7/25 (28)</td>
<td>2.57(0.90-7.38)</td>
<td>0.0790</td>
</tr>
</tbody>
</table>

Table IV. Logistic regression assessing cloud computing adoption based on Technological context

4.3 Organisational setting in cloud computing adoption

There were four indicators under organisational setting: Top management support, Policy, Firm size and individual difference factors. The results of the logistic regression predicting cloud computing adoption based on organisational setting is shown in Table V.

The researcher looked at top management support in terms of adequate budgetary allocation and providing an enabling environment. The results illustrates that only adequate budgetary...
allocation had a statistically significant effect on cloud computing adoption. Those who had adequate budgetary allocation were more likely to adopt cloud computing compared to those who did not have adequate allocation (13/15 [87%] vs 27/54 [50%], OR=6.50, 95%CI [1.34-31.60], p=0.0200). Although those who were aware of policy/legislation regarding cloud computing were more likely to adopt cloud computing compared to those who were not aware, the difference was not statistically significant (12/15 [80%] vs 28/54 [52%], OR=3.71, 95%CI [0.94-14.66], p=0.061). Furthermore only 15/69 (22%) were aware of existing policy/legislation regarding cloud computing.

The researcher looked at firm size in terms of the hospital bed capacity. Firm size had a statistically significant effect on cloud computing adoption. Hospitals that had a bed capacity greater than or equal to 15 beds were more likely to adopt cloud computing compared to hospitals with a bed capacity of 0-15 beds (21/23 [91%] vs 2/23 [41%], OR=14.92, 95%CI [3.12-71.34], p=0.0010).

Individual different factors had three sub-indicators: age of respondent, work experience of the respondent and level of education. All the three sub-indicators under individual different factors did not have a statistically significant effect on cloud computing adoption.

### 4.4 Behavioural factor in cloud computing adoption

Behavioural factor was looked at in terms of Perceived usefulness, Perceived ease of use, Trust and Social influence. The results of the logistic regression predicting cloud computing adoption based on behavioural factor is shown in Table VI.

Perceived usefulness was addressed by two sub-indicators: belief that cloud computing cloud computing will help the hospital staff accomplish tasks more quickly and belief that cloud computing would improve efficiency in delivery of service. Only belief that cloud computing would improve efficiency in delivery of service had a statistically significant effect on cloud computing adoption. Those who believed that cloud computing would improve efficiency in delivery of service in the hospital were more likely to adopt cloud computing compared to those who did not believe it would improve efficiency (34/44 [77%] vs 6/25 [24%], OR=14.92, 95%CI [3.12-71.34], p=0.0010).

The researcher looked at Perceived ease of use in terms of easy to learn and easy to use in accomplishing tasks. Both of the sub-indicators had a statistically significant effect on cloud computing adoption. Those who believed it is easy to learn how to use cloud computing were more likely to adopt cloud computing compared to those who thought otherwise (31/40 [78%] vs 9/29 [31%], OR=7.65, 95%CI [2.60-22.57], p<0.0001). Those who believed it is easy to use cloud computing in accomplishing tasks were more likely to adopt cloud computing compared to those who had a contrary opinion (35/49 [71%] vs 5/20 [25%], OR=7.50, 95%CI [2.29-24.57], p=0.0010).

Trust was addressed by three sub-indicators: ability of cloud computing to operate reliably without failure, the ability of cloud computing to demonstrate the functionality to execute required tasks and lastly belief that cloud computing providers offered help when needed. All the three sub-indicators of trust did not have a statistically significant effect on cloud computing adoption.

The researcher looked at firm size in terms of the hospital bed capacity. Firm size had a statistically significant effect on cloud computing adoption. Hospitals that had a bed capacity greater than or equal to 15 beds were more likely to adopt cloud computing compared to hospitals with a bed capacity of 0-15 beds (21/23 [91%] vs 2/23 [41%], OR=14.92, 95%CI [3.12-71.34], p=0.0010).

### Table V. Logistic regression predicting cloud computing adoption based on Organisational setting

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Cloud Computing Adopted</th>
<th>Cloud computing not Adopted</th>
<th>Odds Ratio [95%CI]</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Management Support</td>
<td>n/N (%)</td>
<td>n/N (%)</td>
<td>Ref</td>
<td>0.0610</td>
</tr>
<tr>
<td>Adequate budgetary allocation</td>
<td>No</td>
<td>27/54 (50)</td>
<td>27/54 (50)</td>
<td>6.50 (1.34-31.60)</td>
</tr>
<tr>
<td>Enabling environment</td>
<td>Yes</td>
<td>13/15 (87)</td>
<td>2/15 (13)</td>
<td>3.71 (0.94-14.66)</td>
</tr>
<tr>
<td>Policy</td>
<td>No</td>
<td>3/7 (43)</td>
<td>4/7 (57)</td>
<td>1.97 (0.41-9.59)</td>
</tr>
<tr>
<td>Aware of Policy</td>
<td>Yes</td>
<td>37/62 (60)</td>
<td>25/62 (40)</td>
<td>14.92 (3.12-71.34)</td>
</tr>
<tr>
<td>Firm Size</td>
<td>0-15 beds</td>
<td>19/46 (41)</td>
<td>27/46 (59)</td>
<td>Ref</td>
</tr>
<tr>
<td>&gt;= 15 beds</td>
<td>21/3 (91)</td>
<td>2/23 (9)</td>
<td>Ref</td>
<td>0.0610</td>
</tr>
<tr>
<td>Individual Difference Factors</td>
<td>Age Category</td>
<td>&gt;30 years</td>
<td>19/29 (66)</td>
<td>10/29 (34)</td>
</tr>
<tr>
<td></td>
<td>24-30 years</td>
<td>21/40 (53)</td>
<td>19/40 (47)</td>
<td>0.58 (0.22-1.56)</td>
</tr>
<tr>
<td></td>
<td>&gt;10 years</td>
<td>28/50 (58)</td>
<td>21/50 (42)</td>
<td>Ref</td>
</tr>
<tr>
<td></td>
<td>1-10 years</td>
<td>11/19 (58)</td>
<td>8/19 (42)</td>
<td>1.00 (0.34-2.90)</td>
</tr>
<tr>
<td>Education</td>
<td>Diploma</td>
<td>25/51 (49)</td>
<td>26/51 (51)</td>
<td>Ref</td>
</tr>
<tr>
<td></td>
<td>Certificate</td>
<td>1/1 (100)</td>
<td>0/1 (0)</td>
<td>Ref</td>
</tr>
<tr>
<td></td>
<td>Bachelors</td>
<td>10/13 (77)</td>
<td>3/13 (23)</td>
<td>3.47 (0.85-14.09)</td>
</tr>
<tr>
<td></td>
<td>Masters</td>
<td>3/3 (100)</td>
<td>0/3 (0)</td>
<td>Ref</td>
</tr>
</tbody>
</table>
The study found out that there were eight drivers for cloud computing adoption by public hospitals in Kisumu County, Western Kenya. The study found out that there were eight drivers for cloud computing adoption in the healthcare sector: technological readiness (skilled in using cloud computing and technological infrastructure), service quality (security and privacy), expert scarcity (availability of deployment experts and availability of integration experts), top management support (adequate budgetary allocation), firm size, perceived usefulness (improved efficiency), perceived ease of use (easy to learn and easy to use to accomplish tasks) and social influence (other hospitals currently adopting cloud computing).

5.1 Cloud computing adoption
The study found out that the prevalence of cloud computing in public hospitals was 58%. This is an improvement compared to 35.6% among public sector institutions reported by CA and KNBS [20]. This increase can be attributed to a high ratio of internet users connecting with mobile devices compared to traditional fixed point connections [12]. In terms of cloud services models, most public hospitals implemented SaaS while very few adopted PaaS and none had IaaS. This is consistent with the findings from Medium and high tech industries in Nairobi, Kenya [26]. This differential in implementation of cloud service models could be attributed to high cost implications and the level of skills required to implement and maintain services associated with PaaS and IaaS [31] [44].

5.2 Technological context
The study found all the three indicators of technological context to be drivers of cloud computing adoption: technological readiness (skilled in using cloud computing and technological infrastructure), service quality (security and privacy) and expert scarcity (availability of deployment experts and availability of integration experts).

Technological readiness through its sub-indicators, skilled in using cloud computing and technological infrastructure, were found to positively affect adoption. This is consistent with previous studies [45] [46]. This finding can be explained by the fact that hospitals with existing technological infrastructure (installed network technologies and enterprise systems) would incur less financial costs compared to those who do not have an existing infrastructure. Additionally, hospitals having staff with the technical competence to handle cloud computing would readily adopt compared to those who are technically incompetent as there will be minimal resistance.

Service quality was also found to be a predictor of cloud computing adoption through its sub-indicators of security and privacy. This is in concurrence with the findings from other studies [47] [48] [49]. Data security and privacy is more complicated in cloud computing than in traditional information systems as cloud computing transcends into the realm of architecture and data models. Therefore providing a trustworthy environment in terms of security and privacy is a prerequisite that wins confidence of users to adopt cloud computing.

Lastly, expert scarcity was found to influence adoption through the sub-indicators availability of deployment experts and availability of integration experts. This was in agreement with previous studies [50] [51]. Organizations need IT professionals to help them articulate their cloud computing plans, determine what tasks to accomplish, execute required tasks and operate reliably to accomplish tasks. This finding can be explained by the fact that hospitals with existing technological infrastructure found to positively affect adoption. This is consistent with the findings from Medium and high tech industries in Nairobi, Kenya [26].

Table VI. Logistic regression predicting cloud computing adoption based on Behavioural factor

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Cloud Computing Adopted</th>
<th>Cloud computing not Adopted</th>
<th>Odds Ratio[95%CI]</th>
<th>p-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Perceived Usefulness</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accomplish tasks quickly</td>
<td>No</td>
<td>4/7 (57)</td>
<td>3/7 (43)</td>
<td>Ref</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>36/62 (58)</td>
<td>26/62 (42)</td>
<td>1.04(0.21-5.04)</td>
</tr>
<tr>
<td>Improved efficiency</td>
<td>No</td>
<td>6/25 (24)</td>
<td>19/25 (76)</td>
<td>Ref</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>34/44 (77)</td>
<td>10/44 (23)</td>
<td>10.77(3.38-34.26)</td>
</tr>
<tr>
<td><strong>Perceived Ease of Use</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Easy to Learn</td>
<td>No</td>
<td>9/29 (31)</td>
<td>20/29 (69)</td>
<td>Ref</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>31/40 (78)</td>
<td>9/40 (22)</td>
<td>7.65(2.60-22.57)</td>
</tr>
<tr>
<td>Easy to use in accomplishing tasks</td>
<td>No</td>
<td>5/20 (25)</td>
<td>15/20 (75)</td>
<td>Ref</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>35/49 (71)</td>
<td>14/49 (29)</td>
<td>7.50(2.29-24.57)</td>
</tr>
<tr>
<td><strong>Trust</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Operates reliably without failing</td>
<td>No</td>
<td>33/56 (59)</td>
<td>23/56 (41)</td>
<td>Ref</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>7/13 (54)</td>
<td>6/13 (46)</td>
<td>0.81(0.24-2.74)</td>
</tr>
<tr>
<td>Functionality to execute required tasks</td>
<td>No</td>
<td>10/19 (53)</td>
<td>9/19 (47)</td>
<td>Ref</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>30/50 (60)</td>
<td>20/50 (40)</td>
<td>1.35(0.47-3.91)</td>
</tr>
<tr>
<td>Providers offer help when needed</td>
<td>No</td>
<td>2/6 (33)</td>
<td>4/6 (67)</td>
<td>Ref</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>38/63 (60)</td>
<td>25/63 (40)</td>
<td>3.04(0.52-17.86)</td>
</tr>
<tr>
<td>Social influence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other hospitals are adopting</td>
<td>No</td>
<td>8/23 (35)</td>
<td>15/23 (65)</td>
<td>Ref</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>32/46 (70)</td>
<td>14/46 (30)</td>
<td>4.29(1.48-12.41)</td>
</tr>
<tr>
<td>Hospitals that are benefiting</td>
<td>No</td>
<td>4/11 (36)</td>
<td>7/11 (64)</td>
<td>Ref</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>36/58 (62)</td>
<td>22/58 (38)</td>
<td>2.86(0.75-10.92)</td>
</tr>
</tbody>
</table>

Table VI. Logistic regression predicting cloud computing adoption based on Behavioural factor

5. Discussion
The purpose of the study was to establish the determinants of cloud computing adoption by public hospitals in Kisumu County, Western Kenya. The study found out that there were eight drivers for cloud computing adoption in the healthcare sector: technological readiness (skilled in using cloud computing and technological infrastructure), service quality (security and privacy), expert scarcity (availability of deployment experts and availability of integration experts), top management support (adequate budgetary allocation), firm size, perceived usefulness (improved efficiency), perceived ease of use (easy to learn and easy to use to accomplish tasks) and social influence (other hospitals currently adopting cloud computing).
by the fact that adequate technical support guarantees smooth and seamless transition to the cloud and institutions who believed this experts were readily available would be predisposed to adopt cloud computing. The study found out that only 39% and 31% of the respondents believed deployment and integration experts were available respectively. This is in concurrence with existing literature that have reported scarcity of IT professionals in the area of cloud computing [50] [52] [53] and this shortfall is projected to hit 5 million globally within the next decade, if nothing is done to mitigate it.

5.3 Organisational setting
The study found only top management support (adequate budgetary allocation) and firm size constructs of organizational setting to be predictors of cloud computing adoption. Top management support under the sub-indicator of adequate budgetary allocation was found to influence adoption. This is concurrent with existing literature on cloud computing adoption [54] [55] [56]. This can be explained by the fact that cloud computing comes with additional costs as it is a pay-per-use platform and it also heavily relies on the internet, institutions with adequate budgetary allocation for IT would therefore be more inclined to adopt cloud computing compared to those with inadequate allocations. However, overall only 22% of respondents indicated they had adequate budgetary allocation for IT. This small proportion compared to 89% who indicated that top management was supportive of cloud computing illustrates that not lack of interest in cloud computing but rather budget constrains from allocations by county governments as the possible reason for inadequate budgetary allocations for IT. This brings to the front the need for implementation of the Abuja declaration on health budget[57] which would in turn translate to improved allocations to the counties and consequently the hospitals and IT department.

Firm size was also found to be a predictor of cloud computing adoption. This is consistent with findings from previous studies [31] [55]. Hospitals with a higher bed capacity are more likely to have a bigger budget than those with lower bed capacity and in turn be more likely to adopt cloud computing than their counter parts from hospitals with a smaller bed capacity. Additionally, the uptake of internet and its infrastructures in hospitals is slower among smaller hospitals than in large ones. Policy was not a predictor of cloud computing adoption from the findings of the study. This is consistent with results from previous adoption studies [35] [55]. This could possibly be explained by the fact that despite deliberate government policy to promote new computing technologies, their advancement is largely due to corporate focus on technology [58] and this is justified by the 89% of top management that provided an enabling environment.

5.4 Behavioural factor
The study found three indicators under behavioural factor to be predictors of cloud computing adoption: perceived usefulness (improved efficiency), perceived ease of use (easy to learn and easy to use to accomplish tasks) and social influence (other hospitals currently adopting cloud computing). Perceived usefulness in terms of improved efficiency in delivery of services was found to influence cloud computing. This is consistent with existing literature [31] [34] [59]. This could be explained by the fact that adoption of new technology increases when a firm perceives a relative advantage in that innovation. Additionally, the study reported operational benefits of cloud computing at 69% indicating confidence of respondents that cloud computing provided a relative advantage.

Both sub-indicators of perceived ease of use were found to be predictors of cloud computing adoption: easy to learn and easy to use to accomplish tasks. This finding is in agreement with results from previous studies [60] [61] [62]. This can be explained by the proliferation of cloud computing services that can be accessed by mobile devices. Services like email and storage (google drive and drop box) have reduced complexities in user interface and learning curve thereby bolstering the belief of users that cloud computing requires less mental effort to learn and use.

The study did not find trust to be a significant factor in adoption cloud computing. This is contrary to results from previous studies that found trust to be a predictor of adoption [63] [64].

Lastly, social influence in terms of other hospitals currently adopting cloud computing was found to be a predictor of cloud computing. This is in concurrence with existing literature [65] [66] [67]. This can be explained by the need for non-adopter hospitals to conform to the current trend in the sector. Sociologists believe that often group member’s exhibit cohesiveness even against their own feelings in order to show commitment to group norms [68].

6. Conclusion
This study was motivated by the desire to see the healthcare sector compete favorably with other industries in adoption of cloud computing and consequently realize the associated operational, financial and functional benefits thereby remaining relevant in a dynamic business environment.

The study results showed that the following factors significantly affect adoption: technological readiness (skilled in using cloud computing and technological infrastructure), service quality (security and privacy), expert scarcity (availability of deployment experts and availability of integration experts), top management support (adequate budgetary allocation), firm size, perceived usefulness (improved efficiency), perceived ease of use (easy to learn and easy to use to accomplish tasks) and social influence (other hospitals currently adopting cloud computing) were all significant constructs of cloud computing adoption. Policy, individual difference factors and trust were found to be insignificant predictors of cloud computing adoption.

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Determination of Normal Thyroid Gland Volume On Ultrasound In Normal Adults In Jos, North Central Nigeria.

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Authors’ contributions: This work was carried out in collaboration among all authors. The author AJS designed the study and literature review, author POI co-designed the study, author SMD managed the analysis and literature review, author AAS performed statistical analysis and the author HAA managed literature review. All authors read and approved the final manuscript.

Abstract- AIM AND OBJECTIVES: This study was done to establish a standard ultrasonographic measurement of the thyroid gland volume in normal adults in Jos University Teaching Hospital.

Background: The thyroid gland is one of the largest endocrine glands in the body weighing about 10-25g. It regulates the rate of metabolism, the growth and rate of function of many other systems in the body. These it does, by producing thyroid hormones, principally thyroxine (T4) and triiodothyronine (T3). The accurate estimation of the size of the thyroid is very important for the evaluation and management of thyroid disorders. Thus, knowing the normal size in a geographic location would form a baseline for detecting abnormalities. Ultrasonography is a cheap, readily available, easy to perform and non-invasive method to image the thyroid gland, hence its use in this resource limited setting.

METHODOLOGY: This is a cross sectional study of sonographic measurement of thyroid gland volume on 400 normal (healthy) adults in Jos, Plateau State, Northern part of Nigeria. All examinations were performed using LOGIC 5, a real-time ultrasound machine using a 10MHz linear transducer and ultrasound transmission gel to act as a coupling gel. Measurements of each lobes and isthmus were obtained in longitudinal (length), transverse (width) and depth (breadth) in centimeters (cm). Blood samples were taken for thyroid function tests. The weight and heights were obtained. The data obtained were statistically analyzed using SPSS software version 17. The results were presented in forms of tables, graphs and chart.

RESULTS: The mean thyroid volume for males 6.03cm3 ± 2.22 was higher than that of females 5.62cm3 ± 2.14. The mean right lobe volume (RLV) was 3.09cm3 ± 1.47 and that of males and females were 3.16cm3 ± 1.34 and 3.04cm3 ± 1.55 respectively. The mean left lobe volume (LLV) was 2.69cm3 ± 1.37 and that of males and females were 2.89cm3 ± 1.32 and 2.57cm3 ± 1.39 respectively. The right lobe volume was significantly greater than the left lobe (p=0.000). The total mean isthmus volume was 0.27cm3 ± 0.31. The mean isthmus volume in males 0.34±0.28 is significantly higher than that of females 0.24±0.23 (p=0.025)

CONCLUSION: The volume obtained in this study was slightly lower than those reported by previous studies in Nigerian adults. The right lobe volume was higher than that of the left and the volume was higher in males compared to females.

I. INTRODUCTION

The thyroid gland is one of the largest endocrine glands in the body weighing about 10-25g. It regulates the rate of metabolism and control the growth and rate of function of many other systems in the body. These it does, by producing thyroid hormones, principally thyroxine (T4) and triiodothyronine (T3). The accurate estimation of the size of the thyroid is very important for the evaluation and management of thyroid disorders. Thus, knowing the normal size in a geographic location would form a baseline for detecting abnormalities. Ultrasonography is a cheap, readily available, easy to perform and non-invasive method to image the thyroid gland, hence its use in this resource limited setting.

The evaluation of thyroid volume by ultrasonography in adults and children has been discussed in many Caucasian reports as well as in Africans, Iranians and Indians. In Nigeria most of the studies have been conducted in the North-Western, North-Eastern, South-Western, South-South and South-Eastern parts of the country. But none in North Central Nigeria. The evaluation of thyroid volume by ultrasonography in adults and children has been discussed in many Caucasian reports as well as in Africans, Iranians and Indians. In Nigeria most of the studies have been conducted in the North-Western, North-Eastern, South-Western, South-South and South-Eastern parts of the country. But none in North Central Nigeria.

The total thyroid volume (TTV) is a summation of the left and right lobes, the isthmus was not included in the measurement. Several studies done in the past showed a good relationship between the TTV with age in adults. In the study by Ahidjo et al, the volume of the thyroid gland was 8.55cm3±1.82 in adults. Mohammed et al in Sudan, obtained a value of 6.44±2.44mls; this value was lower than that obtained by Ahidjo et al in Nigeria.
In both studies, their sample sizes was small, compared to the 400 used in this study. However, Mohammed et al. used 10MHz transducer as was done in this study. Ivanač et al. in a study among adult females obtained TTV of 10.68±2.83ml. All of them healthy and with normal thyroid hormonal status. Short-comings of the study includes the fact that only female population was selected, isthmus was included in calculation of TTV; and the fact that Zagreb, a region in Croatia, was in an earlier investigations indicted as one with iodine deficiency problem, thus accounting for the apparently slightly elevated figures.

Another study by Adibí in healthy adults of Isfahan, a centrally located city in Iran, an iodine replete area using 200 subjects (123 Males, 77 females, average age: 37.27 ± 11.80 Years). The overall thyroid volume was 9.53 ± 3.68 ml. Males thyroid volume (10.73 ± 3.44 ml) was significantly higher than the females one (7.71 ± 2.63 ml) (P<0.001). The thyroid volume ranges from 3-23.9 ml, 3.6-23.9 ml and 3-14.3 ml in all, males and females, respectively. The knowledge of the fact that sex plays a role in determining the thyroid volume is essential in interpreting results obtained based on the sex of the patient.

The thyroid gland has two lobes that are joined together by isthmus. They are usually of different sizes, with the right being larger. The vascular supply of the right is larger than that of the left. The right lobe is larger than the left in the study done by Suwaidi et al among school children. Marchie et al and Anele found no difference in sizes between the right and left lobes in children and adults. Anele also observed that there was no difference in volume between males and females in his study. Adidjo et al found difference in the sizes of the lobes. The mean volume for both lobes in males and females were 4.48cm³ and 4.07cm³ respectively. The right thyroid lobe volume was higher than the left (p=0.000). Ying and Yung in a prospective study of 106 healthy subjects without family history of thyroid diseases, were recruited in the study aimed at investigating the association of handedness and position of esophagus with thyroid size asymmetry using 41 men and 65 women: age range of the subjects was 16–59 years old (mean age 5-37.1 years). For normal thyroid, the right lobe (6.8 ml) was significantly larger than the left lobe (5.66 ml) (P < 0.05). Right-handed subjects (mean, 7.11 ml) had a significantly larger right lobe than left-handed subjects (mean, 5.82 ml) (P < 0.05). There was no significant difference in the left lobe volume between right-handers (mean, 5.81 ml) and left-handers (mean, 5.18 ml) (P > 0.05). Subjects with an esophagus deviated to the left (mean, 7.15 ml) had a significantly larger right lobe than those with a centrally located esophagus (mean, 5.7 ml) (P < 0.05). There was no significant difference in the left lobe volume between subjects with different esophageal positions (deviated to left: mean 5.76 ml; centrally located: mean, 5.19 ml) (P > 0.05).

Thyroid asymmetry is suggested to be related to the unilateral differentiation of the hypothalamus on the thyroid gland. However, besides the association of the CNS and thyroid gland asymmetry, the asymmetry of paired organs may also be associated with the presence and the size of their adjacent organs.

For example, it has been found that the right kidney is significantly smaller than the left kidney, and the asymmetry of renal size is suggested to be related to the smaller size of the spleen than the liver, and thus, the left kidney has more space for growth. In the neck, the esophagus is commonly deviated to the left. Hence, the hypothesis that the smaller size of the left thyroid lobe may be related to the position of the esophagus. The study found scanty information about the association of handedness with thyroid lobe volume asymmetry. The limitation of this study is the small sample size of left-handers and subjects with centrally located esophagus. Moreover, no subject with esophagus deviated to the right was recruited. Another limitation of this study was that the subjects are mainly in the younger population.

The thyroid isthmus is the part of the thyroid gland that connects together the lower thirds of the right and left lobes. The isthmus may be absent in which the two lobes are not connected as noted by Taty-Anna et al. The size of the isthmus is usually assessed separate from the thyroid lobes. Servet et al assessed the isthmus separately. The mean isthmus thickness was 3.23±1.10mm (men: 3.42±1.14, women: 3.10±1.05).

Growth is seen with increase in age in human. The thyroid gland increases with growth of man. Suwaidi et al observed that the thyroid volume increases with increase with age. There has been steady increase in the mean thyroid lobe volume with increase in age. The mean thyroid volume at 6 years is 2.94 ± 0.79 cm³ and increases to 8.55 ± 2.79 cm³ at 13 years. Marchie et al showed strong correlation between the median thyroid volume and subjects' age (r = 0.804, P < 0.001). Anele also found strong correlation between subjects' age and median thyroid gland volume. Barrer et al also noted increase in thyroid volume with increase in age, they, however observed that the increase ceases after the age of 65 years. No volume increase was noted in the elderly.

The evaluation of thyroid volume by ultrasonography in adults and children has been discussed in many Caucasian reports as well as in Africans, Iranians and Indians. In Nigeria most of the studies have been conducted in the North-Western, North-Eastern, South-Western, South-South and South-Eastern parts of the country. But none in North Central Nigeria. The total thyroid volume (TTV) is a summation of the left and right lobes, the isthmus was not included in the measurement. Several studies done in the past showed a good relationship between the TTV with age in adults. In the study by Adibí et al., the volume of the thyroid gland was 8.55cm³±1.82 in adults. Mohammed et al in Sudan, obtained a value of 6.44±2.44mls; this value was lower than that obtained by Adibí et al in Nigeria. In both studies, their sample sizes was small, compared to the 400 used in this study. However, Mohammed et al used 10MHz transducer as was done in this study. Ivanač et al. in a study among adult females obtained TTV of 10.68±2.83ml. All of them healthy and with normal thyroid hormonal status. Short-comings of the study includes the fact that only female population was selected, isthmus was included in calculation of TTV; and the fact that Zagreb, a region in Croatia, was in an earlier investigations indicted as one with iodine deficiency problem, thus accounting for the apparently slightly elevated figures.

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II. MATERIALS AND METHODS

STUDY AREA

Jos is the capital city of Plateau State. Plateau state has over 30 different ethnic groups. The 2006 Nigerian census put the population of Plateau State at 3,178,712.22 Jos University Teaching Hospital (JUTH) is one of the three teaching hospitals in the North-Central Zone of Nigeria. It serves as a referral center for the neighbouring states of Bauchi, Gombe, Benue, Kogi, Nassarawa, Taraba, Adamawa and parts of Kaduna State.

STUDY POPULATION AND DESIGN

This was a hospital-based Cross-sectional study that was done in the Department of Radiology, Jos University Teaching Hospital (JUTH), a tertiary health institution situated in the central part of Jos, for the period of twelve months (June 2011-June 2012).

III. INCLUSION CRITERIA

- Patients that consented to have the procedure (sonographic evaluation of thyroid gland volume and laboratory assessment of thyroid function)
- Patients referred for ultrasound examination, other than thyroid ultrasound scan.
- Patients 18 years and above
- Patients with normal laboratory values of T3(0.6-2ng/ml), T4(45-115ng/ml) and TSH(0.3-6.5ng/ml)

IV. EXCLUSION CRITERIA

- Female during menstruation, pregnancy or who have delivered within the last twelve (12) months
- Subjects with anterior neck swelling or clinical evidence of thyroid/endocrine disorder
- Subjects with previous thyroid surgery.
- Subject with abnormal laboratory values of T3, T4 and TSH.
- Subjects who did not consent to participate in the study

V. SAMPLE SIZE DETERMINATION

The sample size was determined using Fisher’s statistical formula n=z²pq/d² for population greater than 10,000 and it was calculated to be 384 as shown below:

The formula n=z²pq/d²
Where n = Desired sample size.
\[ z = \text{Standard deviation, using set at 1.96, which correspond to} \]
95% confidence level.
p = Proportion in target population estimated to have a particular
characteristic. If no reasonable estimate, 50% (0.5) is used.
\[ q = 1.0 - p \]
d = degree of accuracy desired, usually set at 0.05

Therefore \[ n = \frac{z^2 \times 0.5 \times 0.5}{d^2} = 384. \]
However a sample size of 400 was used.

VI. TECHNIQUE

The procedure was explained to all participants, and informed consent was obtained. A data sheet (appendix I&II) was completed for all participants in which the ages were obtained and weights and heights were obtained by the participants climbing a weighing scale and standing by a wall that was marked in meters. The participants were asked questions on history of previous thyroid disease or surgery as stated in the questionnaire. Questions on alcohol consumption, cigarette smoking and parity of women were asked as seen in the questionnaires. Patients were examined in supine position with a pillow placed under the shoulders to aid in the extension of the head. All examinations were performed using LOGIC 5, a real-time ultrasound machine fitted with a 10MHz linear transducer. Ultrasound gel was applied over the anterior neck (thyroid area) and the transducer placed directly on the skin over the thyroid area. Images of each lobe and the isthmus were obtained in transverse (Fig 1) and longitudinal planes (Fig 2). Longitudinal (length) as well as transverse (width) and depth (AP) were measured in centimeters (cm). The right and left thyroid volume data were obtained and analyzed separately.

The isthmus was not included in the sum. The lobe volume (cm\(^3\)) was calculated from the equation of Brunn et al\(^{20,23}\) using the ellipsoid model formula by multiplying length (L) by width (w) by depth (d) in cm by a correction factor 0.52 and the lobe volumes are summed. The isthmus volume was calculated from \[ V_{\text{isthmus}} \] (cm\(^3\)) equals length \( l_{\text{isthmus}} \) by width \( w_{\text{isthmus}} \) by depth \( d_{\text{isthmus}} \) all in cm multiplied by 0.479\(^{24}\). Total Thyroid volume (cm\(^3\)) = total sum of lobe volumes (cm\(^3\))

\[ V_{\text{isthmus}} \] (cm\(^3\)) equals length \( l_{\text{isthmus}} \) by width \( w_{\text{isthmus}} \) by depth \( d_{\text{isthmus}} \) all in cm multiplied by 0.479\(^{24}\). Total Thyroid volume (cm\(^3\)) = total sum of lobe volumes (cm\(^3\))

The body surface area was calculated using the formula of Dubois and Dubois\(^{25}\)

Body surface area BSA (m\(^2\)) = Weight \( 0.425 \times \) Height \( 0.725 \times 71.84 \times 10^{-4} \)

and Body mass index (BMI) (Kg/m\(^2\)) was calculated from weight/height\(^2\).

- Blood samples were taken for thyroid function tests( T3,T4 and TSH) in which results that were not within normal range were not included. The normal laboratory values of T3(0.6-2ng/ml), T4(45-115ng/ml) and TSH(0.3-6.5ng/ml)
- **Underweight** < 20 kg/m\(^2\)
- **Normal weight** 20-25kg/m\(^2\)
- **Overweight** >25kg/m\(^2\)
- **BSA** **CATEGORIZE**:\(^{14}\)
- **Normal** 1.91m\(^2\)(male) 1.6m\(^2\)(female)
- **Abnormal** >1.91m\(^2\)(male) >1.71m\(^2\)(female)
Fig 1: Transverse Ultrasound Scan of the Thyroid Gland at the Level of the Tracheal Cartilage (C6 level) Showing its two lobes (arrows), the isthmus (arrow head) and the trachea centrally (curved arrow).
Fig 2: Longitudinal ultrasound scan of the thyroid, showing measurement of the longitudinal (LS) and anteroposterior diameters of the thyroid lobe.

VII. DATA ANALYSIS

The data obtained from the structured questionnaire was entered into a computer to generate a computerized data base for subsequent analysis and processing using SPSS version 17. Statistical parameters such as student’s test were used for association between different variables. P value of 0.05 or less was considered statistically significant. The results were presented in the form of tables, chart and graphs.

VIII. ETHICAL CONSIDERATION

Approval was obtained from Research and Ethical Committee of Jos University Teaching Hospital. Informed signed consent was obtained from the volunteers before enrollment for the study and they were given the freedom to withdraw from the study at any stage without consequences. The data collected from the participants were recorded serially and kept with utmost confidentiality.

IX. RESULTS

A total of 400 adults were recruited comprising 150(37.5%) males and 250(62.5%) females (Figure 3). The number of females were more than the males.

Tables 1a and 1b shows the age-sex distribution pattern of the male and female subjects in the study population.

The total mean thyroid volume was 6.03±2.49 (range of 1.38-11.34). There is steady increase in thyroid volume with increase in age. The lowest total mean volume of 5.52cm³ was seen in 20-29years age groups, whereas the highest of 6.12cm³ was noted on the greater than 50years age groups. There was no statistically significant increase in thyroid volume with increase in age.

The total mean thyroid volume for males was 6.30cm³±2.37 (range1.38-11.34). The lowest volume of 5.80±1.51cm³ was seen in 20-29years age groups and the highest of 6.28±3.31cm³ in
50 years age group. No statistically significant increase in volume with age was noted with a p=0.930. The total mean thyroid volume for females 5.65cm\(^3\)±2.61(1.38-15). There is steady increase in thyroid volume with increase in age groups from 21-29years age groups. The lowest is 5.24±2.35cm\(^3\) in 21-29years and the highest was 5.96cm\(^3\) in greater than 50years. The increase was however not statistically significant, with a p=0.637. The thyroid volume was higher in the less than 20years compared to 21-29 years age group in both sexes. But the increase was not statistically significant, with p=0.092 and p=0.55 for females and males respectively. However, there is a statistically significant increase in thyroid volume when the volumes of 20-29 and 30-39years age groups are compared. The male has a p=0.032 and the females p=0.041(Fig 3)

The total mean isthmus volume was 0.27cm\(^3\) ± 0.31and that of males and females are 0.3 ± 0.28 and 0.24 ± 0.23cm\(^3\).There is steady increase in volume with age in both sexes, with the exception of the 40-49 years in males. The increase is statistically significant in males, with a p=0.025. The increase is not statistically significant in females, with a p=0.457. The volumes were highest in males in the 40-49years age group and in >50years in the females. There is no statistically significant increase in isthmus volume between males and females.

Tables 1a and 1b also shows that the total mean right lobe volume was 3.2cm\(^3\)±1.47 and that of male was 3.37±1.34 and female 3.08±1.55. There is increase in volume with increase in age in both sexes from 20-29years age group upward. The lowest value is 3.09cm\(^3\)±1.17 in the 21-29years age group and the highest in the greater than or equal 20years in males. There was no statistical significant increase in volume with increased age (p=0.65). The lowest value in female was 2.98±1.43cm\(^3\) in the age group of 40-49years and the highest is 3.22±1.93cm\(^3\) in the age group of greater than 50 years. There was no statistically significant increase in right lobe volume with increase in age.

The total mean left lobe volume(LLV) was 2.77cm\(^3\) ± 1.35 and that of males and females are 2.98cm\(^3\) ± 1.32 and 2.57cm\(^3\) ±1.38 respectively (Table 1a and 1b). There was no significant increase in LLV with increase in age in males. The lowest measured 2.34±0.67cm\(^3\) in the less than 20years age groups and the highest was 3.44±1.22cm\(^3\) in the greater or equal 50years age group was noted (p= 0.619). There is a steady increase in LLV with increase in age groups in females. The lowest value is 2.29±0.43 in the less than 20 age groups and the highest is 2.74±2.08 in the greater than or equal to 50years age group. However, the p value was not statistically significant 0.059. There is increase thyroid volume with increase in age as seen in the scatter gram (Fig 5)

Table 1a: Age and sex distribution pattern of thyroid volume in male subjects

<table>
<thead>
<tr>
<th>Age</th>
<th>Right(MeanSD)</th>
<th>Left(MeanSD)</th>
<th>Mean Thyroid Vol(Mean)</th>
<th>Total</th>
<th>Isthmus Vol</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;20</td>
<td>3.83±0.33</td>
<td>2.34±0.67*</td>
<td>6.17±0.66</td>
<td>0.17±0.14*</td>
<td></td>
</tr>
<tr>
<td>21-29</td>
<td>3.09±0.79</td>
<td>2.71±0.98</td>
<td>5.80±1.51</td>
<td>0.22±0.19</td>
<td></td>
</tr>
<tr>
<td>30-39</td>
<td>3.19±1.52</td>
<td>3.09±1.91</td>
<td>6.28±3.31</td>
<td>0.26±0.24</td>
<td></td>
</tr>
<tr>
<td>40-49</td>
<td>3.22±1.17</td>
<td>3.30±1.26</td>
<td>6.52±2.16</td>
<td>0.42±0.36</td>
<td></td>
</tr>
<tr>
<td>≥50</td>
<td>3.30±1.63</td>
<td>3.44±1.22</td>
<td>6.74±2.47</td>
<td>0.34±0.33</td>
<td></td>
</tr>
<tr>
<td>P</td>
<td>0.652</td>
<td>0.619</td>
<td>0.930</td>
<td>0.025</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>3.326±1.34</td>
<td>2.976±1.32</td>
<td>6.302±2.37</td>
<td>0.30±0.28</td>
<td></td>
</tr>
</tbody>
</table>
### Table 1b: Age and sex distribution pattern of thyroid volume in female subjects

<table>
<thead>
<tr>
<th>Age group</th>
<th>Right(MeanSD)</th>
<th>Left(MeanSD)</th>
<th>Mean Total Thyroid Vol(Mean)</th>
<th>Isthmus Vol</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;20</td>
<td>3.06±0.89</td>
<td>2.29±0.43</td>
<td>5.35±0.81</td>
<td>0.20±0.17</td>
</tr>
<tr>
<td>21-29</td>
<td>3.02±1.58</td>
<td>2.22±1.02</td>
<td>5.24±2.35</td>
<td>0.24±0.23</td>
</tr>
<tr>
<td>30-39</td>
<td>3.15±1.46</td>
<td>2.63±1.34</td>
<td>5.80±2.32</td>
<td>0.25±0.23</td>
</tr>
<tr>
<td>40-49</td>
<td>2.98±1.43</td>
<td>2.73±1.24</td>
<td>5.91±2.51</td>
<td>0.31±0.25</td>
</tr>
<tr>
<td>≥50</td>
<td>3.22±1.93</td>
<td>2.74±2.08</td>
<td>5.96±3.87</td>
<td>0.34±0.16</td>
</tr>
<tr>
<td>P</td>
<td>0.927</td>
<td>0.059</td>
<td>0.637</td>
<td>0.457</td>
</tr>
<tr>
<td>Total</td>
<td>3.08±1.55</td>
<td>2.57±1.38</td>
<td>5.65±2.61</td>
<td>0.24±0.23</td>
</tr>
</tbody>
</table>

**Fig 3:** Pie chart of sex distribution of study subjects.
Fig 4: Relationship between mean total thyroid volume with increasing age group.

Table II: Comparison between right and left thyroid lobes

<table>
<thead>
<tr>
<th>Thyroid lobes</th>
<th>Mean±SD</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Right</td>
<td>3.20±1.47</td>
<td>0.000</td>
</tr>
<tr>
<td>Left</td>
<td>2.77±1.37</td>
<td></td>
</tr>
</tbody>
</table>

The right lobe volume was greater than the left lobe. RLV is 3.20 ± 1.47 and LLV is 2.77 ± 1.37 with a p= 0.000. (Table II)

X. DISCUSSION

The knowledge of the normal thyroid volume is essential in evaluating diseases affecting the gland. A normogram of thyroid volume in our environment is important to serve as a reference point in managing patients with thyroid pathologies.

This study showed that the mean thyroid volume (Table II) was lower than the values recorded by other investigators among caucasians.26,24 Ahidjo et al4 in Maiduguri found the overall thyroid volume of 8.55 ± 1.82cm³, while that of males and females were 9.72cm³ and 7.58cm³ respectively. Ivanac et al15 in Zagreb obtained thyroid volumes that were higher than what was obtained in this study. In their study, the thyroid volume was 10.68 ± 2.83cm³. The reason for this difference values may be attributed to improved intake of table salt.27 The value obtained in this study is about the same with the study done by kayastha et al28, in which the mean thyroid volume was 6.629 ± 2.502cm³ in a mountainous area that has good iodization programme of food supplements. Increasing use of iodine supplementation in this country in the recent years could be one of the factors reducing the
iodine deficiency prevalent in the country and thus reducing the total thyroid volume.

The male’s thyroid volumes (6.30±2.37) were higher than that of females (5.65±2.61). This finding was similar to that of other investigators. 4,29,10,30,21. This may be due to the fact males have increased body mass index than females of the same age. However, Anele T17 and Marchie et al13 found no significant difference between males and females thyroid volumes.

The mean right lobe volume was higher than that of the left, and it was statistically significant. Similar findings were noted by other investigators.4,10,20,21 This increase may likely be due to increased vascularization of the right lobe compared to the left10.

The mean heights of males were higher than that of females. There was a positive correlation of thyroid and isthmus volume with height. Similar findings were noted by other investigators 4,31,15,20.

Thyroid volume increases steadily with increase in age in the females and male subjects. This increase was however, not statistically significant. Similar findings by Suwaid et al10 and Barrer et al13 were statistically significant. It was thought that thyroid volume increases with age up to 65 years as noted by Barrer et al21. The thyroid volume was higher in the less than 20years compared with 20-29years age groups in both sexes. The increase was not statistically significant. No obvious reason was found for such. It was however thought to be due to a growth spurt at less than 20years age groups.

The isthmus volume was higher in males (0.30±0.28) compared to females (0.24±0.23) and also increased with age. Servet et al20 in Turkey obtained values that were similar to this study. They recorded positive correlation between the mean isthmus volume with age, weight, height and BSA. The mean total isthmus volume was 0.45 ± 0.31 and that of males and females was 0.44 ± 0.34 and 0.46 ± 0.29 respectively. However, the mean isthmus volume in this study was lower than what they obtained in their study. The reasons attributed to difference in thyroid lobes volume in my study compared with others may also be applicable here.

In conclusion, there was no statistically significant increase in thyroid volume with increase in age. There was steady increase in isthmus volume with increase in age. The males thyroid volume was higher than that of females across the age groups. Also, the right lobe volume was noted to be bigger than the left.

REFERENCES
AUTHORS

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The geology and petrography of the ultramafic rocks at north-northeastern margin of Kandahar city, Afghanistan.

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Abstract: The border city in the southwestern side of Afghanistan, and a predominant portion of Helmand block comprises a huge wandering desert, domestic and industrialize opportunity, and a vast varieties of mountains (rocks), among such mountains one is Tur Ghar (Black mountain) at the north, northeastern view of the city, occurred through a volcanogenic activity. Kandahar’s Cretaceous sequence consists of volcanogenic-terrigenous rocks of the geosyncline type. When the Indian plate collided to the Eurasian plate the evidence is Kandahar volcanic at the southern margin of Afghan block. Geological maps of the area depict magmatic spots. The geological formation and rocks varieties are unknown. Here we show the geology, stratigraphy, and the petrography that consist here in the study area. Tur Ghar occupies the northeastern side of Kandahar city and some parts of ShawaliKot and Daman Districts. Such Cretaceous volcanogenic formation containing Hematite veins, fan alluvium foothills, lamprophyre, Basalt, lherzolitic rocks, and olivinite with basanite rocks. More obviously the area is completely magmatic (mafic-ultramafic) complex, which indicates black shiny appearance. Through the advanced geological, and geophysical opportunities some further investigations would be considered and expected results would be deep stratigraphical variation, its occurrences, and resources.

Key words: Geology, petrography, ultramafic rocks, Kandahar, Afghanistan.

1. Introduction
Ultramafic rocks are composed of orthopyroxene, clinopyroxene, Olivine minerals, and some of them are hornblende-bearing ultramafic rocks (Best, 2003). Ultramafic and ultrabasic rocks, though not abundant at the Earth’s surface, provide valuable insight into basalt magma genesis and mantle source domains (Gill, 2010). A primary earth science information about such area is missing in all native and worldwide literature except the geological map of Afghanistan by USGS compiled in 2006, which is the up to date edition of the Afghan geological map, which was designed by BGS in 1977. All that missing is because of 40-year foreign and tribal wars that cause many more catastrophes like bans of schooling, a huge volume of migration, no family without sacrifices, and etc. This transcript provides an introduction of the area through the respect of geological structures (mountains, and hills), and other varieties like different types of deposits especially at the foothill of those structures that existing or being visible at each lower part of the mountains. Such structures have been considered and investigated with the significant of thin-section petrography, mega section identification, field observation, including with previous geological maps, and areal availabilities that will provide the sequence stratigraphy of each structure and general magnitude of them. Geological formations of this area exhibit igneous (volcanic) formation, and some deposits like fan alluvium. Meanwhile, such area in Afghan geological formation belongs to the mountainous region of south-eastern Afghanistan that includes the Afghan part of the Suleiman Mountains bounded in the north by the Spin Ghar and Altamur ridges, in the west by the Ghazni-Kandahar Highland and in the south by the Registan Desert (SH Abdullah, geology and mineral resources of Afghanistan, 2008). As a result, some petrological varieties including geological structures, stratigraphic understanding, and geographical position would be considered, and the concern about the (varieties, occurrences, and identification) of rocks among public and private sectors will have vanished.

2. Study area.

http://dx.doi.org/10.29322/IJSRP.10.01.2020.p9709  
www.ijsrp.org
Kandahar or the southwestern state of Afghanistan comprises three major geological varieties, the southern half of it, is scorching desert (Sahara), the northern part of the province containing a huge volume of mountainous hills, and mountains that are called relief zone, finally, the remaining part between these controversies are domestic, industrialize city, and productive area that is properly applicable for rehabilitation, and moderate irrigation. Such staying area is good enough choice rather than others through the respect of geological aspects (soils, water, and temperature), a city among the ridges existed in the center of its districts and neighbors, keeps the role as a focal point, and even famous both politically and historically. While 3 out of 4 highways toward outside are just crossing on or in those ridges, and just like a geostrategic spot covered by barriers. Such kind of structure has predominant role in the evolution of this city, because it safes from rebel or any other enemy, and another valuable aspect for it is the revolution the first ancient civilization that took place on the edge of Arghandab River, a river that guessed a big gift to the area mandating more than 80 percent of agriculture development, and as well as supports all live stocks. The geopolitical importance of the area is more considered, which had been being capital of the country several times. It is a border city having good relationships with both 3 native states and 1 country (Pakistan). Hot scorching heat at the summit of summer reaches to almost 48oC guessed much more annoying but an opportunity for the corpses that matured rapidly and saturates the market first, and a tiny winter span that rarely reaches to minus 8oC, do not keep people workless for a long time, that is why more than a several thousand other states’ residents staying as a labors consuming their forces right here to sustain their life properly. Visible mountains from the city like Pil Ghar, Myan Koh, Tur Ghar, Arghandab Ghar, BaBa Sahib Ghar, Kukaran Ghar, Shurandam Ghar, and Surfuza stony hill are quite famous, blocking the city from its suburbs. Among these local named mountains, the (Tur Ghar) is located from northeast to the northern sides of Kandahar city that kept under deep consideration through this information.
Figure 1: (A) Geological map of Afghanistan published 1977, the block square at the southwestern corner is the study area indicates a magmatic structure. (B) Google earth image showing the area, including fan alluvium in the basement of the mountain. (C) Dykes at hematite hill. (D) Volcanic dome shows the mode of occurrences of the mountain comprises basalts rocks. (E) Hematite vein structures in a single hill at the southern margin of the mountain, hand specimen figure (#). (F) foothill of the mountains and hills containing basaltic holder and conducted to fan alluvium. (G) a view of magmatic rocks mountain.

3. Review of the literature

An overall geological depiction of two provinces in the southwestern zone of Afghanistan revealed in a quadrangle 3146, Kandahar (606) sheet (1: 250,000) by USGS and AGC (Afghanistan Geodesy & Cartography Head Office, that complied by (Dennis W. O’Leary and John W. Whitney 2005), such map introduces the updated version of the Magmatic map of Afghanistan that compiled in 1977. The geological formation that exposed in the north-east of the town of Kandahar is known by Anagay Formation, consisting of pre-Barremian beds, some intrusion, and volcanic-terrigenous rocks (BGS,2008, p. 165). Kandahar volcanic-region is depicted in the Helmand-Arghandab uplift zone (Map of magmatic formation of Afghanistan.1977, 1: 2,500,000). The Kandahar forearc basin developed during late Jurassic-mid-Cretaceous times along the present SE margin of the Helmand Block, and it is separated from the latter by Moqor-Tarnak Fault. The volcano-sedimentary basin was located on the margin of the Neotethys realm of Baluchistan. The basin is narrow in the NE, broadening towards the SW, where it continues below the Sistan Desert in the Chagai are along the Afghan-Pakistan border. To the east, the basin is truncated by the Chaman Fault, which separated it from the Paleogene sediments of the Katawaz Basin belonging to the Himalayan tectonic domain (Siehl, 2017, p.76). The first evidence that India drifted north, away from Gondwanaland toward the enlarged Eurasian plate with the Afghan block at its southern margin is the Kandahar volcanic and that marked the beginning of the development of a volcanic arc on the margins of the Eurasian upper plate. These were intruded by subduction-related, I-type granitoid in the Helmand and west Nuristan blocks (during the Cretaceous to early tertiary). The Farad block was subsequently overlain by Upper Jurassic-Cretaceous sediments and the Helmand block by Cretaceous sediments only. During this period the Pamir and West Nuristan blocks of northeast Afghanistan were also accreted onto Eurasia. These four blocks, together with the Tadjik block, are collectively known as the Afghan Block (Ministry of Mine AGS. n. d). All the igneous intrusions in the area including mountains and hills in a wide distribution are Neogene volcanoes (AFG Geology). Early in the Mesozoic, Pangaea began to break apart into two major pieces: Laurasia to the north of the Tethys Sea and Gondwana to the south. Smaller landmasses split off from Gondwana into the Tethys Sea. During the Cretaceous, one of these landmasses, now part of central Afghanistan south of the Hari Rud fault, was sutured against Laurasia. India was another one of these landmasses, migrating during the Cretaceous and Paleocene across the Tethys; by the middle Eocene, it had begun to collide with Laurasia northeast of Afghanistan, forming the beginning of the Himalayan orogeny. A tongue of the Tethys Sea remained between Afghanistan and India until the Pliocene. Deposited upon this remnant of oceanic crust was marine sediments. As this oceanic crust was subducted westward beneath Afghanistan, igneous activity increased along the eastern margin of Afghanistan that is now west of the Chaman fault (Schindler, 2002). Petrographic study of the chromite samples recorded between 5-10% interstitial silicate minerals in the ultramafic lithology. In chromite sample LGR 013 this consists largely of olivine with minor alteration to serpentine, whilst the other samples are more altered with mainly serpentine, chlorite and a few remnants of olivine. A photomicrograph of chromite LGR 010 showing olivine with the serpentine alteration. The chromite itself is generally fresh showing red to red-brown colors with some minor darkening along with fractures, but LGR 001 (chromitite) is much more intensely darkened indicating alteration to ‘ferrit-chromite’ and magnetite (Styles, June 2009). The most prospective areas for gold-bearing skarn are the south-central provinces of Zabul, Ghazni, and Kandahar which contain over 50 gold-bearing sites including the largest gold resource currently known in Afghanistan. The occurrences are associated with Cretaceous subduction-related volcanic arcs within the Helmand Block (Coats, January 2006). The beginning of the development of a magmatic arc on the southern margin of the Eurasia Plate was marked by the Late Jurassic and middle Cretaceous Kandahar volcanic (Klaus Steinmuller, Dec 2010, p. 10). Cu and Pb-Zn skarn deposits and their related vein and manto style deposits are found adjacent to both late Triassic intrusions formed during the Cimmerian orogeny in Herat and Baghlan provinces, and to Oligocene intrusions in Uruzgan and Kandahar. Many of these occurrences are small but those at DarraAlasang in the Baghlan, as well as Darra-i-Nur and Kalai-Assad in the Kandahar province, are larger and more economically significant (Klaus Steinmuller, Dec 2010, p. 28). Organic remains are scarce. Poorly preserved remains of ammonites were collected in an area 20 kilometers east of Kandahar along the road to Spin Boldak. After preliminary examination, N.P Luppov identified Costidiscus sp., Paraspidiceras sp., and Leptoceras sp. On this basis, he dated the enclosing rocks as Barremian. Later he succeeded in identifying one of the forms as cotidiscus ex gr. Recticotatus Orb., and placed the rocks into a range of Upper Barremain-Lower Aptian (SH Abdullah, geology and Mineral resources of Afghanistan, 2008). The report of Pajwak Afghan news about Kandahar prescribed estimated iron mine around 8.5 million tons in Khakriz district, Marble mine in Dara-e-Noor in Maiwand district, fluorite mine in Bakhhtu mountain in Nish district, Stacoo mine around 2.5m deep and 5m wide in Dama district 22,242 cubic meters extracted annually, Cement mine in Zakir Shirif in Dand district 14 kilometer east to Kandahar city, Coal in Spin Boldak pajwak news. Iron bearing deposits in Kandahar province like Haji Alam mine in Khakriz district, Asad
Kala with 63% magnetite, Syah Darah in khakriz district, Dara Chinar in Khakriz district, including with some other ore-bearing deposits (Taniwal, 2009).

4. Regional geology
The south-western side of Afghanistan consists different geological formations from ancient Precambrian up to quaternary, and it is one of the terrane (Helmand block) of the afghan block (Helmand block, Pamir block, West-Noristan block, Farak block these are the anterior separated blocks of Gondwana supercontinent and Tajick block in the southern margined part of Eurasia supercontinent), however, the Helmand block is among the Helmand and Chaman faults and contains Maqur and Tirin sub-faults, and with so many other geological varieties such as (Sistan basin, Chagay Arc, Rashkoh Arc, and northeast of Kandahar city Kandahar Arc.). The sampling area completely consists of Kandahar Arc (Kandahar mountain). Kandahar Arc is the distinguished part of the Helmand block (SH Abdullah, geology and Mineral resources of Afghanistan, 2008). Some portion of it is the evidence of Late Cimmerian, and the Kandahar forearc basin developed in the Late Jurassic–Mid Cretaceous at the active west-directed subduction zone of the Balochistan Neotethys (Siehl, 2017). This Arc consists of so many local named mountains as (Pil-Koh; Baba-Sahib; Khaybar; Toor-Ghar; Dahla Dam; Kokaran; Chilzini), and even so many hills at the foothills of such mountains, including with some mineral resources like a huge amount of gypsum veins in different places, dolomite containing rocks and in the further west of the province in Khakriz district the iron-bearing deposits accompanied with marble and precious stone.

5. Method
Topographical studies of the targeted relief structures have been conducted through fieldwork, including their structural varieties, positioning, and their average width and length. Sampling for petrographical studies has been done in the applicable points mainly at the crashing and excavating spots, and then provided them to polarize microscope to be considered micro-petrography of the rocks. Considering the Lithostratigraphy of each point and explaining it with diagrams and figures including the basement structures, and the deposits at the skirt of those mountains.

6. Result
The following section is the overall description of my research (petrographical, and structural information of the mountains located at the boundaries of Kandahar city.

1. Tur Ghar: Tur Ghar or black mountain (figure 1) occupies a huge area at the northeastern side of Kandahar province, it views east-to-west from the city, but it lays from northeast-to-southwest, beginning from the middle of Shawali Kot at the southern corner of Dahla Dam up to the northern margin of Kandahar City, almost 35 kilometers in length, average width is 4-5 kilometers, and around 1300-1500m elevation. It separates Arghandab, and Shawali Koot districts from Dand district. Both sides of such mountain are comprised of fan alluvium deposits.

Figure (2): The illustrations introduce fresh samples, marginal appearances of some spots, and visibility from a remote area.

1.1. Petrography: Almost 6 types of different rocks were collected, while 3 types were more abundant and prepared for petrographical studies, and the rest were identified through hand specimens, including basalt, lamprophyre, hematite with quartz veins and studied for further investigation. Under the petrographic microscope plane and crossed polarized light has been conducted, both textural and mineralogical studies were done with the prepared slides.
Figure (3): Magnesium-rich olivinite of Tur Ghar and microphotograph of PPL and XPL. The study area of the samples is located at the southern portion of Tur Ghar at the further north of Ayno Mina new city at the northeastern side of Kandahar old city. Its aphanitic texture covered a huge area such as domes and isolated peaky structures, including enough soils or sand deposits at the basement that makes clear it's adjusting to easy weathering rather than others (figure 2). Such rocks occur at the margin of other siblings like dunite rocks, serpentinite, and basalt. The specimens are free from any injected veins and vessels but only surficial variation at weathered spots that causes the easy brittle in such a portion. Compose of it is 90% olivine mineral with quartes, and magnesium accessories. Under microphotography, the rock looks green with white spots and the crystals of the rock are not distinguishable, which means very fine grains with the result of rapid cooling through cold atmospheric surroundings. The specimens look free from relief structures and no twining with zero cleavage. Hand specimen or seeing from the remote area it looks like a black monster, but when you take it out or took a broken sample it looks like green leaves of arid zone tree.

Figure (4): Hematite with magnesite veins of Tur Ghar and microphotograph of PPL and XPL Samples area at the further north of Ayno new city almost 15 km at the northeastern side of Kandahar old city, appeared just like a middle reddish hill in front of that black mountain, and just separated by a valley (figure 1c). The geology of the hill looks like layers around 10 cm to 1m of such reddish hematite, between those layers fragments of such hematite deposited that introducing its adjustment to the dominated weather phenomenon. With its aphanitic texture no, one capable to distinguish the grains. Low metallic luster with the reddish streak, and with massive structure. The samples with its heavy scale rather than its neighbor rocks (serpentinite, dunite, lherzolite). The rock composition with its opaque diaphaneity containing a huge amount of Hematite with magnesite veins. No more accessories are applicable.
Figure (5): Lherzolitic of Tur Ghar and microphotograph of PPL and XPL. Lherzolitic from such Tur Ghar complex containing more than 70 percent volume, such rock with blackish basanite blanket occurred at near beneath of basalt rocks, mainly contact with basalt. Geographically located at the northeastern side of Kandahar city, well known by a black mountain in the local area but after taking a fresh hand sample except a thin black layer the whole body is greenish to dark greenish lherzolite rocks. This rocks with its massive appearance containing medium grains which are enabled to see through the necked eye. By containing visible grains introduce us to a phaneritic igneous texture. The colorless in thin section is Clinopyroxene, the green and greenish are orthopyroxene, the brown indicates the spinal minerals, the reddish is the chromite accessories. With a no twining containing, that has relief structures.

1.2. Stratigraphy: The area containing varieties of stratification that is distinguishable during field observation. Both sides along the strike covered through alluvium fan that comprises rock samples including from tiny particles up to the size of a boulder, and at the near margin solitary hills comprising hematite veins with eroded soil’s particles, apart from that the valley shape between hill and mountain is again alluvial fan (figure). The vertical lithostratigraphical variation forms the bottom of the mountain started by lherzolitic, Basanite-Dunite and at the top a massive basalt.

Figure (7): diagram shows surficial stratigraphy
7. Discussion

This geological spot is at the middle of Helmand terrain (Kandahar province) occupies the central, south-southwestern geography of Afghan block, depicts completely mafic-ultramafic rock containing geological structures (mountains, and hill), and easily distinguishable from the rest geological structures (sedimentary, metamorphic, losses, and vast area of sand Sahara). Such mountainous ridge is a subpart of Afghanistan central mountains that started from the north of Ghuzni and Bamyan provinces crossing the north of Zabul and Uruzgan provinces reaches to the north of Helmand Kajakie water dam, and southeastern wing of such enlarged structure become weak at the north of Kandahar city, but more furtherly vanished at the periphery of Kandahar Registan Desert (Taniwal, 2009). It is volcanos geological formation that may have occurred at the age of mega colliding or some convergent geological formation at the peripheries of this terrane. In the Kandahar, in contrast to all others, the Cretaceous sequence consists of volcanogenic-terrigenous rocks of the geosyncline type (BGS, 2008, p. 26). On behalf of the field observation majority of the rocks are basalts, regarding its physical, and chemical properties, basalt rock weathers fast, so that is why soils and other weathered particles are accompanied up to the upper peaky points of the mountains. Stratigraphical formation of the area shows (1) fan alluvium, (2) hematite dikes containing hills, (3) volcanogenic valley full of basanite rocks boulders, (4) soil aggregated with fine grains olivinite rock, (5) combination of lherzolitic, lamprophyre, and magnesium-rich serpentine, (6) and finally the whole surficial rocks structures containing basalt, and basanite rocks. It strikes from northeastern to the northwestern direction. The foothill of the southern side of the mountain that consists of soil and boulder particles in the form of a huge vast plain was free and weapon’s storage zone called (Kishla Jijid) in the previous government, but right now changed to a very new urbanized area. One unexpected idea that I have such rock would not good enough capable to industrialize at the bridge, and dam area while continuously faced to water flow because these rocks are unresisting against erodible agents, and the discharging of the gravels should be avoided from the visible attractive area because it destroys the landscape of the mountains. The lack of petrological, and geophysical opportunities limited me from further beneath, and advanced consideration, by such advanced instruments the garnet, and lamprophyre formation will be available. However, the area with dark and greenish color explains volcanic rocks, the darkish foothill and rested plain area have occurred during magmatic activities and latter geological and environmental impacts. The resources are quite applicable industrializing objects rather than liquid confrontation foundation.

8. Conclusion

The northeastern portion of Kandahar city including some parts of Shawalikot, and Daman districts occupied by mafic-ultramafic intrusive, and extrusive rocks containing hematite veins, basanite, lamprophyre, and basalt. Stratigraphical variation from bottom to top is indicated by the grain size of the rocks, while the coarse grains rocks at the foundation and the very fine grains rocks at the top. Soils and rock’s weathered particles being visible up to the very peaky point of the mountains, that is because of the non-consistency of extrusive basalt rocks. Deep stratigraphical (borehole) researches should be conducted for garnet and other related valuable resources. Extracting of construction sands at random spots should be avoided regarding the landscape of the area.

References
Coats, J. S. (January 2006). Minerals in Afghanistan ; the potential for gold. BGS.

Comparative analysis of Percutaneous Needle Aspiration of Breast abscess with antibiotic cover versus Traditional Surgical Incision and Drainage

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Abstract- INTRODUCTION – Observing the poor satisfaction and morbidity following incision & drainage of breast abscess, the need for alternate treatment modalities is frequently being questioned. Repeated needle aspiration with antibiotic cover is an effective and satisfactory treatment modality. METHODS - In study group, percutaneous needle aspiration of abscess under local anesthesia was done with 18/16G needle. Empirical antibiotic therapy with amoxicillin clavulanic acid was started which was changed in accordance to pus culture & sensitivity report if needed. In the control group, breast abscess was treated by conventional Incision & drainage under general anesthesia in operation theatre. Breast abscess treatment acceptance was assessed at the last visit.

RESULTS – The patients treated by repeated needle aspiration had lower complication rate and scar formation compared to incision & drainage group (P<0.001). The patient satisfaction was excellent, as there were no scar and cosmesis result was good (P<0.001).

CONCLUSION - Percutaneous aspiration of breast abscess is simple, painless, day care procedure and effective alternative method of treatment to incision and drainage in properly selected patient with better outcomes in terms of better cosmetics and shorter duration hospital stay.

Index Terms- Breast abscess, Incision & drainage, Aspiration, Patient Satisfaction

I. INTRODUCTION

Breast abscess is one of the most common form of abscess in surgical emergencies, usually seen in lactating woman [1,2]. The frequency of occurrence is highly related to pregnancy and mainly caused due to minor trauma to nipple by a child during feeding and bacterial colonization due to improper nursing technique and incomplete emptying of the breast [3,4]. Immediate diagnosis and treatment are necessary if breast feeding is to be continued and for the prevention of further complications [5]. At an early stage, acute mastitis may be treated by the use of appropriate antibiotics [6]. Once an abscess is established, management involves incision and drainage by providing general anesthesia however this is associated with regular dressing, prolonged healing time, and difficulty in breast feeding, possible unsatisfactory cosmetic outcome, rupture and recurrent breast abscesses [7]. Hence now-a-days treatment of breast abscess by repeated needle aspiration with or without ultrasound guidance gained importance [8]. This procedure has been used successfully and is associated with less recurrence, excellent cosmetic results and has lesser cost [9]. The purpose of this study was to compare the outcome and effectiveness of traditional incision and drainage against needle aspiration in the treatment of breast abscess in postoperative pain, duration of hospital stay, healing time, cosmetic outcome and patient satisfaction.

II. MATERIAL AND METHODS

SOURCE OF DATA
• Cases coming to the OPD and emergency department at Dr. Susgila Tiwari Government Hospital, Haldwani with breast abscess were clinically evaluated.

METHOD OF COLLECTION OF DATA
• Data was collected from patient diagnosed between January 2018 to September 2019 with breast abscess in each group of study. Randomization was done with the alternate patient being placed in case and control group. Total 60 patients were studied.

INCLUSION CRITERIA
• Patient who will be coming in the OPD and emergency with a breast abscess.
• Patient giving consent to be part of this study

EXCLUSION CRITERIA
• Patient not giving consent to be part of study

III. METHODOLOGY

• Percutaneous needle aspiration of pus under local anesthesia was done with 18/16G needle. Empirical antibiotic therapy with amoxicillin clavulanic acid was started. Aspirated pus was sent for bacteriological study. The antibiotics were changed in accordance to sensitivity report if needed.
Lactating patients were advised to resume breast-feeding on both breasts as soon as possible. The patient’s follow up was done at the OPD on day 3, day 7, day 14 and on day 30.

At every follow up, clinical assessment of symptoms and signs was done to assess resolution of the abscess. Ultrasound scan was done to assess radiological resolution of the abscess which was defined as complete absence of fluid collection, normal breast glandular and fibro fatty tissues without edema. In situation where the abscess persisted in case of ultrasound guided needle aspiration, re-aspiration was done on day 3, 7, if it still persisted on day 14 it was considered as treatment failure and hence converted to the traditional incision and drainage.

In the control group, breast abscess was treated by conventional incision & drainage under general anesthesia in operation theatre. Breast abscess treatment acceptance was assessed at the last visit (day 30).

### IV. OBSERVATIONS & RESULTS

#### Table 1: Mean Age between Group A (Needle aspiration) and Group B (Incision and Drainage)

<table>
<thead>
<tr>
<th>Age Groups</th>
<th>Group A (Needle aspiration)</th>
<th>Group B (Incision and Drainage)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean ± SD</td>
<td>Mean ± SD</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>29.37 ± 5.64</td>
<td>30.73 ± 8.70</td>
<td>0.473</td>
</tr>
</tbody>
</table>

#### Table 2: Age group distribution between two groups

<table>
<thead>
<tr>
<th>Age Groups</th>
<th>Group A (Needle aspiration)</th>
<th>Group B (Incision and Drainage)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>%</td>
<td>Frequency</td>
</tr>
<tr>
<td>Upto 20 yrs</td>
<td>0</td>
<td>0.0%</td>
<td>2</td>
</tr>
<tr>
<td>21 - 30 yrs</td>
<td>20</td>
<td>66.7%</td>
<td>18</td>
</tr>
<tr>
<td>31 - 40 yrs</td>
<td>9</td>
<td>30.0%</td>
<td>8</td>
</tr>
<tr>
<td>&gt;40 yrs</td>
<td>1</td>
<td>3.3%</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100%</td>
<td>30</td>
</tr>
</tbody>
</table>

#### Table 3: No. of Aspirations

<table>
<thead>
<tr>
<th>No. of Aspirations</th>
<th>Group A (Needle aspiration)</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>1</td>
<td>5</td>
<td></td>
<td>16.7%</td>
</tr>
<tr>
<td>2</td>
<td>21</td>
<td></td>
<td>70.0%</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td></td>
<td>13.3%</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td></td>
<td>100%</td>
</tr>
</tbody>
</table>

#### Table 4: Amount of Aspirate

<table>
<thead>
<tr>
<th>Group A (Needle aspiration)</th>
<th>Amount of Aspirate</th>
<th>Mean ± SD</th>
<th>Median</th>
<th>Min - Max</th>
<th>Median (IQR)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>28.17 ± 31.80</td>
<td>13.00</td>
<td>2 - 100</td>
<td>13.00</td>
<td>6.00 - 30.00</td>
</tr>
</tbody>
</table>

#### Table 5: Correlation between Causative Organism and two groups

<table>
<thead>
<tr>
<th>Causative Organism</th>
<th>Group A (Needle aspiration)</th>
<th>Group B (Incision and Drainage)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>E. coli</td>
<td>3</td>
<td>10.0%</td>
<td>6</td>
</tr>
<tr>
<td>MRSA</td>
<td>23</td>
<td>76.7%</td>
<td>18</td>
</tr>
<tr>
<td>No growth</td>
<td>3</td>
<td>10.0%</td>
<td>2</td>
</tr>
<tr>
<td>Staph</td>
<td>0</td>
<td>0.0%</td>
<td>3</td>
</tr>
<tr>
<td>Streptococcus</td>
<td>1</td>
<td>3.3%</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100%</td>
<td>30</td>
</tr>
</tbody>
</table>
Table 6: Antibiotic susceptibility profile between two groups

<table>
<thead>
<tr>
<th></th>
<th>Group A (n=30) (Needle aspiration)</th>
<th>Group B (n=30) (Incision and Drainage)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of Patients</td>
<td>%</td>
<td>No. of Patients</td>
</tr>
<tr>
<td>Meropenem</td>
<td>2</td>
<td>6.7%</td>
<td>0</td>
</tr>
<tr>
<td>Ampicillin+ sulbactum</td>
<td>2</td>
<td>6.7%</td>
<td>0</td>
</tr>
<tr>
<td>Linezolid</td>
<td>14</td>
<td>46.7%</td>
<td>6</td>
</tr>
<tr>
<td>Levofloxacin</td>
<td>1</td>
<td>3.3%</td>
<td>0</td>
</tr>
<tr>
<td>Cotrimoxazole</td>
<td>2</td>
<td>6.7%</td>
<td>0</td>
</tr>
<tr>
<td>Clindamycin</td>
<td>1</td>
<td>3.3%</td>
<td>0</td>
</tr>
<tr>
<td>Azithromycin</td>
<td>1</td>
<td>3.3%</td>
<td>0</td>
</tr>
<tr>
<td>Teicoplanin</td>
<td>1</td>
<td>3.3%</td>
<td>0</td>
</tr>
<tr>
<td>Ciprofloxacin</td>
<td>2</td>
<td>6.7%</td>
<td>6</td>
</tr>
<tr>
<td>Ampicillin-Subactam</td>
<td>10</td>
<td>33.3%</td>
<td>2</td>
</tr>
<tr>
<td>Tetracycline</td>
<td>2</td>
<td>6.7%</td>
<td>1</td>
</tr>
<tr>
<td>Polymixin B</td>
<td>0</td>
<td>0.0%</td>
<td>2</td>
</tr>
<tr>
<td>Amoxicillin +clavunice</td>
<td>5</td>
<td>16.7%</td>
<td>9</td>
</tr>
<tr>
<td>Amoxicillin-Clavulanate</td>
<td>1</td>
<td>3.3%</td>
<td>2</td>
</tr>
<tr>
<td>Amikacin</td>
<td>2</td>
<td>6.7%</td>
<td>5</td>
</tr>
<tr>
<td>Vancomycin</td>
<td>15</td>
<td>50.0%</td>
<td>7</td>
</tr>
<tr>
<td>Gentamycin</td>
<td>1</td>
<td>3.3%</td>
<td>13</td>
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Table 7: Correlation between Lactation continued after & two groups

<table>
<thead>
<tr>
<th>Lactation continued after</th>
<th>Group A (Needle aspiration)</th>
<th>Group B (Incision and Drainage)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of Patients</td>
<td>%</td>
<td>No. of Patients</td>
</tr>
<tr>
<td>Allowed</td>
<td>22</td>
<td>73.3%</td>
<td>14</td>
</tr>
<tr>
<td>Not allowed</td>
<td>8</td>
<td>26.7%</td>
<td>16</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100%</td>
<td>30</td>
</tr>
</tbody>
</table>

Table 8: Appearance of Antioma in patients undergoing needle aspiration

<table>
<thead>
<tr>
<th>Antioma</th>
<th>Group A (Needle aspiration)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Patients</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>NP</td>
<td>28</td>
<td>93.3%</td>
</tr>
<tr>
<td>P</td>
<td>2</td>
<td>6.7%</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 9: Correlation between Patient Satisfaction & Two groups

<table>
<thead>
<tr>
<th>Patient Satisfaction</th>
<th>Group A (Needle aspiration)</th>
<th>Group B (Incision and Drainage)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Patients</td>
<td>%</td>
<td>No. of Patients</td>
<td>%</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>0.0%</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>0.0%</td>
<td>9</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>3.3%</td>
<td>14</td>
</tr>
<tr>
<td>6</td>
<td>16</td>
<td>53.3%</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>13</td>
<td>43.3%</td>
<td>0</td>
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<tr>
<td>Total</td>
<td>30</td>
<td>100%</td>
<td>30</td>
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</table>

Table 11: Correlation between Cosmetic outcome & two groups

<table>
<thead>
<tr>
<th>Cosmetic outcome</th>
<th>Group A (Needle aspiration)</th>
<th>Group B (Incision and Drainage)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Patients</td>
<td>%</td>
<td>No. of Patients</td>
<td>%</td>
</tr>
<tr>
<td>No Scar</td>
<td>29</td>
<td>96.7%</td>
<td>0</td>
</tr>
<tr>
<td>Scar</td>
<td>1</td>
<td>3.3%</td>
<td>30</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100%</td>
<td>30</td>
</tr>
</tbody>
</table>

Table 12: Correlation between Hospital stay & two groups

<table>
<thead>
<tr>
<th>Hospital Stay</th>
<th>Group A (Needle aspiration)</th>
<th>Group B (Incision and Drainage)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Patients</td>
<td>%</td>
<td>No. of Patients</td>
<td>%</td>
</tr>
<tr>
<td>No Scar</td>
<td>29</td>
<td>96.7%</td>
<td>0</td>
</tr>
<tr>
<td>Scar</td>
<td>1</td>
<td>3.3%</td>
<td>30</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100%</td>
<td>30</td>
</tr>
</tbody>
</table>
Breast abscess is defined as an acute soft tissue infection which is characterized by localized pain, swelling and redness associated with a mass that may or may not be fluctuant. Most breast abscesses develop as a complication of lactational mastitis. The standard clinical treatment of breast abscess has been incision and drainage of pus and antibiotics. This procedure has its own limitations like pain, fear of incision, prolonged healing time, difficulty in breastfeeding and the possibility of milk fistula and unsatisfactory cosmetic outcome. This procedure needs hospital stay and have various drawbacks. In need of a less invasive method and good cosmetic outcome, various methods have been suggested. One of these methods is repeated needle aspirations under antibiotic cover which is done on OPD basis.

A study conducted by Richard J Schwarz et al to see whether or not needle aspiration of breast abscesses without ultrasound guidance was an efficient treatment modality, showed that needle aspiration without ultrasound guidance is an efficient treatment for breast abscesses.

In our study in 60 patients, the mean age was 29.36 years in aspirated and 30.73 years in incised group. Most patients had lactational breast abscess in 20 (66.66%). Of the 20 patients in I & D group, 6 patients (30%) were unable to resume lactation whereas only 1 patient (5%) in the aspiration group was unable to do so. The mean number of aspirations needed was 1.96.

A prospective study conducted by Ranjeesh V et al in 60 patients with clinical features suggestive of puerperal breast abscess. The patients were divided into two treatment groups A and B with 30 patients in each group. Patients in group A underwent percutaneous needle aspiration and in group B underwent open surgical drainage. In group A 25 patients were treated successfully with needle aspiration and antibiotics. 7 abscesses showed growth of S. aureus, 17 showed MRSA, 4 showed no growth, 2 abscesses showed other rarer organisms. Success rate of aspiration was found to be 83%.

In our study, the most common isolated pathogen was MRSA in both needle aspiration group (76.7%) and incision & drainage group (60.0%). The patients treated by repeated needle aspiration had lower complication rate and scar formation compared to incision & drainage group (P<0.001). Antibiotic formation was seen in 2 patients in the needle aspiration group, which was eventually treated with incision and drainage. The antibiotics were changed as soon the culture and sensitivity reports were available.

A study conducted by Anita Jagdish Kandi et al compared the outcomes in management of breast abscess by ultrasound guided needle aspiration against incision and drainage. They found that satisfaction rate in patients treated by USG guided aspiration was 88.57% and in incision & drainage was 54.1%. They concluded that USG guided aspiration is simple, painless, day care procedure and effective alternative treatment to incision and drainage in properly selected patient and with timely support by sonologist.

In our study, the patient satisfaction was excellent, as there were no scar and cosmesis result was good (P<0.001). The apprehensive patients were especially happier towards needle aspirations and avoiding ugly scar marks left after incision and drainage.

<table>
<thead>
<tr>
<th>No. of Patients</th>
<th>%</th>
<th>No. of Patients</th>
<th>%</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPD</td>
<td>1</td>
<td>3.3</td>
<td>24</td>
<td>80.0</td>
</tr>
<tr>
<td>OPD</td>
<td>29</td>
<td>96.7</td>
<td>6</td>
<td>20.0</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100%</td>
<td>30</td>
<td>100%</td>
</tr>
</tbody>
</table>

V. DISCUSSION

Breast abscess is a common problem, especially in lactating female. The traditional treatment by incision and drainage causes a considerable distress in patients. This also require hospital stay and leaves an ugly scar mark. With the present treatment option by repeated needle aspirations and antibiotics, the need of general anesthesia, hospital stay and scar marks could be avoided. The other complication like pain, regular dressings, problem in breast feeding and mammary duct fistula are also avoided. With appreciable cure rate by repeated needle aspiration, this method can be preferred as treatment of breast abscess in selected patients. Thus, percutaneous aspiration of breast abscess is simple, painless, day care procedure and effective alternative method of treatment to incision and drainage in properly selected patient with better outcomes in terms of better cosmesis and shorter duration hospital stay.

VI. CONCLUSION

Breast abscess is a common problem, especially in lactating female. The traditional treatment by incision and drainage causes a considerable distress in patients. This also require hospital stay and leaves an ugly scar mark. With the present treatment option by repeated needle aspirations and antibiotics, the need of general anesthesia, hospital stay and scar marks could be avoided. The other complication like pain, regular dressings, problem in breast feeding and mammary duct fistula are also avoided. With appreciable cure rate by repeated needle aspiration, this method can be preferred as treatment of breast abscess in selected patients. Thus, percutaneous aspiration of breast abscess is simple, painless, day care procedure and effective alternative method of treatment to incision and drainage in properly selected patient with better outcomes in terms of better cosmesis and shorter duration hospital stay.

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Comparative study of early vs late enteral feeding following intestinal anastomosis

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http://dx.doi.org/10.29322/IJSRP.10.01.2020.p9711

Abstract- INTRODUCTION – Observing the low incidence of complications following early feeding in patients undergoing intestinal anastomosis, the need for delayed feeding is frequently being questioned. The early enteral feeding in intestinal anastomosis can be safely started.

METHODS - In study group we started the feeding after 12-14 hours of surgery with clear water at the rate of 50ml/hr. Well tolerated patients were taken on semi-solid diet after 24-36 hours and on normal regular diet after 36-48 hours of surgery. Patients general vital charting, assessment of time of passage of first stool, appearance of bowel sounds and assessment of complains was done at 12 hourly all complications is recorded.

RESULTS – The average length of hospital stay was shorter in the early feeding group and was statistically significant with a (P<0·001). There were no complications of anastomotic leakage in both the delayed feeding group and early feeding group.

CONCLUSION - Early feeding after intestinal anastomoses is a safe method that improves the condition of the patients without increasing the post-operative complications and this increases patient’s satisfaction irrespective of the surgical technique used.

Index Terms- Anastomoses, Early Feeding, Delayed Feeding, Leakage

I. INTRODUCTION

The concept of delayed oral feeding following gut surgery only after passage of flatus or stool has been adopted over the years with the notion that restriction of oral feeding offers the GIT longer to heal and recover and reduces stress on anastomosis site and prevent leakage thus reducing post-operative complications, [1] but even if we do not give oral feeding, about 2-2.5 L of gastrointestinal and pancreatic secretions enters the small bowel and transit from the anastomosis site. It was antecedently assumed that the fasting would defend the anastomosis from any complication like abdominal distention, vomiting, ileus, anastomotic dehiscence or leaks, wound infection and would allow a hermetic closure of the anastomosis before the beginning of enteral feeding. [2-4]. It is clearly demonstrated that the mucosal epithelium of the bowel is perfectly sealed after the first 24 hours of the post-operative period. According to Davila-Perez et al. [5], it is not necessary to keep the 5-day fasting in order to prevent post-operative complications and should not be used routinely. ESPEN guidelines suggested early initiation of enteral feeding within twenty-four hours after gastrointestinal surgery however conjointly state that it has to be adapted in keeping with the individual tolerance and type of surgery [6]. Initiation of feeding ought to be progressive and a 24-hr liquid diet should be maintained before starting a bland diet just in case of complications ought to arise. Gulsen Ekigen et al. reported in their study that early small-volume feed tends to be tolerated and are valuable despite the kind of abdominal surgery and in different study the time for reaching a complete diet were significantly earlier in the early feeding group, also hospital stay decreased [7].

II. MATERIAL & METHODS

SOURCE OF DATA

• Cases admitted and operated in surgery department at Dr. Susgila Tiwari Government Hospital, Haldwani undergoing intestinal anastomosis were clinically evaluated.

METHOD OF COLLECTION OF DATA

• Data was collected from patient admitted between January 2018 to September 2019 who underwent intestinal anastomosis in each group of study. Randomization was done with the alternate patient being placed in case and control group. Total 60 patients were studied.

INCLUSION CRITERIA :

• All patients fit for surgery
• Patient giving consent to be part of study

EXCLUSION CRITERIA :

• Patient not giving consent to be part of study

III. METHODOLOGY

• In study group we started the feeding after 12-14 hours of surgery with clear water at the rate of 50ml/hr. Well tolerated patients were taken on semi-solid diet after 24-36 hours and on normal regular diet after 36-48 hours of surgery.
• Patients who were not tolerating early feeding i.e. having abdominal distention and vomiting, feeding was stopped for 12 hours and refeeding was started afterwards. In late feeding groups, we started the feeding in traditional method (after bowel sounds and passage of flatus) after 5th day and same feeding plan was given as in early feeding group.
• Patients general vital charting (pulse rate, blood pressure, fever), assessment of time of passage of first stool, appearance of bowel sounds and assessment of time of passage of first stool, appearance of bowel sounds and assessment of...
complains like vomiting, abdominal distension and sign of bowel anastomosis dehiscence (fever, tachycardia, abdominal distension, guarding, rigidity, drain content and output) was done at 12 hourly all complications is recorded.

IV. OBSERVATIONS & RESULTS

Table 1: Correlation between Sex distribution & two groups

<table>
<thead>
<tr>
<th>Sex</th>
<th>Early</th>
<th>Late</th>
<th>Chi square value</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of Patients</td>
<td>%</td>
<td>No. of Patients</td>
<td>%</td>
</tr>
<tr>
<td>F</td>
<td>8</td>
<td>26.7%</td>
<td>11</td>
<td>36.7%</td>
</tr>
<tr>
<td>M</td>
<td>22</td>
<td>73.3%</td>
<td>19</td>
<td>63.3%</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100.0%</td>
<td>30</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Table 2: Correlation between Age groups distribution & two groups

<table>
<thead>
<tr>
<th>Age Groups</th>
<th>Early</th>
<th>Late</th>
<th>Chi square value</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of Patients</td>
<td>%</td>
<td>No. of Patients</td>
<td>%</td>
</tr>
<tr>
<td>upto 20 yrs</td>
<td>6</td>
<td>20.0%</td>
<td>9</td>
<td>30.0%</td>
</tr>
<tr>
<td>21 - 30 yrs</td>
<td>9</td>
<td>30.0%</td>
<td>2</td>
<td>6.7%</td>
</tr>
<tr>
<td>31 - 40 yrs</td>
<td>7</td>
<td>23.3%</td>
<td>8</td>
<td>26.7%</td>
</tr>
<tr>
<td>41 - 50 yrs</td>
<td>4</td>
<td>13.3%</td>
<td>5</td>
<td>16.7%</td>
</tr>
<tr>
<td>&gt;50 yrs</td>
<td>4</td>
<td>13.3%</td>
<td>6</td>
<td>20.0%</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100.0%</td>
<td>30</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Table 3: Correlation between Resolution of Ileus (First passage of Faeces) & two groups

<table>
<thead>
<tr>
<th>Resolution of Ileus (First passage of Faeces on POD)</th>
<th>Early</th>
<th>Late</th>
<th>Chi square value</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of Patients</td>
<td>%</td>
<td>No. of Patients</td>
<td>%</td>
</tr>
<tr>
<td>2</td>
<td>22</td>
<td>73.3%</td>
<td>17</td>
<td>56.7%</td>
</tr>
</tbody>
</table>

Only 3 patients (10%) in the early group complained of vomiting and none of the patients had symptoms abdominal distention and, in any patient, we had not reinserted the nasogastric feeding tube. Feeding was stopped for next 12 hours in patients with vomiting and was resumed after 12 hours. Patient well tolerated feeding after 12 hours.

Table 4: Correlation between Vomiting & two groups

<table>
<thead>
<tr>
<th>Vomiting</th>
<th>Early</th>
<th>Late</th>
<th>Chi square value</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of Patients</td>
<td>%</td>
<td>No. of Patients</td>
<td>%</td>
</tr>
<tr>
<td>+</td>
<td>3</td>
<td>10.0%</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>-</td>
<td>27</td>
<td>90.0%</td>
<td>30</td>
<td>100.0%</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100.0%</td>
<td>30</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Table 5: Correlation between Abdominal Distension & two groups

<table>
<thead>
<tr>
<th>Abdominal Distension</th>
<th>Early</th>
<th>Late</th>
<th>Chi square value</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. of Patients</td>
<td>%</td>
<td>No. of Patients</td>
<td>%</td>
</tr>
<tr>
<td>Yes</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>No</td>
<td>30</td>
<td>100.0%</td>
<td>30</td>
<td>100.0%</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100.0%</td>
<td>30</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Table 6: Comparison of mean Hospital stay between two groups

<table>
<thead>
<tr>
<th>Hospital stay</th>
<th>Early Mean ± SD</th>
<th>Late Mean ± SD</th>
<th>Mean Difference</th>
<th>t Value</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5.80 ± 0.81</td>
<td>9.23 ± 1.87</td>
<td>3.433</td>
<td>9.238</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>
management in patients undergoing intestinal anastomosis. Early feeding was shown to scale back the danger of any specific infection, mean length of hospital stay, anastomotic dehiscence, wound infection, pneumonia, intra-abdominal abscesses. Overall early enteral nutrition reduced post-operative morbidity and better patient outcome.

In this study, there were no complications of anastomotic leakage in both the delayed feeding group and early feeding group. The average length of hospital stay was shorter at 5.80 ± 0.81 days in the early feeding group than the late feeding group at 9.23 ± 1.87 days. This was statistically significant with a (P<0.001).

VI. CONCLUSIONS

In early feeding group, there were no such complication of anastomotic leakage like fever, tachycardia etc. In early feeding group, patient was well tolerated to early feeding. There was no such significant complication like vomiting, abdominal distension. In addition, in early feeding group as compared with late feeding group, hospital stay of the patient was shorter. This study showed that the early feeding after intestinal anastomoses is a safe method that improves the condition of the patients without increasing the post-operative complications and this increases patient’s satisfaction irrespective of the surgical technique used. This approach also reduces hospital stay.

Table 7: Correlation between Anastomotic Leakage & two groups

<table>
<thead>
<tr>
<th>Anastomatic Leakage</th>
<th>Early No. of Patients</th>
<th>Early %</th>
<th>Late No. of Patients</th>
<th>Late %</th>
<th>Chi square value</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>0</td>
<td>0.0%</td>
<td>0</td>
<td>0.0%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>No</td>
<td>30</td>
<td>100.0%</td>
<td>30</td>
<td>100.0%</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100.0%</td>
<td>30</td>
<td>100.0%</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

V. DISCUSSION

After intestinal anastomosis the practice has been to delay feeding until there is clinical evidence of bowel movement. Studies have shown that early enteral feeding has better outcome in terms of shorter duration of hospital stay and lower rates of complication. In spite of the documented evidence the practice of delayed feeding after small gut anastomosis is still the norm. Adequate nutrition in the postoperative period is a major goal that is never achieved when feeding is delayed after anastomosis. Early feeding reduces the incidence of infections, improves wound healing and anastomotic strength. A study conducted by Detry R et al on 33 patients were placed under early oral feeding after elective colorectal surgery. Nasogastric tube was removed as soon as they were widely awake, or on the morning following the afternoon operations. Oral feeding was resumed four hours later, and the first meal consisted in a slight solid meal. There was no postoperative mortality or significant morbidity. Liquid and solid oral intakes were resumed eighteen and twenty-four hours respectively after the operation. Tolerance was perfect in 22 patients (66%), good (slight complaints) in 16%, and was considered as fair or bad in the last six cases. No adverse effect on the anastomoses was noted.

In our study, majority of the patients were within the age range of 18 to 60 years but extreme age groups were also included in the study. Mean age group of patients in the early feeding group was 34.27 ± 16.04 years and in the late feeding group was 34.45 ± 1.87 years. This was statistically significant with a (P<0.001). In this study, there were no complications of anastomotic leakage in both the delayed feeding group and early feeding group. The average length of hospital stay was shorter at 5.80 ± 0.81 days in the early feeding group than the late feeding group at 9.23 ± 1.87 days. This was statistically significant with a (P<0.001).

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**Tackling Cancer using the method of CRISPR**

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**Abstract**- Over 500,000 people in the United States and over 8 million people worldwide are dying every year from cancer. As people live longer, the incidence of cancer is rising worldwide, and the disease is expected to strike over 20 million people annually by 2030. Cancer is a genetic disease; thus, CRISPR is a method enables us to delete a portion of the genome. Other treatments did not serve the wanted demands; that is, it could help in tackling cancer, but with victimizations. Hence, it is time to tackle the Cancer by this genome editing tool.

**Index Terms**- CRISPR Technology, the combination of guide RNA and Cas9, Genome-engineering, cell-based therapies, versatile tool for genome engineering.

**I. INTRODUCTION**

CRISPR/Cas9 has become an incredible strategy for making changes to the genome of numerous life forms. First found in quite a while as a major aspect of a versatile resistant framework, CRISPR/Cas9 and adjusted adaptations have discovered an across the board use to build genomes and to actuate or to subdue the declaration of qualities. Accordingly, CRISPR/Cas9 vows to quicken malignant growth explore by giving an effective innovation to dismember instruments of tumorigenesis, recognize focuses for tranquilize improvement, and conceivably arm cells for cell-based treatments. Here, we survey ebb and flow utilisations of the CRISPR/Cas9 innovation for malignant growth research and treatment. We portray novel Cas9 variations and how they are utilized in practical genomics to find novel malignant growth explicit vulnerabilities. Moreover, we feature the effect of CRISPR/Cas9 in producing organoid and mouse models of malignant growth. At last, we give a diagram of the main clinical preliminaries that apply CRISPR/Cas9 as a helpful methodology against disease.

**II. Cancer**

From the scratch, it is much better to identify the problem to be solved well. Hence, “What is meant by cancer?” Cancer refers to various terms: uncontrolled growth, tumor, and neoplasm. Nevertheless, Cancer is a disease caused by the uncontrolled division of abnormal cells in a part of the body. In other words, it is a swelling of a part of the body, generally without inflammation, caused by an abnormal growth of tissue, whether benign or malignant. Therefore, Cancer is caused by an accumulation of detrimental variation to the genome. It’s important to member that a single mutation is not sufficient to induce cancer formation. The most feasible branch that involve cancer studying and researching is the Oncology. The term oncology literally means a branch of science that deals with tumors and cancers. The word "onco" means bulk, mass, or tumor, while "-logy" means study. Metastasis is the spread of cancer from primary site to distant organ.

**III. Cancer Classification**

Types of cancer are classified according to the tissue in which they originate to start their attack. There are classified into four main types:

- Sarcoma arise from connective tissue that is found in bones, tendons, cartilage, muscle, and fat.
- Carcinoma arise in epithelial tissue that is found in the internal and external lining of the body.
- Adenocarcinomas develop in an organ or gland.
- Squamous cell carcinomas develop in the squamous epithelium of organs, including the skin, bladder, esophagus, and lung.
- Leukemia is cancer of the blood that originate in bone marrow.
- Lymphoma is cancers of the lymph system.

The first step toward cancer is the Hyperplasia, which is

![US Deaths 2014](http://dx.doi.org/10.29322/IJSRP.10.01.2020.p9712)
Types of Cancer according to the most common worldwide:

1. Lung cancer (13% of all cancers diagnosed; 1.8 million)
2. Breast cancer (12% of all cancers diagnosed; 1.7 million)
3. Colon cancer (10% of all cancers diagnosed; 1.4 million)
4. Prostate cancer (8% of all cancers diagnosed; 1.1 million)
5. Stomach cancer (7% of all cancers diagnosed; 952,000)
6. Liver cancer (6% of all cancers diagnosed; 782,000)

IV. CRISPR–Cas in its prime

The CRISPR–Cas technology has transformed genome editing by relying on nucleic acid base pairing for target specificity. However, most known human disease-relevant mutations remain difficult to correct owing to the formation of insertions and deletions (indels) upon repair of Cas-generated DNA double-stranded breaks (DSBs) and the low efficiency of introducing precise changes through homology-directed repair in most cell types. Anzalone et al. now introduce CRISPR–Cas9-based ‘prime editing’, which overcomes these obstacles by relying on reverse transcription for editing.

The nuclease Cas9 is targeted to specific sequences by single guide RNAs (sgRNAs) that hybridize with the target DNA. The authors fused a disabled, ‘nickase’ form of Cas9 that cannot make DSBs to a reverse transcriptase (RT). In addition, they engineered pegRNAs (prime editing guide RNAs), which are sgRNAs that include a sequence that serves as template for precise editing through reverse transcription. When the Cas9 domain produces a nick, the RT polymerizes a modified DNA segment from the template pegRNA directly into the template DNA strand, forming a heteroduplex with the non-edited strand, which is converted into the edited sequence by DNA repair pathways. Importantly, this prime editing system can accommodate long (≥30bp) RT templates, and thus its targeting is not constrained by the availability of nearby protospacer adjacent motifs. Next, pegRNA optimization and the engineering of mutant RT with improved functionality increased editing efficiency and specificity. These were further increased by augmenting the conversion rate of the non-edited strand in the heteroduplex with the additional use of sgRNAs matching only the edited sequence.

In this way, the non-edited strand is also nicked, but only upon flap-resolution of the edited strand, to minimize concurrent nicking of both strands and thus DSB formation. In human cells, prime editing corrected a transversion causing sickle cell disease, and the 4bp insertion that causes Tay–Sachs disease. The system functioned also in terminally differentiated mouse neurons, and can edit all types of local mutation with high efficiency and low off-targeting levels. Based on the targeting scope and range of insertions and deletions supported by prime editing, it could in theory correct up to ~89% of known human pathogenic mutations.

V. Identify the sequence of cancer exists

Consequently, we have accomplished the Guide RNA portion that will be combined with the Cas9 protein to make the CRISPR combination. In contrast, we will enter the guide RNA into the Cas9 protein, after being extracted from the cell by fractionation, using plasmids as shown in the following figure. Finally, we have got that combination of Cas9/Guide RNA protein ready to be injected into the targeted tumors to detect cancer.

The combination will enter the cell and each ingredient will do his function; that is, the Cas9 protein, carrying the sgRNA, will attach to the DNA of the cell and start to separate the double stranded DNA searching for the portion that 100% analogous to the sgRNA inside it.

Cas9 protein work as slasher that slash the DNA quickly once it finds the analogous portion if the DNA according to its sgRNA. Once it finds that portion it slashes the DNA at that part from the end and the start to get rid of that portion which represents the Cancerous bases within the cell’s DNA.

After slashing the cancer part of the genes from the whole genome, it is time for ligase enzyme to do its job. Ligase is a catalyst that can catalyze the joining of two enormous particles by framing another substance bond, for the most part with going with hydrolysis of a little pendant concoction bunch on one of the bigger atoms or the chemical catalyzing the connecting together of two mixes; hence, it attaches that sticky ends of the slashed DNA to combine their ends again. Finally, we have aimed the cancer from its roots in the cell and get rid of it for long time.

VII. Summary

As a whole process, it all revolves around maintaining CRISPR method in dealing with this rooted disease from its origin. Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR) is method designed to engage with DNA sequencing. The whole idea revolves around using Cas9 protein and Guide RNA analogous to the targeted DNA we want to abolish which are the cancer mutations in the cell. This combination of protein and guide RNA induced the cell to scan the DNA till detecting the part of nucleotides similar to the guide RNA. After finding it, the two strands of DNA separates and the one corresponding to the guide RNA attach to it. Then the Cas9 protein receives a sign for slashing the DNA from this part to delete it and to be considered among DNA fragments.

Affording us the advantage of editing the DNA molecules, CRISPR technology is a simple effective tool for editing genomes. It allows scientists to easily alter DNA sequences and modify gene functionality. Its high potential applications include correcting genetic defects, treating and stopping the spread of diseases and enhancing crops that seem harmful or unwanted in the form of mutations or diseases.

VIII. CONCLUSION

In conclusion, CRISPR is an effective technology affords us the opportunity to edit the human genome by the removal of undesirable treats beyond the gene expression. Applying it to cancer is one of the ideas in new lights in medicine and sciences; however, with the study and research, it was expected that it is applicable and have met the achievements. Hence, why not use it? I think that CRISPR is going through considerable growth the coming years-growth will save the world.

IX. REFERENCES


The Role Of Managerial Performance In Creating Corporate Entrepreneurship

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Abstract: This study investigated the effect of managerial competence, organizational culture on managerial performance and their impact on corporate entrepreneurship. The samples of this study were 95 KCP Bank BCA in East Java Region. The respondents were considered by 3 leaders who are responsible for the office, so the number of research respondents were 285 people. For data analysis, this study applied Partial Least Square (PLS). The results of this study indicated that managerial competence, organizational culture, and managerial performance were variables that could explain and predict corporate entrepreneurship variables. Moreover, the managerial competence had no direct or indirect effect on corporate entrepreneurship, while organizational culture had a direct or indirect effect on corporate entrepreneurship.

Keywords: managerial competence, organizational culture, managerial performance corporate entrepreneurship.

I. INTRODUCTION

Both banking and entrepreneurship worlds are inseparable from one another. The development of banking does not outflow from entrepreneur processes. A bank must have competitive power and be constantly ready to face incoming threats; a bank must also be more creative and innovative by creating innovations in its service and products so that it can possess the competitive advantage in order to survive as competitive company (Morris and Laforge, 2002). Being creative and innovative are elements of corporate entrepreneurship (Abosede et.al., 2018). Being a company with corporate entrepreneurship is highly required in banking world nowadays.

Abosede et al. (2018) explains that the elements of corporate entrepreneurship (e.g.: innovative, proactive, risk taking, strategic renewal and corporate venturing) have positive significant impacts on international bank in Nigeria. Specifically, a research conducted by Bobby and Harry (2013) in Malaysia
mention that there is a strong relationship between corporate entrepreneurship and performance in banking industry. Research by Guth and Ginsberg (1990); Covin and Slevin (1991); and Zahra (1991) show that the higher the concept of corporate entrepreneurship is, the higher the organization performance will become.

Burgelman (1983c); Kanter (1989); Stevenson and Jarillo (1990); Elenkov et al. (2005) identify organization internal factors influencing the capability of corporate entrepreneurship. Those internal factors include organization leadership, company culture and value system, structure and process, system and the availability of resources (Covin and Slevin, 1991; Damanpour, 1991; Zahra, 1991, 1993, 1995; Zahra and Covin, 1995; Hornsby et al., 2002; Goosen, 2002). These factors facilitate the activities of corporate entrepreneurship either individually or jointly.

Some studies also explain that there are relationships between organization performance and corporate entrepreneurship (Ghina, 2012; Ghina and Larso, 2011; Dyduch, 2008; Utama, 2013; Karacaoglu et al., 2013; Shafinaz et al., 2014; Shamsuddin et al., 2012). However, the research results are various; one generates significant relationship (Ghina, 2012; Ghina and Larso, 2011; Dyduch, 2008; Utama, 2013; Karacaoglu et al., 2013) and the other generates insignificant relationship (Shafinaz et al., 2014; Shamsuddin et al., 2012). Moreover, Shafinaz et al. (2014) in their research mentions four dimensions in corporate entrepreneurship, namely innovativeness, reactiveness, risk taking and competitive aggressiveness which have significant influence on business performance. While autonomy dimension does not influence business performance.

Other researches also confirm that the relationship between business performance and corporate entrepreneurship are negative (Karacaoglu et al., 2013; George et al., 2001; Shamsuddin et al., 2012). Another research result conducted by Karacaoglu et al., (2013) shows that corporate entrepreneurship dimensions such as innovation, risk taking and proactive one have positive significant relationship with financial performance. Meanwhile, the autonomy and competitive aggressiveness variables are not related to company financial performance. Moreover, there is a different argument on the impact of corporate entrepreneurship on business performance.

II. THEORETICAL REVIEW

Corporate Entrepreneurship

Nowadays, entrepreneurship plays an important role in improving productivity and spurring economic growth (Covin and Slevin, 1991; Zahra, 1991, 1993; Yu, 1998). Dyduch (2008) states that entrepreneurship is an approach of management strategy. Human resource is a factor that plays an important role in the success of corporate entrepreneurship.
Hornsby et al. (1999) identifies five factors that must be applied by human resource management in order to support the success of corporate entrepreneurship. These five factors include appreciation or reward, management facilities that support innovation, the availability of resource for innovation and conducive organization structure for learning and cooperation, and the ability to take risks from all individuals. One of the aspects of corporate entrepreneurship of human resource management that has been highly investigated is innovation. While all researches in relation to human resource management and compensation towards innovation refer to one factor that draws the most attentions (Balkin and Bannister, 1993; Balkin and Gomez, 1984, 1987; Balkin et al., 2000). Corporate entrepreneurship is a factor that triggers innovations by utilizing new markets, offering new products, or both (Sharma and Chrisman, 1999).

Research done by Hornsby et al., (2002) examines the measurement nature of Corporate Entrepreneurship Assessment Instrument (CEAI) that includes factors such as reliability analysis and assessment. From managerial perspective, the result shows that Corporate Entrepreneurship Assessment Instrument (CEAI) can be a useful instrument in diagnosing company environment in order to become corporate entrepreneurship. In addition, a company must also possess entrepreneurial orientation in order to actualize entrepreneurship activities (Lumpkin and Dess, 2001).

**Managerial Performance**

Managerial performance is the ability or the work performance that has been achieved by a person or a group of person in an organization (Sonntag and Frese, 2002). Managerial performance can also interpreted as an achievement or level of success achieved by an individual within an organization in reaching the goals or targets that have been set (Stoner, 2002).

An organization with good performance can benefit more from the existing environment opportunity, can more easily solve problems created by environment, can meet the social needs segment both quantitatively and qualitatively in an excellent way and can gain competitive excellence in the market (Verboncu and Corcodel, 2014).

**Managerial competencies**

Competencies have impact on company performance (Sánchez, 2012; Tehseen and Ramayah, 2015; Wickramaratne et al., 2014). Competencies have characteristics that are used to distinguish an individual’s performance. Then, Deist and Winterton (2005) mention that holistic typology of competencies is essential in understanding the combination of knowledge, skill and social competencies. The three competencies are
necessary in a job, both conceptual (cognitive, knowledge and comprehension) and operational competencies (functional, psycho-motor and applied skill).

The result of research conducted by Sánchez (2012) mentions that entrepreneurial competencies play very important roles in the organization ability in enhancing its competitiveness; and they also have direct effect to company performance. Otherwise, Tehseen and Ramayah (2015) examine the effect of entrepreneurial competencies to the success of Small and Medium Enterprise (SME) with SMEs in Malaysia as the objects. The result of the research states that external integration moderates the effect of entrepreneurial competencies to the success of Small and Medium Enterprise (SME) in Malaysia. Therefore, entrepreneurs should have competencies in managing relationships with customers and suppliers in order to improve company competitiveness.

Then, Wickramaratne et al. (2014) examine the impact of entrepreneurial competencies of the owner or manager to entrepreneurial orientation in a tea company in Sri Lanka and the relationship between the backgrounds of the owner or manager to entrepreneurial competencies. In this research, entrepreneurial competencies are put into operation with opportunity, organizing, strategic, relationship, commitment and conceptual competencies. The research result shows that the characteristic background of the owner or manager has direct effect to entrepreneurial competencies which then have implications to the existence of positive and direct relation between entrepreneur strategy and the commitment of the entrepreneurship oriented owner or manager.

**Organizational Culture**

Mejia and Balkin (2012) define organizational culture as a system of value, assumption, belief, and norms that unites the members of an organization. Organizational culture reflects the views of employees in the way things are done. Organizational culture give meaning to actions and procedures in an organization which can be considered as the personality of an organization.

Organizational culture is a predictor of entrepreneurial orientation. The success of entrepreneurial orientation can be achieved if it is supported by the right organizational culture. Denison and Mishra (1990) mentions that organizational culture refers to the basic values, belief and principle which serve as the foundation of the management system of an organization, and also a series of management practice and behavior which set examples and reinforce the foundation.

Research conducted by Shihab et al. (2011) shows there is a significant relation between organizational culture and entrepreneurial orientation. Organizational culture is a predictor of entrepreneurial orientation. The success of entrepreneurial orientation can be achieved if it is supported by the right organizational culture. The organizational culture dimensions mentioned in the research conducted by Shihab et al. (2011) consist of
orientation, communication, control, flexibility and employee oriented vs job oriented. Research conducted by Lee and Lee (2007) shows that leadership and organizational culture have a positive and significant relationship in affecting the organizational operation and learning.

**Conceptual Framework and Research Hypothesis**

The conceptual framework of this study was derived from thought, theoretical foundation, and concepts of previous researchers. Referring to the theoretical foundation, companies require numerous capabilities to develop their higher business performance.

![Conceptual Framework](image)

**Figure 1. Conceptual Framework**

This study acknowledges two capabilities, i.e. market orientation and entrepreneurial orientation and indicates how the capabilities are in relation to performance. Porter (1980) defines an entrepreneurial orientation as a corporate benefit strategy to compete in the same market place more effectively. Dess et al. (2003) conclude that complex and uncertain environments require a strong entrepreneurial attitude in the strategy consideration. While Gosselin (2005) argues that a significant relationship within entrepreneurial orientations can be generated from the company performance. Moreover, the higher degree of entrepreneurial orientations are obviously driven on profit so that an entrepreneur has the opportunity to take benefits and emerged opportunities which, in turn, achieve a positive effect on business performance (Wiklund, 1999). The hypotheses based on conceptual and theoretical framework were proposed as follows:

- **H1:** Managerial competencies affected corporate entrepreneurship.
- **H2:** Organizational culture affected corporate entrepreneurship.
- **H3:** Managerial competencies affected corporate entrepreneurship through managerial performance.
- **H4:** Organizational culture affected corporate entrepreneurship through managerial performance.
- **H5:** Managerial performance affected corporate entrepreneurship.

**III. RESEARCH METHOD**
This research employed quantitative approach. The populations of this research were the Branch Offices of PT. Bank Central Asia within 16 cities in East Java. The sample selection in every city was conducted by lottery method. The number of samples in this research were 95 Branch Offices of BCA in East Java. There were 3 managers as respondents from each Branch Office; hence the number of respondents in this research were 285 individuals. Data analysis technique used in this research were classified into two groups, namely descriptive data analysis technique and inferential statistics analysis technique using PLS (Partial Least Square).

IV. ANALYSIS AND DISCUSSION

Descriptive Analysis

The age range of respondents in this research falls into 4 categories, namely 21–30 years old, 31–40 years old, 41–50 years old and above 50 years old. 64.9% of respondents are in the category of 41–50 years old. 25.6% of respondents are in the category of above 50 years old. 7% of respondents were in the category of 21–30 years old. It is clear that based on the age, the category of 41–50 years old has the most respondents. This shows that the maturity level in making decision for their subordinates is pretty good. In that range of age most people tend to be more thoughtful and less emotional in making decisions.

The service period in this research was classified into 4 groups, respondents with years of service within 0-10 years of service, between 11–20 years of service, 21–30 years of service, and above 30 years of service. The percentage of respondents within 21–30 years of service were 53.3%; and the above 30 years of service was 42.8%. While the group of 21–30 years was quite long period to learn problems and find the right solution.

The length of service as managers in this research was classified into 4 categories, which were within 0–3 years, 4–7 years, 8–11 years and above 11 years. Most respondents or as much as 40.0% had been serving their managerial position for 4–7 years. The percentage of respondents who had been serving their managerial position for more than 11 years was 14.4%. Instead, the percentage of respondents who had been serving their managerial position for 0–3 years were 15.4%, while the percentage of respondents who had been serving their managerial position for 8–11 years is 30.2%. This indicated that the managers as respondents in this research possess had adequate experience in facing problems in their field. Having 4 to 7 years of experience not only enabled them to face problems and find solutions, but also empowered them in generating new ideas for the success of the company.

Factor Loading and Average Score for Each Indicator

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The value of outer loading shows the weight of each indicator as a measure of each variable. Indicator with the highest outer loading shows the indicator as the strongest variable measure.

### Table 1

**Outer Loading of Each Indicator of Each Variable**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Indicator</th>
<th>Outer Loading</th>
<th>Means Indicator</th>
<th>Means Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Managerial Competencies</td>
<td>External competency (KE)</td>
<td>0.845</td>
<td>4.56</td>
<td>4.64</td>
</tr>
<tr>
<td></td>
<td>Interpersonal competency (KI)</td>
<td>0.882</td>
<td>4.63</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Personal competency (KP)</td>
<td>0.855</td>
<td>4.69</td>
<td></td>
</tr>
<tr>
<td>Organizational Culture</td>
<td>Involvement (BOI)</td>
<td>0.888</td>
<td>4.77</td>
<td>4.74</td>
</tr>
<tr>
<td></td>
<td>Consistency (BOC)</td>
<td>0.925</td>
<td>4.74</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adaptability (BOA)</td>
<td>0.915</td>
<td>4.71</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mission (BOM)</td>
<td>0.906</td>
<td>4.74</td>
<td></td>
</tr>
<tr>
<td>Managerial Performance</td>
<td>Quantity of work (KMQT)</td>
<td>0.792</td>
<td>4.55</td>
<td>4.66</td>
</tr>
<tr>
<td></td>
<td>Quality of work (KMQL)</td>
<td>0.844</td>
<td>4.59</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Job knowledge (KMJ)</td>
<td>0.877</td>
<td>4.55</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cooperation (KMKJ)</td>
<td>0.855</td>
<td>4.73</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Initiative (KMI)</td>
<td>0.864</td>
<td>4.67</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Creativeness (KMKR)</td>
<td>0.873</td>
<td>4.62</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dependability (KMD)</td>
<td>0.780</td>
<td>4.83</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Personal Qualities (KMP)</td>
<td>0.811</td>
<td>4.81</td>
<td></td>
</tr>
<tr>
<td>Corporate Entrepreneurship</td>
<td>Management Support (CEM)</td>
<td>0.833</td>
<td>4.66</td>
<td>4.63</td>
</tr>
<tr>
<td></td>
<td>Work Discretion (CEW)</td>
<td>0.934</td>
<td>4.69</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reward (CER)</td>
<td>0.878</td>
<td>4.56</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Time Availability (CEO)</td>
<td>0.888</td>
<td>4.64</td>
<td></td>
</tr>
</tbody>
</table>

Table 1 presented the value of outer loading after conducting re-estimation. The result of the first outer loading test figured out the indicator of corporate entrepreneurship that was below 0.7, which included time availability (CET) indicator with the value of 0.591. Therefore, a retest needs to be conducted without CET indicator. The strongest measure of managerial competencies variable was the interpersonal competency (KI); the strongest measure of organizational culture variable was consistency (BOC); the strongest measure of managerial performance variable was job knowledge (KMJ); and the strongest measure of corporate entrepreneurship variable was work discretion.

From respondents’ perception, it was implied that the best perception for managerial competencies variable was personal competence (KP); the best perception for organizational culture variable was involvement (BOI); the best perception for managerial performance variable was creativeness (KMKR); and the best perception for corporate entrepreneurship variable was work discretion (CEW).

### Table 2

**Coefficients of Direct Effect**

| Original Sample | Sample Mean | Standard Deviation | T Statistics (|O/STDEV|) | P Values | Significance test |
|-----------------|-------------|--------------------|----------------|----------|----------|------------------|

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Table 3
Coefficients of Indirect Effects

|                  | Original Sample (O) | Sample Mean (M) | Standard Deviation (STDEV) | T Statistics (|O/STDEV|) > 1.650 | P Values |
|------------------|---------------------|-----------------|---------------------------|---------------|----------|
| COMP → CE        | -0.031              | -0.033          | 0.046                     | 0.666         | 0.506    | Not Significance |
| CULT → CE        | 0.502               | 0.507           | 0.069                     | 7.238         | 0.000    | Significance     |
| COMP → MP        | 0.012               | 0.016           | 0.045                     | 0.278         | 0.781    | Not Significance |
| CULT → MP        | 0.209               | 0.206           | 0.060                     | 3.476         | 0.000    | Significance     |
| MP → CE          | 0.262               | 0.262           | 0.097                     | 2.704         | 0.007    | Significance     |

The Effect of Managerial Competencies on Corporate Entrepreneurship

The statistical test result of this research indicated that managerial competencies did not affect corporate entrepreneurship. This was because the bond of managerial competencies in forming a corporate entrepreneurship oriented company is weak. The result describes that managerial competencies could not be used as a variable to predict Branch Offices of BCA in East Java regions as an entrepreneur oriented company. This result was in contrast with findings of Hayton and Donna (2006) and Robles and Zarraga (2015). Hayton and Donna (2006) state that a corporate entrepreneurship needs a competencies-based approach to gain human capital that are able to promote a corporate entrepreneurship oriented company. In addition, the respondents’ competencies in this research do not show their ability as entrepreneurs. The competency of each individual is key or highly related and determine the company competencies as entrepreneurship (Robles and Zarraga, 2015).

The Effect of Organizational Culture on Corporate Entrepreneurship

The result of this research assumed that organizational culture highly affected corporate entrepreneurship. This meant that organizational culture was able to bring the organization to an entrepreneur oriented company. The measuring indicators in the organizational culture variables involved involvement, consistency, adjustment, and mission. In terms of involvement, all leaders of an organization are pursued in the structuring process and execution of work plan. In addition, in doing their work, everybody felt that they were part of a team. Consistency in doing the work was also shown by the existence of definite value guidance and the coordination process in all parts of the organization as a whole.
This research result supports Paunovic and Dima (2014) stating that one of key elements of corporate entrepreneurship is the creation of cultural organization that includes cultural entrepreneurship values. Moreover, Paunovic and Dima (2014) mention that motivation factor supporting the implementation of cultural values are vitally needed. This research is in line with the research conducted by Bau and Wagner (2015) that mention that corporate entrepreneurship and intrapreneurship reflect behavior and culture that can help a company to grow competitively. The research also develops index that measures culture and market related factors that might influence employee ability to behave in entrepreneurial behavior.

The Effect of Competencies on Corporate Entrepreneurship on Managerial Performance

The statistical test result of the managerial competencies affected corporate entrepreneurship on managerial performance as an intervening variable was p value 0.803 > 0.05, which means insignificant. This indicated that managerial competencies had no significant effect of corporate entrepreneurship on managerial performance as an intervening variable.

The calculation indicated that managerial competencies did not have direct and indirect effect on corporate entrepreneurship. Therefore, the managerial competencies were predicated to be unable to bring Branch Offices of BCA in East Java regions as a corporate entrepreneurship oriented company. It can be concluded that managerial competencies are unable to form a corporate entrepreneurship oriented company especially on the level of branch offices.

The Effect of Organizational Culture on Corporate Entrepreneurship on Managerial Performance

The statistical test result of this research found that the effect of organizational culture on corporate entrepreneurship with managerial performance an intervening variable was p value 0.026 < 0.05. This result revealed that organizational culture had a significant effect on corporate entrepreneurship with managerial performance an intervening variable.

The path coefficient value of direct effect of organizational culture on corporate entrepreneurship (0.502) was higher than the path coefficient of indirect effect of organizational culture on corporate entrepreneurship with managerial performance an intervening variable (0.055). Based on that path coefficient value, it can be concluded that managerial performance serves as partial mediation. In other words, the existing organizational culture in Branch Offices of BCA in East Java regions has successfully bring the organization as a corporate entrepreneurship oriented company.

V. CONCLUSION AND SUGGESTION
Conclusion

Managerial competencies, organizational culture, and managerial performance were considered as variables that could explain and predict the corporate entrepreneurship variable at Branch Offices of Bank Central Asia in East Java as a company that was oriented to corporate entrepreneurship.

Managerial competencies did not have direct and indirect effect to corporate entrepreneurship, while organizational culture had both direct and indirect effect to corporate entrepreneurship. The direct effect of organizational culture to corporate entrepreneurship was larger than the indirect effect. This meant that managerial competencies as an intervening variable was as partial mediation.

Suggestion

Organizational culture should be used as a framework and daily behavior guidance in working and reaching goals. Managerial competencies become crucial in making the Branch Offices of Bank Central Asia as a corporate entrepreneurship oriented company by improving the managerial ability of Branch Offices, as explained by Hsu et al., (2014) that entrepreneurial leadership has an impact to innovative behavior. By possessing the ability as entrepreneur, the Branch Offices managerial persons of Bank Central Asia are able to see opportunities and improve their performance which then influences the company competitiveness.

REFERENCES


Validity, Effectiveness, and Practicality of Learning Media Using Advance Organizer to Increase Critical Thinking on Colloid Material of Senior High School

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Abstract

The purpose of this study is to determine the validity, effectiveness, and practicality of learning tools to improve student’s critical thinking skills by using an advanced organizer learning model on colloidal material. The test was conducted in grade XI-5 of 7th Senior High School of Surabaya with 24 students. The learning device development model in this study uses the 4D model from Thiagarajan, but only 3 stages are applied (define, design, develop). The implementation phase of learning in the class uses one group pretest-posttest design. The assessment is carried out by using a validation sheet filled out by the validator, pretest-posttest questions based on the critical thinking skills, and an observation sheet on the implementation of the lesson plan by the observer.

Based on the research conducted, it is founded that: (a) the results of the validation of learning devices in general have an average score of 3 to 4 with a reliability of 80 to 100%. (b) the average of critical thinking ability data of students is 63.12 with the categories less critical, critical and very critical. Furthermore, it is also obtained the results of the increment in each indicator of critical thinking ability, namely (i) the indicator of formulating the problem gets an increase of 31.25, (ii) the indicator of giving an argument gets an increase of 16.06, (iii) the analyzing indicator gets an increase of 6, (iv) the indicator of doing induction or concluding gets an increase of 40.62, and (v) the indicator of applying gets an increase of 39.58, and (c) the observation of the implementation of the lesson plan of three meetings obtain an average score of 3.33 to 4 with reliability of 86 to 100 %. Based on the data analysis, it can be concluded that the learning tools developed are valid, effective, and practical to improve student’s critical thinking skills.

Keywords: validity, effectiveness, practicality, advance organizer, student’s critical thinking skills

A. Introduction

According to the Chairman of the National Education Standard Agency, Bambang Suryadi, the procurement of High Order Thinking Skill (HOTS) questions make Indonesian education standard even higher to catch up with other countries. Therefore, this question will continue to be held, but with more preparation, namely increased learning both for students and teachers (Okezone News, 2018). Referring to the standard of National Exam questions, namely HOTS based questions, the teacher must prepare provisions for students from an early age, where the priority of a teacher as an educator is to teach students how to learn and how to think HOTS based so that when dealing with National Exam questions, students do not experience difficulties. The 2013 curriculum was developed with the completing mindset of the following: teacher center learning into student centers, one-way learning (teacher-student interaction) into interactive learning (teacher-student-community-environment-source-other media interactions), passive learning becomes a scientific learning, and individual learning becomes group learning.

The results of the pre-research test by giving questions about colloids to the 12th grade students of Science as many as 12 students at 7th Senior High School of Surabaya showed that students had difficulty learning when faced with chemical problems. Students are also lacking in critical thinking seen from the achievement of an average score that has not reached the minimum standard of the school which is 70. This is evidenced by the pre-research test scores.
of 33% or as many as 4 out of 12 students who have achieved the minimum standard, while 66.67% or as many as 8 out of 12 students have not reached the minimum standard.

Students must have good critical thinking skills in order to overcome this problem. And the teacher's job is to help the students, one of it is to develop devices using an advanced organizer model.

B. Method

1. Learning Tool Validation Analysis

The data analysis which includes the device validation and assessment is done by calculating the average score of each component obtained from the validator. The average score results are described in the following table. Learning device is said to be valid for use if the average score obtained is at least 2.6.

<table>
<thead>
<tr>
<th>Interval</th>
<th>Category</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1,0 ≤ to ≤ 1,5</td>
<td>Invalid</td>
<td>Cannot be used yet, consultation is needed</td>
</tr>
<tr>
<td>1,6 ≤ to ≤ 2,5</td>
<td>Less Valid</td>
<td>Can be used with a lot of revisions</td>
</tr>
<tr>
<td>2,6 ≤ to ≤ 3,5</td>
<td>Valid</td>
<td>Can be used with a little revisions</td>
</tr>
<tr>
<td>3.6 ≤ to ≤ 4,0</td>
<td>Very Valid</td>
<td>Can be used without revisions</td>
</tr>
</tbody>
</table>

(The adapted from Ratumanan & Laurens, 2011)

The reliability of the instrument is determined based on the assessment data from the validator. The level of reliability can be calculated by using the formula below:

\[
R = \left(1 - \frac{A - B}{A + B}\right) \times 100\%
\]

(adapted from Borich, 1994)

Explanation:

R = Percentage of instrument reliability

A = Higher average score than the validator

B = Average number of scores lower than the validator

The instrument is said to be reliable if it has a reliability value ≥ 75% (Borich, 1994).

2. The learning tool effectiveness analysis

a. Analysis The ability to think critically

The analysis of student’s critical thinking skill is carried out to determine the increase in student’s critical thinking skill through pretest and posttest. Critical thinking ability data is analyzed through the critical thinking rubric.
Critical thinking skill rubric used in this study is a multilevel scale, which is a question followed by columns that indicate the level of scoring with a scaling scale in accordance with predetermined criteria as in Table 2.

Table 2 Categories of Student’s Critical Thinking Ability

<table>
<thead>
<tr>
<th>No.</th>
<th>Criteria</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Very Correct</td>
<td>4</td>
</tr>
<tr>
<td>2.</td>
<td>Correct</td>
<td>3</td>
</tr>
<tr>
<td>3.</td>
<td>Correct Enough</td>
<td>2</td>
</tr>
<tr>
<td>4.</td>
<td>Less Correct</td>
<td>1</td>
</tr>
<tr>
<td>5.</td>
<td>Is not done</td>
<td>0</td>
</tr>
</tbody>
</table>

(adapted from Purwanto, 2008)

The data that has been obtained is analyzed to determine the increase in critical thinking skills.

Level of critical thinking = \( \frac{\text{Score obtained by students}}{\text{Total score}} \times 100 \)

After obtaining the results of student’s critical thinking skill, researchers adjust to the category of student’s critical thinking abilities. The categories of critical thinking skill can be seen in Table 3.

Table 3 The Guidelines for Critical Thinking Categories

<table>
<thead>
<tr>
<th>No.</th>
<th>Obtained Scale</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>&gt; 81,25 to ≤ 100</td>
<td>Very Critical</td>
</tr>
<tr>
<td>2.</td>
<td>&gt; 62,50 to ≤ 81,25</td>
<td>Critical</td>
</tr>
<tr>
<td>3.</td>
<td>&gt; 43,75 to ≤ 62,50</td>
<td>Less Critical</td>
</tr>
<tr>
<td>4.</td>
<td>≤ 25,00 to 43,75</td>
<td>Very Less Critical</td>
</tr>
</tbody>
</table>

(Source: Setyowati et al, 2010)

3. Student Response Questionnaire Analysis

The results of the student response questionnaire will be obtained, are analyzed by using the following formula:

Percentage = \( \frac{\text{Number of students answering items}}{\text{number of respondents}} \times 100\%

The percentage criteria for student responses are presented in the following table:

Table 4 The Criteria for Percentage of Student Responses

<table>
<thead>
<tr>
<th>No.</th>
<th>Scale Obtained</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>0 – 20%</td>
<td>Very Less</td>
</tr>
<tr>
<td>2.</td>
<td>21 – 40%</td>
<td>Less</td>
</tr>
<tr>
<td>3.</td>
<td>41 – 60%</td>
<td>Enough</td>
</tr>
<tr>
<td>4.</td>
<td>61 – 80%</td>
<td>Good</td>
</tr>
<tr>
<td>5.</td>
<td>81 – 100%</td>
<td>Very Good</td>
</tr>
</tbody>
</table>
4. Learning Device Practical Analysis

The value of the implementation of learning conducted by observers who have understood the observation sheet correctly, then, the data is processed by calculating using the following equation:

\[ P = \frac{\text{Number of learning stages carried out}}{\text{total number of learning stages}} \times 100\% \]

The implementation of lesson plan is analyzed descriptive qualitatively, by comparing the average rating scale given by the two observers with the following evaluation criteria.

Table 5 The Analysis of the Implementation of Lesson Plan

<table>
<thead>
<tr>
<th>No</th>
<th>Interval Score</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>3.60 ≤ score ≤ 4.00</td>
<td>Very Good</td>
</tr>
<tr>
<td>2.</td>
<td>2.60 ≤ score ≤ 3.59</td>
<td>Good</td>
</tr>
<tr>
<td>3.</td>
<td>1.60 ≤ score ≤ 2.59</td>
<td>Less Good</td>
</tr>
<tr>
<td>4.</td>
<td>1.00 ≤ score ≤ 1.59</td>
<td>Is not Good</td>
</tr>
</tbody>
</table>

(Ratumanan & Laurens, 2011)

The level of data reliability between the two observers was calculated by using an interobserver agreement by using statistical analysis of percentage of agreement (R). The reliability level is calculated by using the following formula.

\[ R = \left(1 - \frac{A-B}{A+B}\right) \times 100\% \]

Explanation:

R = Percentage of instrument reliability
A = Higher average score than the observer
B = Lower average score than the observer

The instrument is said to be reliable if it has a reliability value ≥ 75% (Borich, 1994).

C. The Result of Research and Discussion

1. Learning Tool Validation Result

The tool developed to be validated are the syllabus, lesson plans, student teaching materials, student worksheets, and pretest and posttest questions based on the critical thinking skills, and student response questionnaires. The following summarizes the results of the validation of learning tool developed using the advanced organizer learning model as presented in Table 6.

Tabel 6 Learning Tool Validation Result
Based on the Table 6, it is known that all devices get an average score that ranges from 2.67 to 4 with a valid category and is very valid. In addition, each device also has reliability ranging from 80-100%, it means that the devices developed using the advanced organizer model are appropriate for use in improving critical thinking skills on colloidal material. Thus, all devices developed can be used in the process of learning colloidal material because it has met the criteria for proper use, namely valid and appropriate.

2. Learning Tool Effectiveness Result

a. Critical Thinking Ability Assessment Result

The data of student’s critical thinking skill before learning was obtained based on the pretest scores carried out before the first meeting, while the student’s critical thinking skill after learning was obtained based on the posttest scores after the third meeting. The indicators of student’s critical thinking skill is assessed namely formulating the problem, giving arguments, analyzing, inducing or concluding, and applying those assessed by using the rubric of critical thinking with a range of 0-4. The results of the student’s critical thinking skill are presented in Table 7.

<table>
<thead>
<tr>
<th>Code</th>
<th>Pretest Score</th>
<th>Category</th>
<th>Posttest Score</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>S1</td>
<td>45</td>
<td>LK</td>
<td>62.5</td>
<td>LC</td>
</tr>
<tr>
<td>S2</td>
<td>57.5</td>
<td>C</td>
<td>70</td>
<td>C</td>
</tr>
<tr>
<td>S3</td>
<td>62.5</td>
<td>C</td>
<td>72.5</td>
<td>C</td>
</tr>
<tr>
<td>S4</td>
<td>42.5</td>
<td>VLC</td>
<td>60</td>
<td>LC</td>
</tr>
<tr>
<td>S5</td>
<td>57.5</td>
<td>LC</td>
<td>75</td>
<td>C</td>
</tr>
<tr>
<td>S6</td>
<td>40</td>
<td>VLC</td>
<td>60</td>
<td>LC</td>
</tr>
<tr>
<td>S7</td>
<td>42.5</td>
<td>VLC</td>
<td>60</td>
<td>LC</td>
</tr>
<tr>
<td>S8</td>
<td>42.5</td>
<td>VLC</td>
<td>67.5</td>
<td>C</td>
</tr>
<tr>
<td>S9</td>
<td>42.5</td>
<td>VLC</td>
<td>60</td>
<td>LC</td>
</tr>
<tr>
<td>S10</td>
<td>42.5</td>
<td>VLC</td>
<td>72.5</td>
<td>C</td>
</tr>
<tr>
<td>S11</td>
<td>40</td>
<td>VLC</td>
<td>60</td>
<td>LC</td>
</tr>
<tr>
<td>S12</td>
<td>35</td>
<td>VLC</td>
<td>47.5</td>
<td>LC</td>
</tr>
<tr>
<td>S13</td>
<td>52.5</td>
<td>LC</td>
<td>67.5</td>
<td>C</td>
</tr>
<tr>
<td>S14</td>
<td>45</td>
<td>LC</td>
<td>72.5</td>
<td>C</td>
</tr>
<tr>
<td>S15</td>
<td>30</td>
<td>VLC</td>
<td>55</td>
<td>LC</td>
</tr>
<tr>
<td>Code</td>
<td>Pretest</td>
<td>Posttest</td>
<td></td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>---------</td>
<td>----------</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Score</td>
<td>Category</td>
<td>Score</td>
<td>Category</td>
</tr>
<tr>
<td>S16</td>
<td>45</td>
<td>LC</td>
<td>75</td>
<td>C</td>
</tr>
<tr>
<td>S17</td>
<td>65</td>
<td>C</td>
<td>80</td>
<td>C</td>
</tr>
<tr>
<td>S18</td>
<td>57.5</td>
<td>LC</td>
<td>75</td>
<td>C</td>
</tr>
<tr>
<td>S19</td>
<td>60</td>
<td>LC</td>
<td>80</td>
<td>C</td>
</tr>
<tr>
<td>S20</td>
<td>52.5</td>
<td>LC</td>
<td>77.5</td>
<td>C</td>
</tr>
<tr>
<td>S21</td>
<td>47.5</td>
<td>LC</td>
<td>67.5</td>
<td>C</td>
</tr>
<tr>
<td>S22</td>
<td>40</td>
<td>VLC</td>
<td>65</td>
<td>C</td>
</tr>
<tr>
<td>S23</td>
<td>45</td>
<td>LC</td>
<td>67.5</td>
<td>C</td>
</tr>
<tr>
<td>S24</td>
<td>60</td>
<td>LC</td>
<td>85</td>
<td>VC</td>
</tr>
<tr>
<td>Average</td>
<td>47.71</td>
<td>LC</td>
<td>63.12</td>
<td>C</td>
</tr>
</tbody>
</table>

Explanations: VLC = Very Less Critical; LC = Less Critical; C = Critical; VC = Very Critical

Based on Table 7, it is known that before the learning activities there are 3 critical students and 21 less critical students with grades ranging from 30 – 62.5. After learning the student’s grades have increased, there are still 8 less critical students, 15 critical students, and 1 very critical student with grades ranging from 47.5 – 85.

Furthermore, the analysis of each indicator of critical thinking skill that are formulating the problem, providing arguments, analyzing, inducing or concluding, and applying can be seen in Table 8.

Table 8 The Analysis of Each Indicator of Critical Thinking Skill

<table>
<thead>
<tr>
<th>No.</th>
<th>Indicator</th>
<th>Average Score</th>
<th>Pretest</th>
<th>Explanation</th>
<th>Posttest</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Formulating the problem</td>
<td>25</td>
<td>VLC</td>
<td>56.25</td>
<td>LC</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Providing arguments</td>
<td>44.87</td>
<td>LC</td>
<td>60.93</td>
<td>LC</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Analyzing</td>
<td>77.07</td>
<td>C</td>
<td>83.07</td>
<td>VC</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Inducing or concluding</td>
<td>16.67</td>
<td>VLC</td>
<td>57.29</td>
<td>LC</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Applying</td>
<td>17.18</td>
<td>VLC</td>
<td>56.76</td>
<td>LC</td>
<td></td>
</tr>
</tbody>
</table>

Explanations: VLC = Very Less Critical; LC = Less Critical; C = Critical; VC = Very Critical

Based on Table 8, it is known that there is an increase in the five indicators of critical thinking skills after learning by using an advanced organizer model. The indicator of formulating the problem gets an increase of 31.25, the indicator of giving an argument gets an increase of 16.06, the analyzing indicator gets an increase of 6, the indicator of inducing or concluding gets an increase of 40.62, and the indicator of applying gets an increase of 39.58.

The indicator that experienced the highest increase is the indicator of inducing or concluding a value of 40.62, while the indicator that experienced the lowest increase is analyzing with a value of 6.

b. The Analysis Result of Student Response Questionnaire

The result of the student questionnaire responses to the learning activities that have been carried out and the learning tools that have been developed by using the advanced organizer learning model presented in Table 9.

Table 9 The Result of Student Response Questionnaire

<table>
<thead>
<tr>
<th>Goal</th>
<th>Declaration</th>
<th>Respond Percentage</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interest</td>
<td>The design of LKS andcoloid student’s material are interesting</td>
<td>100</td>
<td>-</td>
</tr>
</tbody>
</table>

http://dx.doi.org/10.29322/IJSRP.10.01.2020.p9714
Based on Table 9, it is known that the device with an advanced organizer learning model gets a positive response from students. This is shown by the interest in student worksheets and teaching materials ranging from 83.33-100%, it means that most students are interested in the worksheets and teaching materials developed. The percentage of the content of the material ranges from 66.67 to 95.8%, it means that from the aspect of the content of the material, students can understand the student worksheet and teaching material developed. While from the aspect of language, it gets a percentage ranging from 79.16 to 83.33%, it means that the aspects of the language used in the worksheets and student teaching materials are easy to understand and do not cause multiple meanings.

Based on the description above, it can be concluded that student’s responses to learning devices by using the advanced organizer model, students give positive responses, which means students can follow the learning activities carried out by the teacher using learning devices by using the advanced organizer model.

c. Learning Device Practical Result

The learning device practical result is reviewed from the result of the trial of the learning device by using an advanced organizer learning model conducted with three meetings observed by 3 observers. The following are the data:

<table>
<thead>
<tr>
<th>Material</th>
<th>The material in the student’s book can be easily understood</th>
<th>95.8</th>
<th>4.16</th>
<th>Very Good</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The material in the student’s book make student doing discussion with their friends</td>
<td>66.67</td>
<td>33.33</td>
<td>Good</td>
</tr>
<tr>
<td></td>
<td>The steps of practice in the student’s book(LKS) are easily understood</td>
<td>79.16</td>
<td>20.83</td>
<td>Good</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Language</th>
<th>Sentences and paragraphs that have used in the student’s book are easily understood</th>
<th>83.33</th>
<th>16.67</th>
<th>Very Good</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The language that has used in the student’s book is simple and easily to understood</td>
<td>79.16</td>
<td>20.83</td>
<td>Good</td>
</tr>
</tbody>
</table>
practicalities of the learning tools obtained based on trials in 1 class for 3 meetings. The results of observing the implementation of learning observed by 3 observers while conducting the trial are presented in Table 10.

Table 10 The Observation Result of Lesson Plan Implementation

<table>
<thead>
<tr>
<th>Steps</th>
<th>First Meeting</th>
<th>Second Meeting</th>
<th>Third Meeting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average</td>
<td>Category</td>
<td>R (%)</td>
</tr>
<tr>
<td>First Activity</td>
<td>G 86</td>
<td>VG</td>
<td>86</td>
</tr>
<tr>
<td>Teacher gives greeting</td>
<td>3.33</td>
<td>G</td>
<td>86</td>
</tr>
<tr>
<td>Teacher asks one of the student to lead the pray</td>
<td>4</td>
<td>VG</td>
<td>100</td>
</tr>
<tr>
<td>Teacher explains the advance organizer model</td>
<td>3.33</td>
<td>VG</td>
<td>86</td>
</tr>
<tr>
<td>Main Activity</td>
<td>G 86</td>
<td>VG</td>
<td>86</td>
</tr>
<tr>
<td>Phase 1 : the presentation of advance organizer</td>
<td>G 86</td>
<td>VG</td>
<td>86</td>
</tr>
<tr>
<td>a. Explain the goal of learning</td>
<td>3.33</td>
<td>G</td>
<td>86</td>
</tr>
<tr>
<td>Teacher explains the goal of the learning and indicator</td>
<td>G 86</td>
<td>VG</td>
<td>86</td>
</tr>
<tr>
<td>b. The presentation of advance organizer</td>
<td>3.67</td>
<td>VG</td>
<td>86</td>
</tr>
<tr>
<td>1. Teacher gives student’s worksheet</td>
<td>G 86</td>
<td>VG</td>
<td>86</td>
</tr>
<tr>
<td>2. Teacher</td>
<td>3.33</td>
<td>G</td>
<td>86</td>
</tr>
<tr>
<td>Steps</td>
<td>First Meeting</td>
<td>Second Meeting</td>
<td>Third Meeting</td>
</tr>
<tr>
<td>-------</td>
<td>--------------</td>
<td>---------------</td>
<td>--------------</td>
</tr>
<tr>
<td></td>
<td>Average</td>
<td>Category R (%)</td>
<td>Average</td>
</tr>
<tr>
<td></td>
<td>3.33 G</td>
<td>86</td>
<td>3.67 VG</td>
</tr>
<tr>
<td></td>
<td>4. Teacher asks the student to answer (giving argument)</td>
<td>3.33 G</td>
<td>86</td>
</tr>
<tr>
<td></td>
<td>5. Teacher explains</td>
<td>3.67 VG</td>
<td>86</td>
</tr>
<tr>
<td></td>
<td>6. Teacher explains the technical term (giving attention)</td>
<td>4 VG</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>c. Reminding the knowledge or relevant experience</td>
<td>3 G</td>
<td>100</td>
</tr>
</tbody>
</table>

Phase 2: Learning material
<table>
<thead>
<tr>
<th>Steps</th>
<th>First Meeting</th>
<th>Second Meeting</th>
<th>Third Meeting</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average</td>
<td>Category</td>
<td>R (%)</td>
</tr>
<tr>
<td>presentation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Give material</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Teacher asks the students to make a group</td>
<td>3,33</td>
<td>G</td>
<td>86</td>
</tr>
<tr>
<td>2. Teacher gives LKS</td>
<td>3</td>
<td>G</td>
<td>100</td>
</tr>
<tr>
<td>3. Teacher gives instruction to the student to do LKS</td>
<td>4</td>
<td>VG</td>
<td>100</td>
</tr>
<tr>
<td>4. Students do the question from the teacher (stating problem), (giving argument), (analyzing), (inducting or concluding), (applying) (observing, asking, trying, thinking, communicating)</td>
<td>3,33</td>
<td>G</td>
<td>86</td>
</tr>
<tr>
<td>5. Teacher supervises the discussion</td>
<td>3,67</td>
<td>SB</td>
<td>86</td>
</tr>
<tr>
<td>6. Teacher asks one group to do</td>
<td>3</td>
<td>G</td>
<td>100</td>
</tr>
<tr>
<td>Steps</td>
<td>First Meeting</td>
<td>Second Meeting</td>
<td>Third Meeting</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>---------------</td>
<td>----------------</td>
<td>---------------</td>
</tr>
<tr>
<td></td>
<td>Average</td>
<td>Category</td>
<td>R (%)</td>
</tr>
<tr>
<td>presentation about the discussion and asks another group to give attention</td>
<td>3.33</td>
<td>G</td>
<td>86</td>
</tr>
<tr>
<td>7. Another student gives responses and questions</td>
<td>3.67</td>
<td>VG</td>
<td>86</td>
</tr>
<tr>
<td>Phase 3: strength cognitive organization</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Using integrative reconciliation principal</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Teacher reminds the students about the main idea of the material</td>
<td>3.67</td>
<td>VG</td>
<td>86</td>
</tr>
<tr>
<td>2. Teacher asks the student to re-state the definition of term(giving argument)</td>
<td>3.67</td>
<td>VG</td>
<td>86</td>
</tr>
<tr>
<td>3. Teacher asks</td>
<td>3.67</td>
<td>VG</td>
<td>86</td>
</tr>
<tr>
<td>Steps</td>
<td>First Meeting</td>
<td>Second Meeting</td>
<td>Third Meeting</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>---------------</td>
<td>----------------</td>
<td>---------------</td>
</tr>
<tr>
<td></td>
<td>Average</td>
<td>Category</td>
<td>R (%)</td>
</tr>
<tr>
<td>the students to summary what they have learned</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Teacher gives student the assignment for writing the difference of each concept that has served (thinking)</td>
<td>3.33</td>
<td>G</td>
<td>86</td>
</tr>
<tr>
<td>b. Suggest active reception learning</td>
<td>3.67</td>
<td>VG</td>
<td>86</td>
</tr>
<tr>
<td>Teacher asks the student to write another examples (thinking)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Build the critical approach to the learning material</td>
<td>3.33</td>
<td>G</td>
<td>86</td>
</tr>
<tr>
<td>Teacher asks the student to explain again the main idea of the material (giving argument)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Steps** | **First Meeting** | **Second Meeting** | **Third Meeting**
---|---|---|---
| Average | Category | R (%) | Average | Category | R (%) | Average | Category | R (%) |
d. Clarification | | | | | | | |
Teacher asks the student in every group to ask question **(statistical problem)** *(asking)* | 4 | VG | 100 | 3.33 | G | 86 | 3.67 | VG | 86 |

Closing

1. Teacher gives homework | 3.33 | G | 86 | 3 | G | 100 | 3.67 | VG | 86 |
2. Teacher closes the lesson by praying and greeting | 3 | G | 100 | 3.67 | VG | 86 | 3.67 | VG | 86 |

Class Condition

1. Teacher’s enthusiasm | 3.33 | G | 86 | 3.67 | VG | 86 | 4 | VG | 100 |
2. Student’s enthusiasm | 4 | VG | 100 | 3.67 | VG | 86 | 3.33 | G | 86 |
3. Time management | 3.67 | VG | 100 | 3 | G | 100 | 3.67 | VG | 86 |

Explanation: G: Good; VG: Very Good

Based on Table 10, it is known that the implementation of each aspect in the lesson plan of meetings I, II, III gets an average score of 3.33 to 4. These results indicate that overall the stages of learning, namely the initial, main, and closing activities have been carried out with both good and very good categories. In addition, each stage has reliability ranging from 86 to 100%, it means that all stages in the three meetings are appropriately carried out in accordance with the stages in the lesson plan.

**D. Conclusion**

Based on the results of the development and the data collection that is held at 7th Senior High School of Surabaya towards 24 students, it can be concluded that the learning device by using the advanced organizer model has fulfilled the validity, practicality, and effectiveness requirements so that it is appropriate to be used in the learning process to improve student’s critical thinking skills, especially at indicators of formulating the problems, analyzing, providing arguments, inducting or concluding, and applying.
E. References


Factors Affecting for E-Waste Recycling in Sri Lanka

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Abstract- Owing to the recent technological advancements and growing tendency to embrace technology has tremendously increased the use of Electrical and Electronic Equipment (EEE) both in developed and developing countries. Consequently, this led to accumulation of large quantities of e-waste around the world. Importantly, management and proper disposal of household e-waste in almost every country including Sri Lanka has become a prevailing challenge. Evidently, Sri Lanka has given a minimum priority for systematic e-waste management compared to the developed countries. The main aim of this research is to examine the factors influencing the e-waste recycling of households in Sri Lanka. Hence, this research was conducted as a quantitative study involving cross-sectional survey, gathering valid responses from 245 households. Multiple Regression Analysis was employed to analyze the data and tested the constructed hypotheses. The findings exhibited that attitude and perceived convenience are the factors that influence willingness of e-waste recycling of Sri Lankan households. A succinct overview of Sri Lanka’s household perception of current e-waste recycling is emphasized in this research. Ultimately, findings would support the relevant waste management authorities in Sri Lanka to plan and execute effective strategies to manage household e-waste.

Index Terms- Electrical and Electronic Equipment, E-Waste, Recycling, Willingness,

I. INTRODUCTION

Presently, exponential growth in manufacturing and subsequent use of sophisticated EEE is commonly witnessed all around the world. In fact, there is an incessant production of EEE with rapid cutting-edge technical enhancements striving to feed the respective growing consumer demand. Moreover, duration of expected use of some EEE such as communication devices has drastically reduced with frequent arrival of upgraded versions embedded with enhanced user-friendly smart features and high-performance capabilities. Consequently, rising demand with increasing tendency of replacing/upgrading EEE and acceleration of production with minimum attention to Waste Electrical and Electronic (WEEE) recycling has created a major threat for both the humanity and natural environment (Nixon, Saphores, Ogusentian, & Shapiro, 2009). Regrettably, it is evident that most of the consumers tend to discard WEEE without practicing a proper environmental friendly disposal mechanism (Borthakur, Anwesha, Sinha, & Kunal, 2013). Mainly, these disposed WEEE contain numerous toxic chemicals and other harmful substances. Thus, WEEE cannot be treated as normal junk. Many countries, including both the developed and developing countries have taken several counter measures to manage WEEE disposal with the aim of minimizing the harm. Major protective step acknowledged is the proper recycling of WEEE (Ray, 2008). Therefore, managing WEEE by proper recycling would minimize the negative results affected for human livelihood and natural environmental. Presently, Sri Lanka is similarly encountering the problem of managing WEEE. However, insufficient counter measures have been taken to address the issue of managing e-waste (Mallawarachch & Karunasena, 2012). The researchers argue that there exists a gap in examining the extent of Sri Lankan consumer readiness on e-waste management and recycling. Thus, researchers seek to address aforementioned issue via this empirical research.

II. LITERATURE REVIEW

1.1. E-waste

Increasing use and frequent replacement of EEE gave a rise to the e-waste as an emerging phenomenon that happens be challenging the existence of humanity and nature. Although the concept of WEEE has been predominantly received interest among many scholars, research studies are still progressing aimed at exploring appropriate strategies to minimize the harmfulness. Many reputed organizations and scholars embarked to conceptually define e-waste or WEEE as an initially approach to investigate this phenomenon. E-waste is all obsolete or outdated electronic and electrical devices commonly used in offices, homes and by people on the go (Electronic Recyclers of America, 2006). Similarly, e-waste is referred as an end-of-life equipment, whose working depends on electric current or electromagnetic field (United Nations Environmental Programme, 2007). Organization of Economic Cooperation and Development (2001) defined e-waste as “any appliance using electric power supply that has reached its end-of-life”. The Directive 2012/19/EC defined e-waste as the electrical or electronic equipment which is waste including all components, subassemblies and consumables which are part of the product at the time of discarding. Above mentioned directive lists ten categories of e-waste namely: large household appliances; small household appliances; IT and telecommunication equipment; consumer equipment; lighting equipment; electrical and electronic tools (with the exception of large scale stationary industrial tools); toys, leisure and sports equipment; medical devices (with the exception of all implanted and infected products); monitoring and control instruments; and automatic dispensers.
It is evident that usage of EEE including computers, mobile phones and entertainment electronics has proliferated and disposing them is growing rapidly throughout the world. The amount of e-waste in the newly industrialized and developing countries is relatively growing up due to the increasing tendency to import e-waste from developed countries. Approximately, 50–80% of the WEEE accumulated in developed markets is being shipped to developing countries for reuse and recycling (Widmer, Oswald-Krapf, Sinha-Khetriwal, & Schen, 2005). Sri Lanka as a developing country imports large amounts of EEE a year. Following table shows the annual import (legally) statistics of major types of EEE in Sri Lanka, their average useful life times and the forecasted growth rate in next couple of years.

<table>
<thead>
<tr>
<th>Item</th>
<th>PC</th>
<th>Printers</th>
<th>TV</th>
<th>Mobile Phones</th>
<th>AC</th>
<th>Refriger.</th>
<th>Washing Machines</th>
<th>Batteries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Imports</td>
<td>300,000</td>
<td>130,000</td>
<td>400,000</td>
<td>1,200,000</td>
<td>40,000</td>
<td>250,000</td>
<td>70,000</td>
<td>6,000,000</td>
</tr>
<tr>
<td>Average Life (yrs)</td>
<td>6</td>
<td>6</td>
<td>12</td>
<td>3</td>
<td>15</td>
<td>25</td>
<td>20</td>
<td>0.2</td>
</tr>
<tr>
<td>Forecasted Growth</td>
<td>12%</td>
<td>7%</td>
<td>7%</td>
<td>40%</td>
<td>5%</td>
<td>5%</td>
<td>8%</td>
<td>1%</td>
</tr>
</tbody>
</table>

Source: Sri Lanka Customs (2010)

However, a little concern is paid on managing the obsolete or damaged equipment which are no longer in usable state.

Recycling of WEEE is an important subject not only from the point of waste treatment but also from the recovery aspect of valuable materials. (Cui & Eric, 2003).

E-waste is chemically and physically distinct from other forms of municipal or industrial waste; it contains both valuable and hazardous materials that require special handling and recycling methods to avoid environmental contamination and detrimental effects on human health. Indeed, e-waste contains many toxic materials such as lead (Pb), cadmium, mercury, barium, beryllium, hexavalent chromium, and brominated flame-retardants. Recycling can recover reusable components and base materials, especially Cu and precious metals. However, due to lack of facilities, high labour costs, and tough environmental regulations, rich countries tend not to recycle E-waste. Instead, it is either landfilled, or exported from rich countries to poor countries, where it may be recycled using primitive techniques and little regard for worker safety of environmental protection.

E-waste not only includes house-hold and industrial electrical appliances but also components such as, batteries, capacitors, castings, cathode-ray tubes, glass, etc are also included in them. (Environment, 1989).This may release several pollutants in the environment, on exposure to which, might result in several negative effects on various biotic and abiotic components in vicinity of such informal recycling plants (Wong, Duzgoren-Aydin, Aydin, & Wong, 2007) (Fu, Zhou, & Liu, 2008) Anecdotal reports suggest that a large percentage of discarded e-waste is exported to Asia, where processing is very cheap; unfortunately, e-waste is often handled improperly there, which results in severe human exposure and environmental pollution (Coalition, 2002). When it is not exported, discarded e-waste is often landfilled. It has become the largest contributor of Pb to the solid waste stream in the United States since the creation of battery recycling programs (EPA,2000).

Most common ways of exposure to hazardous components of e-waste is by ingestion, skin contact and inhalation, through mediums like contaminated soil, water, food and air (Robinson, 2009). Pregnant women, workers in the informal e-waste recycling plants, children, and other vulnerable populations come across comparatively more risks of exposure (ATSDR, 2012). Children are at maximum risk because of additional mediums of exposure (eg, maternal feeding), excessive dermal contact behaviors (eg, hand-to-mouth activities in early years and care less behaviors while growing ages), and their changing body requirements (eg, more intake of water and food, and low rates of toxin elimination) (Pronczuk de Garbino, 2004). The effect can also transfer from workers in informal recycling plants to other family members through dermal contact, clothes, etc.

III. THEORETICAL BACKGROUND

An in-depth analysis of literature shows that at the household, municipal, and student levels, the factors that influence on recycling behavior was explained using the TRA-TPB theoretical framework. (Largo-Wight, Bian, & Lange, 2012) (Oom Do Valle, Rebelo, Reis, & Menezes, 2005)

Theory of Planned Behavior (TPB)

The Theory of Reasoned Action (TRA; (Ajzen & Fishbein, Understanding Attitudes and Predicting Social Behaviour, 1980)) suggested that an individual’s intention to perform certain behaviors is the immediate determinant of that behavior and it consists of two parts. The first part states that an individual act in a rational manner and she or he uses the available information before doing so (attitude). The second part states that the attitude toward the specific behavior and subjective norms determines the individual’s intentions (Subjective norm). But the performance of certain behaviors is usually deterred by the lack of adequate opportunities, knowledge, time etc (Liska, 1984). Therefore, in order to overcome those circumstances Theory of Planned Behaviour (TPB) (Ajzen, “The theory of planned behaviour”, 1991) extended the TRA by adding other variables which explains
IV. RESEARCH MODEL AND HYPOTHESIS

Mainly this study contributes to the literature by concentrating on eCycling concept from consumers’ perspective. And in order to build up the conceptual framework both TRA and as well as TPB have been used along with the aforementioned literature.

[Diagram showing the relationships between Attitude, Perceived Knowledge, Awareness of Consequences, Subjective Norm, and Perceived Convenience leading to Behavioral Intention (Willingness).]

**- eCycling Behavioral intention**

eCycling intention can be defined as the individual’s willingness to recycle e-waste in the future (Ajzen & Fishbein, Understanding Attitudes and Predicting Social Behaviour, 1980). Past literature it is mentioned that person’s behavioral intention is substantially related to actual behavior. Therefore it used as a proxy for behavior.

**- Attitude toward eCycling**

The attitude toward behavior is defined by (Ajzen & Fishbein, Understanding Attitudes and Predicting Social Behaviour, 1980) as “an individual’s beliefs toward behavior and evaluation that captures an individual’s perceptions about that behavior”. In this study as the attitude toward eCycling the individual’s favorable or unfavorable assessment of performing eCycling has been taken. But in the past literature some researchers identified that this fact as a very important predictor of recycling behavior (Calvin, Ronnie, & Geoffrey Qiping, 2012); (Chu & Chiu, 2003) while some as unimportant factor (Davies, Foxall, & Pallister, 2002). By considering all, following hypothesis is proposed,

**H1.** Attitude toward eCycling correlates to eCycling intention.

**- Perceived knowledge**

In order to perform the intention or willingness associated with recycling one must have an adequate knowledge to perform these actions. Hence, fortitude of one’s knowledge is essential in order to assess his/her preparation in adopting the environmentally responsible behaviour. In many studies, the importance of perceived knowledge has been confirmed (Aung & Arias., 2006). For instance, some studies find that knowledge is a significant predictor and correlates positively with environmental behaviour (Chu & Chiu, 2003). However, contrary to common expectation, several other research findings show that higher levels of knowledge do not necessarily translate into substantially higher levels of behavioural activities (Marandu, Moeti, & Joseph, 2002).
2010). Therefore, the following hypothesis is proposed regarding Perceived knowledge:

**H2.** Perceived knowledge correlates to eCycling intention.

- **Awareness of consequences**
  
  In many observed studies, anxieties for the environment are perceived to be one of the important encouragers of recycling behavior. In this study, awareness of consequences is defined as the individual’s awareness of environmental consequences when the individual behaves in a certain way. There are contradictions in recycling literature about how awareness of consequences influences behavioral intentions.

  Although, numerous studies have confirmed that awareness of consequences and the environmental concerns associated with recycling positively predict recycling intentions (Calvin, Ronnie, & Geoffrey Qiping, 2012) (Tonglet, Phillips, & Read, “Using the theory of planned behaviour to investigate the determinants of recycling behaviour: a case study from Brixworth, UK”, 2004) found a negative relationship between awareness and intentions. However, the empirical studies focus on eCycling find that awareness of environmental consequences is a positive significant predictor of eCycling behavior such as paying for green electronics. Hence, the following hypothesis is proposed regarding the awareness of consequences:

**H3.** Awareness of consequences correlates to eCycling intention.

- **Subjective norms**
  
  A subjective norm can be defined as social pressure and it is a function of the perceived expectations by other individuals or groups who are important or close to a person, and that person’s motivation to comply with these expectations (Ajzen & Fishbein, Understanding Attitudes and Predicting Social Behaviour, 1980). That means the pressure from peers, family and neighbors has a positive effect on behavior of recycling. Past literature also stated that this is one of the vital factors in motivating recycling behavior. (Oskamp, Harrington, Edwards, & Sherw, 1991) (Sidique, Lui, & Joshi, 2010)

**H4.** Subjective norms correlates to eCycling behavior.

- **Perceived convenience**
  
  The number of expected recycling site visits increased when recycling was considered a convenient activity (Sidique, Lui, & Joshi, 2010). Time, space and the perceived ease of an individual in managing waste can be considered as the convenience (Tonglet, Phillips, & Bates, “Determining the drivers for householder pro-environmental behaviour: waste minimisation compared to recycling”, (2004b)).

**H5.** Perceived convenience correlates to eCycling intention.

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**V. METHODOLOGY**

**4.1 population**

In order to conduct the research university students have been taken as the subject population because they potentially respond differently from non-student consumers and they are an important group of consumers (Peterson, 2001)

According to (Carlson, 1971) “students are ‘unfinished’ personalities”. Therefore, they differ from non-students based on number of specific psychological dimensions and as well as behavioral dimensions. Another fact is that today’s university students are rapidly changing and they are very nontraditional. And also “college students are likely to have less-crystallized attitudes, less-formulated senses of self, stronger cognitive skills, stronger tendencies to comply with authority, and more unstable peer group relationships” (Sears, 1986) and they are more homogeneous than non-students (Calder, et al., 1981). Therefore, this research investigates the determinants of eCycling behavior using university students as subjects. Regardless of the limitation, this study executes students as an important group to sample because they are the representatives of future generation that is likely to use technology and better understanding them allows better preparation for how to develop attitudes about eCycling. Finally, university students can be taken as a representation of all consumers because past literature also suggests that university students’ behavior has an impact on the general public and broader humanity (Calvin, Ronnie, & Geoffrey Qiping, 2012) (Kelly, Mason, Leiss, & Ganesh, 2006).

Considering all, people need a better understanding of consumer behavior with e-waste to reduce e-waste and its potential threat to humanity and the environment. This paper examines the determinants of eCycling intention using university students as the subject population.

**4.2 Questionnaire Design and Data Collection**

The questionnaire used was designed with reference to the recycling literature and the TPB theoretical framework (Tonglet, Phillips, & Read, “Using the theory of planned behaviour to investigate the determinants of recycling behaviour: a case study from Brixworth, UK”, (2004a)) (Sidique, Lui, & Joshi, 2010). In order to test the theoretical model proposed, the questionnaire was conducted among students at the University of Kelaniya, Sri Lanka. The questionnaire included questions about the respondents’ eCycling willingness (eCycling Behavioral intention), Attitude toward eCycling, Subjective norms, Awareness of consequences, Perceived convenience, Perceived knowledge. The questionnaire also contained questions asking demographic information of the respondents. The dependent variable and all the independent variables are measured using a seven-point Likert-type scale with endpoints “Strongly Disagree=1” and “Strongly Agree=7”.

To enhance internal validity, pre-testing was conducted to modify the questionnaire before launching formally. Thirty copies of the questionnaire were randomly distributed in this pilot study. The main data collection was conducted in January 2017, during with 255 questionnaires were distributed in the university. 245 completed and valid questionnaires (response rate 96%) were returned.
This research was a preliminary study to gather data and test the constructs for recycling e-waste in light of previous research findings. In this study, SPSS software was used to evaluate data.

VI. RESULTS OF THE STUDY

The main purpose of this study was to analyze the factors that influence eCycling intention. In order to analyze the data, researcher has used the regression analysis. As it proves all the assumptions of regression analysis (Multicollinearity, Autocorrelation, Homoscedasticity, Normality) researcher has continued with the analysis. According to Table 01 all the factors i.e. Attitude toward eCycling, Subjective norms, Awareness of consequences, Perceived convenience, Perceived knowledge are significantly correlated to the dependent variable, eCycling willingness (eCycling Behavioral intention).

Among them, Perceived Convenience has the highest correlation with Behavioral Intention (Willingness) to eCycling which the value is 0.414. Perceived knowledge has the next highest correlation which is 0.302 and other 3 variables Attitude, Awareness of consequences, Subjective norms have a positive correlation of 0.268, 0.288 and 0.260 respectively. This indicates that all the five factors have a moderate positive association with Behavioral Intention (Willingness) to eCycling and association of all the five factors are significant under the 5% significant level.

Table 1: Correlation analysis

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Pearson Correlation</td>
<td>1</td>
<td>.293**</td>
<td>.569**</td>
<td>.080</td>
<td>.268**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.000</td>
<td>.105</td>
<td>.000</td>
<td>.019</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>245</td>
<td>245</td>
<td>245</td>
<td>245</td>
<td>245</td>
</tr>
<tr>
<td>B</td>
<td>Pearson Correlation</td>
<td>293**</td>
<td>1</td>
<td>.332**</td>
<td>.543**</td>
<td>.302**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>245</td>
<td>245</td>
<td>245</td>
<td>245</td>
<td>245</td>
</tr>
<tr>
<td>C</td>
<td>Pearson Correlation</td>
<td>.569**</td>
<td>.332**</td>
<td>1</td>
<td>-.015</td>
<td>.288**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.000</td>
<td>.407</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>245</td>
<td>245</td>
<td>245</td>
<td>245</td>
<td>245</td>
</tr>
<tr>
<td>D</td>
<td>Pearson Correlation</td>
<td>.080</td>
<td>.543**</td>
<td>-.015</td>
<td>1</td>
<td>.260**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.105</td>
<td>.000</td>
<td>.407</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>245</td>
<td>245</td>
<td>245</td>
<td>245</td>
<td>245</td>
</tr>
<tr>
<td>E</td>
<td>Pearson Correlation</td>
<td>.268**</td>
<td>.302**</td>
<td>.288**</td>
<td>.260**</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>245</td>
<td>245</td>
<td>245</td>
<td>245</td>
<td>245</td>
</tr>
<tr>
<td>F</td>
<td>Pearson Correlation</td>
<td>.132</td>
<td>.462**</td>
<td>.232**</td>
<td>.493**</td>
<td>.414**</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
<td>.019</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>245</td>
<td>245</td>
<td>245</td>
<td>245</td>
<td>245</td>
</tr>
</tbody>
</table>

. Correlation is significant at the 0.05 level (2-tailed).
A – Attitude
B – Perceived knowledge
C – Awareness of consequences
D – Subjective norms
F – Perceived convenience
E – Behavioral intention (Willingness)

Multiple Regression Analysis

Multiple regression allows to determine the overall fit which means the variance explained of the model and the relative contribution of each of the factors to the total variance explained. Tables 02 explains how well the regression model fits the data.
Table 02:  
**Model Summary**

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.488</td>
<td>0.24</td>
<td>0.223</td>
<td>3.76926</td>
</tr>
</tbody>
</table>

R value is considered as one measurement of the quality of the prediction of dependent variable. So, R value of 0.49 describes a moderate level of prediction.

R square value of behavioral intention (0.240) showed the amount of variance in eCycling behavioral intention that could be explained by attitudes, Perceived knowledge, awareness of consequences, subjective norms, and perceived convenience.

According to the Table 3 the F-test is highly significant so it is assumed that there is a linear relationship between variable in this model.

Table 03:  
**ANOVA Table**

<table>
<thead>
<tr>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>1063.751</td>
<td>5</td>
<td>212.750</td>
<td>14.975</td>
</tr>
<tr>
<td>Residual</td>
<td>3395.553</td>
<td>240</td>
<td>14.207</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>4459.304</td>
<td>245</td>
<td>14.207</td>
<td></td>
</tr>
</tbody>
</table>

Table 4 describes the unstandardized coefficient values and the significance of the independent variable to the dependent variable.

Table 04:  
**Coefficient Table**

<table>
<thead>
<tr>
<th>standardized Coefficients</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td></td>
</tr>
<tr>
<td>Attitude toward eCycling</td>
<td>.166</td>
</tr>
<tr>
<td>Perceived knowledge</td>
<td>.006</td>
</tr>
<tr>
<td>Awareness of consequences</td>
<td>.125</td>
</tr>
<tr>
<td>Subjective norms</td>
<td>.125</td>
</tr>
<tr>
<td>Perceived convenience</td>
<td>.299</td>
</tr>
</tbody>
</table>

Level of Significance 5 %

According to the above analysis, only two out of five independent variables were found as significant to the dependent variable. This describes that the Attitude toward eCycling and Perceived convenience have significant impact on eCycling intention (Willingness) while Perceived knowledge, Awareness of consequences and Subjective norms have minimum impact on willingness due to the less significant of the variables.

**Test of Hypothesis**

Table 05 shows the Hypothesis testing. H1 and H5 are accepted and H2, H3 and H4 Rejected.

<table>
<thead>
<tr>
<th>Hypotheses</th>
<th>Accept/reject</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1: Attitude toward eCycling correlates to eCycling intention</td>
<td>Accept</td>
</tr>
<tr>
<td>H2: Perceived knowledge correlates to eCycling intention</td>
<td>Reject</td>
</tr>
<tr>
<td>H3: Awareness of consequences correlates to eCycling intention</td>
<td>Reject</td>
</tr>
<tr>
<td>H4: Subjective Norms correlates to eCycling intention</td>
<td>Reject</td>
</tr>
</tbody>
</table>

VII. DISCUSSIONS AND CONCLUSIONS

The TPB provided a useful foundation in explaining recycling behaviour. Attitudes and subjective norms significantly correlated with behavioral intention. This finding was consistent with those empirical studies in related areas, including those of Chen and Tung (2010), (Oom Do Valle, Rebelo, Reis, & Menezes, 2005), and Cheung et al. (1999). The additional measures of Perceived knowledge, awareness of consequences, and Perceived convenience were included in the model; these variables were also statistically significant in explaining the behavioural intention of recycling behaviour. The current study’s result regarding Perceived convenience was consistent with the findings by (Tonglet, Phillips, & Read, “Using the theory of planned behaviour to investigate the determinants of recycling behaviour: a case study from Brixworth, UK”, (2004a)).

This study gives insightful information to facilities management professionals as regards shaping a more user-friendly and convenient recycling scheme to fulfill the social responsibility for environmental protection. The results suggested that each of the five predictors – Attitude, Perceived knowledge, Awareness of consequences, Subjective Norms, Perceived Convenience – contributed approximately 25 per cent of R² in explaining behavioral intention. However, the contributions of all the variables were comparatively low. These findings implied that the key challenges and considerations for practitioners about the design and implementation of eCycling schemes.

This study developed a model to identify the determinants of eCycling intention vis-a-vis eCycling activities in university in Sri Lanka. The results showed that out of five critical factors including eCycling intention were less influenced by only attitude, and Perceived convenience and that each of those five factors correlated positively with recycling intentions. This sheds light for facilities managers on the design and implementation of eCycling schemes in university.

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Assessment of Heavy Metals Concentration in Agriculture Soil of Kolfe Area, Addis Ababa, Ethiopia

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Abstract- This research evaluated the concentration and distribution of heavy metals (Chromium (Cr), Lead (Pb), & Cadmium (Cd)) in the vegetable field in the Kolfe area, Addis Ababa. Soil samples were tested for pH and heavy metals. Heavy metals in the soil are higher than the earlier report [1]. However, concentrations of heavy metal were observed (Cr > Pb > Cd), mean concentrations of heavy metal Cr, Cd and Pb were 274.83 mg kg⁻¹, 3.09 mg kg⁻¹, and 29.83 mg kg⁻¹, respectively. Overall, some concentrations of heavy metal (Cr & Cd) are higher than the safe limit. Hence, the soils studied indicate that vegetable cultivation in the area of study can lead to health and environmental problems. In terms of health and safety, soil pollution and toxicity, heavy metal sources are discussed.

Index Terms- Soil, Heavy metals, Soil Pollution

I. INTRODUCTION

Due to the availability of pollutants in the soil, soil contamination is natural and inorganic [2]. Contaminants from heavy metal soil cannot be biodegraded and would cause harm to the human body through the food chain bioaccumulation [2-8]. Arsenic (As), cadmium (Cd), lead (Pb), copper (Cu), nickel (Ni), chromium (Cr) and zinc (Zn) are heavy metals. An element’s available concentration in the soil is an estimate of the fraction of that element that is present either as free ions, soluble complexes or in readily absorbable forms [9]. The maximum heavy metal content in the soil is the estimate of the concentration of mineral-derived elements in the geological parent material on which the soil has formed and contributions from a wide range of potential sources of contamination. The causes of heavy metal contamination are the airborne absorption of aerosol particles (< 30 mm in diameter), raindrops containing heavy metals or gaseous types of elements, direct applications of agricultural fertilizers, agrochemicals and various organic materials like sewage sludge’s, animal manures, food waste and compost [2, 9].

The level of concentration of heavy metals in the soil has an adverse effect on soil quality and biological functions. Heavy metals such as Lead (Pb) are largely insoluble heavy metal soil [10], which can undergo a complex phosphate and carbonate reaction. When Pb is present in the soil, growth inhibition can affect the plant by inhibiting enzyme activity, changes in membrane permeability, and impaired photosynthesis [11, 12]. Plants and plants eaten by animals and humans will absorb Pb, which is a significant human health problem [13]. Cd occurs in agricultural fields, of course. In addition, the use of phosphate fertilizers and sewage sludge, dumping of mine spills or tailings, and industrial discharge are major causes of soil cadmium dispersion. Cd is a mobile component in soils that can be easily absorbed by roots and transported to shoots of plants [14]. High levels of Cd induce phytotoxicity by decreasing the absorption of nutrients, inhibiting photosynthesis, inducing lipid peroxidation, and altering the antioxidant process and membrane functioning [15]. Cd can be adsorbed from soil and water by plants. Excess consumption of Cd affects human health, can primarily cause kidney damage, and can cause adverse health effects on respiratory, cardiovascular, and musculoskeletal systems [10].

Global cancer research organizations have listed Chromium Cr (VI) as one of the human carcinogens [16]. Chromium (Cr) contamination is primarily caused by industry such as mining and smelting industries [17]. Cr is usually found in the forms of Cr (III) and Cr (VI) in the natural environment. Cr (III) can control insulin and blood glucose levels as one of the important trace elements of a mammal [18]. Cr (III) primarily exists in the form of Cr (OH)3, or Cr2O3, and a complex can be easily produced and stable in the sediment. The toxicity of Cr (VI) is 100 times greater than that of Cr (III). Long-term human skin exposure to Cr (VI) wastewater is confirmed to be the cause of dermatitis and eczema. And Cr (VI) inhalation can cause sneezing, running nose, nosebleeds, ulcers, and even damage to the kidneys and liver. Cr(VI) is detrimental to the human circulatory system or even threatens human life in vital situations [19]. In water and soil, Cr (VI) was highly mobile [20].

Contamination with heavy metals is a major problem worldwide; the problem in a country like China is very serious. One-sixth of China’s cultivated land was estimated to have been contaminated by heavy metals [21, 22]. According to the Ethiopian Public Health Institute, over 2,000 factories are based in the capital city of Ethiopia and about 90% of the industries spill untreated effluent into the river network [23]. The two main rivers are used for irrigation of urban farms and contribute about 60% [1, 24]. The present study showed that due to significantly rapid urban
expansion, increased industrial activity, lack of sewage treatment, inadequate solid waste management and other economic development, some toxic and potentially toxic elements polluted the Addis Ababa City soil in various degrees [1, 23]. The objective of this research is to evaluate the level of heavy metals in wastewater irrigated agricultural land in Kolfe, Addis Ababa, Ethiopia

II. MATERIALS AND METHODS

Description of the study area

Kolfe, the research study area is one of the sub-cities of Addis Ababa City. Addis Ababa is the capital city of Ethiopia. It is the country’s administrative city and consists of 10 sub-cities [25]. Within the city are two major rivers namely, Tinshu (Little) and Tilku (Big) Akaki River at the eastern and western part of the city respectively. The total catchment area of Tinshu Akaki is about 540km². It is along the courses of Little Akaki river that most of the manufacturing industries like tanneries, food and beverages, woodworks, textiles, pharmaceutical, wineries, battery and paints, rubber and plastic products, non-metal and metal products, paper and printing products are located. The industries most often discharge untreated wastewater into the river network and unfortunately, the river water is used for irrigation in five different vegetable farm areas including Burayu, Kolfe, Kera, Gofa and Akaki vegetable farms. The major vegetables under irrigation include, Swiss chard, lettuce, red beet, potato, cabbage, Ethiopian kale, salad, tomato, green paper, carrot and onion grow in these farm areas [1].

Kolfe, is located in the western part of the capital city and has a total land area of 61.25 sq.km, its population and population density are 546,219 and 7,448.5 square meters and has 15 Weredas. Kolfe farm is located in the Sub-city of Kolfe Keraneo City Administration, the upstream and south western direction of the Little Akaki River [25].

Sample collection and analysis

A sample site was selected based on wastewater irrigated vegetable farmland. This site was selected because previously report compared to other locations (based on observation and expert view). The selected site was further subdivided into a total of eight (8) sample sites; all which were wastewater irrigated vegetable farmland. The soil sample was collected in July 2019 (Wet season) from eight different vegetable farmlands; the farmland is used for cultivation of garlic, lettuce, carrot, and cabbage. The soil samples were collected from topsoil at the depths of 0–20 cm. The samples were air-dried for five days, ground with mortar and pestle, sieved to < 2 mm and homogenized sieve, sieved through 0.5 mm and then kept in clean polythene bags and coded for further soil characterization.

The soil samples were digested; 0.5 g of sample was mixed with 10 mL of Aqua-regia (3:1 of HCl: HNO₃), heated on a hot plate inside fume cupboard. The digested samples were filtered through Watchman filter paper; the filtrate was diluted with 50 mL of distilled water. The diluted samples were taken for heavy metal determination using Atomic Absorption Spectrophotometer (AAS).
Soil pollution indices

The geo-accumulation index (I-geo) and Contamination factor (CF) were employed to assess the pollution of metals in the soil of Kolfe area.

**Geo-accumulation index:** The geo-accumulation index (I_{geo}) introduced by Muller [26]. I_{geo} Index is used to assess metal pollution in sediments or soil. I_{geo} Can be calculated by Eq. (1)

\[
I_{geo} = \log 2 \left( \frac{C_n}{1.5 \times B_n} \right)
\]

Where \(C_n\) = the concentration of heavy metal (n) in the soil, \(B_n\) = is the background value for heavy metal (n) and Factor 1.5 indicates the variation of background values for heavy metal in the environment [27, 28]. The classes of soil pollution were identified in terms of I_{geo}. Unpolluted (I_{geo} < 0), unpolluted to moderately polluted (I_{geo} = 0–1), moderately polluted (I_{geo} = 1–2), moderately to strongly polluted (I_{geo} = 2–3), heavily polluted (I_{geo} = 3–4), strongly to extremely polluted (I_{geo} > 5) [28-30].

**Average contamination factor (CF):** Contamination Factor is the ratio obtained by dividing the concentration of a specific heavy metal in the soil sample by the background value of that metal. It can be calculated by Eq. (2)

\[
CF = \frac{C_m}{C_b}
\]

Where, \(C_m\) is the concentration of heavy metals in soils sample, \(C_b\) is the reference of background value for heavy metals (permissible limit), the value of \(C_b\) can be measured either in pre-civilization soil or sediments of the study area or taken from the literature and the value of \(C_b\) for Cr, Cd and Pb was considered as 100, 0.8 and 80 mg kg\(^{-1}\), respectively [31, 32]. Table 1. Shows different categories of soil contamination class in terms of CF.

**Table 1.** Classification based on contamination factor (CF) [31]

<table>
<thead>
<tr>
<th>CFs Value Scale</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤1</td>
<td>Uncontaminated soil</td>
</tr>
<tr>
<td>1-2.0</td>
<td>Suspected</td>
</tr>
<tr>
<td>2-3.5</td>
<td>Slight</td>
</tr>
<tr>
<td>3.5-8</td>
<td>Moderate</td>
</tr>
<tr>
<td>8-27.0</td>
<td>Severe</td>
</tr>
<tr>
<td>≥27</td>
<td>Extremely</td>
</tr>
</tbody>
</table>

III. Statistical Analysis

The levels of different heavy metals in the soil were measured using a one-way analysis of ANOVA. Furthermore, Pearson correlation was used to determine the heavy metals inter-element relationship in the soil. The mean and standard deviations of metal concentrations, CF and I_{geo} in the soil were calculated. Data and Figure were analysed using OriginPro and SPSS software.

IV. Results and Discussion

**Results**

The soil heavy metal content in the soil samples is shown in Table 1 and Figure 2. Figure 3 indicates the average heavy metal concentration of the three heavy metals. Results are expressed as a mean and standard sample deviation.

**Table 2 Concentration of Heavy Metals at Different Sample Site**

<table>
<thead>
<tr>
<th>Sample Name</th>
<th>Co-ordination</th>
<th>Metal concentration mg kg(^{-1})</th>
<th>pH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Latitude</td>
<td>Longitude</td>
<td>Cr</td>
</tr>
<tr>
<td>1</td>
<td>09°02'40&quot;N</td>
<td>038°4126'E</td>
<td>329.32</td>
</tr>
<tr>
<td>2</td>
<td>09°02'15&quot;N</td>
<td>038°4147'E</td>
<td>312.71</td>
</tr>
<tr>
<td>3</td>
<td>09°02'37&quot;N</td>
<td>038°4139'E</td>
<td>322.51</td>
</tr>
<tr>
<td>4</td>
<td>09°02'08&quot;N</td>
<td>038°4201'E</td>
<td>271.01</td>
</tr>
<tr>
<td>5</td>
<td>09°02'22&quot;N</td>
<td>038°4146'E</td>
<td>312.23</td>
</tr>
<tr>
<td>6</td>
<td>09°02'16&quot;N</td>
<td>038°4146'E</td>
<td>297.45</td>
</tr>
<tr>
<td>7</td>
<td>09°02'11&quot;N</td>
<td>038°4149'E</td>
<td>189.12</td>
</tr>
<tr>
<td>8</td>
<td>09°02'12&quot;N</td>
<td>038°4156'E</td>
<td>164.32</td>
</tr>
<tr>
<td>Mean ± SD</td>
<td></td>
<td></td>
<td>274.83-63.42</td>
</tr>
<tr>
<td>Range</td>
<td></td>
<td></td>
<td>164.32-329.32</td>
</tr>
<tr>
<td>Safe limit</td>
<td></td>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

The average amounts of the three heavy metals were Cr > Cd > Pb. Figure 2 indicates the distribution of heavy metal in the eight areas.
The findings in Table 2 and Figure 2 indicate that the concentration of the two heavy metals in sample sites 1 and 3 reached the healthy chromium and cadmium limits. Perhaps the highest concentration of Cr is due to wastewater irrigation; waste from Burayu, Winget, and Askot tannery and other industries. The other sample site for heavy metal concentration Cd, Cd, and Pb were lower than FAO / WHO's safe level.

The average contamination factor (CF); shows contamination of soil with heavy metals. Table 3 shows the average values of the soil sample for heavy metal contamination variable. The mean CF values of heavy metal followed the declining order of Pb > Cr > Cd.

Table 3 Average contamination factor (CF) of heavy metals pollution in the soil sample sites

<table>
<thead>
<tr>
<th>Sample ID</th>
<th>Cr</th>
<th>Cd</th>
<th>Pb</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3.2932</td>
<td>1.3875</td>
<td>0.340125</td>
</tr>
<tr>
<td>2</td>
<td>3.1271</td>
<td>3.925</td>
<td>0.4015</td>
</tr>
<tr>
<td>3</td>
<td>3.2251</td>
<td>4.9</td>
<td>0.4955</td>
</tr>
<tr>
<td>4</td>
<td>2.7101</td>
<td>3.7375</td>
<td>0.126375</td>
</tr>
<tr>
<td>5</td>
<td>3.1223</td>
<td>1.475</td>
<td>0.26675</td>
</tr>
</tbody>
</table>

Figure 2. Heavy metals concentration in different sample areas

Figure 3 Concentration of the three heavy metals
Average geo-accumulation index ($I_{geo}$); measures the contamination level of soil with different heavy metals[30]. The $I_{geo}$ values of the eight sample sites were shown in Table 4. The mean values of $I_{geo}$ for heavy metals followed the decreasing order of Cd > Cr > Pb.

Table 4 Average geo-accumulation index ($I_{geo}$) of heavy metals pollution in the soil of the eight sites

<table>
<thead>
<tr>
<th>Sample ID</th>
<th>Cr</th>
<th>Cd</th>
<th>Pb</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.66090132</td>
<td>0.27845275</td>
<td>0.068258552</td>
</tr>
<tr>
<td>2</td>
<td>0.62756727</td>
<td>0.78769516</td>
<td>0.080575696</td>
</tr>
<tr>
<td>3</td>
<td>0.64723456</td>
<td>0.98336465</td>
<td>0.099440242</td>
</tr>
<tr>
<td>4</td>
<td>0.54388093</td>
<td>0.75006641</td>
<td>0.025361777</td>
</tr>
<tr>
<td>5</td>
<td>0.62660397</td>
<td>0.29601283</td>
<td>0.053533168</td>
</tr>
<tr>
<td>6</td>
<td>0.59694248</td>
<td>0.80776382</td>
<td>0.085342004</td>
</tr>
<tr>
<td>7</td>
<td>0.37953862</td>
<td>1.04858782</td>
<td>0.102877001</td>
</tr>
<tr>
<td>8</td>
<td>0.32976833</td>
<td>1.25680023</td>
<td>0.083360223</td>
</tr>
<tr>
<td>Mean ± SD</td>
<td>0.551 ± 0.127</td>
<td>0.776 ± 0.343</td>
<td>0.074 ± 0.025</td>
</tr>
</tbody>
</table>

Table 5 Comparison of heavy metal concentration (mg $kg^{-1}$) of this study and other authors

<table>
<thead>
<tr>
<th>Country</th>
<th>Pb</th>
<th>Cr</th>
<th>Cd</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nigeria</td>
<td>29.67</td>
<td>51.83</td>
<td>1.82</td>
<td>[33]</td>
</tr>
<tr>
<td>China</td>
<td>42.89</td>
<td>69.64</td>
<td>0.20</td>
<td>[34]</td>
</tr>
<tr>
<td>Colombia</td>
<td>0.071</td>
<td>-</td>
<td>0.040</td>
<td>[35]</td>
</tr>
<tr>
<td>Macedonia</td>
<td>17.15</td>
<td>38.21</td>
<td>0.60</td>
<td>[36]</td>
</tr>
<tr>
<td>Ethiopia (Kolfe)</td>
<td>18.35</td>
<td>234.23</td>
<td>0.13</td>
<td>[1]</td>
</tr>
<tr>
<td>This study</td>
<td>29.83</td>
<td>274.83</td>
<td>3.09</td>
<td>This study</td>
</tr>
<tr>
<td>Safe limit</td>
<td>0.8</td>
<td>100</td>
<td>80</td>
<td>[32]</td>
</tr>
</tbody>
</table>

V. DISCUSSIONS

The contamination factors of metals in all sample sites are shown in Table 4. The contamination factors of Cr were between 1.6432 and 3.2932, indicating slight contamination, cadmium contamination factor were moderate and Pb shows no contamination.

Table 6 Contamination level of all samples site

<table>
<thead>
<tr>
<th>Sample ID</th>
<th>Cr</th>
<th>CF</th>
<th>Cd</th>
<th>CF</th>
<th>Pb</th>
<th>CF</th>
<th>Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3.2932</td>
<td>Slight</td>
<td>1.3875</td>
<td>Suspected</td>
<td>0.340125</td>
<td>Uncontaminated</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>3.1271</td>
<td>Slight</td>
<td>3.925</td>
<td>Moderate</td>
<td>0.4015</td>
<td>Uncontaminated</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>3.2251</td>
<td>Slight</td>
<td>4.9</td>
<td>Moderate</td>
<td>0.4955</td>
<td>Uncontaminated</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>2.7101</td>
<td>Slight</td>
<td>3.7375</td>
<td>Moderate</td>
<td>0.126375</td>
<td>Uncontaminated</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>3.1223</td>
<td>Slight</td>
<td>1.475</td>
<td>Suspected</td>
<td>0.26675</td>
<td>Uncontaminated</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>2.9745</td>
<td>Slight</td>
<td>4.025</td>
<td>Moderate</td>
<td>0.42525</td>
<td>Uncontaminated</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>1.8912</td>
<td>Suspected</td>
<td>5.225</td>
<td>Moderate</td>
<td>0.512625</td>
<td>Uncontaminated</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>1.6432</td>
<td>Suspected</td>
<td>6.2625</td>
<td>Moderate</td>
<td>0.415375</td>
<td>Uncontaminated</td>
<td></td>
</tr>
</tbody>
</table>
Geo-Accumulation Index in Kolfe farm area, the soil was polluted by Cd and Cr. The geo-accumulation index value of Cr was less than 1; the value shows unpolluted to moderately pollution. Cadmium was also unpolluted to moderately polluted, but in sample site 7 and 8 the pollution was moderate. No pollution by Lead. Igeo No pollution to slight pollution of all soil samples. The ANOVA sample analysis presented in Table 7.

Table 7 Pearson correlation and ANOVA analysis of heavy metals in the soil samples

<table>
<thead>
<tr>
<th>Pearson correlation</th>
<th>Cr</th>
<th>Cd</th>
<th>Pb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cr</td>
<td>1</td>
<td>-0.72296</td>
<td>0.23699</td>
</tr>
<tr>
<td>Cd</td>
<td>1</td>
<td>0.521556</td>
<td>1</td>
</tr>
<tr>
<td>Pb</td>
<td>1</td>
<td>0.973</td>
<td>0.902</td>
</tr>
</tbody>
</table>

VI. CONCLUSION

Following the collected sample analysis the concentrations of heavy metals in soil samples used for cultivation of vegetable including Swiss chard, lettuce, red beet, potato, cabbage, Ethiopian kale, salad, tomato, green paper, carrot and onion Cabbage, Onion, lettuce, Habsha Gomen & carrot area of Kolfe farm were determined. The analysis indicated that the soils serve as the potential source of the heavy metals in the environment and the concentration of the heavy metals Pb in all sample site are far below the maximum tolerable levels set by FAO/WHO however, the values of Cr and Cd were higher than maximum tolerable levels set by the country. In general, the results also show that the level of contamination of the soils by the heavy metals is moderately contaminated at present and the soil is polluted by toxic heavy metals (Cd and Pb). On the other hand however, the increase in concentration of some elemental may be due to long-term wastewater irrigation, application of various types of pesticides and fertilizer in the vegetable farming areas. Further research is needed to analyse the contamination level of heavy metals in the vegetables and recommend proper soil and wastewater remediation method to solve the current situation.

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Comparing of job satisfaction due to coping of stress in government and private sector

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Abstract- The present study is an attempt to examine the stress coping over job satisfaction in government and private sector. Background: The rising prevalence of job dissatisfaction is due to stress in satisfaction of job and here we are measuring how much a person have stress coping in private and government sector over job satisfaction. Sample: A purposive sample of 60 teachers from Udaipur Rajasthan in which 30 are from government sector and remaining 30 are from private sector. Research design : Two group survey research design, Tools : Teachers job satisfaction scale (TJSS) was used to assess the level of job satisfaction and stress coping resource inventory: a self assessment was used to assess the level of coping of stress. Result :The positive correlation has been found between level of stress coping and level of job satisfaction in both government and private sector teaching professionals which is highly correlated , as the coping of stress increases, the level of job satisfaction also increases. Another finding is that Result shows not identifiable difference in correlation of level of job satisfaction among government and private sector working professionals. There is same job satisfaction in both sectors (government and private sector) the difference is not found significant. Conclusion: the study found that level of coping of stress affect the level of job satisfaction in both government and private sector. This study is not significant in the second hypothesis that there is identifiable difference in job satisfaction of government and private sector , this proves that there is no difference in the job satisfaction in both the sectors (government and private sector)

Index Terms- Private sector (PS), Government sector (GS), Teachers job satisfaction scale (TJSS), Coping of stress (COS)

I. SIGNIFICANT OF THE STUDY

Coping is defined as the thoughts and behaviors used to manage the internal and external demands of situations that are appraised as stressful (Folk man & Moskowitz, 2004; Taylor & Stanton, 2007)

Stress is a negative emotional experience accompanied by predictable biochemical, physiological, cognitive and behavioral changes that are directed either toward altering the stressful event or accommodating to its effects.

A job is a collection of tasks that can be performed by a single employee to contribute to the production of some product or service provided by the organization. By: Herbert G Hereman

job satisfaction is favorableness towards job and the persons satisfaction with their home and community life. But this definition is not correct because there are so many people are not happy with their work life but they are satisfied with their life. But we can say that job satisfaction and life satisfaction are related with each other. Job satisfaction is the attitude of an employee which results from so many factors related with job such as timing, work load, wages, supervision, opportunities, employee interaction, Appreciation, Communication, Coworkers, Fringe benefits, Job conditions, Nature of the work, Organization, Personal growth, Policies, Procedures, Promotion opportunities, Recognition, Security, Supervision etc. Job satisfaction is a positive attitude a person carries and teachers have a control on student’s education and students are the future, so that understanding that in which sector coping of stress is high and as I am connecting coping of stress with job satisfaction they are directly proportional to each other

II. STATEMENT OF THE PROBLEM

Comparing job satisfaction due to coping of stress in government and private sector.

1. Job satisfaction

Job satisfaction is defined as feeling of contentment and sense of accomplishment with environment which is self-motivated, positive and healthy in context of job stability, career growth, comfortable work life balance, pay, respect, research pursuit time, colleague behavior, library availability etc. which is result of appraisal that meet one’s job value and basic needs. It helps in determining at what extent a person likes or dislikes his/her job

2. Stress coping

Stress is a feeling of emotional or physical tension. It can come from any event or thought that makes you feel frustrated, angry, or nervous. and Coping usually involves adjusting to or tolerating negative events or realities while attempting to maintain your positive self-image and emotional equilibrium. It occurs in the context of life changes that is stressful. Psychological stress is usually associated with negative life changes, such as losing a job or loved one.

3. Private sector

The private sector is the part of the economy that is run by individuals and companies for profit and is not state controlled. Therefore, it encompasses all for-profit businesses that are not owned or operated by the government.
4. Government sector

The government sector includes all institutional units whose output is intended for individual and collective consumption and mainly financed by compulsory payments made by units belonging to other sectors, and/or all institutional units principally engaged in the redistribution of national income and wealth. The General government sector is subdivided into four subsectors: central government, state government, local government, and social security funds.

Objectives:
- To assess the level of job satisfaction in private sector.
- To assess the level of job satisfaction in government sector.
- To assess the level of coping of stress in private sector.
- To assess the level of coping of stress in government sector.
- To find out the comparison in job satisfaction due to coping of stress in private and government sector.

Hypothesis:
- \( H_1 \): There will be significant impact of level of stress coping over job satisfaction.
- \( H_2 \): There will be identifiable difference in job satisfaction among private and government sector.

Review of literature:

Study of job satisfaction of private sector:
- There has been found several earlier studies by Sinha Deepti on studies of job satisfaction of the employees of private sector banks in which describes that Job satisfaction is a subjective indicator that indicates how contented an individual feels while performing his/her duties. In shaping job expectations, there are economic considerations (e.g. compensation and retirement benefits) and occupational and family considerations (professional satisfaction, job satisfaction, advancement opportunities, relocation, etc.) in the private sector of job area.[1]
- Another study conducted by Ayesha Ajmal, Mohsin Bashir Muhammad Abrar, Muhammad Mahroof Khan, Shahnawaz Saqib in The Effects of Intrinsic and Extrinsic Rewards on Employee Attitudes; Mediating Role of Perceived Organizational Support employees shows positive response about intrinsic and extrinsic rewards. On the topic of the job satisfaction in private sector.[2]

Study of job satisfaction in government sector:
- Some earlier studies done on job satisfaction in government sector by the Staff of Sindh Bureau of Statistics, Planning & Development Department, Government of Sindh. Methodology/Sample- measurement of satisfaction of employee satisfaction against various facets of their job, facets like job security, immediate supervisor’s behavior, recognition, interpersonal relations, workload, career growth and pay/compensation were the factors that the employees are satisfied with.[4]
- Another study conducted by Maheshwari Uma by job satisfaction of municipal government employees in which proved that government job is good salary followed by job security and it describes the satisfaction and dissatisfaction of the employees and the higher satisfaction the more effective the performance.[6]

Comparative study of job satisfaction in private and government sector:
- One of the study conducted by Akhtar Naeem Shafqat in a comparative study of job satisfaction in public and private school teachers at secondary level which concluded job satisfaction refers to the attitudes which can be positive, favourable attitude and feelings they have about their job, positive teaching behavior and considerable relationship between job satisfaction and other areas of his/her life. and it shows there is no significant difference between teachers job satisfaction in public and private schools.[7]
- Another study conducted by Sinha Deepti on Comparative Study of Job Satisfaction of the Employees of Private & Public Sector Banks which concluded the causes of satisfaction and dissatisfaction in both public and private sector banksin shaping job expectation, economic consideration and occupation and family consideration and novel changes increases productivity.[8]

Studies on impact of stress on work:
- Study conducted by Usman Bashir & Muhammad Ramay on impact of stress on employees job performance in which bankers are in a great stress such as overload, role ambiguity, role conflict, responsibility of people and other and it defines that job stress reduces job performances and the stress is highly effective in the area of job satisfaction which includes so many factors.[10]
- Another study conducted by Sauter, Steven, Murphy & R. Lawrence on organizational risk factors for job stress which concluded the changing structure of work in our society and presents empirical research studies that examine
organizational factors that appear to promote or decrease job stress\textsuperscript{[11]}

Studies on stress coping affect on job satisfaction:

- Study conducted by Griffith Jayne & Steptoe Andrew in a study investigation of coping strategies associated with job stress in teachers which signed that behavioural disengagement and suppression of competing activities are maladaptive responses in a teaching environment and contributes to job stress. Coping and social support moderate the impact of stressors on well-being and influence the appraisal of environmental demands as stressful\textsuperscript{[12]}
- Another study conducted by Skaalvik M. Einar & Skaalvik Sidsel on job satisfaction , stress and coping strategies in the teaching profession which gives or confirmed that the teachers of different stages in their careers reported the same source of job satisfaction and stress and coping strategies and consequences were differed with age and their ability of performance\textsuperscript{[13]}

III. MATERIAL AND METHODS

Research design:
Research design provides overall plan for addressing research question. Here Two Group Survey Research Design is used to find out coping of stress over job satisfaction in government and private sector.

Two group survey research design:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Indications</th>
</tr>
</thead>
<tbody>
<tr>
<td>O1</td>
<td>Level of coping of stress</td>
</tr>
<tr>
<td>O2</td>
<td>Level of job satisfaction</td>
</tr>
</tbody>
</table>

Variables
- Independent variable : Coping of stress
- Dependent variable : Level of job satisfaction

Sampling
- Target population: Working teaching professionals.
- Accessible population: In Udaipur.
- Sample size: 60 consecutively selected samples.
- Sampling technique: Convenience sampling.
- Type of study : Observation type.
- Type of data : Secondary data.

Sampling criteria:
Inclusion criteria:

- Working professionals in teaching field.
- Teachers from government and private sector working in Udaipur.
- Teachers who knows English language.
- Teachers who gives the consent for data collection.

Exclusion criteria:
- Teachers who don’t know English language.
- Retired teaching professionals.

The data has been collected by using following psychological tools:

<table>
<thead>
<tr>
<th>Psychological test</th>
<th>Developed by</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teachers job satisfaction scale</td>
<td>Y. MUDGIL, I.S. MULHAR &amp; P. BHATIA</td>
<td>1998</td>
</tr>
<tr>
<td>Stress Coping Resource Inventory: A Self Assessment</td>
<td>Kenneth B. Matheny and Christopher J. McCarthy</td>
<td>2000</td>
</tr>
</tbody>
</table>

Statistical Analysis:
After finding mean and SD scores; correlation has been found by using Karl Pearson’s product movement correlation and significant by using t value.

IV. RESULT:

Table: A1 Mean and SD of stress coping level over job satisfaction in government sector:

<table>
<thead>
<tr>
<th>Coping of stress level</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1.5 (Below average stresscoper)</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1.5-2.4 (Average stresscoper)</td>
<td>13</td>
<td>217.15</td>
<td>19.75</td>
</tr>
<tr>
<td>2.5-3.4 (Above average stresscoper)</td>
<td>16</td>
<td>278.62</td>
<td>16.57</td>
</tr>
<tr>
<td>&gt;3.5 (Superior stresscoper)</td>
<td>1</td>
<td>300</td>
<td>-</td>
</tr>
</tbody>
</table>

Table (A1) shows the mean values of coping of stress level, and job satisfaction among teaching professionals working in Udaipur (Rajasthan)

(Mean coping of stress level over job satisfaction in government sector categorized in <1.5 = 0, 1.5-2.4 = 217.5, 2.5-3.4=278.62 and >3.5 = 300 and SD values of stress level over job satisfaction in government sector are categorized in <1.5= nil , 1.5-2.4= 19.75 , 2.5-3.4= 16.57 , >3.5= nil respectively.)
Figure no-1 Average stress coping level over job satisfaction in government sector:

Table : A2 Mean and SD of stress coping level over job satisfaction in private sector :

<table>
<thead>
<tr>
<th>Coping of stress level</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1.5 ( Below average stresscoper )</td>
<td>0</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1.5-2.4 ( Average stresscoper )</td>
<td>13</td>
<td>223.6</td>
<td>22.3972979</td>
</tr>
<tr>
<td>2.5-3.4 ( Above average stresscoper )</td>
<td>16</td>
<td>268.8</td>
<td>20.30</td>
</tr>
<tr>
<td>&gt;3.5 ( Superior stresscoper )</td>
<td>1</td>
<td>308.2</td>
<td>7.36</td>
</tr>
</tbody>
</table>

Table (A2) shows the mean values of coping of stress level, and job satisfaction among teaching professionals working in Udaipur (Rajasthan) in private sector.

(Mean coping of stress level over job satisfaction in government sector categorized in <1.5 = nil , 1.5-2.4 = 223.6 , 2.5-3.4=268.8 and >3.5 = 308.2 and SD values of stress level over job satisfaction in government sector are categorized in <1.5=nil , 1.5-2.4= 22.39 , 2.5-3.4= 20.30 , >3.5= 7.36 respectively.)
Figure no-2 Average stress coping level over job satisfaction in private sector

Table A3: Mean and SD of stress coping level over job satisfaction in government and private sector:

<table>
<thead>
<tr>
<th>Coping of stress level</th>
<th>Government sector</th>
<th>Private sector</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
<td>Mean</td>
</tr>
<tr>
<td>&lt;1.5 (Below average stresscoper)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>1.5-2.4 (Average stresscoper)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>2.5-3.5 (Above average stresscoper)</td>
<td>30</td>
<td>252.7</td>
</tr>
<tr>
<td>&gt;3.5 (Superior stresscoper)</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table (A3) shows the mean values of coping of stress level, and job satisfaction among teaching professionals working in Udaipur (Rajasthan) in government and private sector.

(Mean coping of stress level over job satisfaction in government and private sector categorized in <1.5 = nil, 1.5-2.4 = nil, 2.5-3.5= 252.7 and 267.83 and >3.5 = nil and SD values of stress level over job satisfaction in government and private sector are categorized in <1.5= nil, 1.5-2.4= nil, 2.5-3.4= 36.31 and 31.02, >3.5= nil respectively.)
Figure no-3 Average stress coping level over job satisfaction in government and private sector

Figure no-4 Comparison of job satisfaction and level of coping with stress among government and private sector:
Table B1: correlation, t-score and p value measures comparison of job satisfaction and coping of stress among government and private sector

<table>
<thead>
<tr>
<th>Sectors</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>r</th>
<th>t score</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government sector</td>
<td>30</td>
<td>252.7</td>
<td>36.3025125</td>
<td>0.91738151</td>
<td>0.0228</td>
<td>0.981</td>
</tr>
<tr>
<td>Private sector</td>
<td>30</td>
<td>267.83</td>
<td>31.07397551</td>
<td>0.862703672</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table B1 shows the correlation, t-score and P value measures comparison of job satisfaction and coping of stress among both government and private sector working professionals.

- The correlation of coping of stress in job satisfaction in teaching professionals of government sector was found 0.91738151.
- The correlation of coping of stress in job satisfaction in teaching professionals of private sector was found 0.862703672.
- t score for both government and private sector was found 0.0228 which is 0.981 that is >0.05 that shows data is statistically not significant.

V. DISCUSSION:

Stress coping level over job satisfaction:

- **H1:** There will be significant impact of level of stress coping over job satisfaction.

  The finding of stress coping level has significant affect over job satisfaction.

  Table B1 shows the correlation and significance of level of stress coping over job satisfaction.

  The positive correlation has been found between level of stress coping and level of job satisfaction in both government and private sector teaching professionals which is highly correlated, as the coping of stress increases the level of job satisfaction also increases which means level of job satisfaction is high in the person whose level of stress coping is high so that level of job satisfaction is directly proportional to level of stress coping in both the sectors (government sector and private sector) the finding is highly significant in present study.

  Job satisfaction is identified by some factors which are personal pulls, Appreciation, Communication, Coworkers, Fringe benefits, Job conditions, Nature of the work, Organization, Personal growth, Policies, Procedures, Promotion opportunities, Recognition, Security, Supervision. These points are highly responsible for the satisfaction of job of a working professional as it produces stress in the working professional and reduces the productivity in work which may lead to certain consequences related to stress and these are fear and uncertainty, attitude and perceptions, unrealistic expectation and change related to job.

  In present study most of the working professionals have found to have high level of job satisfaction whose level of coping of stress is high. Professionals have difficulty in occupational, social functioning whose coping of stress is low is found in both the sectors (government and private).

  Because of low coping of stress professionals having difficulty in adjustment in work place. Due to lack of interest in work their cooperation is decreased with coworkers. With poor life satisfaction and interpersonal relationship the patients do not want to involve with others in various settings and task performances.

**Hence; first hypothesis is accepted.**

These findings are supported by following studies.

- Study conducted by Usman Basher & Muhammad Ramay on impact of stress on employees job performance in which bankers are in a great stress such as overload, role ambiguity, role conflict, responsibility of people and other and it defines that job stress reduces job performances and the stress is highly affective in the area of job satisfaction which includes so many factors similarly other study conducted by Sauter & Steven, Murphy & R. Lawrence on organizational risk factors for job stress which concluded the changing structure of work in our society and presents empirical research studies that examine organizational factors that appear to promote or decrease job stress. Another study conducted by Ajayi Samuel on effect of stress on employ performance and job satisfaction in which stress is taken as a universal challenge for a workplace and the components include are lack of administrative support, excessive work load and work demand, problematic customer relations, co-worker's relationship, family & work life balance and associated job risks are undertaken in this study.

  Other Study conducted by Griffith Jayne & Steptoe Andrew in a study investigation of coping strategies associated with job stress in teachers which signed that behavioural disengagement and suppression of competing activities are maladaptive responses in a teaching environment and contribute to job stress. Coping and social support moderate the impact of stressors on well being and influence the appraisal of environmental demands as stressful.

  **Comparison of job satisfaction in government and private sector:**

  **H2:** There will be identifiable difference in job satisfaction among private and government sector

  Table B1 shows the correlation of comparison of job satisfaction and coping of stress among both government and private sector working professionals.

  Result shows not identifiable difference in correlation of level of job satisfaction in government and private sector working professionals which is not identifiable. There is same job satisfaction in both sectors (government and private sector) the difference is not found significant.

  Most of the time it is observed that both the sectors having same problems in coping stress and due to that the level of job satisfaction is also same in both the sectors, because there is no much difference in job environment, Appreciation, Communication, Coworkers, Fringe benefits, Job conditions, performance in which bankers are in a great stress such as overload, role ambiguity, role conflict, responsibility of people and other and it defines that job stress reduces job performances and the stress is highly affective in the area of job satisfaction which includes so many factors similarly other study conducted by Sauter & Steven, Murphy & R. Lawrence on organizational risk factors for job stress which concluded the changing structure of work in our society and presents empirical research studies that examine organizational factors that appear to promote or decrease job stress. Another study conducted by Ajayi Samuel on effect of stress on employ performance and job satisfaction in which stress is taken as a universal challenge for a workplace and the components include are lack of administrative support, excessive work load and work demand, problematic customer relations, co-worker's relationship, family & work life balance and associated job risks are undertaken in this study.

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  **Comparison of job satisfaction in government and private sector:**

  **H2:** There will be identifiable difference in job satisfaction among private and government sector

  Table B1 shows the correlation of comparison of job satisfaction and coping of stress among both government and private sector working professionals.

  Result shows not identifiable difference in correlation of level of job satisfaction in government and private sector working professionals which is not identifiable. There is same job satisfaction in both sectors (government and private sector) the difference is not found significant.

  Most of the time it is observed that both the sectors having same problems in coping stress and due to that the level of job satisfaction is also same in both the sectors, because there is no much difference in job environment, Appreciation, Communication, Coworkers, Fringe benefits, Job conditions,
Nature of the work, Organization, Personal growth, Policies, Procedures, Promotion opportunities, Recognition, Security, Supervision so that there is higher the coping of stress higher the level of job satisfaction in both sectors which proves that there is no difference in job satisfaction level in government and private sector.

In this study it has been identified that almost all professionals having same difficulties in their job and due to coping of stress all professionals having same level of job satisfaction as coping of stress is high, job satisfaction is also high similarly as coping of stress is low job satisfaction is also low so that there is no identifiable difference in government and private sector working professionals.

**Hence; second hypothesis is not accepted.**

These findings are supported by following studies.

One of the study conducted by Akhtar naeem shafqat in a comparative study of job satisfaction in public and private school teachers at secondary level which concluded job satisfaction refers to the attitudes which can be positive, favourable attitude and feelings they have about their job, positive teaching behavior and considerable relationship between job satisfaction and other areas of his/her life and it shows there is no significant difference between teachers job satisfaction in public and private schools.[7] Another study conducted by Sinha deepi on Comparative Study of Job Satisfaction of the Employees of Private & Public Sector Banks which concluded the causes of satisfaction and dissatisfaction in both public and private sector banks in shaping job expectation, economic consideration and occupation and family consideration and novel changes increases productivity.[8] Another study conducted by pragya ,sharma Sandeep &malu ,Job Satisfaction: A Comparative Study of Private and Public Sector Banks in which job satisfaction is described as a satisfied, happy and hard working employee is the big positive point and in this the level of job satisfaction in which factors including general working conditions pay and promotion potential, work relationships, use of skills and abilities and overall job satisfaction are found important for improving job satisfaction of bank employees.[9] Another study conducted by gupta shobhna & pannuhartesh on a comparative study of job satisfaction in public and private sector which gave the conclusion that the feelings, emotions are also a good, valid reason to improve job satisfaction and job satisfaction meaning one enjoys the job, their work and how responsibly they take the responsibility and taking the information regarding the satisfaction that how satisfied the person with their own work and the satisfaction level should increase by the communication or giving the person some sort of positive regard about their problems that these all are getting noticed and the more satisfied the employee means more motivation and commitment to the organization[14]

VI. CONCLUSION

During this study it has been found that level of coping of stress affect the level of job satisfaction in both government and private sector. Coping of stress and level of job satisfaction is directly proportional to each other and there is no difference in proportionality among government and private sector. Government sector employee are positively associated with coping of stress in the level of job satisfaction and similarly private sector employee are also positively associated with coping of stress in the level of job satisfaction and the whole study simply describes that level of job satisfaction. All professionals having same difficulties in their job and due to coping of stress all professionals having same level of job satisfaction. This study doesn’t is not significant in the second hypothesis that there is identifiable difference in job satisfaction of government and private sector , this proves that there is no difference in the job satisfaction of both the sectors (government and private sector)

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[22] Dr.K Nigama, Dr S Selvabaskar, Dr S T Surulivel, Dr R Alamelu, Ms. D Uthaya Joice, Job satisfaction among school teachers, Faculty, School of Management, SAESTA Deemed University Student, School of Management, SAESTA Deemed University Thirumalaisamudram, Thanjavur, Tamil Nadu, India., International Journal of Pure and Applied Mathematics, Volume 119 No. 7 2018, 2645-2655


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Development Of Analytical Method For The Simultaneous Estimation Of Diclofenac Sodium And Pantoprazole In Pharmaceutical Formulation By RP-HPLC

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DOI: 10.29322/IJSRP.10.01.2020.p9718

Abstract- A sensitive high-performance liquid chromatographic (HPLC) method were developed and validated for the estimation of Diclofenac sodium and Pantoprazole in bulk and pharmaceutical formulations. The chromatographic separation was achieved by RP-HPLC using a mixture of methanol: Phosphate buffer (10mM) in ratio 80:20 pH 3.5 as the mobile phase with isocratically system, a C_{18} column & the eluents was monitored using UV detector at 284 nm. The pH is adjusted by ortho phosphoric acid. These methods were tested and validated for various parameters according to ICH guidelines. The proposed methods were successfully applied for the determination of Diclofenac sodium & Pantoprazole in pharmaceutical formulations. The results demonstrated that the procedure is accurate, precise and reproducible (relative standard deviation <2%), while being simple, cheap and less time consuming.

Index Terms- Diclofenac sodium; Pantoprazole, Marketed formulation, Spectrophotometer, HPLC.

I. INTRODUCTION

Diclofenac sodium is - 2-[(2, 6-Dichlorophenyl) amino]benzenecacetic acid monosodium salt is a N.S.A.I.D.(1) Pantoprazole is 5-(Difluoromethoxy)-2-(((3, 4-dimethoxy-2-pyridinyl)methyl) sulfinyl)-1H-benzimidazole is a proton pump inhibitor compound which has been developed for oral and parenteral use.(2)

High-performance liquid chromatographic (HPLC) is the most frequently applied technique in the determination of drugs in biological fluids and dosage forms. We believe that the availability of this new method, with increased simplicity, sensitivity and selectivity, will be very useful for the determination of Diclofenac sodium and Pantoprazole in raw material and pharmaceutical preparations. This gradient HPLC method uses a simple mobile phase, UV detection and does not require complicated sample preparation. The aim of this study was to develop a simple, rapid and reproducible reversed-phase HPLC method.

II. EXPERIMENTAL

2.1 Materials

DIC & PNT was supplied by Amoli organics Pvt, Ltd and was used without further purification. Sodium hydroxide was purchased from Molychem (Mumbai). Hydrochloric acid and hydrogen peroxide was procured from LOBA Chemie Pvt. Ltd. (Mumbai). HPLC grade methanol was purchased from S. D. Finechem Ltd. (Mumbai) whereas HPLC grade water was purchased from Merck Ltd. All other chemicals were of analytical reagent grade.

2.2 Chemical structure :

DIC & PNT

2.3 Instrumentation

The HPLC system consisting of Thermo Separation Quaternary Gradient HPLC pump Spectra System P4000 with Variable UV-VIS detector of Spectra System UV1000, manual rhodyne injection system, the software was a Data ace software.
version 6.1. The chromatographic separation was performed using Grace C18 (250mm × 4.6 mm i.d., 5mm particle size) Separation was achieved using a mobile phase consisting of buffer:methanol in the ratio (80:20 pH 3.5 adjusted with ortho phosphoric acid) at a flow rate of 1ml/min and UV detection at 284 nm. The column was maintained at ambient temperature with injection volume of 20 µl. The mobile phase was filtered through 0.45 µm Chrom Tech Nylon-66 filter and degassed in ultrasonic bath prior to use. A blank chromatogram was recorded before the studies. Quantization of result was performed using peak area counts.

2.4 Standard preparation
Stock solution of DIC & PNT was prepared. Accurately weighed quantity 5 mg of both was dissolved in methanol and volume was made up to 25 ml mark (200 µg/ml). The stock standard solution was diluted further with Methanol to get final concentration of about 10 µg/ml then various trial are taken & mobile phase finalized where proper resolution of both the drug were seen. This was found that the sample preparation in mobile phase gives sharp resolution hence all samples were prepared in mobile phase. The stock solution was prepared in mobile phase of 100µg/ml.

III. RESULT & DISCUSSION:
3.1 Preparation of calibration curve:-
The mobile phase was allowed to equilibrate with the stationary phase until steady baseline was obtained. The series of concentration from 2-20 µg/ml of both drug solutions were injected and peak area was recorded. The graph plotted as the concentration of the drug Vs peak area depicted in Fig. No.2 and 3.

3.2 Method Validation
3.2.1 Specificity (Selectivity)
Specificity was measured as ability of the proposed method to obtain well separated peak for DIC and PNT without any interference from component of matrix. The values obtained were very close to that in standard laboratory mixture in DIC no interference from the component of matrix. Mean retention time for – DIC = 2.446
PNT = 6.678

3.2.2. Accuracy and precision
It was ascertained on the basis of recovery studies performed by standard addition method. The results of recovery studies and statistical data are recorded in Table No.1 Precision of an analytical method is expressed as S.D or R.S.D of series of measurements. It was ascertained by replicate estimation of the drugs by proposed method.

3.2.3 Ruggedness:
The studies of ruggedness were carried out under two different conditions-
a) Days
b) Analyst.

a) Interday (Different days):
Same procedure was performed as under marketed formulation analysis on different days. The % label claim was calculated. Data obtained for day 1, day 2, and day 3 is shown in Table No. 1

b) Different analyst:
The sample solution was prepared by two different analysts and same procedure was followed as described earlier. The % label claim was calculated as done in marketed formulation estimation.

3.3 Analysis of Pharmaceutical dosage form (eye drop):
The values of analysis of eye drop obtained by the proposed method were between 99.6% and 101.6% (Table 2), which showed that the estimation of dosage forms were accurate within the acceptance level of 95% to 105%. (Refer Table 2).

Tables:
Table 1: Summary of validation parameters for the proposed method

<table>
<thead>
<tr>
<th>Validation Parameters</th>
<th>DIC</th>
<th>PNT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linearity µg mL-1</td>
<td>0.5-5.0</td>
<td>0.2-2.0</td>
</tr>
<tr>
<td>Accuracy mean</td>
<td>0.065</td>
<td>0.055</td>
</tr>
<tr>
<td>Precision (% RSD)</td>
<td>0.047</td>
<td>0.100</td>
</tr>
<tr>
<td>Intraday (% RSD)</td>
<td>0.0360</td>
<td>0.115</td>
</tr>
</tbody>
</table>
Table 2: Results of analysis of formulation and recovery studies

<table>
<thead>
<tr>
<th>Drug</th>
<th>Mean</th>
<th>S.D.</th>
<th>%RSD</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIC</td>
<td>99.89</td>
<td>99.89</td>
<td>99.89</td>
</tr>
<tr>
<td>PNT</td>
<td>99.88</td>
<td>99.88</td>
<td>99.88</td>
</tr>
</tbody>
</table>

*Recovery amount was the average of six determinants

<table>
<thead>
<tr>
<th>% Label claim</th>
<th>ANALYST I</th>
<th>ANALYST II</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIC</td>
<td>PNT</td>
<td>DIC</td>
</tr>
<tr>
<td>%R.S.D</td>
<td>0.2033</td>
<td>0.4288</td>
</tr>
</tbody>
</table>

Fig. No.1: Table No. 3: Observations of Linearity and range study for DIC and PNT.

<table>
<thead>
<tr>
<th>Sr.No.</th>
<th>%Label claim</th>
<th>Peak area</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>DIC</td>
</tr>
<tr>
<td>1</td>
<td>80</td>
<td>3500.941</td>
</tr>
<tr>
<td>2</td>
<td>90</td>
<td>4015.44</td>
</tr>
<tr>
<td>3</td>
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Modelling the Universe of Data (DataVerse)

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Abstract- The paper presents an axiomatic model of Abstract Universe or the Universe of Information. It suggests the minimum elements required to create the information of Abstract Universe and this model forms the necessary and sufficient condition for an Abstract Universe to exist. This Universe of Information is viewed for outside to see its impact on real Universe. The process of creation of Information Universe from its Axiomatic model is proposed. Some interpretation based on the model is proposed. This model will form the basis for the axiomatic model of the Real Universe which is beyond the scope of the paper.

Index Terms- DataVerse, Data, Process, Algorithm, Datafication, Instantiation, Actor, Agent, Axiomatic Model, RootCause

I. INTRODUCTION

In today’s information age, information is multiplying exponentially and the devices using these data are exploding. Various data sources as Internet of Things (IoT), sensors, user devices as mobiles etc. are creating enormous data. Analysis of this data as Big Data, Artificial Intelligence (AI) and Deep Learning are the attempts to map the reality and to emulate it. This growing is creating an increasing Virtual Universe and Abstract Universe. The advent of communication and Information Technology also has exploded the Data Universe. With such an impact of Data in our lives, it has become important to understand the nature of the Data Universe in a holistic way.

II. WHAT IS DATA

Data comes from the Latin term meaning literally ‘something given,’. It is a set of codes that represent information, processes, measurements, any phenomenon, any physical or non-physical aspect, etc. As such, data as a general concept refers to the fact that some existing information or knowledge is represented or coded in some form suitable for better usage or processing. Data is always a slice of reality, we are chopping the Universe up into little bits, codifying into symbols and storing them to be utilised in converting it back to Reality. Such data can be brought back to reality.

This makes the data portable. It can be taken from one context and brought into another. No matter how extensive our gathering of data it will only ever be able to capture a partial representation of the system and in so doing separate it from its overall context. Data is always incomplete but the discrete nature of data makes it quantifiable and thus accessible to formal quantitative methods of analysis (Colchester, Datafication - Complexity Labs, 2018). The Universal Set of all such data can be termed as DataVerse.

III. WHAT CONSTITUTES THE DATAVERSE

Any information which is captured, recorded and stored will constitute the DataVerse. This data can be information (meaningful) or noise (meaningless). These information can be any one of the following.

1. Literature, Language, Books, Documents, etc. which are presented in the form of documents or books etc.
2. Sound or audio stored in Cassettes, Memory devices, tapes etc, which can be played back.
3. All types of pictures, photographs
4. Movies, Videos, etc.
5. Data on the internet, Social Media, etc.
6. Memory in the mind of living being which can be recollected.
7. Any operator or Process or Algorithm which has been designed for the processing, modification, manipulation or replication or the data.
8. All the data and operator for its processing constitutes knowledge also forms the part of DataVerse.

IV. CREATION OF DATA

The data can be created in multiple ways. Some of them are

1. Act of Measurement or Datafication: It is process of taking snapshot of Reality, codifying it and storing it. The snapshot can be of physical objects, process, phenomenon, ideas, thoughts, feelings, etc. Any aspects of reality can be converted to Data by the process of Datafication. (Colchester, 2018). E.g. Recording a movie is an act of datafication of the event.
2. Manipulation of existing Data/Applying Operator on the Data: The existing data can undergo various operations (as arithmetic, logical, process, algorithm, etc.) to create more data. The processing device can be human mind or a computer. Generally such processing creates the data of higher order. Eg Graph from raw data, words from alphabets, etc. A language is a recursive process of data manipulation on alphabets. E.g. Giving the VFX to the movie is the manipulation of movie.
3. Replication of Data: A data can be increased by replicating or copying. A broadcast is one of the example of replicating in large quantity. In today’s world, data on
internet, Youtube, Facebook, Newspaper etc. are big replicators. Because of such replications, we are overwhelmed with data in our day to day life. E.g. Broadcasting or Downloading the movie is the process of replication.

**Destruction of Data**

The data which is created can be destroyed. It can be destroyed in the following ways:

1. Destruction of storage device where data is stored: If the storage device is destroyed, then the data stored in it is destroyed.

2. Destruction of the Interpreter or Instantiator (Cohchester, 2016): Since the data are set of symbols, it needs interpreter to make sense. If the interpreter of data is absent or destroyed, the data cease to exist. For example, the data in a cassette cease to exist if there is no player. A language is destroyed if there is nobody to read or understand it.

**Axiomatic Model of DataVerse**

Since the data is the Symbolic or the coded version of the real Universe, it is possible to reduce all type of data into its Elementary Code by breaking the data into simpler form till the simplest indestructible Elementary Code is arrived. Following is some of the effort to reduce the data to its Elementary Code.

1. Literature → Book → Chapters → Paragraphs → Sentences → Words → Alphabets

   ![Figure 1 Reduction of Literature into Elements](image)

   The Elementary code derived are the alphabets which cannot be subdivided.

2. Music → Notations → Note. The indivisible element is notes.

   ![Figure 2 Reduction of Music into Elements](image)

3. Movie → Pictures → Pallete. Here the element is the color palate which cannot be divided.

   ![Figure 3 Reduction of Picture into Elements](image)

From the above examples it can be seen that for different type of information there were different indivisible elements. Hence there is the need of a model which can represent all types of elements.
With the advent of Computers and Binary representation of Information, all the information can now be represented in terms of Bits (‘0’s and ‘1’s). Now all the forms of Information as Alphabets, Pallets, Music notes can now be represented in the combinations of Bits.

\[ \text{Bits}(0,1) \] are the Elementary Code and all the data in this DataVerse which is the interplay of these basic Elementary Codes. These Elementary Codes are perfect Source and Sink (i.e. infinite numbers of 0’s and 1’s can be extracted from these Elementary Codes and all the symbols can be absorbed into it).

From the above reductionist approach, the Elementary Codes of the DataVerse can be represented as

\[ \text{The DataVerse is composed of two Elementary Codes Bits}(0,1) \]

Elementary Codes are perfect Source and Sink (i.e. infinite numbers of 0’s and 1’s can be extracted from these Elementary Codes and all the symbols can be absorbed into it).

From the above reductionist approach, the Elementary Codes of the DataVerse can be represented as

\[ \text{Elements of DataVerse} \]

The DataVerse is composed of two Elementary Codes Bits(0,1). All the data in the DataVerse is the interplay of these Bits(0,1). All data cease to exist once these symbols are in equilibrium state (0 remains 0 and 1 remains 1). This Equilibrium state of the DataVerse is called Unmanifested form of DataVerse or the RootCause of the DataVerse. It has the potential of becoming Universe of Data or DataVerse.

This DataVerse is static in nature. The data inside the DataVerse cannot modify itself. In order to have dynamism in the data, there is need of another property (Motion) to make any modification in the data effective. The DataVerse is dynamic only to the extent, the motion acts upon the DataVerse. It is just like a vehicle without fuel. It moves to the extent it is pushed. It doesn’t move by itself. This Motion Element provides the dynamism to the entire DataVerse. For e.g. a child picks up the words and forms a sentence. The words were static before and now the sentence is static and both are data. There was small component of motion by the child which changed the state of the DataVerse. Hence there is a new Element Motion which when acts upon DataVerse changes the state of the DataVerse. As the data in the DataVerse do not change by itself, this Motion Element is external to the DataVerse as shown below.
The above scenario also does not make the sense unless there is an Actor / Agent supporting the motion to make sense to the data.

**Actor/Agent** – An Actor is an entity responsible for all the action. The following are the properties of an Agent
a. It is the representative of I or Ego.
b. It can set Goals.
c. It can analyse the information, compare them, have options and make choices.
d. It is the THE FREE WILL.
e. It is responsible for the ACTION.

In the above example, the child’s action enables the formation of the sensible sentences from the words. Hence the new Model of DataVerse becomes as below.

The above scenario makes the DataVerse to be meaningful. Whenever there is an Actor acting on the DataVerse, the DataVerse changes State. Actor/Agent and Motion are external to the DataVerse.

**Thus with reference to Figure 7, DataVerse is composed of the two Elementary Codes. The Motion element which is external to the DataVerse provides the dynamism and changes the state of the DataVerse. The Agent which is also external to the DataVerse is the Purpose of DataVerse. The entire DataVerse happens for the purpose of the Agent.**

**Thus the DataVerse can be defined as an Interplay of Two elementary Codes acted upon by Motion for the purpose of Agent.**
**Necessary and Sufficient Conditions for the existence of DataVerse**

The above Axiomatic model of the DataVerse is both necessary and sufficient for the Creation of the DataVerse. The DataVerse will cease to exist in the absence of any one of the component

1. In the absence of any one the symbol, the data won’t exist. There is no data with only 1’s on only 0’s.
2. In the absence of motion element, no new combination of data will be formed. No change, no evolution, no creation, no destruction of data will happen.
3. In the absence of Agent, the data created will be random or noise without any meaning.
4. The above model can be understood from the following example. The minimum items require to make a painting are two colours (Two symbols), one brush (Motion element) and a painter (Agent). The painting will cease to exist in the absence of any one of the element.

Hence the four elements are necessary and sufficient for the existence of the DataVerse.

Thus the model with its four elements is both necessary and sufficient for the existence of the entire DataVerse.

**Properties of DataVerse**

1. **Composition:** The DataVerse is composed of two Elementary Codes Bits(0,1). All the data in the DataVerse is the interplay of these Bits(0,1). All data cease to exist once these symbols are in equilibrium state.

**Properties of Bits(0,1)**

- (a) The Bits(0,1) are omnipresent in the entire DataVerse.
- (b) The Elementary Codes are Perfect Source and Perfect Sink.

2. **Static in Nature:** This DataVerse is static in nature. The data inside the DataVerse cannot modify itself since the Motion Element is not the component of DataVerse.

3. **Deterministic:** Since the DataVerse is Static in nature and the data in the DataVerse changes only when external motion acts upon it. The operation acting on the data called Algorithm is also a static data. Any algorithm acting on the data will give deterministic result. No randomness can be created in DataVerse.

4. **Discrete:** Since there are only two Elementary Symbols Bits(0,1) and no fractional symbols are created, the DataVerse is discrete and countable in nature.

5. **Finite and Countable:** Any subset of the DataVerse is finite and Countable.

6. **Unintelligent:** Since Agent/Actor is not the component of the DataVerse, DataVerse do not make any sense to its content.

7. **Dependent on Unmanifested DataVerse for Creation or Absorption of Data.**

8. **All knowledge (set of Data and the Operators Action on Data) exist in the DataVerse.**

**Process of creation of DataVerse from the Axiomatic Model**

The creation of the DataVerse happens by the process of Evolution and Emergence. More and more complex data is created by the successive evolution and emergence.

a) **Creation of Language**

The Elementary code inside the DataVerse in presence of Agent and Motion Element moves to produce patterns. The Agent chooses some of the patterns that make sense to form alphabets. Making sense is the property of Agent. The alphabets becomes the first level of Emergence for a language. The Agent in association with Motion Element Continues its interplay to make Words i.e. the combinations of alphabets that make sense, the Second level of Emergence. Other combinations which are not relevant to the Agent also exist in the DataVerse. This process of Emergence or Evolution continues to make Sentences, Paragraphs, Chapters, Books, Subject etc. The data in the DataVerse changes level of Emergence both in terms of depth and Diversity. The complete universe of data is formed from the above process of Emergence and Evolution. The DataVerse formed from this Interplay of the Elementary Code is called **Manifested DataVerse.**

b. **Conway’s Game of Life (Agent based modelling)**

The process of creation is also seen in the Conway’s Game of Life (Gardner, 1970), an agent based model. The bits in the Square of the Game is the Data. All the data in the game is all combination of 0’s and 1’s. The bits in the game are created or destroyed as per the need of the game. This data is static unless the tick happens. This tick is the motion element that acts on the data that changes the state of the data. Hence this motion is external to the DataVerse of the Game. This motion can be single tick or continuous ticks. The Data in the Square will change state so long the tick happens. At every tick, the data gets modified as per the rule defined by the Programmer. Here the agent does not take the decision but follows the logic of the programmer. Any pattern form in the data is based on the logic defined by the programmer. Here the real agent is the programmer which decides the how the data will change in the Game. It is again the programmer which sees the pattern in the data. Making sense is the property of the Agent. Different observers may identify different patterns. Based on the patterns the programmer may decide to change the logic of the game thus resulting into more patterns. This iterative process gives both emergence and diversity resulting into complex creative process.

**V. Conclusion**

This paper is an attempt to present the Information Universe as an Entity in the holistic perspective and named as DataVerse. It gives the crisp definition its nature and properties. The process of creation through emergence and evolution into a complex Information Universe. This model is also the seed to model the Real Universe. DataVerse together with the Real Universe can define the complete Reality (real and Virtual).

**References**

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Diversity V Multiculturalism Advantages And Disadvantages Of Workplace Diversity

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Abstract- The concept of multiculturalism and diversity in organizations continues to draw management and public attentions due to the constantly changing global business atmosphere especially for multinational corporations (MNCs). Diversity and multiculturalism are most times interwoven terms that calls for an organizational culture that allows all members to pursue their objectives’ without being hindered by factors such as age, gender, race, religion, nationality or other potentials that do not contribute to performance. Obviously, diversity and multiculturalism are two terms that are most times used interchangeably, thus, making it difficult for some scholars, managers, and corporate officers etc. to differentiate between the two terms. However, this research paper focuses on the basic differences between diversity and multiculturalism as well as the pros and cons of diversity in an organization.

Index Terms- administration, business, management, diversity, multiculturalism, workplace, culture.

I. INTRODUCTION

Diversity and multiculturalism do not exist without organizational culture which is the fundamental beliefs, expectations, norms and values, and ways of interrelationship that contribute to the distinctive social and psychological organizational environment, however, culture is based on collective attitudes, beliefs, customs, and rules existing within the organization which are considered to be valid. Moreover, culture is considered primary values that direct people’s behavior (Eriksen, 2018) within an organization. Globalization a phenomenon that allows the interaction and integration of people, firms and governments from various countries with one another are facilitated by diversity and multiculturalism, which enables them to take advantage of business opportunities enhanced via information technology.

A study of diversity and multiculturalism in multicultural corporations in Singapore shows that employees’ perceptions of multiculturalism and a diverse workforce are directly proportional to individual and organizational productivity (DeLancey, 2013). The challenges faced by organizations especially of being in business and gaining competitive edge, have compelled them to search for new strategies of developing solutions to mitigate such challenges in order to boost their performances. Therefore, organizations currently concentrate on the inclusion of workforce against monolithic structures that have customarily been in place, with the view of exploring the range of opportunities put in place by a mix of capabilities leading to a broad diversity (Ayega & Muathe, 2018).

Diversity and multiculturalism remains an important issue for the management of organizations, but unfortunately some of them still run on issues due to the fact that they still find it difficult to differentiate between diversity and multiculturalism. Obviously, for managers and supervisors to effectively recognize the dynamic changes and evolution in the workplace, they must first comprehend the basic difference between diversity and multiculturalism to successfully ensure a multicultural and diverse workforce. Managing diversity remains an important organizational challenge, therefore, managerial skills must adjust to accommodate a multicultural work environment (Clark et al, 2016).

Certainly, for organizations to realize the needed potentials vital for productivity and profitability, they must strive to meet the standard of the modern workforce diversity, thus, for firms to reap the benefits of cultural diversity in the workplace they must communicate their obligations to dealing with the challenges of divers workforce (Eriksen, 2018). However, employers must be able to differentiate between workplace diversity and multiculturalism, understand why a diverse workforce is important by knowing the advantages and disadvantages of diversity in the workplace. Besides, organizations must be appealed with their employees’ diversity to prevent unwholesome workplace issues such as entrenchment, awkwardness, and hostility (Eriksen, 2018). This research paper is designed to assist managers, supervisors and organizational team leaders etc. to have more elaborate knowledge of the difference between workplace diversity and multiculturalism, understand the merits of diversity in the workplace to effectively manage diverse workforces.

Diversity

Diversity in the workplace refers to the difference between employees such as race, gender, religion, sexual orientation, ethnicity, socioeconomic background, etc. (Nedha, 2016). Esty et al. 1995 defined diversity as acknowledging, comprehending, accepting and valuing variations among individuals with regard to age, gender, ethnicity, class, race, and disability, etc (Clark et al. 2016). More so, workplace diversity is the differences in race, language, nationality, religion, age, and sexual orientation (Martin, 2014) among individuals.
Undoubtedly, in any organization that promotes workplace diversity, employees tend to acknowledge the disparities that prevail among themselves, that is, there is palpable sense of awareness that can help the prevention of workplace discrimination or prejudice etc. however, they acknowledge an individual for being who they are such as being a woman or belonging to a particular class etc. (Nedha, 2016). Clark et al. (2016) found that diversity is not about differences among individuals, thus, there is uniqueness of individual that do not represent or speak for a specific group.

Perceptibly, in future, organizations that knows the importance of and how to manage diversity in the workplace effectively will hold distinctive advantage as regards to the recruitment and hiring of talent (Dyson, 2017). However, for an organization to nurture a diverse and general workforce, it must understand what constitutes workplace diversity. A survey conducted by Glassdoor on workplace diversity found that sixty seven percent (67%) of job seekers said that workplace diversity is vital when considering job offers, while fifty seven percent (57%) of employees reason that their companies should embrace more diversity (Dyson, 2017). This implies that organizations that fails to hire from diverse talent pools could lack qualified candidates and might have trouble in filling key roles thereby incurring more recruitment costs (Dyson, 2017).

Workplace diversity continues to penetrate major organizations both nationally and internationally as they continue to adjust their organizational culture to accommodate and sustain workplace diversity. AT&T is one of the top companies for diversity, as it continues to embark on initiatives aimed at promoting workplace diversity. However, for example AT&T’s Peace Through Business initiative which provides business education to women entrepreneurs in selected countries in Africa and Asia coupled with its collaboration with an employment agency for the provision of internships for adults with cognitive disabilities at their Dallas Headquarters (Eriksen, 2018), is an example of diversity in workplace at work. Another reputable company in workplace diversity is Kellog Company due to its institution of a new parental leave policy in North America from one week to four weeks, and with paid maternity leave increased from 10 weeks to 14 weeks (Eriksen, 2018). Furthermore, Johnson & Johnson is another notable company in workplace diversity because it acknowledges diversity and inclusion in every part of its organization, thus, “starting with recruitment, Johnson & Johnson aims to stop gender bias with the use of technology” (Eriksen, 2018).

Multiculturalism

Multiculturalism is the practice of giving equal attention to many diverse backgrounds in a specific organizational setting. The Collins Dictionary defines multiculturalism as the policy of giving overt acknowledgement or representation to the cultural needs and contributions of all the relevant groups in a society, (Collins Dictionary [CD], 2019), thus inclusion of those minority groups viewed as been ignored in the past. Nedha (2016) asserts that multiculturalism is the acceptance and promotion of multiple cultural traditions in the society, while Jin (2016) views multiculturalism as the point at which different social customs are recognized in the public as well as advanced. Moreover, DeLancey (2013) stated that multiculturalism is inclusive of employees of differing nationalities, ethnicities, races, religions, education and genders, and Martin (2014) describes multiculturalism as the workforce representation of variations in race, ethnicity, language, nationality, religion and sexual orientation. In addition, it is the concomitance of various cultural and racial groups characterized by an attitude of tolerance, friendship, and acceptance (O’Donnel & Gracia, 2018).

A multicultural workforce is a workforce in which a wide variety of cultural variations exist among the employees within the organization (Kokemuller, 2019). Nonetheless, multiculturalism is an idea that grants equal opportunities to different cultural or racial groups in an organization (O’Donnel & Gracia, 2018) thus creating a situation whereby no member is marginalized or regarded as unimportant. In a multicultural organization, people from diverse cultures and ethnic backgrounds are brought together irrespective of their different socio-economic backgrounds, and
countries (Leonard, 2019). Multiculturalism entails demonstration of open-mindedness and vertical and horizontal communication, collaboration, comprehension and teamwork enhanced through team spirit, and overt dialogue in an organization (O’Donnel & Gracia, 2018). Accordingly, multiculturalism is granting equivalent attention and representation to the cultural desires and contributions of all employees, with special emphasis placed on marginal groups who are traditionally underrepresented (O’Donnel & Gracia, 2018). Multiculturalism seem to be a more complex concept than diversity, however, in multiculturalism, the multiple cultural differences are both accepted and promoted in an organization (Nedha, 2016).

Diversity v Multiculturalism

Diversity refers to the acknowledgement of the variations among individuals in an organizational such as age, race, gender, religion, sexual orientation, socioeconomic background and ethnicity, whereas multiculturalism is the acceptance and promotion of multiple cultural traditions (Nedha, 2016) in an organization. In diversity people are not aware of differential power but in multiculturalism individuals have the knowledge about the differential power among different people and gatherings. Diversity has much concentration on ethnicity and gender while multiculturalism does not has much focus on gender and ethnicity.

Multiculturalism focuses more on inclusiveness, understanding, and respect, with attention on equal power in the society more than diversity. In a diverse workforce the idea of inequality and discrimination is typically illegal and there is provision of policies against discrimination, whereas in a multiculturalism the concept of inequality is also presented with proper understanding provided regarding the variations existing among people (Jin, 2016). Diversity assist with the policies geared towards the prevention of organizational discrimination while multiculturalism provides information that assist in gaining a deeper understanding of the differences between people. Thus, diversity focuses on the distinctiveness between individuals with the objective of ensuring through policies that everyone receives equal treatment while multiculturalism considers system advantages based on race, gender, and sexual orientation as privilege.

In diversity, most of the time, laws secure the rights of individuals who come from different backgrounds, however, individuals have a tendency to recognize the distinctions that exist among different people and groups, while in multiculturalism, integration normally takes place, thus, the general population are aware of dissimilarities that are present among people regarding sex, race, religion, ethnicity and financial foundation (Jin, 2016).

Advantages of Diversity

A diverse workforce is becoming commonly an irrevocable phenomenon in organizations as they face challenges of outsourcing and globalization that became necessary in order to beat competitive edge, meet brand demand, and remain in business while being profitable as well. Obviously, diverse work teams bring high value to organizations (Clark, 2016), besides, workplace diversity effectively impact every organization (Gyebi, 2016). Diversity has some correlation with excellence, as it increases profitability. The more diverse an organization the better its chances of increasing profits. McKinsey’s 2018 study on Delivering Through Diversity found that top-quartile companies with gender diversity or ethnic/cultural diversity in their executive teams are twenty one percent (21%) or thirty three percent (33%) respectively, more likely to have above-average profitability than their peers in the fourth quarter (Das, 2018).

Furthermore, a study by Cedric Herring (2016) on diversity shows that businesses with higher racial diversity reported more sales revenues, larger customers, more market shares and greater relative profits than those with more homogeneity in workforces. Besides, a study by Scott Page (2007) on diversity reveals that people from different backgrounds more effectively work together when compared to those from similar backgrounds, because those from different backgrounds offer various approaches and perspectives in finding and developing solutions. Moreover, another research study by Project Equality disclosed that organizations rated highest with more equal opportunities earned 18.3 percent profit than those rated low on equal opportunity issues who earned 7.9 percent profit (Lauber, 2011).

Diversity offers a host of other opportunities for organizations, it increases productivity and efficiency in a highly competitive environment, helps them maintain competitive advantage and gain market share etc. a study of labor diversity in European Union organizations conducted by Zizek in 2009 found that individual development contributes considerably to the success of employee diversity management “providing competitive advantages to organizations in the sphere of social responsibility, cost management, acquisition of funds, marketing, creativity, problem solving, innovations, and flexibility” (DeLancey, 2013). In a similar fashion, a case study of Consultative Group on International Agricultural Research (CGIAR) centers in Kenya on workplace diversity found that high performance is exhibited where teams shows diversity in age, ethnicity, nationality, gender and other differences, and that employee diversity enriches knowledge and skills of the organization and improves its creativity as well (Ayega & Muathe, 2018), besides, the study also indicated that workplace diversity improves employee career growth as well as the interpersonal skills in a working environment (Ayega & Muathe, 2018).
The Forbes Global Diversity and Inclusion Fostering Innovation Through a Diverse Workforce report indicates that seventy seven percent (77%) of companies use productivity as a measure to estimate the success of diversity programs (Eriksen, 2018). Diversity in the workplace brings about insight, talent, skill, multi-dimensional and general perceptions to the inclusive wisdom and expertise within an organization. Thus, diversity buttresses organizational performances by assisting them to gain more talented members/employees and improve the quality of decision making (Das, 2018). In a study of Multiculturalism and Diversity in Multinational Corporations (MNCs) in Singapore, 81.70% of the respondents agreed that recruiting employees from diverse backgrounds increase moral, motivates, and boost job satisfaction leading to increased productivity (DeLancey, 2013). A weekly data from California garment manufacturing plant covering the years 1995-1997 by Hamilton et al. 2004 revealed that teams with higher diversity in worker’s abilities are more productive (DeLancey, 2013). Furthermore, diversity in a workplace can bring better results with more creative solutions, and ensures that teams have adequate mix of skills, knowledge, expertise and experience for more productivity than homogenous firms (DeLancey, 2013) do.

Diversity enhances communication, increases understanding of various cultures and environments, reduces discrimination and ensures fairness and equity in an organization. Workplace diversity helps organizations increase their general employee satisfaction and inspire their global image (Das, 2018). Moreover, workplace diversity increases the predisposition to overcome culture shock due to expansion in business especially into the international horizon. And it assist an organization to move its business from the brick-and-mortar office to the online marketplace, thus according Alder’s 2002 report the growth of “organizations perspective, approach, strategic tactics, launch of new product, development of a market plan, creation of new idea, design of a new operation, and assessment of emerging trends (Martin, 2014) have diversity as key element. Nonetheless, workplace diversity instills a sense of justice and fair treatment of all members, employees and customers (Das, 2018), and reduces expensive litigations.

Disadvantages of Diversity

Although there are many advantages associated with workplace diversity in organizations, indeed, diversity while being proactively pursued has hitches that occasionally hinders its effective implementation and sustenance in organizations. Workplace diversity can lead to interpersonal conflict, implicit discrimination, entrenchment, bias and stereotypes, overt conflict and retaliation. That is, diversity could make organizational members/employees engage in hemophilic behavior or only associate with individuals of their own very kind, thus, preferring segregation and resisting integration efforts (Wroblewski, 2019) resulting to miscommunication, unhealthy competition, drop in morale and productivity. Obviously, negative attitudes and conduct could harm working cordial relationships, damage morale and work productivity (Clark et al. 2016).

Accordingly, White’s 2010 study discovered that the challenges of diversity lie in the continuous improvement of the integration and social acceptance of people from dissimilar backgrounds, thus, human traits variations certainly effect individual’s mode of thought, action, interaction and choices, however, these differences impede their abilities to support, trust, and respect one another in a productive manner (DeLancey, 2013).

When workplace diversity policies are weak, parochial attitudes that can result to overt conflict due to discrimination, lack of respect, prejudice and racism (Eriksen, 2018) become manifest. Harrison, Price and Bell 1988 research study posit that the effect of deep-level similarity on group structure is positive, whereas that of deep-level difference on group cohesion is negative (Martin, 2014). Thus, employees have the tendency to reasonably indulge in conflict with one another for a work or non-work related issue (Martin, 2014). However, the “interpersonal personal conflict results in lost productivity and development of negative emotions among employees” (Martin, 2014).
Diversity increases the chances of litigation against the organization. Wrobleswki (2019) asserts that many employees feel uneasy working with managers from different backgrounds, and that discriminating against a worker has direct impact on the worker’s productivity.

Conclusion

Obviously, there is marked difference between workplace diversity and multiculturalism, but most times the former does not occur without the later. DeLancey (2013) study on Multiculturalism and Diversity in Multinational Corporations in Singapore found that 77.44% of the respondents agreed that a multicultural and diverse workforce enriches them personally to work harder, and that multiculturalism and diversity in organizations are assets for planned survival and competitiveness in a universal economy. In addition, 78.63% agreed that multiculturalism and diversity are good and result to workforce coherence (DeLancey, 2013).

A diverse workforce has become imperative in today’s market place, therefore, for organizations to achieve its desired aims of increasing stakeholders and shareholders wealth, they must embrace diversity and multiculturalism to be well positioned to proffer adequate solution to its business problems. Diversity management in organizations benefits associates through the creation of a fair and safe environment where all and sundry have access to opportunities and challenges (DeLancey, 2013).

Workplace diversity has a positive correlation with organizational culture, thus, organizational culture determines its level of diversity. DeLancey (2013) study found that 89.63% of the responders agreed that organizational culture that inspires diversity, employee involvement, and creates a sense of ownership and responsibility is essential for the management of a successful, diverse, and happy workforce. Certainly, Brief’s 2008 report shows that diversity has important effect for the promotion of positive organizational change by enhancing both personal and organizational performance (DeLancey, 2013). More so, a diverse workforce ensures the safety of employees and encourage them to interact effectively.

Although workplace diversity has some demerits, certainly, its advantages far outweigh its disadvantages. Indeed, a diverse workforce reflects changing business world and marketplace. A study by Cameron and Caza in 2004 indicates that the benefits of diversity can translate in employees’ satisfaction, higher levels of physical and psychological well-being, and financial strength (DeLancey, 2013). Moreover, Kooence’s 2001 study asserts that to reap the benefits of diverse and multicultural workforce organizations should put in place and sustain ongoing training (DeLancey, 2013) in order to impact people’s behavior. Besides, managers should understand the meaning, significance and implications of diversity, and there should be promotion of a safe place for associate communication through the implementation of policies that provides and allows associates access to information (DeLancey, 2013). Furthermore, there should be established rules and regulations promoting workplace diversity while prohibiting discrimination at all levels.

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Real Time Eye Gaze Detection Using Machine Learning Techniques

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Abstract:
Drowsiness and exhaustion of vehicle drivers reduce the driver's abilities to control the vehicle, his natural reflex, and perception. Such diminished vigilance level of drivers is observed at night driving or prolonged driving, causing an accident and pose a severe threat to commuters. Therefore, it is an absolute requisite in the automobile industry to assimilate the driver assistance system that can detect drowsiness and fatigue of the drivers. This paper proposes a prototype for monitoring the driver's vigilance using a computer vision system in real-time. Eye-tracking is one of the critical parts in future driver assistance systems since human eyes contain much-needed information about the driver's condition, such as attention level, gaze, and fatigue level. One common problem faced by many eye-tracking methods proposed so far is their sensitivity to change in lighting conditions. This tends to limit their scope for automotive applications significantly. This paper illustrates an eye-gaze detection and tracking method that works under realistic and variable lighting conditions in real-time. Keywords: OpenCV, eye gaze, image processing, Machine Learning, drowsiness detection.

Keywords: OpenCV, eye gaze, image processing, Machine Learning, drowsiness detection

INTRODUCTION

The increasing number of traffic accidents due to a driver's diminished vigilance level is a severe problem for society. Driver's abilities to control the vehicle, his natural reflex, and perception decline drastically due to fatigue and drowsiness, reducing the driver's vigilance level. These ultimately results in a threat, not only to other lives but also to their own. According to the U.S. National Highway Traffic Safety Administration (NHTSA), in 2017, drowsiness and falling asleep while driving is responsible for at least 91,000 automobile crashes annually. The annual average of nonfatal injuries is 40,000, and 1,306 fatalities are from these crashes. More than a hundred billion dollars in damage occurs annually due to drowsiness related crashes. These figures only present the casualties happening from midnight to early morning, and underestimates the involvement of sleepiness because the above data does not include crashes during daytime hours. Vehicles having systems that are intelligent can detect drowsiness and alert the driver.

I. THE BASE IDEA

The central concept of Driver Drowsiness Detection is to capture a driver's face from a camera and accurately be able to calculate their drowsiness level, processing it in real-time. To achieve the requirements as mentioned earlier, OpenCV library can be used, for its convenience and compatibility. Various tools used for our prototype are discussed below.

A. OPENCV

Open-source computer vision is a popular computer vision library that has the class for face recognition using the latest computer vision algorithms. Face recognition build on the geometric features of a face is probably the most intuitive approach to face recognition.

B. SCIPY

SciPy is a library that uses NumPy for various mathematical functions. SciPy uses NumPy arrays as the underlying data structure and comes with modules for various commonly used tasks in scientific programming, including linear algebra, ordinary differential equation solving, integration calculus, and signal processing. SciPy is used in this scenario to calculate the Euclidian distance between the vector points plotted on the eyes.

C. DLib

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The face detection or any object detection can be done with any of the OpenCV algorithms. But detecting facial landmarks is a complicated process. The shape predictor's primary job is to localize the critical points of interest along with the shape. In the context of facial landmarks, our goal is to use shape prediction methods to detect facial structures on the face that are crucial.

Facial landmarks are detected in a two-step process:

Step 1: Localizing the face in an image.
Step 2: Detecting the key facial structures of the face.

To localize the face in the image, OpenCV algorithms are used. The crucial task of the process lies in its second step, to detect the key facial structures in the face region. There are a variety of facial landmark detectors, but all methods mostly try to localize and label the following facial regions such as Right and left eyebrow, Right eye, Left eye, Mouth, Nose, and Jaw. This method of Dlib starts by using a training set of labeled facial landmarks on an image. These images are labeled manually, specifying (x, y)-coordinates of regions surrounding each facial structure specifically. Distance between pairs of input pixel's probability is also calculated. Given this training data, using the pixel intensities, an ensemble of regression trees are trained to estimate the facial landmark positions directly. The indexes of the 68 coordinates can be visualized on the image below: Where p1, p2, p3, p4, p5, and p6 are 2D facial landmark locations. The numerator of this equation computes the distance between the vertical eye landmarks while the denominator computes the distance between horizontal eye landmarks, weighting the denominator appropriately since there is one more set of vertical points than horizontal points.

The indexes of the 68 coordinates can be visualized on the image below:

![Fig. 1.0 68 point coordinates of human face.](image)

Where p1, p2, p3, p4, p5 and p6 are 2D facial landmark locations.

### II. THE DROWSINESS DETECTOR

#### ALGORITHM

The eye aspect ratio is the crucial feature of the drowsiness detection algorithm. The eye aspect ratio is the ratio of the mean of Euclidean distance between eyelids to the Euclidean distance between the left and right edges of the eye. Since the distance between eyelids is directly proportional to the EAR, the decrease in distance between eyelids decreases the EAR value. This can be used to find Eye openness and closeness. The points are displayed in the image below.

![Fig. 2.0 Plots marked against a human eye](image)

The formula to calculate Eye Aspect Ratio value is given below.

\[
\text{EAR} = \frac{\|p_2 - p_6\| + \|p_3 - p_5\|}{2\|p_1 - p_4\|}
\]

The numerator of this equation computes the distance between the vertical eye landmarks while the denominator computes the distance between horizontal eye landmarks, weighting the denominator appropriately since there is only one set of horizontal points but two sets of vertical points. The EAR of the above figure 2.0 is about 0.4 which means that the eyes are open.

#### A. EYES OPENNESS DETECTION

The eye openness can be predicted using EAR values. When the eyes open, the Euclidean distance between the upper eyelids and lower eyelids is maximum. Since the distance is maximum, the eye aspect ratio is also more. From this value, we can find that the eyes are open. These annotations form a part of the 68-point Dataset, which the Dlib facial landmark predictor was trained. From these 68 points, 37 to 48 are representing the left and right eyes of humans. These points are used for further analysis of drowsiness detection.
B. EYES CLOSENESS DETECTION

The actual distance between eyelids must be zero to prove that eyes are closed. But drowsiness explains the state of sleep where eyes go from an open state to a closed state. It means that we have to find in between where the EAR value is about less than 0.3. The below image shown is with eyes closed.

III. THE DROWSINESS CHECKING

The python program is written in such a way that the algorithm keeps on tracking for human eyes. When the eyes are detected, the eye aspect ratio value is calculated run time. The standard blink rate of a human is 300 milliseconds. So the tracking system should not consider normal blinking as drowsiness as the eye aspect ratio during blink goes below 0.2. So, whenever the eye aspect ratio value decreases below 0.2, the timer starts. If the eye aspect ratio value is maintained below 0.2 for more than 1.5 seconds, the alert system is triggered. This awakens the vehicle driver from drowsiness.

IV. HARDWARE

The Raspberry Pi 3 microcontroller is used to implement this whole idea and use it for practical application. Due to its high-performance CPU and higher frame rate, Raspberry Pi 3 and Raspberry Pi Camera is used. Raspberry Pi 3 Model B supports Python and OpenCV library. Also, the paper is done by using the Anaconda Python IDE. We apply OpenCV Version 3.4.0 for various features of computer vision. The Haar Cascade Classifier, warpAffine, and template matching are supported in the OpenCV library. Raspberry Pi is connected with a buzzer so that whenever the drowsiness is detected, the buzzer is triggered to alert the car driver.

V. Optimization for Precise Response

The existing detection of drowsiness is based on public datasets available, containing faces of various ethnicity. While scrutinizing, it is understood that a particular car is driven by almost the same set of people every day. In such cases, using public datasets is not only less precise but also time-consuming. Instead of using a public dataset, a local dataset can be prepared in local or cloud storage using an optimized algorithm to maintain the quality of the data in the local dataset.

A. Preparation of dataset

A separate dataset is prepared for every person driving the vehicle. The photo of distinct drivers having the high resolution is stored as a reference for the data which is going to be collected in runtime. The collected data is our dataset having a normal distribution from the higher spectrum of quality.

B. Image comparison technique

The technique used in finding the similarity between images is the Structural Similarity Measure. The results of this algorithm are better compared to the Mean square error technique. The Structural Similarity Index (SSIM) is a perceptual metric that quantifies image quality degradation caused by processing such as data compression or by losses in data transmission. It is often regarded as a full reference metric that needs two images from the same image capture—a reference image and a processed image. The processed image is typically in a compressed state. It may, for example, be obtained by saving a reference image as a JPEG (at any quality level) then reading it back in. SSIM is best known in the video industry as well as in still photography.

C. Creation of Hash map

The Hash map is created with a key ranging from 0.61 to 1.0. The key represents the structural similarity image index (ssim), which is approximated to two decimal places. This results in a dataset having 40 images with varying quality. Here the already exiting image is not replaced by the new image if the key of both the images are similar. The dataset holds the already existing image.

D. Collection of data

The figure 3.0 shows the flow of how the image is being collected. Images of the driver are captured from the camera, and the captured images are compared with the reference image that is already in the dataset. If the quality of the image meets our expectations; the compared image is stored in our dataset, which is usually kept in the range of .61 to .99. The value of the Hash map saves the image with respect to their keys. The data is ignored if the quality of the image is below .61.

VI. FUTURE SCOPE

The detection of drowsiness discussed so far helps in alerting the driver. But numerous unfortunate events have to be taken into account. Such as a sudden jerk by the driver once the alert is given, which may lead to crashes. The autonomous driving modes in self-driving cars are still under research and will be successful in the near future. In the case of self-driving cars coming into practice, the usage of drowsiness detection would be more efficient and useful. Further enhancement can be introduced by activating the self-driving mode first and then alerting the driver. This alert system is not only applicable for vehicles but also in workplaces where drowsiness leads to severe accidents, which may even be fatal.

CONCLUSION:

In the Driver Assistance System, the scope of using OpenCV for image processing are immense. It shows reliable performance in real-time conditions and also highly useful in processing images. The problems associated with human drowsiness and other human errors can probably overcome with OpenCV. Driving can be done better and smarter with the help of the driver assistance system, which uses OpenCV. This system is suitable for future improvements since it is compatible with many operating systems.

The result of the paper "REAL TIME EYE GAZE DETECTION USING MACHINE LEARNING TECHNIQUES" are in line with the expected output. From this implementation of paper, Drivers can quickly be alerted if there is a chance for an accident due to their drowsiness. This paper is also further adaptive for an upgrade.

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Translation and Tribal Areas and the Valley: Meitei language in the Socio-Cultural Context

Thokchom Premlata Devi

Abstract- Despite the fact that Manipur has various communities living together for centuries with long history of culture and tradition it would be imperative to notice that the oral narratives and cultural identity of Meiteis and other tribes of Manipur are relatively of homogeneous nature in the ancient period and this trend is found still persistent. In digging out the truth, the translation versions help depict the relative impacts amongst each other. It is imperative to know that intra- and inter-cultural enrichment can be made possible through translation.

Index Terms- Translation, Oral narratives, Homogeneity

I. INTRODUCTION

Manipur is inhabited by a number of ethnic groups. Geographically, Manipur is divided into the hill and valley areas. The valley is surrounded by hill from all directions. Meitei ancestors have described this land as the one being surrounded by nine hill ranges. The valley is inhabited mainly by the Meiteis, the largest community in the state, while the hills are inhabited by various tribes. All these communities have been living together for centuries with a long history of culture and tradition.

When Manipur became a part of India in 1949, 29 communities were reconginezed as Scheduled Tribes under the Indian Constitution. They are: Aimol, Anal, Angami, Chiru, Chotohe, Hmnr, Kabui, Kacha Naga, Koirao, Koireng, Kom, Lamkang, Mao, Maram,Marin, Mizo, Monsang, Moyon, Paite, Purul, Raite, Sema, Simte, Tangkhul, Thadou, Vaiphei and Zou.

Besides these 29 communities, five more communities were added in 2012 under the Constitution of India (Schedule Tribes) order (Amendment) Act 2011 (No.2 of 2012) dated 8th January, 2012 to the Scheduled Tribe list taking the number to 34. They are namely: Kharam, Poumai, Tarao, Mate and any Kuki Tribes

In a harmonious manner, these communities are grouped on the basis of closer linguistic and cultural affinity. In this chapter, the researcher will make attempt to explore the hidden treasure of oral literature as found in Manipur tribal areas in terms of its origin, culture and religion and revelation of close relationship among the tribals and Meitei. The Oral narrative is said to include different varieties of Oral history, folklore, folktale, Oral tradition etc. In one way, it is cultural information passed on from one generation to the next by story tellers.

The forms of Oral tradition mean to include poetry, folktale, ballads, ritualistic hymns and chants, riddles, myths, legends, epics, proverbs and some magical Spells, etc. The mode of expression in the Oral literary style is in its musical and rhymic ways, which further serve as both entertainment and aids to memory Epic poems mainly concerning the real destiny of the society in concern. When a myth in particular is asked for summarizing, it naturally begins with as Oral tradition followed by the written-down system. In section 2, I shall focus on other tribes’ areas and Meitei language in oral narratives where I shall present the Oral History of Thangal Origin Myth, the Oral History of Anal and the Sacred Fire of Andro showing the very significance of how they are relatively of homogeneous nature in the ancient period and this trend is still persistent. This gets reflected in the translation of the oral narratives from such various tribes. Section 3 is about Cultural knowledge effects in translation prompting that through the translation only all the socio-political informations for past or present within or across the language can be easily grasped.

II. OTHER TRIBES’ AREAS AND MEITEI LANGUAGE IN ORAL NARRATIVE

In Manipur there still continues to have Oral tradition among old people and some minority groups as well as among children and such an Oral narrative survives in their daily games, counting rhymes and songs being transmitted orally from generation to generation.

There is a tide connection amongst the tribal communities and Meitei clans (Salai). Meiteis believe that holy souls of their ancestors used to hunt the stars and planets, i.e., Sajik and Thaba. This sort of belief system could be connected to the Oral story of Khongchomnupi Nongkarol, indicating the lovely relation between the stars and mankind. On the other hand, the practice of buring the dead body of a Meitei was there in the then Meitei social milieu. After the incident of Puya Meithaba (the Burning of Sacred Puya books), the cremation of dead body was introduced among the Meitei society. To the fullest point of surprise, children below 3 years old were exempted from cremation on the basis of which they were not baptized into Hindu religion. The same practice still persists in the present scheduled caste of Meitei-Sekmai or Meitei-Khurkhul society. They used to bury the body within one earthen pottery or vessel instead of cremating the same at “LU-PUNG” near Sekmai Keithel (market). In the present scheduled tribal areas, such an aged burial ceremony is still followed. One can find such a sytem in the Oral history of “Henjunaha and Lairoulembi” that clearly reveals that Meiteis used to bury their dead bodies.

Even in Meitei Laiharaoba festival, which is embellished with songs and dances, the performance of Tangkhul Nurabi Dance confirms the apparent relation between Tangkhul...
community and Meitei. The folktales of Achon Meiraba, a goddess of Tangkhul made introduction of “Lui Cloth” or “Leiroom”, which is a common religious cloth of both Meitei and Tangkhul. Such an attachment amongst the various communities and Meitei is strongly prevalent till now. In its reality, the cultural identity of Meiteis and that any tribes of Manipur are homogeneous. They also belong to pro-mongoloid stock of people.

In terms of translation work for Oral narratives reflecting the origin myth, the researcher is paying focus on some communities for the ease of exposition. We will see some ample cases of tribal languages in the next sub-section touching some logical interpretation of their origins through myth.

2.1 The Oral History of Thangal Origin Myth

The Thangal was formerly identified as Koirao, a small indigenous Scheduled Tribe of Manipur. The etymological meaning of the term “Thangal” is still obscure. It is believed that the name “Thangal” be derived from the saying that other tribes refer to Naga tribes found on the southernmost part of Manipur, which is called “Thangkaimi” that stands for “the southernmost people”. Physically, they are indistinguishable from the neighbouring indigenous tribes belonging to the same Mongoloid stock.

Following is a translation version of oral songs of Thangal origin myth:

“Kajong antou mini sombs
puiba sanao andei
anrum lairing katak
lungkari tangnou, lungkanao tangni
paomi ti nge”

Free translation

The stone drag by the monkey was erected for men
Ties of the collateral mothers broken
The junior one (men) devoured up the senior line
(monkeys).


From the above translation, it can be traced back that Thanagals lived together with the monkeys as cognate brothers born by two collateral sisters. It was believed that Thangal originated from a place called “Angkaipang” and stayed there for a short period and further moved down towards the south to a place called “Angkaipang” and settled there for a long time. There was a large flat magical stone with supreme divine power that can produce the huge quantity of paddy. As a consequence, they become quite prosperous. As a tradition the Thangals erect large memorial stones to show their glory and prosperity. Thangals used to collect a large boulder from the foothills which had to be lifted to the hilltops. The common habitat sharing monkeys assisted them in pulling up the stone to the hilltop. On certain occasions occurred crushing many monkeys to death. As a norm of compensation, the Thangals promised that they would bury the dead monkeys with honour. Instead, they cooked and ate the meat of the dead monkeys. The monkeys didn’t notice the happening. The incident occurred so frequently that monkeys somehow started suspecting the treachery and caught them red handed. The monkeys left the village for jungle with anger and prepared for an appropriate revenge. The above song was sung by the monkeys at the time of departure. The monkeys marred the Thangal in all their life sectors and asked finally to work out a peace treaty with them that Thangals should never kill and slaught the monkeys. Since then the flesh of monkeys has become a taboo of food for Thangals.

What can be interpreted from the above myth is that following the evolutionary theory of man in which man is considered to have evolved from monkeys (or apes), such type of close association of the people with monkeys in this myth is nothing but the real indicator of link between human and monkeys (or apes).

2.2 The Oral History of Anal

The origin of the name ‘Anal’is obscure till now. However, most of the writers commonly agreed that the word ‘Anal’is given by Meiteis (Rd. Kanthung, 1995). In the sacred book of Ningthourol Lambuba, it is stated that King Poireiton, the first century ruler of Manipur, happened to slip over a mossy ground while passing an area inhabited by the tribe. He called the place ‘Nanbá’ which means ‘Slippery’. In this way, the Meitei word nanba was corrupted to the Anal (Lh. Ngamhring, 2007). There is also other belief that because of their cleanliness in comparison with other tribes, the Meiteis called them Anan, which gave way to Anal. This again goes somewhat against the argument countered by the fact that in Burma (Myanmar) they were known as ‘Khôn’ meaning ‘unclean’ or ‘dirty’.

With respect to the legend of Anal origin, there is a belief among the Anal tribes that they came out of the ‘khol’, a word with two meanings. The first means a deep ‘hole’ in the earth while the other means a ‘foreign country’. As the legend spells out, the Anal people came out from a big cave covered with a stone. There was a savage tiger which kept watching over the hole and ate up anyone who came out from the cave. There were two brave Anal heroes called Hanshu and hanta who engaged a bird group, Pari birds (in Anal) with the promise that if it helped them, it could eat freely in their fields for all time to come. Now the Pari birds flew in front of the tiger’s face in a swarm thereby blinding him intelligently. In the mean time, the two brave men came out from along with their party and fought anfd killed the tiger. In this way, the Anal people came out of the hole spreading all over.

The following song depicts the victory over the tiger Anal people won:

Rāi Kasung, rāi kasung zā
Chim pho le rāi ḋu kasung na
Chim pho le rai ḋu kasung na
Karal sungna kakng korera

Free English translation

Fought and fought the enemy,
With shield and sword enemy’s
Sharpeneth was my sword use for war

Kāonvā kāonvā yā
Rāi oh sa danite mī oh kāon vā (2)
Zu oh sa oh danite kappa kekolro

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Free English translation

Called me called me!
Called me thence be enemy
Called me thence be enemy
Invite my father thence be a feast

From Daryal Juli

Anal (2009)
The pari birds still try to feed themselves in the tribe’s fields of paddy and millet. Their emergence from the ‘Khoi’ is concretised from the following Anal song:

Khol – o hahang sānpe
Hnakhāl o lāngdāl pathusinng – o
Hedum patel sinng – o
Kheluwno – o limsor pathusinng – o
Hethun patel sinng –
Hari – o ... Hari ae

Free English Translation:

Ah, the days of old,
When we first emerged from the khol
The broad teak leaves were our make-believe gongs
day long
Which we playfully tolled, the whole

cattle, you know
And the grasshoppers would be our

time ago1.

There is a cultural practice in Anal society that whenever there is any journey to take amongst the whole family, the women and children are made to go in the front while the men walk behind. This issue from an earlier reflection that when the people were about to leave the cave, the priest chanted prayer to invoke blessing and gave farewell and after the event of chanting, they performed divination by breaking an egg and started journey forward in response to the divination. The women and children walked in the front while the heroes, Hansu and Hantha followed them behind with shields in their hand. So, the practice of letting the women and children go before the men emerged henceforth. Even in our Meitei society the same culture is visible. The above translation version is the only proof showing the idea of how Anal community originated and how they got spreading all over.

Analns have many festivals similar to that of Meiteis’. Daryal (2009: 76) mentions that Khamtungro/Phamka (Coronation) is of a recent origin after the Analns came in contact with the Meiteis and their subjugation by the Meitei rulers. This coronation happens to be performed only by a member of the village authority. A person nominated or elected as a member of the village has to perform this function. This coronation function usually takes place during the night and all the villages invited are served with Zu-tuwn (rice beer) and Sa-tuwn (meat). The song leaders (Kamšang) lead the singing with musical instruments and Jakadām (a kind of dance) is performed. In this function, the host first dances with his wife and other males and females make pairs and followed the session. Every pair, after the dance, offers some money to the host team for buying a pig to be eaten by those who will help in the closing ceremony of the coronation.

Anal songs are of various types composed by great heroes of the past, poets and singers. One of the traditional love songs called ‘Tuna’ is ‘Akam Hla’ is sung only during the Akam festivals. ‘Luhla’ is sung on the occasion of Sape ceremony while the songs sung during the death ceremony are called ‘Athọ Hla’.

The following song is one of the many songs sung on the occasion of ‘Akam’:

In hmun su – oh sewa kenu sewa – tha
Akanare amma atuwn nare amma
Akanare amma atuwn nare amma
Athọ puwnt rang chunrawng, oh

Thinsel
Free English Translation:
Looking for the construction of a house
Quite lonely, when no men are there

Though Thinsel built a house and called the people.

The following song is sung on the occasion of Phamkha:

‘Jakase, jakase, jakaatinke
Jakamumda, changluse jakaatinke
Ningthou majumda changluse
jakatintare”

Free English Translation:
Merry, merry, be joyful
Enter the house of a man merrily
Enter the house of a man merrily2.

In the above song, the last line contains a phrase Ningthou majumda, which are Meitei words meaning ‘to the house of the King’. Daryal (2009) opines that “it is in Meitei language and shows the influence of Meiteism on the Analns. Besides, the Phamkra ceremony origin goes back to the time after the Analns were subjugated by the Meitei Kings in the 16th and 17th century”.

From the above translation work, it clearly reveals that Anal literature is highly influenced by Meitei literature, and even Meitei words are found inserted in their songs. We can see the linguistic synthesis out of the source language, Anal and the target language, Meitei-lon within the state itself.

From the political point of view, the Anal heroes protected the Anal land from dangers and were adventurous and they went out on an expedition to the Kabow valley by establishing their hegemony over a large tract of territory. Thumkel (the Anal hero) extended hi hold over the Loktak Lake region of Moirang and there he caught a wild bull for his ailing wife. The following song depicts the underlying connection:

Kathe palung eni- o. Thebong palung
enī – o
Morang so ki sal- o jungke kadobe
A sha the thal pinam- o, ka ruwng ngan

teh dim ma

Free English Translation

Oh! Thebong, my kind hearted wife,
She has asked me to catch the wild bull from the green pastures of moirang region.

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Though caught and killed, the beef thus obtained seemed not enough. The following is the song of Thumkhel’s Expedition to the Kabaw Valley:

**Thumkhel lāngcham sina, Tamu zol, huzā eh vathal ting hmi deso. Oh, volhlung lāngcham sina pinsa zol, husa eh vathal tehmi lingsā.**

*Oh, Volhlung rāl dāh tensinbe, simzong lə oh marenede, Huzā- aluwng som hmin tungka. Oh, Volhlung rāl dāh tensinbe, kikkiing lə oh marenede, Huzā- aluwng khee hmin tungmi.*

Free English Translation:

The battlefields of Thumkhel lies at the southern part of Tamu, covering vast area. As a mightier fighter, he killed and destroyed everything. Nothing remained behind to be seen at far. Southern part of ‘Pinsa’ (now called pandah in Myanmar) is the battle field of Volhlung. As a less superior fighter, he could not clear and conquered a large area. Many lives and things remained visible when looked at. The number of heads of his victims is as amny as the number of monkey heads being raised by a good hunter in front of his house. The heads which filled ten rows are Thumkhel’s. The score of heads claimed by Volhlung are of weaker and smaller beings like ‘Kikiing’ (sea snails) and is even short of one row.

From the above songs and brief traditional accounts, we could spell out that the Anals belonging to the Tibeto-Burman family of Mongolian race are one of the various types of Manipur. They believe that they came out of the ‘Khol’, still preserving their cultural way of life by tradition. Christianity and modernization cannot wipe away their tradition and culture. The Anal’s cultural literature is found influenced by the interaction with the various tribes such as Kuki chin tribes and the Naga tribes. The Anal tribe has also tendency of strong feeling that there is impact of the Meiteis in belief, culture and language. Daryal (2009: 145) spells out that “Today’s Anal dialect has many Manipuri words. Old words have given way to these new borrowed words. The Anals have linguistic affinity to the Kuki Chin tribes”. This is how we can observe how the above translated version provides a clue depicting the richness of the culture of a language like Anal. The Oral narratives and cultural identity of Meiteis and other tribes of Manipur are relatively of homogeneous nature in the ancient period and this trend is still persistent. This gets reflected in the translation shown above.

### 2.3 The Sacred Fire of Andro

Andro is one of the Scheduled Caste Communities, who spoke *Chakpa* which has died out and they now speak Meiteilon. Only a few elders know their old language which is used only in rituals. It can be noted that some Puyas (old Manipuri sacred manuscripts) have information about the history, civilization as well as culture of the Chakpas in the name of Chakparol, Chakparol Khunda, Chakpa Khoira, and Chakpa Lai Khunda. There are eleven hakpa localities in the state of Manipur and most of them still practice the aged-old traditions, calling themselves the Meitei Ariba (true Meiteis) in the sense that they are what the whole Meitei community was befor the Hinduism that came into existence in 18th century was adopted by most of the Meiteis. Still Andro community preserves and guards their cultural practices forming a council to function as a local self-government. There is a building where the council has its office and they call it ‘Loishang’. Inside this Loishang is the Sacred Fire, which is believed to been started at the time when the Chakpas started living at Andro more than two thousand years ago. This Sacred Fire has never been extinguished from that time by following a particular system called ‘Singhul Leng Meihul Leng’ according to which two persons for everyday from two different families have to attend to the sacred fire by bringing firewood to the temple of the Loishang. A hym is sung to glorify the sacred fire. The following is a part of the hym with translated version.

**English Translation**

<table>
<thead>
<tr>
<th>Manipuri</th>
<th>English</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ubi uyel mei</td>
<td>Fire in the ashes</td>
</tr>
<tr>
<td>Hemba pamchak mei</td>
<td>Fire that can burn everything</td>
</tr>
<tr>
<td>Lanchao Khambí mei</td>
<td>Fire to cremate</td>
</tr>
<tr>
<td>Amam singkum mei</td>
<td>Fire also in childbirth</td>
</tr>
<tr>
<td>Chapok kadang mei</td>
<td>Fire to cook rice</td>
</tr>
<tr>
<td>Tara chakthong mei</td>
<td>Fire to cook dishes</td>
</tr>
<tr>
<td>Shenglou Yenphut mei</td>
<td>Fire to bake pots of the Chakpas</td>
</tr>
<tr>
<td>Chapka phuyik mei</td>
<td>Fire to burn hay in the field</td>
</tr>
<tr>
<td>Charu tangsam mei</td>
<td>Fire brought by Poireiton</td>
</tr>
<tr>
<td>Poireiton khanthok mei</td>
<td>Fire brought by Poinaota</td>
</tr>
<tr>
<td>Poinaotana kunphao mei</td>
<td>Fire, the foundation of Meitei</td>
</tr>
<tr>
<td>Poirei khulling mei</td>
<td>civilization.</td>
</tr>
</tbody>
</table>

Rajketan Chirom (2013: 113)

Rajketan remarks that “the hym gives the various uses and qualities of fire. It describes the role that fire plays in all the aspects of man’s life. One notable in the hym is that it talks about Poireiton, and his wife Poinaota, as having brought fire (the know-how to make and use fire) to Manipur during their migration and its importance in the civilization of this land. Thus, the people of Andro believe that if the sacred fire is extinguished, the Manipuri civilization will come to an end and all its people, culture and tradition will become extinct. Therefore, this sacred fire is always to be kept alive”. This small translation tells a lot about the ancient days when many clan principalities were ruling their own small kingdoms. Pakhangba, the Ningthouja king defeated Poireiton, who came to Manipur to help Khaba clan in war. Poireiton married his younger sister Laisna to Pakhangba and she was made queen. It is said that the fire used in the coronation of Pakhangba was said to have been brought by Poireiton. It is still believed that it is the same fire which is still kept burning at Andro.
III. CULTURAL KNOWLEDGE EFFECTS IN TRANSLATION

Now let us see a recent view of the semiotician Lotman & Upensky (1978) describe literature who declares the following statement:

*No language can exist unless it is steeped in the context of culture; and no culture can exist which does not have at its centre, the structure of natural language.*

Viewd so, language behaves as the heart within the body of culture. The interaction between the two brings forth the continuation of life-energy.

Thriveni (2002, p.46.) describes such interactive phenomenon as an item covering all aspects of life expanding from history to traditional customs. At this crucial juncture, the translator has to to take good decision about the importance given to certain cultural aspects and to what extent it is necessary or desirable to translate such elements into the target language.

Again, one can also have the handsome idea of which Hatim and Mason’s theory (1990) on translation is focused on the decisive relevance of cultural context: Translating is communicative process which takes place within a social context. According to them, translators are considered as mediators: *Translators mediate between cultures (including ideologies, moral systems and socio-political structures), seeking to overcome those incompatibilities which stand in the way of transfer of meaning. What has value as a sign in one cultural community may be devoid of significance in another [...].*

Hatim and Mason consider translation as a communication process going through linguistic and cultural barriers. According to them, the translator may face problems within or outside the language concept.

The existing fact is that when a language exists in a particular culture it is very hard to realize the meaning of linguistic text to be comprehended as per the particular culture. However, even though cultural words create problems as the impact of them gets lost in the process of translation, what is good here is that through the translation only all such socio-political informations for past or present within or across the language can be easily grasped.

IV. CONCLUSION

In this paper, we have explored that Manipur has various communities living together for centuries with long history of culture and tradition. The Oral narratives and cultural identity of Meiteis and other tribes of Manipur are relatively of homogeneous nature in the ancient period and this tread is still persistent. The translation versions depict the relative impacts amongst each other. It is imperative to know that intra- and inter-cultural enrichment can be made possible through translation.

ACKNOWLEDGEMENT

I am deeply grateful to Mr. Amom Nandaraj Meetei who helped me a lot in developing this paper extending this academic insight. I am also grateful to Mr. Athokpam Jeet Prabhat Meitei for his moral support and encouragement.

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First Author – Thokchom Premlata Devi
A Study about the cognomens that were adopted by the kings during Anuradhapura Era

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Abstract: During the Anuradhapura Era the King was the head of the state. When studying inscription stones enlisted in this regard, what is clearly visible is the fact that, a reign based on heritance has been functioning. The kingship was deserved by those who hail from the Kshatriya dynasty. The amateur prince becomes a proper king after the coronation ceremony. In the absence of such coronation, the prince is not considered as the king of the state. In Mahavamsa Teeka, this is discussed at length. The one who commanded the entire governance system was the King, thus since the inception, a governance based on dynastic line was existed in ancient Sri Lanka. (Journal of the Royal Artistic Society of the Royal Asiatic Society of Great Britain and Ireland (1936, p.443.)

Corpus

Sri Lanka was so closely and intimately connected with India that every great change that took place in the main continent whether political, social, economic or religious influenced considerably the life of the people of Sri Lanka (Amaratunga G & Gunawardana N, 2019, Volume-3-issue6, 203-206). The king needs to be a secular, orderly person in his governance due to certain factors; those were to receive rain at apt time in favor of successful cultivation, to obtain prosperity and blessing for both citizens and the state, and for the smooth function of his governance with the help of citizens. Thus, given the stability of the reign and as a custom, the kings were given various honorary names/cognomens when enthroned. This was a custom which prevailed since the inception of the Anuradhapura Era. The fifth chapter of Mahavamsa has been dedicated to the emperor Asoka (Gunawardana N, 2019, IJSRP Volume 9, Issue 7, 230-235). “Devanapiya” is one such forefront cognomen. This has been first adopted by the King Asoka. Simply as the manner in which governance was established in Sri Lanka along with the introduction of Buddhism, these honorary Indian terms were also adopted by Sri Lankan Kings as well. The holy city of Anuradhapura was originally planned and laid out by Mahinda son of king Asoka. (Gunawardana N, 2019, IJSRP Volume 9, Issue 6, 634-638).

One of the influential kings in Ceylon named “Tissa” (B.C 250-210) was later known as “Devanampiyatissa”. King Devanampiyatissa, became the king after his father’s death (Gunwardana N, 2019, IJSRP Volume 9, Issue 7, 236-240). The inscription stones testified that these honorary terms was used by the kings for a period about three years during the Anuradhapura Era. (see. Amaravansha Himi, Kothmale., (1969). Lakdiwa Sellipi, (LS), Epigraphy Zeylanica., (EZ.) Volume (Vol:1 ), p.144., EZ., vol:III., p.154 EZ., vol: V. p.209).

Though it was used as an honorary term alluded to King Devanampiyathissa, later on the other kings were also used it as a cognomen. Even though, the usage of these honorary terms seceded during the first century, they have emerged again during the reign
of King Upatissa (A.D 517-518). Many scholars have taken into discourse about the usage of the honorary terms. (see Wimalakeerthi, Madayangoda., (1958) Part 2, Epigraphs Compilation.,Moratuwa., D.G Dodangoda and Company. Page 45, EZ. Vol: I, p.63). However, the study about the epigraphs listed during A.D centuries shows the gradual secession of the term devanapiya.

During the anno domini (A.D) era, one of the pivotal honorary terms in use was ‘Maha Raja’, and the term Raja which had a lesser importance than the former was also in use. During the B.C era the term Raja-Maha Raja was in use overwhelmingly yet during anno domini (A.D) era the term Maharaja was hardly used. (EZ. vol: V., p-209). The term raja was particularly used by the minor rulers who ruled the other parts of the island. Dathuvansa mentions about two such minor rulers who governed Rohanaya. (Ven Sri Kakusanda via Sri Sumedankara. (1930) Dathuwanshaya. (ed): 52). However, it is not evident that they maintained any relationship with the Anuradhapura royal family. Further, an epigraph enlisted in a cave in Mihinthalaya speaks about a king called DipaRaja (EZ. vol: V. p.209). Though the name connotes the meaning as the king of the state, it also holds the allusion to the honorary term used by the prince who governed Nagadeepaya region in the Jaffna peninsula. (Pali text society. p.443) However, the study of epigraphs enlisted during the Anuradhapura era reveals that the honorary term MahaRaja existed in usage for a longer period while the term raja diminished quickly from colloquial.

The honorary term Gamani is also a term adopted by majority of kings. However, there is a hullabaloo regarding this since it has been adopted by both kings and other heads at managerial level in governance. However, as testified by the epigraphs, the kings have adopted this term to connote a sense of honorary while other minor heads of state have adopted it as an official term associated with their duties. The study of the evolution and the expansion of this term gamini reveal many facts in this regard. (Gunawardana., R. Liyanagamage A., (1961)., Anuradhapura Era (A.E)., Kelaniya., Vidyalankara Press. p.53., Ven Vimalawansa, Baddegama., (1961) Epigraphic Society., Colombo.,Anula Press., p.99-100). At first it has been used in association with powers vested in administration yet later on it has been used to connote a sense of honorary, a sense of belongingness to a high strata of society and finally as a term of identification. The cave epigraphs reveal that many such cognomens have been used in association with gamini. (EZ., vol: v. p.209). As evident from the epigraphs, this title of honor has seceded from usage after the B.C era.

Mapurumu is another cognomen used by kings during the Anuradhapura reign, in Sanskrit Mapurumu connotes the meaning the greatest while it gives the same meaning in Pali language as well. This is an ancient term which has been gradually evolved over the time. (See. Diwakara., Anurin Indika., (2008) Compilation of Scholarly Articles.(CSA), Colombo., Godage and Brothers. The term also has been in use as Mapurmuka & Mapurumu. As the cognomen Gamini, the title of honor Mapurmuka has also been adopted by both kings in power and other heads in governance. Since this cognomen has been cited as chula parumuka in the Tissamaharama epigraph, it can be assumed that a clan associated with the cognomen Maha Parumaka had also been in existence. (p.202). the study of epigraphs reveals the different platforms in which this cognomen had been in use. (EZ., vol: IV, pp. 144-249). Some epigraphs testify that this has been used as a personal identification term/name of the kings concerned. (EZ., vol: iii. P. 122). Thus, Mapurmuka can be defined as a popular cognomen which had been in use during the Anuradhapura era.

Buddhadasa is another contemporary cognomen that can be noted during this era. Buddhadasa (Buddhadasa in Pali) denotes the accomplice of Buddha. The kings such as Sena, Mahasen, has adopted this title as a cognomen. As per the Culavamsa one particular kings has adopted this as the personal name. (Giger, Wilhelm., (1952) Chulavamsa., (edited) Part I., London, Pali Books Company., p.37)
Toward the latter part of the Anuradhapura era, the cognomen Sirisangabo has been in use. As exemplified from the epigraphs, this title of honor has been used by coupling it along with the cognomen Budhadasa (EZ., Vol: I. p.43). Even this cognomen Sirisanabo has also been adopted as a personal name by some of the kings. Subsequently, it has been used as a title of honor. The (Aba, Apaya) is another cognomen visible in the respective epigraph. The Thonigala epigraphs reveal how the aforementioned cognomen has been used in front of the term Maharaja & Raja. (EZ. vol: III. p.172). This cognomen has been in use as an integral part of the name itself linked with the titles Maharaja and Raja (EZ. vol: ii. p.177). Abha Salamewan I is another such name which has adopted the respective cognomen. (EZ., vol: I. p. 182). Toward the latter part of the Anuradhapura period, many kings have enlisted the epigraphs only mentioning their cognomens in lieu of their personal names. Thus, this has resulted in creating a complex scenario in the exploration of the political nuances in the respective era (EZ. vol: 1.p. 24).

The term pa in Rajapa is another such cognomen. In Sanskrit, it denotes the meaning Arya Pada. In Pali, it is used in lieu of Abhaya. (EZ., Vol: iii., p. 132). The term Thiripali, has been used as an adjective for the Mahanamayan, while the terms such as Siri Niwasa, Siri Kudda that can be found in Samanthapasadikawa and Dammhapadatta Katha are also considered as honorary titles. (Sikawalnda Winisa., Introduction. p.ii)

As the time goes by the notion about the governance/state became more overwhelming. The cognomens that were used during the initial years were left out and instead of that honorary titles such as Maharad, Maharadthuma, Maharadunwahanse, Wathhimi, Wathhimiyawahanse were adopted. While the concept of state was getting wider in its scope, the terms such as parapura, wanshaya, were adopted instead of the honorary adjectives. Further, the titles were also coined based on the duties that were assigned to the respective persons. These titles have further evolved into terms such as chathra wanshaya, surya wanshaya. As per the epigraphs, the aforementioned titles stem from Okkaka dynasty. These titles are used in isolation or at times as siri Bara kath kula koth (EZ. vol: 1. p.31, 182, 241)

Conclusion

Thus, the study of cognomens used during the Anuradhapura era exemplifies several factors. It reflects that the kings have mainly enlisted these epigraphs stressing the fact that he (the kings) as the leader of the country, highlighting his eligibility to hold the thrown with the particular emphasis on his dynasty, bond with the citizens, inherent positive qualities, his secular and orderly administration of the nation, his fame, generous nature, kindness & combating skills. Thus, the epigraphs have been enlisted highlighting the aforementioned characteristics and the stability of his reign and his aptness for the kingship.

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Quality of Life of Seborrheic Keratosis Patients

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Abstract- Background: Seborrheic keratosis is a benign epidermal tumor that has various clinical appearances. Seborrheic keratosis are found on all area of the body except on the palm and sole, located mostly on the face and upper trunk. Lesions are often unattractive and serve as negative psychological connotations—daily reminders of aging. Objective: To determine the quality of life in subjects with seborrheic keratosis. Methods: This research was a descriptive study with cross-sectional design involving 100 subjects with seborrheic keratosis. Each subject answered Skindex-29 questionnaires and the the answers were assessed. Results: Quality of life in most subjects with seborrheic keratosis was very high quality of life with value of Skindex-29 in the amount of ≤ 5 (71%), followed by high quality of life with value of Skindex-29 in the amount of 6-17 (27%), and at least having moderate quality of life with value of Skindex-29 in the amount of 18-36 (2%). Conclusion: Quality of life in most subjects with seborrheic keratosis was very high quality of life.

Index Terms- seborrheic keratosis, skindex-29, quality of life.

I. INTRODUCTION

Seborrheic keratosis is a benign epidermal tumor that has various clinical appearances.¹,³ Seborrheic keratosis are found on all area of the body except on the palm and sole, located mostly on the face and upper trunk. The most clinical appearance is superficial verrucose plaque that looks stuck on the epidermis with various colours from tan to black colour.⁴ Lesions are often unattractive and serve as negative psychological connotations—daily reminders of aging. Many patients want to remove the seborrheic keratosis for cosmetic reason, especially with multiple lesions.⁵,¹¹

In the last decade, there is an increasing interest to assess quality of life of patients with skin diseases and increasing development of quality of life method.¹²,¹³ Skin diseases are the the most cause for morbidity because of clinical sign appearances.¹² Patients may complain itch, uncomfortable, and the other severe symptom. Skin disease can cause worry, depression, angry, shame that can cause social isolation, and interference in the work.¹²,¹⁴

WHO defines quality of life as individuals perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. It is a broad ranging concept affected in a complex way by the person's physical health, psychological state, level of independence, social relationships, personal beliefs and their relationship to salient features of their environment.¹⁵,¹⁶ Quality of life correlates with health-related quality of life reflect patient evaluation to disease and treatment for physic function, psychologic, social and health. Skindex-29 is HRQL instrument that designed to measure the impact of skin disease in patient’s life.⁶,¹⁷

No study was done before about seborrheic keratosis impact to quality of life of the patient by used skindex-29, so researcher wanted to know and assess quality of life seborrheic keratosis’ patient. This study aimed to find quality of life’s spectrum of the seborrheic keratosis patients. Special purpose was to assess quality of life to subjects that suffered from seborrheic keratosis based on age, sex, and period suffered from disease.

II. MATERIAL AND METHODS

This research is descriptive study with cross sectional design. Research had done in December 2015 until February 2016 in Medan involving 100 subjects with seborrheic keratosis that fulfilled inclusion and exclusion criteria and collected samples with consecutive sampling method. Each subject answered Skindex-29 questionnaires and the answers were assessed.

Ethical Approval

The protocol of this study was approved by The Health Research Ethical Committee, University of Sumatra Utara/H. Adam Malik General Hospital, Medan, Indonesia.

III. RESULT

In this research subject charateristics were based on age, sex, ethnic group, education, occupation, marital status and period suffered from the disease. The most subjects that had seborrheic keratosis were at age group 41-50 years old (33%), followed by age group 51-60 years old (31%), seen in table 1.

http://dx.doi.org/10.29322/IJSRP.10.01.2020.p97XX

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Table 1. Distribution of subjects according to age.

<table>
<thead>
<tr>
<th>Age</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;40</td>
<td>9</td>
<td>9,00</td>
</tr>
<tr>
<td>41-50</td>
<td>33</td>
<td>33,00</td>
</tr>
<tr>
<td>51-60</td>
<td>31</td>
<td>31,00</td>
</tr>
<tr>
<td>61-70</td>
<td>21</td>
<td>21,00</td>
</tr>
<tr>
<td>&gt;70</td>
<td>6</td>
<td>6,00</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100,00</td>
</tr>
</tbody>
</table>

The most subjects that suffered from seborrhoeic keratosis were women (55%), followed by male (45%), seen in table 2.

Table 2. Distribution of subjects according to sex.

<table>
<thead>
<tr>
<th>Sex</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>55</td>
<td>55,00</td>
</tr>
<tr>
<td>Male</td>
<td>45</td>
<td>45,00</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100,00</td>
</tr>
</tbody>
</table>

The most subjects that suffered from seborrhoeic keratosis were Bataknese (55%), followed by Javanese (6%), seen in table 3.

Table 3. Distribution of subjects according to ethnic groups.

<table>
<thead>
<tr>
<th>Ethnic group</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bataknese</td>
<td>94</td>
<td>94,00</td>
</tr>
<tr>
<td>Javanese</td>
<td>6</td>
<td>6,00</td>
</tr>
<tr>
<td>Melayu</td>
<td>0</td>
<td>0,00</td>
</tr>
<tr>
<td>The other</td>
<td>0</td>
<td>0,00</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100,00</td>
</tr>
</tbody>
</table>

Based on education, the most subjects that suffered from seborrhoeic keratosis had bachelor/postgraduate degree (38%), followed by senior high school (31%), diploma degree (15%), junior high school (11%), and elementary school (5%), seen in table 4.

Table 4. Distribution of subjects according to education

<table>
<thead>
<tr>
<th>Education</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Undergraduate/postgraduate</td>
<td>38</td>
<td>38,00</td>
</tr>
<tr>
<td>Diploma</td>
<td>15</td>
<td>15,00</td>
</tr>
<tr>
<td>Senior high school</td>
<td>31</td>
<td>31,00</td>
</tr>
<tr>
<td>Junior high school</td>
<td>11</td>
<td>11,00</td>
</tr>
<tr>
<td>Elementary school</td>
<td>5</td>
<td>5,00</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100,00</td>
</tr>
</tbody>
</table>

The most subjects that suffered from seborrhoeic keratosis were farmers (55%), followed by civil servants (20%), private employees (15%), and midwife (13%), seen in table 5.

Table 5. Distribution of subjects according to occupation

<table>
<thead>
<tr>
<th>Occupation</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Civil servant</td>
<td>20</td>
<td>20,00</td>
</tr>
<tr>
<td>Military</td>
<td>1</td>
<td>1,00</td>
</tr>
<tr>
<td>Private employees</td>
<td>15</td>
<td>15,00</td>
</tr>
<tr>
<td>Entrepreneur</td>
<td>9</td>
<td>9,00</td>
</tr>
<tr>
<td>Farmer</td>
<td>31</td>
<td>31,00</td>
</tr>
<tr>
<td>Labour</td>
<td>1</td>
<td>1,00</td>
</tr>
<tr>
<td>Pension</td>
<td>10</td>
<td>10,00</td>
</tr>
<tr>
<td>Midwife</td>
<td>13</td>
<td>13,00</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100,00</td>
</tr>
</tbody>
</table>

From table 6, the distribution of subjects based on marital status where all subject had married (100%).

Table 6. Distribution of subjects according to marital status

<table>
<thead>
<tr>
<th>Marital status</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Married</td>
<td>100</td>
<td>100,00</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100,00</td>
</tr>
</tbody>
</table>

The highest proportion of disease’s duration was less than or equal to 10 years (50%), followed by 11-20 years (34%), 21-30 years (14%), and more than 30 years (2%) (table 7).

Table 7. Distribution of subjects according to duration of seborrhoeic keratosis

<table>
<thead>
<tr>
<th>Duration (years)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤10</td>
<td>50</td>
<td>50,00</td>
</tr>
<tr>
<td>11-20</td>
<td>34</td>
<td>34,00</td>
</tr>
<tr>
<td>21-30</td>
<td>14</td>
<td>14,00</td>
</tr>
<tr>
<td>&gt;30</td>
<td>2</td>
<td>2,00</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100,00</td>
</tr>
</tbody>
</table>

Based on Skindex-29 Scoring, the quality of life in seborrhoeic keratosis patients was predominantly score ≤ 5 (very high) in 71% patients, followed by score 6-17 (high) in 27% patients, and score 18-36 (moderate) in 2% patients (table 8).

Table 8. Skindex-29 Quality of life of subjects who experienced seborrhoeic keratosis according to the value of Skindex-29.

<table>
<thead>
<tr>
<th>Skindex-29 score</th>
<th>Quality of life</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤5</td>
<td>Very high</td>
<td>71</td>
<td>71,00</td>
</tr>
<tr>
<td>6 – 17</td>
<td>High</td>
<td>27</td>
<td>27,00</td>
</tr>
<tr>
<td>18 – 36</td>
<td>Moderate</td>
<td>2</td>
<td>2,00</td>
</tr>
<tr>
<td>≥37</td>
<td>Low</td>
<td>0</td>
<td>0,00</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100</td>
<td>100,00</td>
</tr>
</tbody>
</table>

The quality of life of seborrhoeic keratosis patients based on ages were score ≤ 5 (very high) predominantly in age group 41-50 years (26%), score 6-17 (high) predominantly in age group
51-60 years (9%), score 18-36 (moderate) predominantly in age group 51-60 and >70 years (1%), and score ≥ 37 (low) was none (table 9).

Table 9. Quality of life of subjects who got seborrheic keratosis according to age

<table>
<thead>
<tr>
<th>Age</th>
<th>≤ 5 (very high)</th>
<th>6-17 (high)</th>
<th>18-36 (moderate)</th>
<th>≥37 (low)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N %</td>
<td>n %</td>
<td>n %</td>
<td>N %</td>
<td>n %</td>
</tr>
<tr>
<td>≤ 40</td>
<td>8  8,00</td>
<td>1  1,00</td>
<td>0  0,00</td>
<td>0  0,00</td>
<td>9  9,00</td>
</tr>
<tr>
<td>41-50</td>
<td>26  26,00</td>
<td>7  7,00</td>
<td>0  0,00</td>
<td>0  0,00</td>
<td>33 33,00</td>
</tr>
<tr>
<td>51-60</td>
<td>21  21,00</td>
<td>9  9,00</td>
<td>1  1,00</td>
<td>0  0,00</td>
<td>31 31,00</td>
</tr>
<tr>
<td>61-70</td>
<td>14  14,00</td>
<td>7  7,00</td>
<td>0  0,00</td>
<td>0  0,00</td>
<td>21 21,00</td>
</tr>
<tr>
<td>&gt; 70</td>
<td>2   2,00</td>
<td>3  3,00</td>
<td>1  1,00</td>
<td>0  0,00</td>
<td>6   6,00</td>
</tr>
<tr>
<td>Total</td>
<td>71  71,00</td>
<td>27 27,00</td>
<td>2   2,00</td>
<td>0  0,00</td>
<td>100 100,00</td>
</tr>
</tbody>
</table>

The quality of life of seborrheic keratosis patients based on gender was predominantly score ≤ 5 (very high) in 35% female and in 36% male (table 10).

Table 10. Quality of life of subjects who got seborrheic keratosis according to gender

<table>
<thead>
<tr>
<th>Sex</th>
<th>Skindex-29 score</th>
<th>≤ 5 (very high)</th>
<th>6-17 (high)</th>
<th>18-36 (moderate)</th>
<th>≥37 (low)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N %</td>
<td>n %</td>
<td>n %</td>
<td>n %</td>
<td>n %</td>
<td>N %</td>
</tr>
<tr>
<td>Female</td>
<td>35  35,00</td>
<td>18 18,00</td>
<td>2  2,00</td>
<td>0  0,00</td>
<td>0  0,00</td>
<td>55 55,00</td>
</tr>
<tr>
<td>Male</td>
<td>36  36,00</td>
<td>9   9,00</td>
<td>0  0,00</td>
<td>0  0,00</td>
<td>0  0,00</td>
<td>45 45,00</td>
</tr>
<tr>
<td>Total</td>
<td>71  71,00</td>
<td>27 27,00</td>
<td>2  2,00</td>
<td>0  0,00</td>
<td>0  0,00</td>
<td>100 100,00</td>
</tr>
</tbody>
</table>

The quality of life of seborrheic keratosis patients based on duration of disease was predominantly in duration ≤ 10 years with Skindex-29 score ≤ 5 (43%) and followed by duration 11-20 years with Skindex-29 score ≤ 5 (24%), seen in table 11.

Table 11. Quality of life of subjects according to duration of disease

<table>
<thead>
<tr>
<th>Duration</th>
<th>Skindex-29 score</th>
<th>≤ 5 (very high)</th>
<th>6-17 (high)</th>
<th>18-36 (moderate)</th>
<th>≥37 (low)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N %</td>
<td>n %</td>
<td>n %</td>
<td>n %</td>
<td>n %</td>
<td>N %</td>
</tr>
<tr>
<td>≤ 10</td>
<td>43  43,00</td>
<td>7   7,00</td>
<td>0  0,00</td>
<td>0  0,00</td>
<td>50 50,00</td>
<td></td>
</tr>
<tr>
<td>11-20</td>
<td>24  24,00</td>
<td>10 10,00</td>
<td>0  0,00</td>
<td>0  0,00</td>
<td>23 23,00</td>
<td></td>
</tr>
<tr>
<td>21-30</td>
<td>4   4,00</td>
<td>9   9,00</td>
<td>1  1,00</td>
<td>0  0,00</td>
<td>11 11,00</td>
<td></td>
</tr>
<tr>
<td>&gt; 30</td>
<td>0   0,00</td>
<td>1   1,00</td>
<td>1  1,00</td>
<td>0  0,00</td>
<td>2   2,00</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>71  71,00</td>
<td>27 27,00</td>
<td>2  2,00</td>
<td>0  0,00</td>
<td>100 100,00</td>
<td></td>
</tr>
</tbody>
</table>

IV. DISCUSSION

The most subject that had seborrheic keratosis was at group 41-50 years old (33%). A Study in Korea with 303 male 40-70 years old showed seborrheic keratosis prevalence 88% which increased 79% at age 40 years old until 99% for more than 60 years. A study in Australia found at least 1 seborrheic keratosis at 83% non dermatology patient 35-76 years old. Generally known that the prevalence of seborrheic keratosis increases with age, but can be found in the young. In this study, the majority of subjects who experienced a seborrheic keratosis is found in the age group 41-50 years (33%), because in this age group were most disturbed by the appearance of facial and body cosmetic problems. By sex, subjects with seborrheic keratosis majority were women (55%), compared with men (45%).

Australian study examined the prevalence of seborrheic keratosis with 170 patients and found no significant differences between men and women, although found slightly found increased number of women (26%: 21%).

Distribution of subjects according to ethnic were Batakense (94.00%). Hafner and Vogt said that seborrheic keratosis rarely found in blacks and native Americans, but dermatosis Papulosa nigra, a variant of seborrheic keratoses are common among people with black skin. Education level of the subject of research is the level of undergraduate / postgraduate (38%). The most occupation of the subjects were farmers (31%). Gefilem et al study found that from 478 patients with tumors of the skin verruca vulgaris and seborrheic keratosis, 126 patients (26.36%) were housewives, and 105 patients (21.97%) were students. Based on the marital status of subjects with seborrheic keratosis in showed that all the subjects were married...
100 (100%). Based on the period that suffered from seborrheic keratosis majority of subjects had experienced seborrheic keratosis ≤ 10 years as many as 50 (50%). Baykal and Yazganoglu stated that seborrheic keratosis patients usually do not remember exactly when it started having seborrheic keratosis, except for the rapid development and a lot of the cases on the basis of internal malignancy.2

The quality of life of subjects who had keratosis seborrheic based on the Skindex-29 value obtained the majority of the subjects had a quality of life is very high (71%) with a value Skindex-29 at ≤ 5, followed by a high quality of life (27%) with the value Skindex-29 at 18-36, then the quality of life medium (2%) with a value Skindex 6-17.

V. CONCLUSION

This study demonstrated that the most quality of life of the seborrheic keratosis patients had very high quality of life.

REFERENCES


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Comparison The Events Of Postoperative Sore Throat In Patients Undergoing Surgery With General Anesthesia Endotracheal Tube After The Administration Of Dexamethasone And NACL 0.9% At Haji Adam Malik Hospital Medan


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Abstract- Introduction: Most surgeries require general anesthesia, where one of its complication is sore throat. Sore throat can reduce patient’s satisfaction and increase postoperative discomfort ranging from 17% to 76%. Some way to reduce this complication are to restrict physical trauma arising from instrumentation and airway manipulation.

Objective: To determine the difference in throat pain by administering intravenous dexamethasone versus intravenous NaCl 0.9% in postoperative patients with general anesthesia endotracheal tube at Haji Adam Malik General Hospital, Medan.

Method: This research is an experimental research with a double-blind randomized research design. After obtaining approval from the Ethics Committee, Medical Faculty, University of North Sumatra, Medan, 62 samples were collected, ages 21-60 years, PS-ASA I-II, agree to participate, informed consent approval, and operating time < 3 hours. After being calculated statistically, all samples were randomly divided into 2 groups. Group A received 10 mg dexamethasone and group B received NaCl 0.9%. Data were tested with the Mann Whitney Test with a significance of p<0.05.

Results: The mean VAS value in patients who was given by dexamethasone were VAS 2 for T1 and T2, and VAS 1 for T3 and T4. The mean VAS value in patients who was given by NaCl 0.9% were VAS 3 for T1, VAS 2 for T2 and T3, and VAS 1 for T4.

Conclusion: There was a statistically significant difference after administering dexamethasone compared with NaCl 0.9%.

Index Terms- general anesthesia, sore throat, VAS, dexamethasone, NaCl 0.9%

I. INTRODUCTION

Postoperative Sore Throat (POST) is one of many complications that can occur in patients undergoing general anesthesia techniques with intubation using the endotracheal tube. These complaints usually improve after the first 24 hours. POST is the 8th biggest complaint for patients undergoing general anesthesia, where the most cause is the use of an endotracheal tube using a balloon during surgery.1 POST is a complication that decreases patient satisfaction and increases discomfort in the postoperative period.2 The incidence of POST after general anesthesia with endotracheal tube (ETT) ranges from 17% to 76%. This occurs because of irritation and inflammation of the airway and damage to the tracheal mucosa due to pressure of the endotracheal tube.3 Several studies had been carried out in an effort to reduce POST including limiting physical trauma that might result from instrumentation and airway manipulation, such as pharmacological interventions.4

Dexamethasone is a steroid drug whose mechanism of action is related to prevent the formation of prostaglandins and stimulate the release of endorphins, which affect mood and calmness. This drug have anti-inflammatory and immunosuppressant effect.5 As we all know that the reduction and inhibition of lymphocytes and peripheral macrophages play a role in this effect. Also indirect inhibition of phospholipase A2 which inhibits the release of arachidonic acid, prostaglandin and leukotriene precursors, from membrane-bound phospholipids.6

II. METHODS

This study is a double blind randomized experimental study to determine the comparison of postoperative sore throat pain with general anesthesia using endotracheal tube anesthesia in intravenous dexamethasone administration and intravenous NaCl 0.9%. This research was conducted at the Haji Adam Malik General Hospital, Medan, Juli 2019. The population was all patients who underwent elective surgery at the Haji Adam Malik General Hospital, Medan. Samples obtained in this study were 62 samples that fit the inclusion and exclusion criteria. All samples were divided into 2 groups. Group A received 2ml dexamethasone 5mg and group B received 2ml NaCl 0.9%. Data were tested by Chi Square with significance of p<0.05.
III. RESULTS

The study was followed by 62 subjects who were divided into two groups with the same amount, each as many as 31 people where group A received 2ml dexamethasone 5mg and group B received 2ml NaCl 0.9%.

3.1 Demographic Data Table

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Dexamethasone</th>
<th>NaCl 0,9%</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender, n (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>15 (48,3%)</td>
<td>13 (41,9%)</td>
<td>0,613</td>
</tr>
<tr>
<td>Female</td>
<td>16 (51,7%)</td>
<td>18 (58,1%)</td>
<td></td>
</tr>
<tr>
<td>Age, mean ± SD</td>
<td>48,58 ± 13,55</td>
<td>46,58 ± 10,95</td>
<td>0,266</td>
</tr>
<tr>
<td>Body Weight ± SD</td>
<td>59,94 ± 5,78</td>
<td>58,35 ± 5,25</td>
<td>0,339</td>
</tr>
<tr>
<td>Body Height ± SD</td>
<td>1,56 ± 0,06</td>
<td>1,58 ± 0,09</td>
<td>0,297</td>
</tr>
<tr>
<td>BMI, mean ± SD</td>
<td>24,69 ± 2,86</td>
<td>24,72 ± 2,85</td>
<td>0,972</td>
</tr>
<tr>
<td>Duration of Intubation ± SD</td>
<td>148,87 ± 28,80</td>
<td>149,35 ± 39,40</td>
<td>0,920</td>
</tr>
<tr>
<td>ASA</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ASA 1</td>
<td>3 (9,6%)</td>
<td>7 (22,5%)</td>
<td>0,171</td>
</tr>
<tr>
<td>ASA 2</td>
<td>28 (90,3%)</td>
<td>24 (77,4%)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>31</td>
<td>31</td>
<td></td>
</tr>
</tbody>
</table>

In this study, gender found in samples at the most were female with 54.8%, and with an average age of sample was 47.58 years. For the mean body mass index (BMI) at sample was 24.71 kg / m2 which shows normoweight. Patients in this study were mostly in ASA 2 of 83.8%. In addition to this study, it was found that the characteristic data in this study were gender, age, weight, height, body mass index, duration of intubation, and ASA had some data that were not normally distributed with p values <0.05. After further testing was carried out to assess homogeneity, it is concluded that the data obtained are homogeneous with p-value > 0.05. Therefore, to carry out further tests to assess the relationship, the Mann Withney Test was conducted with a 95% confidence level.

3.2 Average of VAS Value on POST Patients with General Anesthesia Endotracheal Tube After the Administration of Dexamethasone and NaCl 0,9% at T1 (1 Hour Post-Extubation), T2 (6 Hours Post-Extubation), T3 (12 Hours Post-Extubation), T4 (24 Hours Post-Extubation).

<table>
<thead>
<tr>
<th></th>
<th>Mean (± SD)</th>
<th>NaCl 0,9%</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dexamethasone</td>
<td>2,00 (0,577)</td>
<td>2,74 (0,729)</td>
<td>0,001</td>
</tr>
<tr>
<td>NaCl 0,9%</td>
<td>1,74 (0,445)</td>
<td>2,48 (0,677)</td>
<td>0,001</td>
</tr>
<tr>
<td>VAS T3</td>
<td>1,10 (0,301)</td>
<td>1,84 (0,735)</td>
<td>0,001</td>
</tr>
<tr>
<td>VAS T4</td>
<td>1,06 (0,250)</td>
<td>1,52 (0,626)</td>
<td>0,001</td>
</tr>
</tbody>
</table>

Based on Table 3.2, it was found that the mean VAS of POST patients in the group that had previously been given dexamethasone was at VAS 2 at T1, and VAS 1 at T2, T3, and T4. Whereas in groups that had previously been given 0.9% NaCl injections were in VAS 2 at T1, T2 and VAS 1 at T3, and T4. Statistically there were significant differences in the VAS POST patients after administration of dexamethasone and NaCl 0,9% on T1, T2, T3, and T4 observations with p values of 0.001 (<0.05), respectively.

3.3 Comparison of VAS Value on POST Patients with General Anesthesia Endotracheal Tube after Administration of Dexamethasone and NaCl 0,9% at T1

<table>
<thead>
<tr>
<th></th>
<th>VAS 1 n (%)</th>
<th>VAS 2 n (%)</th>
<th>VAS 3 n (%)</th>
<th>VAS 4 n (%)</th>
<th>Total</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dexamethasone</td>
<td>5 (16,1%)</td>
<td>21(67,7)</td>
<td>5 (16,1)</td>
<td>0 (0)</td>
<td>31 (100)</td>
<td>0,001</td>
</tr>
<tr>
<td>NaCl 0,9%</td>
<td>1 (3,2)</td>
<td>10 (32,3)</td>
<td>16 (51,6)</td>
<td>4 (12,9)</td>
<td>31 (100)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>6 (9,6)</td>
<td>31 (50,0)</td>
<td>21 (33,8)</td>
<td>4 (6,4)</td>
<td>62 (100)</td>
<td></td>
</tr>
</tbody>
</table>

Mann Whitney Test, α<005

Based on table 3.3 it was found that the VAS value of POST patients in the group that had previously been given dexamethasone injection was seen more at VAS 2 (21 patients = 67.7%) while in the group that had previously been given NaCl 0,9% injection had VAS 3 values were 16 patients (51.6%). In addition, in the dexamethasone group there were no patients with a VAS 4 value, while in the NaCl 0,9% group there were still patients with a VAS 4 value (4 patients = 12,9%). Based on this it can be concluded that patients given dexamethasone have lower VAS values compared with 0,9% NaCl. Statistically there were significant differences in the VAS value of sore throat patients...
after extubation after dexamethasone injection and NaCl 0.9% on T1 observations with p = 0.001 (<0.05).

3.4 Comparison of VAS values on POST Patients with General Anesthesia Endotracheal Tube after dexamethasone injection and 0.9% NaCl at T2

<table>
<thead>
<tr>
<th>VAS 1 n (%)</th>
<th>VAS 2 n (%)</th>
<th>VAS 3 n (%)</th>
<th>VAS 4 n (%)</th>
<th>Total n (%)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dexamethasone</td>
<td>8 (25.8)</td>
<td>23 (74.2)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>31 (100)</td>
</tr>
<tr>
<td>NaCl 0.9%</td>
<td>1 (3.2)</td>
<td>16 (51.6)</td>
<td>12 (38.7)</td>
<td>2 (6.5)</td>
<td>31 (100)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>9 (14.5)</strong></td>
<td><strong>39 (62.9)</strong></td>
<td><strong>12 (19.3)</strong></td>
<td><strong>2 (3.2)</strong></td>
<td><strong>62 (100)</strong></td>
</tr>
</tbody>
</table>

Mann Whitney Test, α<005

Based on table 3.4 it was found that in patients given dexamethasone not found to experience VAS 3 and VAS 4, but in the group given NaCl 0.9% there were still experienced VAS 3 (12 people = 38.7%) and VAS 4 (2 people = 6.5%). In addition, the dexamethasone group experienced more VAS 2 (23 people = 74.2%) compared to the NaCl 0.9% group (16 people = 51.6%).

3.5 Comparison of VAS Value on POST Patients with General Anesthesia Endotracheal Tube After Dexamethasone Injection and NaCl 0.9% at T3

<table>
<thead>
<tr>
<th>VAS 1 n (%)</th>
<th>VAS 2 n (%)</th>
<th>VAS 3 n (%)</th>
<th>Total n (%)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dexamethasone</td>
<td>28 (90.3)</td>
<td>3 (9.7)</td>
<td>0 (0)</td>
<td>31 (100)</td>
</tr>
<tr>
<td>NaCl 0.9%</td>
<td>11 (35.5)</td>
<td>14 (45.2)</td>
<td>6 (19.4)</td>
<td>31 (100)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>39 (62.9)</strong></td>
<td><strong>17 (27.4)</strong></td>
<td><strong>6 (9.6)</strong></td>
<td><strong>62 (100)</strong></td>
</tr>
</tbody>
</table>

Mann Whitney Test, α<005

Based on table 3.5, it was found that patients who were given dexamethasone were not found to have VAS 3, but in the group given NaCl 0.9% there were still 6 people (19.4%). In addition, the dexamethasone group experienced more VAS 1 (28 people = 90.3%) compared to the NaCl 0.9% group who experienced more VAS 2 (14 people = 45.2%). Statistically there were significant differences in the VAS value of POST patients with general anesthesia endotracheal tube after dexamethasone injection and NaCl 0.9% on T3 observations with p = 0.001 (<0.05).

3.6 Comparison of VAS Value on POST Patients with General Anesthesia Endotracheal Tube After Dexamethasone and NaCl Injections of 0.9% at T4

<table>
<thead>
<tr>
<th>VAS 1 n (%)</th>
<th>VAS 2 n (%)</th>
<th>VAS 3 n (%)</th>
<th>Total n (%)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dexamethasone</td>
<td>29 (93.5)</td>
<td>2 (6.5)</td>
<td>0 (0)</td>
<td>31 (100)</td>
</tr>
<tr>
<td>NaCl 0.9%</td>
<td>17 (54.8)</td>
<td>12 (38.7)</td>
<td>2 (6.5)</td>
<td>31 (100)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>46 (74.1)</strong></td>
<td><strong>14 (22.5)</strong></td>
<td><strong>2 (3.2)</strong></td>
<td><strong>62 (100)</strong></td>
</tr>
</tbody>
</table>

Mann Whitney Test, α<005

Based on table 3.6, it was found that patients who were given dexamethasone were not found to have VAS 3, but in the group given 0.9% NaCl there were still 2 patients with VAS 3 (6.5%). In addition, the dexamethasone group experienced more VAS 1 (29 people = 93.5%) compared to the NaCl 0.9% group (17 people = 54.8%). Statistically there were significant differences in the VAS value of POST patients with general anesthesia endotracheal tube after dexamethasone injection and NaCl 0.9% at T4 with p value = 0.001 (<0.05).

IV. CONCLUSIONS

4.1. The mean VAS value of POST patients in the group that had previously been given dexamethasone injection was VAS 2 for T1 and T2; and VAS 1 for T3 and T4.

4.2. The mean VAS value of POST patients in the group that had previously been given NaCl 0.9% injection was VAS 3 for T1; VAS 2 for T2 and T3; and VAS 1 for T4.

4.3. Statistically, there are significant differences in the VAS value of POST patients after dexamethasone injection and NaCl 0.9% on observations of T1, T2, T3, and T4 with p values of 0.001 respectively.
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AUTHORS

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A Study of Attitude of Geography Teachers towards Geographic Education in Arunachal Pradesh

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Abstract- The study compares the Attitude of Geography Teachers towards Geography Education in the selected three districts of Arunachal Pradesh. The total of 111 samples were taken from three selected districts. The three districts were randomly selected through simple random sampling techniques and they are Lohit, Lower Subansiri and West Siang Districts of Arunachal Pradesh. The researcher followed Normative Survey Method for the present piece of work. The analysis was done with mean, standard Deviation and ‘t’ test as statistical techniques. The findings reveals significant difference in relation to Sex, and not significant in relation to Settlement and social groups. The study also reveals that the overall attitude of Teachers is positive.

Index Terms- Geographic Education, Attitudes, Geography Teachers, Elementary Education, Arunachal Pradesh

1. Introduction

Geography as a subject enables us to understand the earth we are living in from a spatial viewpoint. It provides a link between the social sciences and the physical sciences, through the provision of an understanding of the dynamics of our cultures, societies and economics on the one hand, and that of physical landscapes and environmental processes on the other. Geography is an inclusive subject, but in India it is taught as a social science discipline. Geography is both a powerful medium for promoting the education of individuals and major contributor to international, environmental and development Education (Commission on Geographical Education of the International Geographical Union, 2004). Indeed, a recurring theme in geography is the way people organize and use the environment (Fien, Gerber, & Wilson, 1989) and this provides the basis for the argument that a school geography is responsive to the developments in geography and as a discipline will equip the students with the knowledge, skills and values as useful citizens of the world.

An effective geography instruction requires teacher to improve students’ individual and group characteristics according to the knowledge, skills, and values embedded within acquisitions. In addition, they bring a lot of components by drawing various shapes over students’ skill and personalities. Then teachers can adapt their students to the unique environmental conditions in the classroom ecosystem (Zabel and Zabel, 1996). In this sense, geography teachers provide the conditions that prepare their students for life (Levin & Nolan, 2000).

Today there is a rising need for geography in both students and teachers, which is known to mould and enhance their skills. The researcher in geography education has yet to flourish which requires investment in the continued training and development of geography education professionals so this is an attempt made to know the attitudes or thinking of Geography Teachers towards Geography Education in the selected three districts of Arunachal Pradesh.

II. STATEMENT OF THE PROBLEM

“A Study of Attitude of Geography Teachers towards Geographic Education in Arunachal Pradesh”

Objective of the study: The study has been designed to test the following objectives;

1. To study the difference between the attitude of Male and Female Geography Teachers towards Geographic Education in Arunachal Pradesh.

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2. To study the difference between the attitude of Tribal and Non-Tribal Geography Teachers towards Geographic Education in Arunachal Pradesh.
3. To study the difference between the attitude of Rural and Urban Geography Teachers towards Geographic Education in Arunachal Pradesh.

Hypotheses of the Study:

H₀₁ There is no significant difference between the attitude of Male and Female Geography Teachers towards Geographic Education in Arunachal Pradesh.

H₀₂ There is no significant difference between the attitude of Tribal and Non-Tribal Geography Teachers towards Geographic Education in Arunachal Pradesh.

H₀₃ There is no significant difference between the attitude of Rural and Urban Geography Teachers towards Geographic Education in Arunachal Pradesh.

Methodology:

The Descriptive Survey Method was employed by the researcher to collect data from Teachers of various schools for the present piece of research work. The researcher used this method for collection of Teachers Attitude towards Geography Education and this involves Measurement, Analysis, Comparison and interpretation.

Population and Sample:

The researcher randomly selected three districts of Arunachal Pradesh namely; Lohit District, Lower Subansiri District and West Siang District. The sample comprised of 111 Teachers (Male-55, Female-56) from 45 Government Schools from the selected districts.

Table No.1: Showing the Distribution of Sex, Gender and Location of Geography Teachers in the Three Selected Districts of Arunachal Pradesh.

<table>
<thead>
<tr>
<th>Districts</th>
<th>Total Students</th>
<th>Race</th>
<th>Gender</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>T</td>
<td>NT</td>
<td>M</td>
</tr>
<tr>
<td>Lohit</td>
<td>53</td>
<td>28</td>
<td>25</td>
<td>40</td>
</tr>
<tr>
<td>West Siang</td>
<td>26</td>
<td>10</td>
<td>15</td>
<td>26</td>
</tr>
<tr>
<td>Lower Subansiri</td>
<td>32</td>
<td>17</td>
<td>15</td>
<td>32</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>111</strong></td>
<td><strong>55</strong></td>
<td><strong>56</strong></td>
<td><strong>98</strong></td>
</tr>
</tbody>
</table>

*Note: T-Tribal, NT-Non-Tribal, M-Male, F-Female, R-Rural and U-Urban.*

Delimitations of the Study:

The sample size of study was delimited to;

1. Lower Subansiri, Lohit and West Siang Districts of Arunachal Pradesh.
2. Only Geography Teachers.
3. The independent variables- Gender, Settlement and Social Group.

Tools Used in the study:

The investigator used a self-developed Attitude scale to measure the Attitude of Geography Teachers towards Geographic Education in the Elementary Schools in Arunachal Pradesh and followed the procedure in order to make the questionnaire reliable and valid. The procedures of construction and Standardization of an attitude scale was adopted as suggested by Likert (1932). This attitude scale is popularly known as Liker’s five point scale because the each statement of the scale possesses five options for a respondent. The respondent was to put the tick/Correct mark on any one option as per his/her willingness. The items with’t’ ratio less than 1.96 at 0.05 level of significance were rejected on the basis that they had no
discriminating power. In this way, some items were rejected from the preliminary draft. This Scale consisted of 23 statements related to various dimensions on Geographic Education.

Statistical Technique Used:

The following statistical techniques were used by the investigator; Mean, Standard Deviation and t-test was carried out to analyse the collected data and verify the hypothesis.

III. RESULTS AND INTERPRETATION

The major findings of the study as per variables wise of geography teachers towards their attitude on Geographic Education in the selected three districts of Arunachal Pradesh.

Objective 1: To study the difference between the attitude of Male and Female Geography Teachers towards Geographic Education in Arunachal Pradesh.

Hypothesis 1: There is no significant difference between the attitude of Male and Female Geography Teachers towards Geographic Education in Arunachal Pradesh.

Table.2: Summary of computed Attitude Mean Scores, SD, SE<sub<t</sub>, and t-value of the scores of male and female Geography Teachers at Elementary School Stage in the Three Selected Districts of Arunachal Pradesh.

<table>
<thead>
<tr>
<th>Groups of Teachers</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>SE&lt;sub&lt;t&lt;/sub&gt;</th>
<th>df</th>
<th>t-value</th>
<th>Criterion Value of ‘t’ at 0.01 level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male Teachers</td>
<td>55</td>
<td>90.62</td>
<td>3.20</td>
<td>0.68</td>
<td>109</td>
<td>11.15</td>
<td>2.62</td>
</tr>
<tr>
<td>Female Teachers</td>
<td>56</td>
<td>82.92</td>
<td>4.06</td>
<td></td>
<td></td>
<td></td>
<td>* Significant at 0.01 level</td>
</tr>
</tbody>
</table>

Interpretation of the result

The Table-2 indicates that the attitude mean scores of Male Teachers is 90.62 which is marginally higher than the Female Teachers with 82.92 and computed t-value came out to be 11.15 which is greater than the table t-value(2.62) at .01 level of significant for 109 df. Therefore, the computed t-values (11.15) have been considered significant and the formulated hypothesis: “There is no significant difference between the attitude of Male and Female Geography Teachers towards Geographic Education in Arunachal Pradesh” got rejected. This means that there exists difference in attitude of male and female teachers towards geography subjects.

Objective 2: To study the difference between the attitude of Tribal and Non-Tribal Geography Teachers towards Geographic Education in Arunachal Pradesh.

Hypothesis 2: There is no significant difference between the attitude of Tribal and Non-Tribal Geography Teachers towards Geographic Education in Arunachal Pradesh.

Table.3: Summary of computed Attitude Mean Scores, SD, SE<sub<t</sub>, and t-value of the Tribal and Non-Tribal Geography Teachers at Elementary School Stage in the Three Selected Districts of Arunachal Pradesh.

<table>
<thead>
<tr>
<th>Groups of Teachers</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>SE&lt;sub&lt;t&lt;/sub&gt;</th>
<th>df</th>
<th>t-value</th>
<th>Criterion Value of ‘t’ at 0.01 level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tribal Teachers</td>
<td>98</td>
<td>82.80</td>
<td>4.04</td>
<td>1.04</td>
<td>109</td>
<td>2.51*</td>
<td>2.62</td>
</tr>
<tr>
<td>Non-Tribal Teachers</td>
<td>13</td>
<td>83.50</td>
<td>3.50</td>
<td></td>
<td></td>
<td></td>
<td>* Not significant at 0.01 level</td>
</tr>
</tbody>
</table>

Interpretation of the result

The Table-3 reveals that the attitude mean scores of Tribal teachers (82.80) is slightly lower than the Non-Tribal (83.50) teachers towards geography subjects and the computed t-value came out to be 2.51 which is lesser than the criterion table t-value (2.62) at .01 level of significant for 109 df. Therefore, the computed t-values (2.51) has not been considered significant and the formulated hypothesis: “There is no significant difference between the attitude of Tribal and Non-Tribal Geography
Teachers towards Geographic Education in Arunachal Pradesh” got accepted. It means that the Tribal and Non-Tribal do not differ in their attitude and they are equally positive towards geography subject in the selected districts of Arunachal Pradesh.

**Objective 3:** To study the difference between the attitude of Rural and Urban Geography Teachers towards Geographic Education in Arunachal Pradesh.

**Hypothesis 3:** There is no significant difference between the attitude of Rural and Urban Geography Teachers towards Geographic Education in Arunachal Pradesh.

<table>
<thead>
<tr>
<th>Groups of Teachers</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>SE_D</th>
<th>df</th>
<th>t-value</th>
<th>Criterion Value of ‘t’ at 0.05 level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rural Teachers</td>
<td>62</td>
<td>82.53</td>
<td>4.16</td>
<td>0.73</td>
<td>109</td>
<td>1.09*</td>
<td>1.98</td>
</tr>
<tr>
<td>Urban Teachers</td>
<td>49</td>
<td>83.33</td>
<td>3.69</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Not significant at 0.05 level.

**Interpretation of the result**

The Table - 4 indicates that the attitude score of rural teachers (82.53) is slightly lesser than the urban teachers (83.33) and computed t-value came out to be 1.09 which is lesser than the table t-value (1.98) at .05 level of significant for 109 df. Therefore, the computed t-values (1.09) have been considered not significant and the formulated hypothesis: “There is no significant difference between the attitude of Rural and Urban Geography Teachers towards Geographic Education in Arunachal Pradesh” got accepted. It reveals that there is no difference in the attitude of rural and urban teachers towards geography subject.

**Finding of the Study:**

- There is a variation between the attitude of Male and Female Geography Teachers towards Geography Education. The study reveals that Male Teachers are having better attitude than Female Teachers.
- The attitude mean scores of Tribal teachers is slightly lower than the Non-Tribal teachers towards geography subjects but the calculated value reveals that the Tribal and Non-Tribal do not differ in their attitude towards geography subject in the selected districts of Arunachal Pradesh.
- The Attitude mean scores of rural teachers are slightly lesser than the urban teachers but it reveals that there is no difference in their attitude towards geography subject.

**IV SUGGESTION AND CONCLUSION**

**Suggestion for Further Research:**

1. A comparative study of different states of northeast India towards Geography Education may be conducted.
2. Attitudes of Geography teachers and Non-Geography teachers towards teaching Geography may be conducted.
3. A Comparative study between Teachers and Students Attitudes towards Geography Education may be conducted.
4. A Comparative study between Teachers of Secondary Level and Senior Secondary Level towards geography Education may be conducted.
5. The Attitude of Government and Private School Students towards geography Education in to the different variables may be conducted.
6. A Comparative study between Students of Secondary Schools and Senior Secondary Schools towards geography Education may be conducted.

**Conclusion:**

On the basis of the present study on the attitude it reveals that the teachers are having positive attitude towards geography subjects in the selected three districts in Arunachal Pradesh. Whereas the study indicates that proper attention needs to be provided by the Government and Parents for improvement of geographic education at elementary school stages in Arunachal Pradesh. Lastly the findings of the research will helpful in the field of geography education especially for the teachers, subject experts, researchers, teacher educators and curriculum framers of elementary schools of Arunachal Pradesh.

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Determinants of Undergraduate Students’ Academic Performance: The Case of University of Sri Jayewardenepura, Sri Lanka

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Abstract- The primary objective of this study was to examine the factors affecting students’ academic performance at undergraduate level. The research is conducted based on students of the Faculty of Management Studies and Commerce at the University of Sri Jayewardenepura which is one of the state universities in Sri Lanka. The Faculty of Management Studies and Commerce is one of the largest faculties in the university system and enrolls about 5,000 internal undergraduate students. The faculty offers 12 special degree programs, more than 250 course units covering the range of Management and Accounting related disciplines (Prospectus USJP, 2017). The sample consisted 191 graduate students who were completed their degree program in the year 2016 and 2015 (Academic year 2011/12 and 2010/11). Correlation analysis and multiple regression analysis were conducted as main analytical methods. The result of the correlation analysis showed that there was a positive correlation of past academic performance, proficiency in English, lecture attendance and time spent outside the university on academic performance and negative correlation between internship period and academic performance. The multiple regression analysis concluded that past academic performance, English proficiency, lecture attendance and time spent outside the university are significant factors when evaluating the academic performance. The study analyzed hypothesis test in order to determine whether there is a significant difference exist between intern students’ and non-intern students’ academic performance. The independent sample T-test was used to test the hypothesis and result found that there is no significant difference exists between interns’ and no-interns’ academic performance. Study concluded that better understanding of factors affects the performance of students in any given course is must in the process of improving students’ academic performance.

Index Terms- Academic Performance, Career Achievement, Internship, Undergraduate Students

I. INTRODUCTION

Education plays a pivotal role in the progress and development of a country. Hence, government invest significant amount on higher education. And most of the developing countries are increasing their university students’ enrollment year by year. Sri Lanka as a developing country also increasing the university student enrollment compared with previous years. In the year 1990 new admission on university education was 1,752 and in 2016 it has been increased to 29,083 students and Sri Lanka expenditure on university education as a percentage of government expenditure, which during the 1990s remained 1.16 had been increased to 2.09 by 2016 (Sri Lanka University Statistics,2016)

But there is a doubt whether government investment on higher education and its output in terms of student’s achievement are equal. When there is a huge gap between government expenditure and academic performance signals fallen standard of education. Despite the increasing trend of student enrollment, the number of students graduating by completing their degree shows decreasing trend. It means that there is a failure to achieve good performance compared with government investment which is negatively impact on student’s future and to the progress of the country. Therefore, it is important to identify the factors affecting students’ academic performance in order to get anticipated outcome.

There are many researches have been conducted to identify the factors affecting student’s academic performance like gender, family background, student previous academic achievement, teacher student ratio, language proficiency, internship in local as well as international context but studies which were empirically examined the impact of above factors including student internship on academic performance in Sri Lankan context are not much adequate. The internship has become an integral part of the degree programs in universities over the past decades. With the internship experience, students are able to gain new perspectives about their academic activities because internship assists to demonstrate the relevance of what they learn in the classroom and applicability in the real world. Hence the impact of internship on academic performance also needs to address when evaluating graduate students’ academic performance.
Therefore, the study primarily conducted to examine factors affecting student’s academic performance at undergraduate level and try to give insight about the effect of those factors on student academic achievement. And study further extended to assess whether there is a significant difference exist between internship and non-internship students’ academic performance in order to evaluate the productivity of undergraduate internship program in university academic curriculum.

II. LITERATURE REVIEW

The study conducted by Cheung and Kan (2002) based on 168 students of business communications course in Hong Kong identified that females perform better than males and positive relationship of academic background and previous academic achievement with academic performance. The tutorial attendance and academic performance also showed a positive relationship and further, there is no relationship between semester course loads and academic performance. The study conducted at University of Technology Sydney by Hutcheson and Tse (2006) found there is a significant relationship between tutorial attendance and academic performance. The students who involved with more academic works within university have obtained higher average marks than others. Nonis and Hudson (2006) found that prior academic result of university students is significant variable when evaluating current academic performance.

Warren (2002) explained students who were not employed intensively spend more time on academic related activities and extra-curricular activities. Mushraq and Khan (2012) have examined factors affect to students’ academic performance based on 175 students, and they found that communication skills, learning facilities and proper guidance positively affect to students’ academic performance and family stress negatively affects to academic performance. They further explained the students’ effective communication and competence in English language contributes to higher academic achievement.

Noble (2006) mentioned that students’ academic accomplishment is affected by background characteristics of the family such as family income, parents’ education level and guidance from parents. The academic environment is significant to student academic performance and there is a positive relationship between father’s education level and child’s academic level. Gang Li at el. (2010) conducted a quantitative research based on questionnaire survey among 435 students in School of Management at the University of Surrey. They found English proficiency, social communication and perceived impact of learning success of family are significant factors when determining academic performance. The family income, parents’ education, lecture attendance, sex and teacher-student ratio were acted as main characters when assessing student performance according to the Raychauduri et al. (2010) findings.

Tessema at el. (2014) examined the effect of student employment on GPA using 5223 respondents in Midwestern public university between 2001 and 2009. Research concluded there is a significant negative but very small impact between working hours and academic performance. When students work more hours, their academic performance come lower. Non-working students and students who work fewer hours per week devote more time on their studies. Research further stated that student employment has both short term and long term benefits and to be competitive in today’s labor market, the internship is critical. Threshold Model explained by Cheng (1995) suggested that positive outcomes increase when students work below the threshold number of and above that limit, increase the negative outcomes. The threshold hours of work do not precisely define, and this model predicts nonlinear effect of work hours on outcome.

Koehehr’s (1974) study looked at the overall GPA of students prior the internship and compared it to their overall GPA at the graduation. He determined that Penssylvania State University students, that both accounting and general grades enhanced with following an internship. English and Koeppen at el. (1993) concluded on their research that students who undertook internship perform better than non-interns in the semesters following an internship in both their accounting and non-accounting courses. Reddy & Moores (2006) explained that interns have improved their final year marks by 3.2% compared with non-interns and out of total, 14% have improved their degree class with the internship experience based on the students of human psychology degree over a six year period.

Rawlings, White, & Stephens (2005) concluded in their study conducted based on students of information system degree that there is a high probability to achieve first and second upper degree for students who undertook internship than non-interns. Thilakerathne and Madurapperuma, (2014) conducted a study to determine whether internship experience impact to improve GPA for students in accounting degree of the University of Kelaniya. They found statistically significant academic performance of internship students. Better result may in turn result in a higher degree class and better employment prospects. They further found in their research that Z-score of students is not a significant variable when analyzing the current academic performance of graduate students in Sri Lankan context.

Knouse et al. (1999) conducted a research to identify the relationship between college internship, college performance and subsequent career opportunity. The data were collected from 1,117 students and study revealed that those who had internships attained a significantly higher GPA upon graduation than those who did not have an internship even both parties entered into the college with same potential. Students who undertook internship showed somewhat younger than non-interns and there was no significant difference in sex when considering the academic performance of interns.

Zoya and Rudkin (2007) found positive relationship between hours worked and academic performance of overall sample based on their study of accounting students in Australia. There is a positive relationship between paid employment and academic performance of local students and negative relationship between these two variables for international students. They further explained that students did not give optimal engagement for university education because of the work pressure.

Andrew Lee Hock Cheong et al. (2014) conducted a research with the use of four purposively selected Malaysian private university students who had undergone three months internship program in the Klang Valley. The study concluded internship provides thorough

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understanding about the academic activities than they learned under the academic curriculum. They further explained university and host companies should have a well-structured internship program to enhance the learning experience.

Barke et al. (2000) concluded that non-working students show 1.7 percent higher GPA than working students. Humphrey’s (2006) also evidenced that working students show a significantly lower end-year average GPA. Lindsay and Paton-Saltzberg (1994) explained working students showed a failure rate of average three times than non-working students and working students obtained poor results and poor degree class. The study conducted by Curtis and Shani (2002) to find the impact of working students on their academic performance, found that employment while studying reduces the lecture attendance, poor grades on exams and higher negative consequences on their health.

Warinda (2013) concluded that most of the internship students do not meet their internship expectations. All interns did not get same level of skills and it varied according to the location they get internship experience. They have recommended that university should identify the areas which need to lead their students to get more exposure of learning and career expectations.

Giacomino (1990) evaluated the internship experience of students based on three-semester post internship period. He found no significant impact of internship on academic performance. He hypothesized the reason for this as, since most of the interns receive permanent employment from internship providers at the end, students have less motivation on academic performance enhancement. Knechel and Snowball (1987) studied academic performance, measured by GPA, to assess the impacts of accounting internships using pairs of non-interns and interns based on GPA and number of credit hours of course work finished prior to the internships of University of Florida. They found no significant difference between interns and non-interns in GPA after completing an internship. They further noted that students who got an auditing internship significantly outperform than those who had not participated in internships. Light (2001) interviewed undergraduate students and found no relationship between grade point and work explaining that students who work more time period show little or no effect on final GPA.

Mendis and Arachchige (2015) performed a research to identify the impact of internship programs on the academic performance of state university students of Sri Lanka through structured questionnaire. According to their findings most of the students show less deviation in GPA compared with prior and after the internship. They found that internship offers greater help to develop skills and competencies of graduates and lead to give better academic performance. Students’ time management skills also help to achieve high performance. They further stated that internship assists to develop communication skills, coordination skills and time management skills and undergraduates were able to form an upright personality and better insight about themselves. Lalanie and Withanawasam conducted a research to identify the impact of internship on academic performance and future employability. According to findings internship is not a significant variable in determining academic performance. Lecture attendance and family index are identified as significant factors when explaining the academic performance. They have further stated that internship is highly correlated with future employability of undergraduates and those who have internship spend less time to reach a higher level job position. Ehrenberg and Sherman (1987) found in their research that there is no strong evidence to prove that work hours during the academic year reduce GPA.

The factors which were taken as independent and dependent variables to conduct the study mainly decided based on above literatures.

III. METHODOLOGY

The study collected data from students who were in the degree program in academic year 2011/2012 and 2010/2011 in the Faculty of Management Studies and Commerce of University of Sri Jayewardenepura in Sri Lanka. The structured questionnaire was used to gather primary data. Study used two groups as control group and experimental group and data were collected from both groups; those who did undertake an internship and those who did not undertake an internship. The total population is about 2000 students and data were collected from 191 respondents using purposive sampling technique. The sample consist 111 male students and 80 female students and 159 students who have engaged with an internship program and 32 students who have not engaged with an internship program.

Based on the variables used in the study the conceptual framework developed in the following manner.

- Gender
- Past Academic Performance
- English Proficiency
  - School
  - University
- Lecture Attendance
- Time Spend outside the university on academic activities
- Parents Education
  - Mother’s education
  - Father’s education
- Internship period

<table>
<thead>
<tr>
<th>Academic Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPA</td>
</tr>
</tbody>
</table>

http://dx.doi.org/10.29322/IJSRP.10.01.2020.p9727
The correlation analysis conducted to identify the relationship between independent and dependent variables. For the consistency of the research, correlation and regression analysis done using data gathered from students who had engaged with internship program. Following model was developed and regression analysis done in order to identify the major determinants for students’ academic performance.

\[ Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9 + U_i \]

Where:

\( Y \) = Overall final GPA (used as the measure of academic performance) \( X_4 \) = English proficiency in university

\( \alpha \) = constant \( X_5 \) = Lecture attendance

\( \beta \) = coefficient \( X_6 \) = Time spend outside the university on academic activities

\( X_1 \) = Gender \( X_7 \) = Mother’s education

\( X_2 \) = Z-score (Z-score value at the G.C.E. A/L) \( X_8 \) = Father’s education

\( X_3 \) = English proficiency in school \( X_9 \) = Internship period

\( U_i \) = Random term

Furthermore, following hypothesizes were formulated and analyzed to identify whether there is a significant difference exist between interns and non-interns when evaluating the overall final GPA. Hypothesis test is conducted using independent sample T-test.

\( H_0 \): There is no significant difference of academic performance between interns and non-interns.

\( H_1 \): There is a significant difference of academic performance between interns and non-interns.

Reject \( H_0 \) if \( p < .05 \)

IV. DATA ANALYSIS

Correlation analysis

The correlation analysis conducted to identify the relationship between independent and dependent variables.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Correlation with graduate GPA</th>
</tr>
</thead>
<tbody>
<tr>
<td>GPA</td>
<td>Pearson Corre. 1</td>
</tr>
<tr>
<td>Gender</td>
<td>Pearson Corre. -.046</td>
</tr>
<tr>
<td>Z-score</td>
<td>Pearson Corre. .250</td>
</tr>
<tr>
<td>English proficiency in school</td>
<td>Pearson Corre. .637</td>
</tr>
<tr>
<td>English proficiency in university</td>
<td>Pearson Corre. .585</td>
</tr>
<tr>
<td>Lecture Attendance</td>
<td>Pearson Corre. .247</td>
</tr>
<tr>
<td>Time spend outside the university on studies</td>
<td>Pearson Corre. .441</td>
</tr>
</tbody>
</table>
The correlation matrix showed positive significant relationship of Z-score, English competency, lecture attendance, time spend outside of university on academic activities with GPA (p<.05) and positive but insignificant relationship between mother’s education and GPA. It showed negative significant relationship between internship period and GPA and negative insignificant relationship of gender and father’s education on GPA.

**Regression Analysis**

The regression analysis conducted in order to find the major determinants which affect to the academic performance of graduate students.

<table>
<thead>
<tr>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
<th>F</th>
<th>Sig.</th>
<th>Durbin-Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.767</td>
<td>0.588</td>
<td>0.563</td>
<td>0.494</td>
<td>23.651</td>
<td>0.000</td>
<td>2.115</td>
</tr>
</tbody>
</table>

The adjusted R2 value implies the extent to which dependent variable is explained by independent variables. The current study showed 56% variance of dependent variable is explained by independent variables. The F value showed 23.651 which implies the overall significance of the model at 1% significance level (p=0.000).

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Constant)</td>
<td>-0.544</td>
<td>-.411</td>
<td>-1.322</td>
<td>.188</td>
</tr>
<tr>
<td>Gender</td>
<td>.074</td>
<td>.085</td>
<td>.048</td>
<td>.871</td>
</tr>
<tr>
<td>Z-Score</td>
<td>.092</td>
<td>.060</td>
<td>.094</td>
<td>1.542</td>
</tr>
<tr>
<td>English proficiency in school</td>
<td>.332</td>
<td>.064</td>
<td>.463</td>
<td>5.175</td>
</tr>
<tr>
<td>English proficiency in university</td>
<td>.234</td>
<td>.097</td>
<td>.211</td>
<td>2.409</td>
</tr>
<tr>
<td>Lecture Attendance</td>
<td>.204</td>
<td>.058</td>
<td>.223</td>
<td>3.524</td>
</tr>
<tr>
<td>Time spend outside the university on studies</td>
<td>.195</td>
<td>.074</td>
<td>.160</td>
<td>2.626</td>
</tr>
<tr>
<td>Mother’s education</td>
<td>.035</td>
<td>.062</td>
<td>.031</td>
<td>.569</td>
</tr>
<tr>
<td>Father’s education</td>
<td>-.013</td>
<td>.061</td>
<td>-.012</td>
<td>-.222</td>
</tr>
<tr>
<td>Internship period</td>
<td>-.066</td>
<td>.048</td>
<td>-.087</td>
<td>-1.383</td>
</tr>
</tbody>
</table>

When consider about the individual variables, the result showed positive impact of English competency, lecture attendance, time spend outside of university on academic activities on overall GPA at 0.05 percent significant level (p<0.05). Analysis showed positive but insignificant impact of gender, Z-score and mother’s education on GPA. There is a negative insignificant impact between father’s education and GPA and between Training period and GPA.
Hypothesis test analysis

H0: There is no significant difference of academic performance between interns and non-interns.

H1: There is a significant difference of academic performance between interns and non-interns.

Reject H0 if p<.05

The Independent sample t-test was used to hypothesis test analysis. Result showed that mean value of non-internship students (2.41) is higher than the mean value of internship students (2.21). But the result was insignificant (p=0.156) at 5% significant level and the null hypothesis was not rejected.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>Mean</th>
<th>t</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internship</td>
<td>No</td>
<td>2.41</td>
<td>1.425</td>
<td>0.156</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>2.21</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

V. DISCUSSION AND CONCLUSION

The study conducted to identify the determinants of academic performance of students in the Faculty of Management Studies and Commerce at University of Sri Jayewardenepura. The correlation analysis used to identify the existing relationships between selected independent variables and dependent variable. The result showed that there is a significant positive relationship between Z-score and GPA concluding students who had higher result at the Advanced Level perform better in the university also. The English proficiency showed a significant positive relationship with GPA which was measured under two circumstances; English proficiency in school and university concluding students who have greater fluency in English can perform better in the academic activities. The relationship with lecture attendance and GPA showed a significant positive relationship proving the importance of interactive learning. Time spent outside the university on academic activities and GPA significantly correlate in positive direction proving that spend more time outside the university on academic activities such as self-study, library usage, group assignments lead to get a highest score in final examination. The result showed that there is no significant relationship exists between gender and GPA and also parents’ education and GPA. The relationship with intern period and academic performance was negatively correlated with each other. When students’ training period is higher, lower the academic performance.

The multiple regression analysis was conducted in order to identify the significant variables among independent variables on the dependent variable. It implied that English competency, lecture attendance and time spent outside the university on academic activities are significant variables of the model.

According to Wardlow (1999), fluency in English is more important for the successful completion of the degree program when they follow their degree in English medium and when their mother tongue is not English. El-Shaarwi at el. (2006) found that English competency is one of the most significant factors on student academic performance. Mushtaq and Khan (2012) explained that students’ effective communication and competence in English language contributes to higher academic achievement. Hutcheson and Tse (2006) found in their research that there is a significant relationship exists between tutorial attendance and academic performance. Students who involved with more academic activities within university have obtained higher average marks. Cheung and Kan (2002) also proved this result by indicating that lecture attendance and tutorial attendance are highly beneficial for get a good GPA at the final examination.

Nonis & Hudson (2006) noted that the students’ time spend outside of class gradually decreasing compared with previous years. Coleman (1959) explained in the zero sum model that when student’s pursuit works outside the academic activities lead to reduce the time spent on academic activities which again reduce the academic performance.

According to the regression analysis, Gender, Z-score, mother’s and father’s education and internship period were not significant variables when assessing the determinants of the academic performance. Thilakerathne and Madurapperuma (2014) found that gender is not a significant variable on academic performance as well as Z-score also not a significant variable when evaluating the graduate’s academic performance which conducted based on the local university context. Nonis and Hudson (2006) found that prior academic result of university students is significant variable when evaluating the current academic performance. According to Noble at el. (2006), students’ academic accomplishment is affected by the background characteristics of the family such as family income, parents’ education level and guidance from parents.

The hypothesis analysis was conducted to assess whether there is a significant mean difference exist between internship students and non-internship students on academic performance. The test result showed that there is no significant mean difference exist between interns and non-interns on GPA. According to Laliane and Withanawasam, internship is not a significant variable on academic performance. Ehrenberg and Sherman (1987) also found in their research that there is no strong evidence to prove that internship lead to reduce GPA. But it is needed to have convenient lecture hours for students who undertake internship and need to maintain transparency and mutual understanding among all parties who involved with the internship program. Internship program needs to be...
more practical and up-to-date according to the market requirement. By having good understanding about factors affecting academic performance, society will be able to get anticipated outcomes at the end of the higher education.

REFERENCES


[8] Faculty prospectus 2010/11, University of Sri Jayewardenepura.


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Knowledge, Attitude and Practice Towards Malnutrition among Mothers of Sunsari, Nepal

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Abstract- Malnutrition, a global health problem, is a state of lacking proper nutrition. It contributes to childhood morbidity, mortality, impaired intellectual development, and increased risk of diseases in adulthood, with lack of knowledge and proper feeding practice being the leading cause. Therefore, the study aims to assess the knowledge, attitude and practice towards malnutrition among the mothers with under five children of Inaruwa, Sunsari, Nepal. A descriptive cross-sectional study was conducted among 389 mothers of under five children in Inaruwa. Systematic random sampling was used to reach the sample. Data was collected using structured questionnaire through face to face interview. Descriptive and bivariate analysis was done. About 38% of respondents were of age group 24-26 years. Mothers with adequate knowledge on malnutrition were 45.2%. Majority of the mothers (87.4%) had good attitude towards the malnutrition. Most of the mothers (78.7%) knew how to prepare the sarbottam pitho. Among the mothers, 76.6% of them started feeding complimentary food after 6 months’ age of baby. The association between educational level and knowledge was found to be statistically significant. Although less than half of mothers had adequate knowledge on malnutrition, they had good attitude. It was also observed that the education of respondent has effect on the knowledge of malnutrition. Hence, it shifts the focus on the health education program related to malnutrition targeting the mothers having under five children.

Index Terms- Knowledge, Attitude, Malnutrition, Practice, Under five

I. INTRODUCTION

Malnutrition can be defined as a lack of proper nutrition. The nutritional status of a child, as with any individual, is assessed through dietary, anthropometric, biochemical and physical observation for signs of malnutrition. These methods of measurement are usually done in combination for more accurate results. When there is a deficiency in the amount and nutritional value of the food consumed, the growth pattern of a child becomes disrupted owing to nutrient deficiencies. [1] The nutritional status of a child is usually described in terms of anthropometry, i.e. body measurement, such as weight, in relation to age or height, which is reflective of the degree of underweight or wasting of that child. Food is the prime necessity of life; life cannot be sustained without an adequate nourishment child needs adequate food for growth and development. According to the World Health Organization (WHO), breast milk has the complete nutritional requirements that a baby needs for healthy growth and development in the first six months of life. According to the United Nations Child Emergency Fund (UNICEF), children who are breastfed in the first six months of life have a six times greater chance of survival as opposed to non-breastfed children. Children are malnourished if their diet does not provide adequate nutrients for growth and maintenance or they are unable to fully utilize the food they eat due to illness/under nutrition. [2]

Malnutrition is one of the major and basic health concerns especially in developing countries. Malnutrition is the major factor which is related to the economic, educational status of the people. Although malnutrition is prevalent in developing countries, it is rarely cited as being among the leading causes of death. This is due in part to the conventional way that cause of death data are reported and analyzed. In many countries, mortality statistics are compiled from records in which a single proximate cause of death has been reported. Childhood under nutrition is a major global health problem, contributing to childhood morbidity, mortality, impaired intellectual development, suboptimal adult work capacity, and increased risk of diseases in adulthood. [3]

Malnutrition can lead to childhood mortality due to diarrhea, pneumonia, severe infections, malaria and measles. According to the WHO (2013), more than 33% of childhood deaths worldwide resulted from malnutrition. Acute malnutrition in childhood is as much a medical problem as it is a social problem because it directly affects a broad range of issues: a country’s mortality rates, educational prospects, productive employment and economic capacity. Malnutrition also happens to be one of the principal mechanisms behind the transmission of poverty and inequality from one generation to the next. [3][7]

According to the United Nations Children’s Fund (UNICEF), the prevalence of stunting in children under five in Guatemala rivals
that of countries like Afghanistan, Bangladesh, Niger and India. At nearly 50%, this Central American country has a higher prevalence of stunting than the average prevalence in either Africa or Asia. [11][12]

Acute malnutrition in childhood is as much a medical problem as it is a social problem because it directly affects a broad range of issues: a country’s mortality rates, educational prospects, productive employment and economic capacity. Malnutrition also happens to be one of the principal mechanisms behind the transmission of poverty and inequality from one generation to the next. [4][8]

The global burden of disease for nutrition-related deaths is high, in part, because of food insecurity, sanitation conditions and a lack of knowledge and experience in implementing appropriate infant and young child feeding practices (IYCF). Malnutrition has three categories, acute, chronic and over-nutrition. According to The Lancet Maternal and Child Nutrition Series (MCNS), three times as many children suffer from chronic malnutrition as acute malnutrition in LMICs. Acute malnutrition (AM) is caused by a variety of factors like food insecurity, an unsanitary environment and inadequate dietary intake. The inappropriate height to weight relationship in AM can lead to death if untreated. Chronic malnutrition (CM) is generally a deficiency of energy, good quality protein and micronutrients (iron, vitamin A, zinc, etc.) that is exacerbated by recurrent infection and poor maternal nutrition before and throughout pregnancy. [5][10]

The nutritional status of children is important as it determines their health, physical growth and development, academic performance and progress in life. Under nutrition and poor health from preventable causes disproportionately affect the well-being of millions of people in the developing world. [6][9]

Malnutrition is the major nutritional problem in context of developing country like Nepal. Due to lack of knowledge and proper practice related to the nutritional requirement, the prevalence of malnutrition among under five children is high in our country. As there has not been any research conducted in Inaruwa, Sunsari, so this study will put a light on knowledge, attitude and practice of those mothers who have under five children, which might be helpful to launch the intervention. Also the association of socio demographic variables with knowledge and attitude will help to know whether or not socio demographic variables influence the knowledge and attitude.

Hence, the main objective of the study is to study knowledge, attitude and practice towards malnutrition among mothers of Sunsari, Nepal.

II. METHOD OF STUDY

A descriptive cross sectional study design was used to conduct the study in Inaruwa Municipality of Sunsari, Nepal for 6 months from June- November, 2017.

Sampling Technique

A Simple random sampling technique was used to select the mothers whose children was below 5 years.

Sample Size

Sample size of 389 was determined by using the statistical formula \[n= (N/1+N) *e^2\]. The sample size was taken according to the CBS data i.e. total female population of Inaruwa, Sunsari where, \(N=14286\), where acceptable error, \(e=0.05\).

Data Collection Tools and Technique

Structured questionnaire was used to collect the quantitative data. Questionnaire was divided into questions for socio demographic variables, knowledge, attitude and practice. Pre testing was done in 10% of the sample i.e. 38 and the samples included in the pre testing was not used in the main study. Those who refused to give consent, those who have neonates, those who were not available at the time of the study, those mothers who have children aged more than 5 years, and only Those mothers who have under 5 years children were included in the study.

Data Analysis

Data entry and analysis was carried out using Statistical Package for Social Sciences version 2.0. Chi square test was used to examine the associations between two variables and p value was significant at <0.05.

Ethical consideration:

Ethical consideration was obtained from the Institutional Review Board of Nobel College. Also, informed written consent was taken from the mothers before conducting the study. (Ref No: NIRC 012/2017)

III. RESULTS

TABLE 1: SOCIO-DEMOGRAPHIC VARIABLES

<table>
<thead>
<tr>
<th>Variable/characteristic</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of the respondent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>17-20years</td>
<td>34</td>
<td>8.7%</td>
</tr>
<tr>
<td>21-23years</td>
<td>78</td>
<td>20.1%</td>
</tr>
<tr>
<td>24-26years</td>
<td>148</td>
<td>38%</td>
</tr>
<tr>
<td>27-30years</td>
<td>94</td>
<td>24.2%</td>
</tr>
<tr>
<td>30+years</td>
<td>35</td>
<td>9%</td>
</tr>
<tr>
<td>Religion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hindu</td>
<td>360</td>
<td>92.5%</td>
</tr>
<tr>
<td>Muslim</td>
<td>29</td>
<td>7.5%</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Brahmin</td>
<td>120</td>
<td>30.8%</td>
</tr>
<tr>
<td>Chettri</td>
<td>68</td>
<td>17.5%</td>
</tr>
<tr>
<td>Janajati</td>
<td>112</td>
<td>31.4%</td>
</tr>
<tr>
<td>Dalit</td>
<td>13</td>
<td>3.3%</td>
</tr>
<tr>
<td>Others</td>
<td>66</td>
<td>17%</td>
</tr>
<tr>
<td>Educational level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>31</td>
<td>8%</td>
</tr>
<tr>
<td>Primary</td>
<td>102</td>
<td>26.2%</td>
</tr>
<tr>
<td>Secondary</td>
<td>134</td>
<td>34.4%</td>
</tr>
<tr>
<td>Higher</td>
<td>122</td>
<td>31.4%</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Service</td>
<td>147</td>
<td>37.8%</td>
</tr>
<tr>
<td>Agriculture</td>
<td>81</td>
<td>20.8%</td>
</tr>
<tr>
<td>Business</td>
<td>81</td>
<td>20.8%</td>
</tr>
<tr>
<td>Others</td>
<td>80</td>
<td>20.6%</td>
</tr>
<tr>
<td>Family type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nuclear</td>
<td>177</td>
<td>45.5%</td>
</tr>
<tr>
<td>Joint</td>
<td>212</td>
<td>54.5%</td>
</tr>
</tbody>
</table>
The above table shows, the maximum age of the respondent was 24-26, (38%) and mean age were 4.05. Similarly, minimum age of the respondent was 17-20, 8.7%. Maximum of the respondent, 92.5% were Hindu and 7.5% were Muslim. Majority, 31.4% were Janajati, and least were dalit 3.3%. Maximum of the respondent, 34.4% completed secondary level education and 8% were illiterate. The occupation of the majority of the respondent, 37.8% was service whereas agriculture and business was equal to 20.8% and minimum respondent 20.6% were foreign employers. 47% had 20-40 thousand monthly income and least had more than 1lakh monthly income i.e. 2.8%. 54.5% of the respondent were from nuclear family and 54.5% were from joint family.

From the analysis done in Table 2, it was clear that 54.8% of the respondent had inadequate knowledge towards malnutrition and remaining 45.2% of the respondent had adequate knowledge towards malnutrition.

### TABLE 2: KNOWLEDGE TOWARDS MALNUTRITION

<table>
<thead>
<tr>
<th>Knowledge Score</th>
<th>Frequency(n=389)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>inadequate knowledge</td>
<td>213</td>
<td>54.8%</td>
</tr>
<tr>
<td>adequate knowledge</td>
<td>176</td>
<td>45.2%</td>
</tr>
</tbody>
</table>

This study finding also showed that 71.2% of the respondent knew about malnutrition and remaining 28.8% of the respondent were unaware about malnutrition. Majority of the respondent, 40.9% fed up to 5 times a day for their children, and very least 5.9% of the respondent fed three times/day. 95.4% of the respondent preferred homemade foods for their children and 4.6% of the respondent preferred readymade foods for their children and 83.3% of the respondents knew about exclusive breastfeeding. 44% of the respondent fed their baby aged below 6month up to 10-12times per day where as 59% of the respondent breastfed less than 5times per day. Source of information for majority, 46% was health professionals, 14.1% from mass media and remaining from family members and other source. When respondents were asked about the age gap between two children, majority of them, 65.6% said 3-5 years followed by 26.7% said 5-7 years and very least 5.4% and 2.3% said 1-3 years and more than 7 years respectively. When respondents were asked about their age during first pregnancy 33.4% said 20-23 years, 45% said 17-20 years, 12.3% said more than 23 years and 9.3 % said below the age of 17 years.

### TABLE 3: ATTITUDE TOWARDS MALNUTRITION

<table>
<thead>
<tr>
<th>Likert Scale</th>
<th>Frequency(n=389)</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good attitude</td>
<td>340</td>
<td>87.4%</td>
</tr>
<tr>
<td>Bad attitude</td>
<td>49</td>
<td>12.6%</td>
</tr>
</tbody>
</table>

Likert scale was used to determine attitude which showed that 87.4% of the respondent had good attitude while least 12.6% had bad attitude towards malnutrition.

The study also suggests, majority of the respondent, 60.9% strongly agreed with statement, “nutrition education for mother is essential to achieve balance diet eating practice for their children” while 0.5% of the respondent disagreed and 38.6% agreed. On the statement, “thick food cause constipation” 70.5% of the respondent agreed, while 0.3% strongly disagreed and 1.8% were neutral. Most 55.5% of the respondent disagreed on the statement, “feeding should be stopped during illness” while 4.4% were neutral, 4.6% strongly disagreed, 5.1% strongly agreed and 30.3% agreed. More than half i.e. 58.6% agreed on the statement, “malnutrition is caused by witchcraft and evil eyes” 1.5% were neutral and 3.1% strongly agreed. Majority 60.2% agreed on the statement, “Nutritious food are expensive” and the least 2.1% strongly disagreed. On the statement, “it is important to give baby some water, honey and other solid foods during the first six months after birth” 46% of the respondent agreed, least 1.8% were neutral and 38.6% disagreed. Majority of the respondent, 65% agreed on the statement “Poor breastfeeding practice makes the child prone to malnutrition” while 0.5% strongly disagreed and 1.3% were neutral. More than two-third of the respondent i.e. 73.8% strongly agreed on the statement, “Colostrum milk is very nutritious to the baby” while 1.3% disagreed and 2.6% were neutral. On the statement, “breast milk protects your child from illnesses up to 6 months” majority 60.9% agreed, 2.8% disagreed and least i.e. 1% were neutral.

### TABLE 4: PRACTICE TOWARDS MALNUTRITION

<table>
<thead>
<tr>
<th>Questions</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Know the preparation of Sarbottam Pitho</td>
<td>306</td>
<td>78.7%</td>
</tr>
<tr>
<td>No</td>
<td>83</td>
<td>21.3%</td>
</tr>
<tr>
<td>Types of milk preferred for the children</td>
<td></td>
<td></td>
</tr>
<tr>
<td>powder milk</td>
<td>9</td>
<td>2.3%</td>
</tr>
<tr>
<td>fresh milk</td>
<td>373</td>
<td>95.9%</td>
</tr>
<tr>
<td>tetra pack milk</td>
<td>4</td>
<td>1%</td>
</tr>
<tr>
<td>others</td>
<td>3</td>
<td>0.8%</td>
</tr>
<tr>
<td>Way children were fed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consistency</td>
<td>270</td>
<td>69.4%</td>
</tr>
<tr>
<td>Variety</td>
<td>51</td>
<td>13.1%</td>
</tr>
<tr>
<td>quantity frequency</td>
<td>67</td>
<td>17.2%</td>
</tr>
<tr>
<td>other method</td>
<td>1</td>
<td>0.3%</td>
</tr>
<tr>
<td>Age baby was started to feed complimentary food earlier than 6month</td>
<td>70</td>
<td>18%</td>
</tr>
<tr>
<td>after 6month of age</td>
<td>298</td>
<td>76.6%</td>
</tr>
<tr>
<td>after 1year</td>
<td>21</td>
<td>5.4%</td>
</tr>
<tr>
<td>boil drinking water</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Always</td>
<td>115</td>
<td>29.6%</td>
</tr>
<tr>
<td>sometimes</td>
<td>88</td>
<td>22.6%</td>
</tr>
<tr>
<td>Never</td>
<td>183</td>
<td>47%</td>
</tr>
<tr>
<td>Others</td>
<td>3</td>
<td>0.8%</td>
</tr>
<tr>
<td>feed the child</td>
<td></td>
<td></td>
</tr>
<tr>
<td>with bottle</td>
<td>5</td>
<td>1.3%</td>
</tr>
<tr>
<td>with spoon</td>
<td>200</td>
<td>51.4%</td>
</tr>
<tr>
<td>with hand</td>
<td>184</td>
<td>47.3%</td>
</tr>
<tr>
<td>Who takes cares of your child while you are working</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family</td>
<td>327</td>
<td>84.1%</td>
</tr>
<tr>
<td>Friends/neighbor</td>
<td>30</td>
<td>7.7%</td>
</tr>
<tr>
<td>Helper</td>
<td>7</td>
<td>1.8%</td>
</tr>
<tr>
<td>Others</td>
<td>25</td>
<td>6.4%</td>
</tr>
</tbody>
</table>

The above table suggests the findings of practice towards malnutrition.

### TABLE 5: KNOWLEDGE AND ATTITUDE

<table>
<thead>
<tr>
<th>Knowledge</th>
<th>Good</th>
<th>Bad attitude</th>
<th>Total</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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In the above table 5, it was found that among total respondents who had good attitude, 55.3% had adequate knowledge whereas 51% had inadequate knowledge. Among mothers who had bad attitude, 49% had inadequate knowledge while 44.7% had adequate knowledge. The association between knowledge and attitude was found to be statistically insignificant (P value= 0.172)

<table>
<thead>
<tr>
<th>attitude</th>
<th>Adequate</th>
<th>Inadequate</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>188 (55.3%)</td>
<td>25 (51%)</td>
<td>213</td>
</tr>
<tr>
<td>Total</td>
<td>152 (44.7%)</td>
<td>24 (49%)</td>
<td>176</td>
</tr>
<tr>
<td>Total</td>
<td>340</td>
<td>49</td>
<td>389</td>
</tr>
</tbody>
</table>

In the above table 6, it was found that among total respondents who had adequate knowledge, 48.3% are literate whereas 9.7% are illiterate. Among mothers who had inadequate knowledge, 51.7% are literate while 90.3% are illiterate. The association between educational level and knowledge was found to be statistically significant. (P value= 0.001)

<table>
<thead>
<tr>
<th>Educational Level</th>
<th>Adequate Knowledge</th>
<th>Inadequate Knowledge</th>
<th>Total</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Literate</td>
<td>173 (48.3%)</td>
<td>185</td>
<td>358</td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>3 (9.7%)</td>
<td>28</td>
<td>31</td>
<td>0.001</td>
</tr>
<tr>
<td>Total</td>
<td>176</td>
<td>213</td>
<td>389</td>
<td></td>
</tr>
</tbody>
</table>

In the above table 7, it was found that among total respondent, who had positive attitude, 88.1% are hindu whereas 79.3% are muslim. Among mothers who had negative attitude, 11.9% are hindu whereas 20.7% are muslim. The association between educational level and knowledge was found to be statistically insignificant. (P value= 0.172)

<table>
<thead>
<tr>
<th>Religion</th>
<th>Positive attitude</th>
<th>Negative attitude</th>
<th>Total</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hindu</td>
<td>317 (88.1%)</td>
<td>43 (11.9%)</td>
<td>360</td>
<td></td>
</tr>
<tr>
<td>Muslim</td>
<td>23 (79.3%)</td>
<td>6 (20.7%)</td>
<td>29</td>
<td>0.172</td>
</tr>
<tr>
<td>Total</td>
<td>340</td>
<td>49</td>
<td>389</td>
<td></td>
</tr>
</tbody>
</table>

IV. DISCUSSION

In the present study, around one-third i.e. 38% of the respondents were from age 24-26 years and least were of age 30 above which is a bit lower than the study conducted by Vinod in village of Belgaum district as 58% of the respondent were of age above 28years and least were of age below 18 years old. [2] Moreover, 92.5% were Hindu in this study and remaining 7.5% were Muslim which is almost reverse case to the study conducted by Vinod as 70% were Jain, 20%, Hindu, 8% Muslim and remaining were Christian. [2]

Here 34% of the respondents had educational status as secondary and least were illiterate which contradict the study conducted by Vinod, where 14% were Illiterate, 70% Primary, 12% Secondary and Degree and above 4% where illiterate. [2]

The economic status of the family was mostly between 20000-40000 and above 1 lakh were least 2.8% which significantly differ to the study conducted by Vinod where majority of family income were 3,000 and below were 54% and 12% have 12,000 and above were minimum. [2] Regarding illiteracy, 8% of the respondent were illiterate but the study which was conducted by Kanchan there 20.3% mothers were illiterate, it was clear that there is difference between the studies. [14]

In the present study, there was no significant association between knowledge and demographic variables which was similar to the study which was conducted by Saurav and Sandhita in Nirlatan Sircar Hospital, Kolkata, India. [13] However, the present study suggests significant association between education level and knowledge of mothers towards malnutrition.

In the study of Kanchan, the age gap between two children were less than two years in 27.3% mothers and in the present study, the age gap between two children less than three years were 5.4%, where maximum respondent said that appropriate age gap between two children were 3-5years. [14]

Likewise, knowledge to increase breastfeeding if the infant was ill, was present in most of the respondents in this study, which inline the findings from the study conducted by Kanchan where, 9% of mothers had the correct knowledge to increase breast feeding if the infant was ill and 20% felt breast feeding should be decreased during illness of child. [14]

The mothers in our study got health information accordingly that, 46% from health professionals, 14.1% from mass media and remaining from family members and other source which were nearly gone similar to the study which was conducted by M. Kavitha that 53% of mothers got information from health professional and lowest percentage 6% of mothers got information from mass media. [15]

More than half i.e. 54.8% of the respondent in this study had inadequate knowledge towards malnutrition and remaining 45.2% of the respondent had adequate knowledge which was a bit higher the study conducted by M. Kavitha where 46.6% of mothers having average knowledge towards malnutrition and 36.6% of mothers having poor knowledge towards malnutrition, only 16.6% of mothers having good knowledge towards malnutrition. [15]

V. CONCLUSION

From the study we can conclude there were no such difference, both the majority were having inadequate and adequate knowledge towards malnutrition were nearly equal. Although
most of the respondent were having inadequate knowledge but majority had good attitude towards malnutrition by mothers. From the study it was found that majority of the respondent were good in practice of complementary food to their baby after the age of 6 month. The association between knowledge and attitude towards malnutrition were statistically insignificant.

VI. REFERENCES


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The Ability to Know the Concept of Numbering at Children Group A through Dakon’s Game Modification

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*Master Program of Basic Education, Post-graduate Program, Surabaya State University  
**Promotor and Co-Promotor of Thesis, Post-graduate Program, Surabaya State University  
Surabaya, Indonesia

Abstract- Research has been conducted to describe the ability to know the concept of numbering at children group A through the Dakon’s Game modification. The research method is to use quasi experimental research with non-equivalent pre-test post-test control group design. Population and samples are group A kindergartens in Sidoarjo. Data collection techniques using observation sheets. The results showed that there was an influence on the Dakon’s game modification to the ability to know the concept of numbering at group A.

Keywords- know the number concept, modification Dakon game, group A

I. INTRODUCTION

The ability to know of numbering concepts is a cognitive ability that is one of the 6 aspects of child development [1]. Cognitive ability is a thought process, which is an individual’s ability to connect an event or event [2]. Cognitive development is part of the development of mind. Thoughts are part of the brain’s thought process. The mind can be used to solve or solve a problem quickly and appropriately. The mind can also be used to recognize, know, and understand [3].

Regulation of the Minister of Education and Culture of the Republic of Indonesia Number 137 Year 2014 on national standards for early childhood education on cognitive development aspects reveals that children aged 4-5 years should have been able to cross the number one to ten and understand the concepts and emblems of numbers [4]. Gessel and Amtruda in Susanto suggested that at the age of 4-5 years is a period of mathematics study. At this stage, the child begins to learn simple mathematics for example mentioning numbers and counting number sequences.

Early Childhood mathematics learning can be taught through playing media, as the age of 4-5 is a game age for children [5]. Play also opens up opportunities for the child to create, shape, discover, and build using existing media, such as playing clay or plasticine and playing beams [6].

The results of observation in TK showed that the ability of children in recognizing the concept of number less, allegedly because of the limitation of educational AIDS (APE) owned by the school so that the counting ability has not developed to the fullest.

One method of learning is thought to introduce the ability to count children is through a method of Congklak play [7]. Counting ability is an ability to use logical reasoning and numbers. According to Yulianty, it turns out that playing Congklak can also train good kids in counting. In addition, children who play Congkak must be clever in making a strategy to win the game. The game, called Dakon in Javanese, is usually played by two daughters [8]. The concept of playing in children should be in accordance with the development phase [9].

The method of play is a teaching method where the teacher gives the child the opportunity to play a particular game, such as the one in everyday life [10]. Play has several meanings, other elements of play are repetition
with repetition of the child gaining the opportunity to consolidate his skills [11]. A simple game can be a vehicle to become such a complex game, through playing a child can safely declare his needs [12]. So it can be said that all the games can express a sense of hate, fear, and emotional social.

This is in accordance with the research results of Wirdawati and Ismet (2018), there is an increase in the calculation of children through congklak’s media modification [13], the research results Pradanawati and Sartinah (2017), the ability to manufacturer children A Group to increase the maximum After being given treatment with a Dakon’s game modification [14], and the results of the research Mardiani and Maulidiyah (2019), there is the influence of Congklak’s game modification to the ability to know the symbol of the number of children [15].

The researchers hope, with the Dakon’s game modification is able to influence the ability to know the concept of numbering at children group A in better direction.

II. IDENTIFICATION, RESEARCH AND COLLECT IDEA

The research method is to use experimental quasi research with non-equivalent pre-test post-Test control group design [16]. The Data is retrieved using an observation sheet to know of numbering concepts. The indicators of the ability to know of numbering concepts as follows:

<table>
<thead>
<tr>
<th>Num</th>
<th>Indicator</th>
<th>Instrument Item</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Crosses and mentions sequence number 1-10.</td>
<td>Manufacturers of many objects 1 to 10.</td>
</tr>
<tr>
<td>2</td>
<td>It crosses (recognizes the concept of numbers with objects 1-10).</td>
<td>Know the number 1-10 with Dakon’s game modification.</td>
</tr>
<tr>
<td>3</td>
<td>Create a sequence of numbers 1-10 by using objects, connecting or pairing number symbols with objects 1-10 (children are not instructed to write).</td>
<td>Shows the number 1-10 with Dakon’s game modification.</td>
</tr>
<tr>
<td>4</td>
<td>Distinguish or accumulate two objects of the same number, which are not equal, more or less.</td>
<td>Shows the sequence of numbers 1-10 with Dakon’s game modification.</td>
</tr>
</tbody>
</table>

Observation sheet is given for assessment on the learning process of number concept in children. Measurements use 1 to 4 stars [18], which describes the level of child's ability to know of numbering concepts. The grid of instruments assessment of the ability to know the concept of numbering as follows:

Table 1. Indicator ability know the number concept [17]

<table>
<thead>
<tr>
<th>Num</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Crosses and mentions sequence number 1-10.</td>
</tr>
<tr>
<td>2</td>
<td>It crosses (recognizes the concept of numbers with objects 1-10).</td>
</tr>
<tr>
<td>3</td>
<td>Create a sequence of numbers 1-10 by using objects, connecting or pairing number symbols with objects 1-10 (children are not instructed to write).</td>
</tr>
<tr>
<td>4</td>
<td>Distinguish or accumulate two objects of the same number, which are not equal, more or less.</td>
</tr>
<tr>
<td>5</td>
<td>Calculates the amount of</td>
</tr>
<tr>
<td>6</td>
<td>Counting number of</td>
</tr>
</tbody>
</table>

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III. RESULT OF FINDINGS

Observation conducted on group A in TK Sidoarjo, in the control group, teachers carry out the appropriate learning conducted daily without treatment, while in the experiment group, in the implementation of learning The teacher provides treatment using Dakon’s game modification [19]. Assessment conducted in group A in TK at Sidoarjo, provided in accordance with the grid instrument of the ability to know the concept of numbers, among which is a number of objects that are told to the children 1-10 in order, crossing 1-10 in reverse, Know the symbol of numbers 1-10 and know the concept of numbers.

The result of the observation on the concept of numbers done, both in the control group and the group of experiments can be seen in the table below.

Table 3. Preliminary and final observation of the ability to recognize number concepts in the control group and Experiment Group

<table>
<thead>
<tr>
<th>Description</th>
<th>Control Group</th>
<th>Experiment Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>9.39</td>
<td>12.91</td>
</tr>
<tr>
<td>Deviation Standard</td>
<td>7.47</td>
<td>1.13</td>
</tr>
<tr>
<td>Lowest Value</td>
<td>8.00</td>
<td>11.00</td>
</tr>
<tr>
<td>Highest Value</td>
<td>11.00</td>
<td>16.00</td>
</tr>
<tr>
<td>Percentage (%)</td>
<td>7.95</td>
<td>75.00</td>
</tr>
</tbody>
</table>

The results of the control class observation followed by 32 children, especially the A1 class. The instrument of control class related to the ability to know the concept of number 13 indicators, where the indicator is divided into 3 levels of developmental achievement. The Division of the indicator in sequence, which is the manufacturer of many objects 1-10 includes 2 scoring indicators of the indicator number 1-2, then know the symbol of number 1-10 includes 6 indicators of assessment of the indicator number 3-8, and recognize the concept of Number includes 4 scoring indicators of the 9-12 indicator number.

In Table 3, the mean difference between the initial observation of the control group is 9.87. These results can be said that the control group has an increase of 20.56% in the ability to recognize the concept of numbers from the initial observation and final observation.

The initial observation of the ability to know the number concept in the experimental group had an average of 26.68. The value of the standard deviation is 3.14 and from the recapitulation of the initial observation of the ability to recognize the number concept has the highest value 32.00 and the lowest value of 20.00. As for the final observation the ability to recognize the number concept of the control group has an average of 36.55. The default value of the final observation result i is 2.61 and from the recapitulation of the final observation, the ability to know the concept of numbers has the highest value of 41.00 and the lowest value of 30.00.

In Table 3, the difference in the mean between the initial observation of the experimental group is 6.84 and from the recapitulation of the initial observation and final observation the ability to recognize the number concept in the experimental group has an average of 26.32. The value of the standard deviation is 3.00 and from the recapitulation of the initial observation
of the ability to recognize the number concept has the highest value 31.00 and the lowest value of 20.00. While the final observation of the ability to know the number concept in the experiment group has an average of 39.55. The default value of the final observation result is 2.74 and from the final observation data the ability to know the concept of numbers has the highest value of 42.00 and the lowest value is 33.00.

In Table 3, the mean value of the average difference between the initial observation and the final observation of the ability to know the numbering concept in the control group is 13.23. These results can be said that in the experimental group there was an increase of 27.56% in the ability to know the concept of numbers from the initial observation and final observation.

From the description above it can be shown that both groups, both the control and experiment groups experienced an increase in the final outcome, but the experimental group experienced a treatment improvement using Dakon’s game modification. Have a higher percentage (27.56%) than the control group (20.56%) who do not get the treatment using Dakon’s game modification. This means that the media is modified in the experimental group to influence the ability to know the number concepts in children.

Test the difference of acceptance to know the concept of numbers between before and after the use of Dakon’s game modification in the research is done using paired sample 1 test. Decision making of the different test is as follows:

a. If the value of the calculated t more bear than the value of t-table or significance value of < 0.05 then H₀ rejected, so there is a difference in the ability to know the concept of numbers before and after using a Dakon’s game modification.

b. If the value of the t-calculated is smaller than the table or significance value > 0.05 then H₀ is accepted, so not be able to.

Based on the results of the Independent sample t-test is known that the T-count value is 9.569 whereas the t-table value obtained from 22 respondents is 2.074. From these results can be known that the value t-count > of the t-table, in addition to the significance value is 0.00 < 0.05 so that it can be deduced H₀ rejected, so there are significant differences in the ability to know the concept of numbers between before and after the use of Dakon’s game modification.

This is in accordance with the National Education Department's developmental achievement level, where learning mathematics for children requires stages from concrete in the abstract direction, where such stages include: concrete (giving To the child the real material to be touched, seen and expressed through the child's verbal), visually (show the child on the number representing the concept), and the symbol (introduce the symbols that can represent the concept) then abstract (the child can Understand the concept of numbers) [20].

From the above exposure presented that the test results have also proved that with the use of Dakon’s game modification of children can manufacturer many objects, mentioning from 1 to 10 (including know, appoint and mention) and use the number emblem to calculate (pinch or take the number of beads and count the number of beads, put the number of beads) the child can make a sequence of numbers 1-10 with objects, connect or pair the coat of arms numbers with objects 1-10 (children are not told to write). Thus, it can be stated that the modified game media is affecting the child's ability to know of numbering concepts.

IV. CONCLUSIONS

Based on the results of the research and discussion, it can be concluded that there is an influence on the game Dakon’s game modification to the ability to know of numbering concept at children group A.

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Development and implementation of virtual academy for enhancement of distance learning

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1. Abstract

Who are the peoples in barriers of time and distance issues, those kinds of peoples can’t achieve their expectation in education. Therefore, we have developed a system for addressing to give a great chance to learn online with more facilities with the use of server configuration. The remainder of this document describes the functional requirements of the Virtual Academy in detail, including descriptions of the individual modules, integration points between existing modules and high-level scope of new modules to be developed specifically for the Virtual Academy.

Index terms – E learning, device, classroom, Virtual, Distance, configuration, mobile, geographical

2. Introduction

Today most of the people in the world have so busy lives. Unfortunately, they cannot avoid their busy lives. Every person is really needed to get more qualifications. So, people need to get more education though they have not time to do it.

So, I am introducing an eLearning system with more facilities here. With that system the students can get the education by staying at home. The special thing is this system is fully support from the beginning to the end of the course.

That means from providing a classroom to get the certificate. Here I would like to build a system to gather all students who wants to do the same course. And then the system gathers the students who want to do the same subject. And get their free times to join to the classes and make a group with same wishes students. Then the system can assign a teacher for that classroom. From now let’s say it’s a virtual classroom.

The teacher as well as all students can log to the virtual classroom at the class begins.

So, class goes as a normal class with teaching, questioning, discussing, assignments and all. And there can teacher-student communication, student-student communication both.

Meanwhile there the students can log to the classroom with their mobile phones too.

So, I have implemented the system for some mobile devices too. Actually we decided to provide complete solution for the above problem from my project.

3. Problem Statement

Well, it is the catalyst that is changing the whole model of learning in this century – for school pupils, university students, for employees, for the on-going training and development of professionals like doctors, nurses and teachers - in fact for just about anyone who wants to find out something on either a formal or casual basis. Here are eight ways why I think e learning is revolutionizing learning, and to illustrate them, I’ve included some examples of e learning freely available on the Internet.

E-Learning means that you no longer need to spend long periods travelling to a location to attend a course; you can now have access to learning when you want it, at the time you want it - day or night, wherever you want it - at home, at work, in your local library. For many students this has opened up a new, much more flexible and accessible world of learning that was previously closed to them due to disability or family circumstances, or perhaps due to the fact that the course they wanted was on the other side of the world. In Other words, there are now no longer any geographical constraints to learning; e-learning Brings learning to people, not people to learning.

E-Learning means that learning no longer needs to be a passive experience, with the learners all sitting in front of the teacher and “learning by telling”, e-learning makes learning an active experience. The emphasis is on interactivity or "learning by doing". And makes learning exciting, engaging and compelling. Hard and boring Subjects can be made easier, more interesting and appealing with e learning, and is also helping to embed learning within work processes, as Organizations begin to recognize that learning is not something that only takes Place in a classroom. In fact, 70% of all learning occurs whilst a person is on the job, that is not in formal training or education but in everyday working Life as employees carry out their jobs - finding out information, reading Documents, talking to other colleagues etc. Learning has moved from the classroom onto the desktop and now into the pocket. It’s a fact that we are all becoming more mobile; about 50% of all employees now spend up to 50% of their time outside the office. We all do a lot more traveling (on buses, trains and planes), as we visit other offices or campuses and there is quite a bit of evidence to show that
people would like to make more use of this "dead time" for
learning purposes. The term m learning is used to describe the
use of PDAs and mobile phones for learning.

The major problem is currently there is no e-learning system that
integrates system to mobile device that has same functionalities
included in desktop system.

4. Requirement Analysis

Basic requirement is implemented new e-learning chat client. For
this client we are supposed to use free and open source chat
server ejabberd.

Basic Requirements are Described below.

- Low Cost – Most important thing is system should be low cost,
there for supposed to use free and open source chat server. Chat
server is the application that transfers data to one user to another
user also called as chat engine.

- User Management – Should be create user accounts, edit users
manage permissions. This system use to facilitate e-learning
therefore it should be possible to create user account for students
and as well as for teachers and also this system should be able to
manage and maintained by administrator account, and also able
to remove user from system this is impartment when one course
is finished he is no longer active user.

- Classroom Management – Should be create classrooms, edit
classrooms and manage classrooms, other task is should be able
to add users as student to classroom as well as should be able to
assign teacher/teachers to classroom. Classroom is like actual
classroom one subject may have one classroom, administrator
can add users to a specific classroom or many classrooms then
user can subscribe to lessons via chat.

- Teacher-Student Communication– Should be able to transfer
chat between teacher to all users as well as teacher to specific
student. Basically, all the learning happens through online chat,
so one teacher has to teach to many students so this is a basic
feature of the system,

- Student-Student Communication – Should be able to transfer
chat between student-students, this is important when one
student wants to discuss something with his friend.

5. Development Methodology

First of all, install ejabberd server, this can be installed on a
Windows, Linux and Mac OSX as you wish. After installing
server should be configured to use to developed client
application. Editing manifest file, which is placed inside installed
directory of the ejabberd server, can do this. The manifest file is
in inside conf directory inside installation of the ejabberd server
the file name is ejabberd.conf. After configuring the server,
server can be accessed via given url and using username and
password provided in the installation wizard.

The client application developed using HTML, javascript and
some other web technologies, after configuring the server client
application should be placed inside server when user access chat
ter to specific
server via browser automatically then automatically loads
developed chat system inside browser.

The mobile application developed using j2me that is a java
version specially design for mobile devices and mobile
application is highly optimized for mobile platforms this
application can be run most mobile devices which support midp.
The system provides the following features:

- Registration
- Course Definition and Scheduling
- Payments and Billing
- Virtual Classroom
- Learning Content Creation
- Online Learning
- Management Tools

6. Results and Discussion

Developed application can use to text chatting, but it is
impossible to use Audio and Video chat, but complete e learning
system needs proper audio and video chat with group video and
audio chatting. But as basic e-learning system developed system
can be use within small-scale organization with low cost and
with minimum requirements.

Mobile application is very useful for many users they can study
while traveling or in the home and clarify their problems with
friends or with teacher.

Finally, this project needs some future development such as
adding video and audio chatting support and file sharing which
make the application fully complete e-learning system.

The modules which together form the complete Virtual Academy
solution, highlighting the integration points between systems
existing at a given tenant, be it a corporate entity or academic
institution and also with the hosting service provider.

The possible integration and points with external systems are:

- iRegistration – Will require information regarding
marketing campaigns, which resulted in the registration
of a given student. In return the registration process will
capture information about how a given student learned
about the programs and why he or she chose to follow
the same, and this information needs to be returned to
the marketing system, which will typically be a CRM
from a known vendor or a custom developed solution.

In addition, if the institute has a legacy Student
Information System which for some reason they would
wish to retain, synchronization of student profiles with
this system will be required.
iCalatog – For the course price and purchasing options to be in line with the financial strategy of an institute it will require integration with the institute’s financial systems, as the ultimate price of a course will need to take into account the complete cost incurred in delivering the same.

Virtual Academy Functions

The functional modules that will be developed specifically for the Virtual Academy are described at a high level below. will describe the functional requirements for these modules in further detail.

iRegistration

The Student self-registration module allows students to enter personal and contact information and other details typically provided via non-electronic means. In addition, the module allows a student to maintain a single consolidated record of all academic achievements over a period of time, plan their future progress academically or professionally and provide a single point of reference for educators regarding student learning plans and history.

In additions all academic progress made at a given institution is also captured and displayed within this module, once the course or assessment is successfully completed. The registration profile is common across institutions and displays information relevant to all institutions regardless of which institution’s portal the profile is currently being accessed from, giving the user a complete portfolio, which can be exported as an academic transcript or e-portfolio.

iCatalog

An on-line catalog of courses and scheduled events using which learners can purchase or subscribe to offerings. The module combines features of a product catalog, price list and course and event schedule, allowing users to browse through offerings available, make their selections and chose their payment method for chargeable offerings.

iReach Alerts

This module will allow any institution to select a set of events for which SMS based alerts should be sent out to their student/learner base, define the message to be sent for a given event and the dynamic values that should be retrieved from data available in the system to be incorporated into the message body. The message will be sent via an SMS gateway that will be globally configured.

iVClass

The iVClass™‘Virtual Classroom’ will deliver live training sessions to a distributed group of participants over the internet. The use of video and audio interactions, together with sharing of the presenter’s applications and desktop, a shared whiteboard and one-on-one or group chat sessions will allow trainers and trainees to interact in real time. It will facilitate mentor assisted training, enabling learners to supplement face-to-face and eLearning courses with pre-scheduled live lectures.

iReach Classroom

The iReach client will be developed to provide anytime, anywhere access to e-Learning for users on the Virtual Academy. This module will allow users to learn online via e-Learning courses, or to ‘stay in touch’ with their lecturers and colleagues from within a ‘Mobile Learning Environment’ to supplement classroom learning, even if they’re always on the road or don’t have access to a PC or laptop.

The iReach™ Classroom will also acts as a place where users and can view what new supplementary learning content is available and what questions are being asked by any learners in the classroom, virtual or physical. The offline access features download and cache new learning content and store progress statistics, which are synchronized with the hosted system when the user is online.

iCatalog

The iCatalog module will be accessible as an independent web portal, which can be integrated with any product listing exposed as a web service. It will provide the following features.

Course Information Maintenance

This feature will allow the definition and maintenance of all information pertaining to a course. A listing of courses will be displayed, with the option to add new courses, edit existing courses and delete unscheduled courses. The add/edit page will capture or display the following information:

1) Course ID – Identifier for course; auto generated.
2) Course Code – Unique within institution.
3) Course Name – Plain Text.
4) Course Description – Plain Text
5) Course Details – Detailed course description, created as an XML document and displayed after processing by an XSLT, for formatted display.
6) Base Cost
   a. Cost to be associated with modes, including live, online and eLearning. In system base currency.
7) Course Version – To allow the course to be updated from time to time.
   a. Course Version Cost – if present will override base cost.
   b. Active date and expiry date.
8) Course Prerequisites – ID’s of pre-requisite courses
   a. Prerequisite Entity ID – ID of prerequisite course or program
b. Prerequisite Type – Type of entity (course or program)

c. Prerequisite Criteria –
i. Mandatory – One prerequisite, and is mandatory
ii. Option – One of many defined pre-requisites, having followed at least one is mandatory.

9) Course Audience – Level of student allowed to follow course (e.g. undergrad, postgrad). The selection will be validated against student profile, so when a signed in user views the catalog, the default behavior would be to list only courses that include the current student as the audience.

10) Course Content ID – Identifier of content item, for an eLearning course.

11) Base Credits – Default credits carried by the course, regardless of scheduling.

12) Total Duration – In hours

Lesson Information Maintenance
This feature will allow lecturers to maintain the details of the course. Listing of lessons for a course will be displayed. It will provide option to add new lessons, update existing lessons, and delete lessons. Lesson add, edit page will provide the following options.

1) Lesson ID – Identifier of the lesson; auto generated
2) Course ID – Reference to the course; foreign key
3) Lesson Name – plain text
4) Lesson Description – Plain text
5) Lesson duration – plain text to integer hours
6) Location type ID – location type suitable for the lesson.

Lecturer Information Maintenance
This feature will allow the definition and maintenance of all information pertaining to a lecturer. A listing of lecturers will be displayed, with the option to add new lecturers, edit existing lecturers and delete unallocated lecturers. The add/edit page will capture or display the following information:

1) Lecturer Name
2) Lecturer Profile
   a. Textual Description
   b. Profile Picture
   c. Contact Details - including e-mail, phone number
   d. Profile Page – Detailed page describing expertise, areas of interest and qualifications. Maintained as XML document, formatted using XSLT.
3) Lecturers available time slots will be enter here using a suitable control or a UI.

Location Information
This page will allow the maintenance of Locations for the tenant, a location being any physical area which can be reserved for courses. A listing of locations will be displayed on entry to the feature, with the option to add a new location, edit existing locations and delete unallocated locations. The add/edit page will capture or display the following information

1) Location ID
2) Location Type – Location type whether lecture room, laboratory for practices.
3) Name
4) Description
5) Capacity
6) Location available time slot. Available time slots will be entered by a suitable time entering control.
7) Active

Program Information
A program will be a bundling of courses into a single program, which a student can register for. The program definition will display/collection the following information:

1) Program Code
2) Program Name
3) Program Courses – Selected from a list of all courses, both e-mode and lecturer delivered
   a. Course ID – Filled upon selection
   b. Mandatory – To be checked, if the course is mandatory

Schedule Information
This feature will allow courses to be scheduled and will contain information pertaining to the schedule. A course will be the template or object while the schedule will be the actual course instance. Schedules will only be maintained for instructor led courses – eLearning courses can be followed at any time, provided the defined pre-requisites are met. The following information will be captured when defining a schedule:

1) Schedule ID – Unique identifier for scheduled item, globally unique.
2) Course ID (subjectid) – Course identifier
3) Course Lecturer – Associated with lecturer information
4) Location - Room identification for physical class
5) Schedule Batch Title – Will default to course title, but may be updated to indicate instance specific information
6) Dates – Added using a calendar or a recurrence control, which will allow selection of the following:
   a. Start Date
   b. End Date
c. Class Duration (validated to be less than or equal to course duration)

d. Recurrence
   i. Daily – Will display from/to time entry fields
   ii. Weekly – Will display Day-of-Week selection checkboxes, in addition to from/to time

7) Audience - Course registered Students will be the audience of the schedule. Students add to the schedule, removing the schedule will be done from the separate UI with datagridview.

**Scheduling Helper**

The scheduling helper will be invoked by a user wishing to automate the scheduling process. The helper will contain the following controls:

1) Courses – List from which the courses to be scheduled are selected
2) Lecturers – Once the list of courses is selected, the lecturer for each course will be specified
3) Locations – All class rooms or lecture halls to be considered by the scheduling algorithm will be selected from a list displayed
4) Period – A date range within which the courses should be scheduled.
5) Preview – This button will invoke the scheduling algorithm and create a draft schedule which can be published.
6) Publish – to publish the schedule to the tenant institute’s calendar.

The scheduling algorithm functionality will ensure that all courses are scheduled within the period allocated and that no two courses scheduled concurrently have the same lecturer or are allocated to the same location. It will also ensure that no mandatory courses of a given program are scheduled concurrently.

**Scheduled Programs List**

This page will list the currently scheduled programs, and will allow a user to subscribe to a given program. Therefore, the details row of a given scheduled program will also display a button which can take one of the following forms:

a) Add to Cart – Will be displayed for programs that the current user has not yet subscribed for but is eligible for the user’s subscription. Will allow the user to subscribe to the program, but directing him or her to the first step of the subscription process.

b) Make Payment – Will be displayed for programs that the current user has subscribed to, but has only made a partial payment for. Will allow the user to complete any pending ‘installment’ payments (using some payment gateway)

c) Not Eligible – Will be displayed for programs where the current user’s profile does not reflect that he or she possesses the necessary pre-requisites specified for the program. Clicking on this button will take the user to the program details page which will contain defined pre-requisites for the program.

**Course Schedule**

This feature will allow showing the courses which are scheduled to particular learner, lecturer or the institute as a whole. This module basically acts as a time table for individual learners, lectures and institute administrators. The time table for a given user at a particular institute will display here.

This page will be represented as a calendar control and scheduled events will be marked in the relevant date and time columns for easy reference. This module should present a user interface that will feel intuitive to users familiar with the calendar control of MS-Outlook.

**Individual User Schedule**

**Lecturer Schedule**

**Institute Schedule.**

**iVClass**

**Lecture Scheduling**

Live lectures are scheduled by Lecturers or Tutors and will be visible to learners on the standard lecture schedule. When scheduling such a session, the schedule information entered at the VA user interface will be populated to the third party iVClass server infrastructure software. The information to be populated into the iVClass server will include the following attributes:

- Session Name
- Session Start Time
- Session End Time
- Lecturer/Tutor Name and ID – Presenter Name and ID
- Subscribed Learner Names and ID’s – Attendee Names and ID’s

The scheduling may be for a single session or for multiple sessions. A notification message with a link to the scheduled session will be sent out to the lecturer and all subscribed learners automatically once the session is successfully created in the iVClass Server.

**Lecture Subscription**

All users subscribed to the subject for whom the live lecture is scheduled will automatically be registered as attendees at the time of lecture scheduling. Additional subscriptions can be accommodated via a one-time subscription, for which a payment may or may not be required. Such subscriber names and ID’s will also be appended to the attendee list on the iVClass server.
**Lecture Attendance**
A user can join a scheduled lecture at the indicated start time, by simply clicking on the schedule entry in the class schedule page. A subscribed user is also sent a notification of the session with a link at the point of scheduling or subscribing to a class; these links can also be clicked on at the scheduled start time to attend the lecture.

**Lecture Delivery Features**
During the lecture, the lecturer will be able to initiate the following activities using the iVClass Client UI:

- **a)** Share Audio – Lecturer can initiate audio sharing using a button click.
- **b)** Share Video - Lecturer can initiate audio sharing using a button click.
- **c)** Upload presentation – Lecturer can upload a presentation to be accessible to all participants using a button.
- **d)** Share Desktop – Lecturer can share the active application on the desktop using a button.
- **e)** Share virtual whiteboard – Lecturer can share a virtual whiteboard using a button. Once shared the lecturer can enter text, mark or annotate and draw basic diagrams using a mouse or other pointing device.
- **f)** View Question & Answer List – A separate Q&A screen will be accessible using a button click. This list will display questions asked by the learners, which can be responded to by selecting a given question and typing in the answer.
- **g)** Chat - An on-line chat session can be initiated, with the chat window displaying the current messages, and providing the control to select whether a response is to a single learner or all attendees
- **h)** Survey – The lecturer can initiate and publish a survey, open polling and close polling, while being able to see a summary of all responses received on-line.
- **i)** Transfer control – Lecturer can transfer control to a learner, passing on all above lecturer features to the learner temporarily.

**Lecture Recording**
The entire lecture session will be recorded and can be published in the using some management DB system as a content item, or distributed to the iReach mobile client.

**Additional Module Integration with iVClass**
The following integration points will be enabled in the learning management system and social learning portal:

- **a)** Initiate iVClass Session with Content Publisher
- **b)** Initiate interactive session with lecturer.

**iReach Alerts**
The iReach Alerts module will consist of an integration API which invokes methods of a given SMSC, and the message trigger and content definition wizard which will be accessed by an authorized user at the tenant site.

**User Management**
User Management will provide the following major features:

- **a)** Add new user
- **b)** Edit existing user information
- **c)** Delete users
- **d)** List users with search and sort

**Group Management**
Group Management will provide the following major features:

- Adding new group
- Editing existing group information
- Deleting group
- Listing group
- Adding users to group
- Exact search/search and filter group
- Sorting

**Functionality Management**
Functionality management will be the granting of feature access to roles. Authorized personnel will be able to select a role for a given unit and assign the system features granted to that unit. To perform any operation, a given role should be granted “Read” permission for that feature.

**iReach Classroom**
The iReach module will provide the mobile and offline access features with learning content security. The iReach client will be an application or ‘app’ which can be downloaded on to an android powered smart phone or a personal computer and used to obtain learning anytime, anywhere. It will be supported by a set of services hosted on the server, to which the client has to connect to occasionally to obtain new content and synchronize updates.

**User Interface Features**
The core feature set to be provided to an iReach user is:

**SCORM Viewer** – The viewer will allow a user to follow a SCORM compliant e-Learning course on a smart phone or offline on a PC, and track all events, which will be updated to the server immediately if the user is online, or stored for later synchronization if the user is offline.

Any SCORM compliant course should ideally be accessible via this viewer, but this would be subject to limitations imposed by the host device.

The user will see a list of assigned courses from which he can select a given course to start following the same. If he or she chooses to stop at some point, the application will record current progress and allow the user to resume following the course at a later date or time.

The user will be able to interact with the course controls using the touch screen, in the case of a smart phone, and a mouse and keyboard in the case of off-line access via PC.
Interactive Assessment Viewer – This viewer will allow a user to attempt an assessment on iReach, using the touch screen to navigate through the question paper and answer questions if a smart phone is being used, and using the mouse and keyboard when on a PC.

The user will be presented with a list of assessments assigned, from which he or she can choose to start a given assessment. Once started, the user will not be allowed to stop or pause an assessment without submitting the answers, and resume will not be possible.

The assessment results will be immediately updated to the server if the user is online and will be stored for subsequent synchronization if the user is offline.

Chat client – a user will be able to chat with his or her tutor or ‘batch’, which for a user on the academic portal will be the set of students following the same course. A user on the public portal will be allowed to chat with a designated ‘mentor’, if such an individual is nominated.

The chat client will indicate the online presence of a given user, and selecting this user will initiate a chat session. Group chat will also be possible for academic portal users, who will be able to see all online users in the batch in a ‘chat room’.

Offline users will not be allowed to use the chat feature.

Video viewer – The viewer will allow a user to watch video based courses within iReach; streamed video when online and cached videos when offline. The resolution supported and the size of the video that can be cached will be restricted by the capabilities of the mobile handset.

Document Viewer – The document viewer will be used to display tutorials, lecture notes and other text based content which will be provided as a part of an on-line course, or as supplementary material for a classroom based course. The viewer will ensure that delivered material can be viewed, but not copied or printed.

Settings and Sync – The user will be allowed to configure the learner profile on the iReach client using this interface. The user ID and password will be requested upon initial registration and will be stored within the client and used for authentication subsequently.

The ‘Sync Now’ button will activate the synchronization process, which will upload any progress statistics to the server and download any content queued for the user to the client.

Security Features and Resource Requirement

Security features will be transparent to the user, who will configure the initial iReach profile by entering the user ID and password which has been registered on the virtual academy. This profile information will be stored securely on the smart phone or PC, along with any other settings specific to the application.

The online authentication module will use profile information configured on the iReach client to authenticate with the virtual academy server, prior to initiating any data transfer for content downloading or progress synchronization. The user will not be expected to authenticate himself when starting the application as it is assumed the owner of the smart phone will be the only person using it for learning.

On a PC the iReach client will again assume that the owner of the current operating system login is the user to whom the application profile is configured and will not request authentication.

7. Conclusion

This e-learning chat application is suitable for small scale organization and possible to use as basic e-learning tool. But, currently this tool does not have much features compared to commercial tools like Microsoft lync. But this tool is free so this does not need to pay anyone and fulfill basic e-learning functions.

8. References


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To Evaluate the Functional Outcome of Close Reduction and Percutaneous Fixation of Fracture Proximal Humerus By K Wires

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Abstract - Proximal humerus fractures are one of the common fractures occurring in the skeleton. They account for approximately 4-5% of all the fractures. 1,2 85% are minimally displaced or undisplaced and can be treated with immobilization 3,4,5 alone. The remaining 15% of these are displaced and provide a therapeutic challenge. 6 This study was conducted to analyze displaced fractures of proximal humerus that was treated with close reduction and pinning and to document their clinical and functional outcomes as well as complications. This study was conducted in Department of Orthopedics, Santokba Durlabhji, Hospital, Jaipur. A minimum of 25 patients with fracture proximal humerus managed with percutaneous k-wires fixation were evaluated. Percutaneous k-wires fixation is recommended in young motivated patients with two and three part fracture. Complication associated with k-wires fixation were few and functional outcomes were comparable with other studies. Complication associated with open reduction can be avoided. In four part fractures had high complication rate of malunion and stiffness, so it is not recommended for percutaneous fixation. It is type of biological fixation, in the sense that it does not compromise circulation of humeral head. It decreases duration of hospital stay.

I. INTRODUCTION

Proximal humerus fractures are one of the common fractures occurring in the skeleton. They account for approximately 4-5% of all the fractures. 1,2 85% are minimally displaced or undisplaced and can be treated with immobilization 3,4,5 alone. The remaining 15% of these are displaced and provide a therapeutic challenge. 6

Conservative management of displaced fractures predisposes to non union, mal union, and painful shoulder dysfunction 10,11. Surgical treatment of displaced fracture requires realignment and fixation. Open reduction and internal fixation is challenging because it requires extensive exposure, which causes substantial blood loss and predisposes to wound complications and delay in fracture healing and risk to neurovascular structures.

As Proximal humerus fractures are metaphyseal fracture, and they heal quickly and provide a unique opportunity for temporary fixation till fracture union occurs. This can be easily done by insertion of percutaneous pins, which can be left in situ for 4-6 weeks to hold reduction. Normally smooth k-wires or 2.5mm threatened wires are used for this purpose. The usual site of insertion of wires are, two wires retrograde from proximal to deltoid insertion into the humeral head, one wire from greater tuberosity to the medial humeral shaft and an optional fourth wire from anterior humeral shaft into the humeral head.

This study was conducted to analyze displaced fractures of proximal humerus that was treated with close reduction and pinning and to document their clinical and functional outcomes as well as complications.

Aims and Objectives
• The goal of study was to evaluate functional outcomes of close reduction and percutaneous pinning of displaced proximal humerus fractures by k- wires.
• To Study the complications that may occur with closed reduction and percutaneous pinning of fracture proximal humerus.

Materials and methods
Study Centre - This study was conducted in Department of Orthopedics, Santokba Durlabhji, Hospital, Jaipur.

Study Design - This was hospital based prospective study.

Source of Data - All patients fulfilling the inclusion criteria were admitted during the study period.

Sample Size - A minimum of 25 patients with fracture proximal humerus managed with percutaneous k-wires fixation were evaluated.

Inclusion Criteria - Two part, three part, four part displaced proximal humerus fracture:
• Acute fractures < 7 days
• Age above 18
• Patient fit for surgery and anesthesia

Exclusion criteria
• Associated humerus shaft fracture
• Associated neurovascular injury
• Pathological fractures
• Old fractures> 7 days
• Open fracture
• Stable fractures

Pre-operative assessment and planning:
The patients were examined according to protocol, which included:
Clinical evaluation
• Detailed history, regarding name, age, sex
• Systemic examination
• Local examination of shoulder
• Examination to check for any neurovascular or associated injury

Radiological evaluation
• Done by conventional radiograph consisting of anterior - posterior and lateral view.
• A CL scan was indicated. If the amount of displacement of the humeral head or tuberosity fragments was unclear on radiographs and for complex fracture patterns.

Routine preoperative investigation
• Hb, BT, CT, Urine Blood Urea, blood sugar, Serum electrolyte, ECG, X-ray chest.
• Antibiotic prophylaxis regime were given as per treatment protocol of closed fractures.

II. OPERATIVE PROCEDURE

Surgery was done under general anaesthesia, Patient was kept in a beach position. After adequate preparation fractured limb was grasped and fracture were manipulated under fluoroscopic control to achieve a closed reduction of the fragments. Reduction checked under image intensifier system. After obtaining adequate reduction, in both AP and lateral projections, 2-3, 2-2.5mm terminally threaded k-wires were passed in a retrograde fashion from proximal shaft of humerus across the fracture into humeral head in a divergent fashion. 1-2 wires passed pragrade from greater tuberosity into the medial proximal humerus across the fracture site, preventing damage to neurovascular structures. Fixation checked under image intensifier for stability

Postoperative management
Post operatively patient was immobilized in shoulder immobilizer. Appropriate antibiotics and analgesics were used. Post-op X-rays were taken.

III. FOLLOW UP AND REHABILITATION
• Patient was asked to come for follow up in OPD after seven to ten days post surgery for X-rays to check for secondary displacement of fracture and pin migration.
• Patients were started on gentle shoulder movements at three weeks from surgery as permitted by pain.
• Flexion/Abduction was permitted and rotation was restricted till fracture union.
• X-ray evaluation was done at six weeks post surgery to assess fracture union and k wires were removed in the clinic after conformation.
• Physiotherapy was continued to regain shoulder movements. Clinical checks was carried out at monthly interval till complete fracture union was achieved.
• Once radiological evidence of fracture healing was achieved, follow up exam was at three month intervals till complete shoulder range of motion was achieved. Patients were followed up for six month post surgery or till when full ROM at shoulder was achieved if this was earlier than six months.

Methods of evaluation

Functional results were evaluated according to constant score

Observations and results
The minimum age of the patients in our series was 32 years and the maximum was 78 years with mean age of 56.60 years. Of all the 25 cases, 12 of them were in fifth and sixth decade of life comprising 48% of the total patients.

Males predominates with incidence of 68% of the total number of patients while females constituted 32% of the total number of cases.

The involvement of left and right extremity was almost equal. 16 patients had injury on right side and 9 had on left side.

Road side accidents were the mode of injury in 10 out of 25 cases. In 15 patient the mode of injury was fall.

Nineteen out of twenty five patients had no associated injury. Six patients had other injuries along with proximal humerus fracture. Out of these six patients two patients had BTC and one had BTA. One patient had HI and two patient had pelvic fracture which were managed conservatively.

In our study, six patients had hypertension, four patients had diabetes mellitus, two patients had both hypertension and diabetes mellitus. One patient had bronchial asthma.

One of total 25 patients, 9 patients had two part fracture 15 patient had 3 part fracture and 1 patient had 4 part fracture.

Out of twenty five patients, twenty patients were operated within 1-4 days of injury and five patients were operated within 5-7 days of injury due to medical problems or associated injuries.

Average union time for fracture to unite was found to be 9.5 weeks which was not very different from other modalities of treatment. The minimum time for union was six weeks and maximum time was twelve weeks.

Out of twenty five patients, three patients had superficial pin infection. Two patients had malunion. Four patients had both malunion and stiffness. Two patients had pin loosening. One patient had proximal pin migration. No patients were found to have non union or avascular necrosis of the humeral head.

2(8%) of the patients had flexion between 150 degree to 180 degree. 14 (56%) of the patients had flexion between 120 degree to 150 degree. 8 (32%) of the patients had flexion between 90 degree to 120 degree. 1 (4%) of the patient had flexion less than 90 degree.

9(36%) patients had abduction between 120 and 150 degree. 13 (52%) patients had abduction between 90 and 120 degree. 3 (12%) patients had abduction less than 90 degree.

4(16%) patients had an external rotation between 60-90 degree that is hand above head and elbow forward. 13 (52%) patients had an external rotation between 30-60 degree that is hand behind head and elbow back. 8 (32%) patients had an external rotation less than 30 degree that is hand behind head and elbow forward.

4 (16%) patients had internal rotation (dorsum of hand) up to the buttocks. 3(12%) patients had internal rotation (dorsum of hand) up to the SI Joint. 11 (44%) patients had internal rotation...
(dorsum of hand) up to the waist. 7(28%) patients had internal rotation (dorsum of hand) up to the T12 level.

17 patients had no pain while 8 patients had mild pain.

Functional results were evaluated by Constant score. The Constant score was graded as poor (0% - 55%), moderate (56% - 70%), good (71% - 85%) or excellent (86% - 100%). In our study average Constant score was 73.65%. Minimum Constant score was 44% and maximum constant was 89%. Patient with Constant score 89% had two part proximal humerus fracture. K-wire fixation was done and mobilisation was started after four weeks. Patient was well educated 40 years male with great motivation. He attained range of motion up to 150° in front and lateral elevation. The only problem was mild pain while sleeping on the affected side. The union time was 1.5 months and there was no complication. Patient having minimum Constant score (44%) was a 73 years male with four part proximal humerus fracture. Front and lateral elevation was less than 90 degree. The union time in this case was eleven weeks.

In our study out of 25 patients, 9 had two part fracture with mean age of 45.55 years and average union time of 7.66 wks, with the mean constant score of 80. Of 9 patients with 2 part fracture, 7 had union time between 6-8 wks in remaining, 2 patients union time of 9-10 wks.

In our study, 15 patients had 3 part fracture with man age of 60.73, union time of 8.6 wks, and mean constant score of 65.86. out of these, three patients had poor results with restriction of movements and persistent mild pain and varus malunion. Two patient had malunion with satisfactory range of movements.

Correlation time of scores of age, union time and results for four part fracture

<table>
<thead>
<tr>
<th>Age</th>
<th>Union time</th>
<th>Complication</th>
<th>Constant score</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>73</td>
<td>11</td>
<td>Mal &amp; ST</td>
<td>44</td>
<td>Poor</td>
</tr>
</tbody>
</table>

This patient had severe restriction of movements and malunion, decreasing neck shaft angle less than 120 degree, probably due to comminution of bone which got impacted after reduction, leading to varus malunion.

Results

<table>
<thead>
<tr>
<th>Results</th>
<th>No. of cases</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>Good</td>
<td>11</td>
<td>44</td>
</tr>
<tr>
<td>Moderate</td>
<td>6</td>
<td>24</td>
</tr>
<tr>
<td>Poor</td>
<td>4</td>
<td>16</td>
</tr>
</tbody>
</table>

Out of twenty five patients of two or three and four part fracture proximal humerus, managed with percutaneous k-wires in our study, 16% had excellent, 44% had good, 24% had moderate and 16% had poor results.

Summary

- A total of 25 patients with two, three or four part fracture proximal humerus managed with percutaneous k-wires fixation were evaluated.
- The minimum age of the patients in our series was 32 years and the maximum was 78 years with mean age of 56.60 years.
- Males predominated with incidence of 68% of the total number of patients while females constituted only 32% of the total number of cases.
- 64% patients had injury on right side and 36% had injury on left side.
- Road side accidents were the mode of injury in 10 out of 25 cases. In 15 patient the mode of injury was fall.
- The average time from injury to surgery was 3.08 days. While most of cases operated within four days, one patient (4%) took six days to operate, as he had associated head injury and was managed for the same.
- Of the total 25 patients, 9 patients had two part fracture 15 patients had 3 part fracture and 1 patient had 4 part fracture.
- Nineteen out of twenty five patients had no associated injury. Six patients had other injuries along with proximal humerus fracture. Out of these six patients two patients had BTC and one had BTA. One patient had HI and two patients had pelvic fracture which were managed conservatively.
- In our study hypertension was the most common medical history. Hypertension present in 6 patients (24%). In two patients hypertension associated with diabetes mellitus. Diabetes mellitus was present in total 4 patients (16%). Bronchial asthma is present in 1 patient (4%).
- Average union time for fractures to unite was found to be 9.5 weeks which was not very different from other modalities of treatment. The minimum time for union was six weeks and maximum time was twelve weeks.
- Two patients had malunion. Four patients had both malunion and stiffness (forward and lateral elevation less than 120 degree, external rotation with hand behind head and elbow forward and back, and internal rotation with dorsum of hand up to buttock or S.I. joint). Three patients had superficial infection. Two patients had proximal pin migration. No patients found to have nonunion or avascular necrosis of the humeral head.
- In our study average Constant score was 70.04%. Minimum Constant score was 44% and maximum Constant was 89%.
- Out of twenty five patients 16% had excellent, 44% had good, 24% had moderate and 16 % had poor results.

Our results are similar to or better than the results reported in literature when k-wire fixation was done in two, three or four part fracture proximal humerus.

In conclusion, fixation of two, three part fracture proximal humerus with percutaneous k-wire after stabilization of the patient gives good functional results in terms of final range of movement achieved and acceptable rate of complications, but four part fracture has high complication rate of malunion and stiffness.

IV. CONCLUSION

- The advantage of close reduction and percutaneous pinning include avoidance of devascularization of fracture fragment, decreasing risk of injury to soft tissue and blood vessels.
- As Proximal humerus fractures are metaphyseal fracture so heals quickly and

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provide a unique opportunity for temporary fixation till fracture union occurs. This can be easily done by temporary insertion of percutaneous pins for two and three part fractures.

Comparable results with fair to good functional outcomes can be obtained with close reduction percutaneous pinning of proximal humerus fracture.

Isolated greater tuberosity fractures and displaced four part fractures are less amiable to treatment with this modality and are more likely to heal in some amount of malunion.

Despite some degree of malunion and stiffness patients are not significantly compromised in their activities of daily living.

Complications though present are not with lasting sequel and can be managed easily.

This is an easy technique and particularly attractive because of the minimally invasive approach and predictably favourable outcomes in majority of patients.

The fixation method is more biologic and reduces cost and hospital stay, and allows for early fracture healing.

V. RECOMMENDATIONS

- Percutaneous k-wires fixation is recommended in young motivated patients with two and three part fracture.
- Complication associated with k-wires fixation were few and functional outcomes were comparable with other studies. Complication associated with open reduction can be avoided.
- Four part fractures had high complication rate of malunion and stiffness, so it is not recommended for percutaneous fixation.
- It is type of biological fixation, in the sense that it does not compromise circulation of humeral head.
- It decreases duration of hospital stay.

REFERENCES


AUTHORS

First Author – Dr.Satish Agarwal. Assistant Profesfor M.L.B.Medical College Jhansi, Dept Of Orthopaedics
Second Author – Dr.Amit Sehgal. Associate Professeor,M.L.B. Medical College Jhansi,(Corresponding Author)
How Quality of Life Affects Emotional Intelligence and Marital Adjustment in Menopausal Women

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²Assistant Professor, Clinical Psychology, Department of psychiatry, Geetanjali Medical College & Hospital, Udaipur, Rajasthan, India

Abstract- Background: Due to menopause, body makes less of the hormones estrogens and progesterone so that very low level of estrogens after menopause can affect health. And menopause leads to Marital Adjustment (MA) and Emotional Intelligence (EQ) in women. Aim: the main aim of the study is to how quality of life affects emotional intelligence and marital adjustment in menopausal women. Sample: 60 sample were selected purposively from the Geetanjali Medical College & Hospital, Udaipur (Raj). Method: Factorial research design was used and data has been collected by using Quality of life scale, Emotional Intelligence Scale, and Locke Wallace Marital Adjustment Test. Result: The result shows significant association of quality of life over marital adjustment and emotional intelligence and there is significant correlation find in quality of life and marital adjustment means low quality of life leads to increase marital difficulties and it is similar in emotional intelligence that there is an impact of quality of life on emotional intelligence. And another finding is that there is a significant correlation between marital adjustment and emotional intelligence. Emotional intelligence and marital adjustment has significant correlation in menopausal women. Conclusion: The study indicates that Quality of life has significant effect on emotional intelligence or marital adjustment in menopausal women.

Index Terms- Quality of life (QOL), Emotional intelligence (EQ), Marital adjustment (MA), Menopausal women

I. MENOPAUSE

Menopause is the transitional period in a woman's life when her ovaries start producing less of the sex hormones estrogen and progesterone. A woman who has her ovaries surgically removed immediately enters menopause.

Meaning of menopause

Menopause is literally the very last period of a women reproductive life and it is said that it occur when a women has not menstruated naturally for 12 consecutive months.

Robert A Wilson, another of feminine forever and the popular messiah of hormone replacement therapy (HRT) writing in menopause- “the loss of womanhood and the loss of good health” claims that menopause is the serious medical condition endangering the health and happiness of any women.

Historical Aspect:

Three major milestones presence in the history of menopause:

1. The first event was the achievement of Butenandt; he was a noble prizewinner in chemistry. He succeeded in 1929 in obtaining in pure form a hormone from the wine of pregnant woman, which was eventually called Estrogen.

2. The second development was the publication of book in 1966 which was published by Robert, A Wilson M.D. Ebtutked “Feminine forever” which become an instant best seller. The popularized theory of this book called “Estrogen Replacement Treatment” or “Hormone Replacement Therapy”

3. The third major landmark was the publication of an editorial and two original articles in the New England Journal of medicine of December 4, 1975. Claiming an association between exogenous estrogen and endometrial cancer.

The hypothalamus, anterior pituitary gland and gonads (ovaries) work together to regulate the menstrual cycle. Gonadotropin releasing hormone from the hypothalamus stimulates luteinizing hormone (LH) and follicular stimulating hormone (FSH) release from anterior pituitary gland. LH and FSH are gonadotropins which act primarily on the ovaries in the female reproductive tract.

II. SIGNIFICANT OF THE STUDY

The study on the topic “How quality of life affects emotional intelligence and marital adjustment in menopausal women” is very relevant in present society. Health is an important factor that contributes to human well-being and economic growth. Currently in India women has to face various health issues, which directly affect the aggregate economy output. Every year we celebrate mother’s day and women’s day or we show love and respect to women that how important she has in our lives but this is a only one side story. India tops the list of countries that are said to have highest mortality rates during delivery or even highest number of non school going girls. In various health issues of women currently menopause is a major problem.

Menopause signs the end of a women’s period. In the months to year before menopause a time called “perimenopause” means the production of hormones that regulate the menstrual cycle changes.

Average age of menopause is 45 to 50 but there is a wide range some women have their last period in their 40s.
Anything that damages the ovaries or stops estrogen production can cause menopause to occur earlier. These include:

- Smoking
- Surgery to remove ovaries
- Radiation therapy

Apart from this almost every women who suffer from menopausal problem also have difficulties with Quality of life, Emotional Intelligence and Marital Adjustment.

**International Scenario**

Menopause defined as a cessation of menstrual period it’s occur naturally in most women with the aging of worldwide population in the coming decades, it is estimated that 1.2 billion women worldwide will be menopausal or premenopausal by the year of 2030. It is estimated that 85% of postmenopausal women have experienced a menopause related symptoms in their lifetime and vasomotor symptoms is estimated 40 to 50 million women in United States (29)

Apart from quality of life, marital adjustment and emotional intelligence (EQ) also have important aspect in menopausal women. Menopausal symptoms affect individual’s quality of life. As well as may cause of difficulty in marital adjustment and emotional intelligence.

**National Scenario**

India has a large population. A project frame in 2026 have estimated that the population in India will be 1.4 billion, people over 60 years 173 million, and the menopausal population 103 million. Average age of menopause is 47.5 years in Indian women with an average life expectancy of 71 years. 35–40% of women between 40 and 65 years have been detected to suffer from osteopenia whereas 8–30% suffers from osteoporosis. Premature menopause in India has been noticed anecdotally to have an increasing incidence and greater prevalence in India. There is an wide burden of surgical menopause in India. A significant number of hysterectomies are performed with bilateral oophorectomies (28)

**III. STATEMENT OF THE PROBLEM**

How quality of life affects marital adjustment and emotional intelligence in menopausal women.

**Menopause:** Menopause happens when fertility and menstruation end. And It is a normal process, not a disease, but it can cause drastic changes in women life. (5) more than 80% of the women experience physical or psychological symptoms in the years when they come near to menopause, with various distresses and disturbances in their lives, leading to a decrease in the quality of life. Women in dissatisfying marriages or marital adjustment, characterized by less social support, less depth, and higher conflict, reported increased stress (4)

**Quality of life:** quality of life means general well being of individual and societies. Quality of life includes not only wealth and employment but also the built environment, physical and mental health, education and recreation and social belonging.

**Marital Adjustment:** marital adjustment describes the experience of a married couple acclimating to a marital relationship. New marriages begin with a period of marital adjustment as both spouses learn to adapt to the marriage. Women’s quality of life affected by family function and marital adjustment in family.

**Emotional Intelligence:** emotional intelligence quotient is the ability to recognize their own emotion and those of others use emotional information to guide thinking and behavior, and manage and or adjust emotions to adapt environment and achieve goal.

**Objectives:**

- To analyze how quality of life affects marital adjustment in menopausal women
- To analyze how quality of life affects emotional intelligence in menopausal women
- To find out the correlation between emotional intelligence and marital adjustment in menopausal women.

**Hypothesis:**

- H1 There will be significant impact of quality of life on emotional intelligence.
- H2 There will be significant impact of quality of life on marital adjustment.
- H3 There will be correlation between emotional intelligence and marital adjustment in menopausal women.

**Review of literature**

There has been a study conducted on Four hundred and eighty-one women aged 40-59 years attending the Southern Metropolitan health service in Santiago de Chile were studied using the Quality of Life Questionnaire for Menopause from Toronto University. The analysis showed that menopausal women have worse Quality of life scores than women conserving cycles in the four areas of the questionnaire: They show a 10.6-fold higher risk for suffering vasomotor disorders affecting QoL, a 3.5-fold higher risk for psychosocial impairment, a 5.7-fold higher risk for physical disorders, and a 3.2-fold higher risk for sexual disorder (20)

Another study found in the health care centers in Kashan City and 700 menopause women were selected using cluster sampling method findings showed that menopausal women had worse QOL in sexual and vasomotor domains. Several studies indicated that QOL was impaired in menopausal women, because menopausal phase is related with several physical and mental changes that may impact women’s health outcomes (21)

This Study were done by Zolinda Stone man and Susana Gavidia-Payne (2006) Marital Adjustment in Families of Young Children With Disabilities and in this study 67 families were included. And the result of this study is that Most of the couples were experiencing average to above average marital adjustment. Husbands and wives viewed their marriages more negatively (23)

Another study was conducted in Social Security hospital in Zahedan and the sample size was 103. Aim of study is to determine the relationship between quality of life and marital satisfaction in nurses in Social Security hospital in Zahedan. Results of study demonstrated the importance of pay attention to family issues and
marital satisfaction and in this regard, the promotion of all aspects of quality of life is essential. (24)

This study was conducted by Rakesh Pandey and Tulika Anand and suggests that emotional intelligence (EI) is a factor of chief importance in adjustment to life. And this study believed that couples with high EQ are good at understanding each other’s emotions and feelings which, in turn, enhances marital adjustment and happiness in their life. The sample size was 32 and thirty two married couples completed a set of self-report questionnaires consisting measures of emotional intelligence, marital adjustment, health and well-being. (26)

Material and Methods

Research design: Factorial Research Design

<table>
<thead>
<tr>
<th>Quality of life</th>
<th>Emotional intelligence(EQ)</th>
<th>Marital adjustment(MA)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of life.</td>
<td>Emotional intelligence</td>
<td>Quality of life.</td>
</tr>
</tbody>
</table>

Variables

Independent variable: Quality of life

Dependent variable: marital adjustment and emotional intelligence

Sampling

- Sample size: 60 Consecutively selected samples
- Sampling technique: purposive sampling
- Type of study: Observation type.
- Type of data: Secondary data.

Sampling criteria:

Inclusion criteria:
1. Subject whose age is between 45 to 55 year and who are attending to Geetanjali medical college and hospital
2. Subject who understand English and Hindi language
3. Subject who are willing to participate in research study
4. Both rural and urban patients were taken for the study

Exclusion criteria:
1. Subject who don’t understand Hindi and English language
2. Subject who are under 13 to 45 year
3. Subject who are suffer from gynecological disorder, serious illness, physical stress
4. medications that affect menstruation include
   - antipsychotics
   - cancer chemotherapy
   - antidepressant

The data has been collected by using following psychological tools:

<table>
<thead>
<tr>
<th>Psychological test</th>
<th>Developed by</th>
<th>year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of life scale</td>
<td>John Flanagan</td>
<td>1981</td>
</tr>
<tr>
<td>Emotional quotient test</td>
<td>Dr. Dalip Singh and Dr. NK Chadha</td>
<td>2006</td>
</tr>
<tr>
<td>Locke Wallace test</td>
<td>Locke, H. J.,&amp; Wallace , K.M.</td>
<td>1959</td>
</tr>
</tbody>
</table>

IV. STATISTICAL ANALYSIS:

After finding mean and SD scores; correlation has been found by using Karl Pearson’s product movement correlation and significant by using t value.

V. OBSERVATION AND RESULT

The present study conducted in the Department of psychiatry of Geetanjali Medical College & Hospital, Udaipur Rajasthan. Sixty menopausal women were taken for this study whose age is between 40-45.

<table>
<thead>
<tr>
<th>Marital adjustment</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>23.15</td>
<td>3.76345</td>
<td></td>
</tr>
</tbody>
</table>

Table A1 shows the mean and SD value of marital adjustment in menopausal women. Mean value is 23.15 and SD value of marital adjustment is 3.76345 respectively.

<table>
<thead>
<tr>
<th>Emotional intelligence</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>255.25</td>
<td>43.99947</td>
<td></td>
</tr>
</tbody>
</table>

Table A2 shows the mean and SD value of emotional intelligence in menopausal women. Mean value of emotional intelligence is 255.25 and SD value is 43.99947 respectively.

<table>
<thead>
<tr>
<th>Quality of life</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>60</td>
<td>63.01667</td>
<td>16.45074</td>
<td></td>
</tr>
</tbody>
</table>

Table A3 shows the mean and SD value of quality of life in menopausal women. Mean value of quality of life is 63.01667 and SD value of quality of life is 16.45074 respectively.

<table>
<thead>
<tr>
<th>Level of Marital adjustment</th>
<th>Emotional intelligence quotient</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficulties in relationship(&lt;=14)</td>
<td>0</td>
<td></td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Neutral(14-27)</td>
<td>53</td>
<td>252.6415</td>
<td>42.56899</td>
<td></td>
</tr>
<tr>
<td>Happy(&gt;27)</td>
<td>7</td>
<td>275</td>
<td>53.07228</td>
<td></td>
</tr>
</tbody>
</table>

Table A4 shows the level of marital adjustment level over emotional intelligence quotient in menopausal women. And categorized are level of marital adjustment of difficulties in relationship (<=14) and EQ value are (N=0, mean =nil, SD = nil) and Neutral (14-27) level of MA AND EQ are (N = 53, Mean =...
252.64, SD= 42.56), and Happy (>27) MA and EQ are (N=7, Mean = 275, SD = 53.07)

![Emotional Quotient](image)

**Figure 4** Average emotional intelligence quotient and marital adjustment among menopausal women

<table>
<thead>
<tr>
<th>Level of Marital adjustment</th>
<th>Quality of life</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficulties in relationship(&lt;14)</td>
<td>0</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Neutral (14-27)</td>
<td>53</td>
<td>60.69811</td>
<td>17.40202</td>
<td></td>
</tr>
<tr>
<td>Happy (&gt;27)</td>
<td>7</td>
<td>75.71429</td>
<td>10.68822</td>
<td></td>
</tr>
</tbody>
</table>

Table A5 shows the means and SD of quality of life over marital adjustment (MA). Level of marital adjustment <14 and mean and SD value of quality of life is (N=0, Mean = nil, SD = nil) and level of MA from 14-27 and mean and SD of QOI is (N= 53, Mean=60.69, SD= 17.40) and Level of MA >27 and in quality of life (N =7, Mean = 75.71, and SD = 10.68).
Table -B1: Correlation, t – score, and p value of emotional intelligence quotient with quality of life.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>r</th>
<th>t score</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional intelligence</td>
<td>60</td>
<td>255.25</td>
<td>43.99947</td>
<td>0.114382</td>
<td>31.7</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Quality of life</td>
<td>60</td>
<td>63.01667</td>
<td>16.45074</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table B1 shows the correlation, t score and p value of emotional intelligence quotient with quality of life
- The correlation of emotional intelligence quotient with quality of life was found 0.114382; t score was found 31.7 which is significant at <0.0001 level of significance.

Table – B2: Correlation, t - score, and p value of marital adjustment with quality of life

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>r</th>
<th>t score</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marital adjustment</td>
<td>60</td>
<td>23.15</td>
<td>3.76345</td>
<td>0.196248</td>
<td>18.3001</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Quality of life</td>
<td>60</td>
<td>63.01667</td>
<td>16.45074</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table B2 shows the correlation, t –score and p value of marital adjustment with quality of life
- The correlation of marital adjustment with quality of life was found 0.196248; t score was 18.3001 which is significant at <0.0001 level of significance

Table – B3: Correlation, t -score and p value of emotional intelligence and marital adjustment.

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>r</th>
<th>t score</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional intelligence</td>
<td>60</td>
<td>255.25</td>
<td>43.99947</td>
<td>0.181964</td>
<td>40.72</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>Marital adjustment</td>
<td>60</td>
<td>23.15</td>
<td>3.76345</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table B3 shows the correlation, t score and p value of emotional intelligence and marital adjustment
- The correlation of emotional intelligence quotient and marital adjustment was found 0.181964; t score was
Emotional Intelligence: 

H1: There will be significant impact of quality of life on emotional intelligence

The emotional intelligence quotient has significant impact on quality of life. Table B1 shows the correlation and significance of quality of life on emotional intelligence quotient. The positive correlation has been found between emotional intelligence and quality of life. That means emotional intelligence directly affects the quality of life they both are positively correlated. As the level of emotional intelligence decreases which means that level of quality of life also decrease. The level of quality of life is directly proportional to the level of emotional intelligence. In present study EQ test measures the three most important dimensions and these dimensions are directly affect the quality of life. These dimensions are sensitivity, maturity and competency. If this dimension will impaired than it will affect persons own emotion and emotional quotient (emotional intelligence).

Present study shows that if level quality of life decreases, it directly affects the self awareness of a person. They cannot manage their emotion .it also affect their self motivation, empathy, and they have difficulty in handling healthy relationship. A good quality of life includes life satisfaction, physical health; family, education; employment and wealth So when level of quality of life increase as emotional quotient also increase.

Hence first hypothesis is accepted

These finding are supported by following studies.
A study conducted by Naemeh Alibabaie to assess the level of Relationship between quality of life and emotional intelligence and life satisfaction and this study shows that higher scores in emotional intelligence shows better quality of life and life satisfaction. And this research finding showed that emotional intelligence had a significant positive correlation with quality of life.

Marital adjustment:

H2: There will be significant impact of quality of life on marital adjustment.

Table B2 give a description of the correlation values and significant impact of quality of life and marital adjustment. Result shows the positive correlation between quality of life and marital adjustment. They both show significant correlation. Means good quality of life directly proportion to happy married life and marital satisfaction. This present study indicates that a woman who has score higher in quality of life has good married life and difficulty level is low in their married life. When women have good and healthy relationship with their partner are more happy than women who has not have good quality of life. When women has good quality of life they can easily balance their life like handling family finances or matter of recreation and demonstration of affection, their family and friends and philosophy of life and ways of dealing with in laws this all situation they can handle easily if their quality of life will good. And this all things more affect easily in menopausal women.

Hence; second hypothesis is accepted.

This Study were done by Zolinda Stone man and Susana Gavidia-Payne (2006) Marital Adjustment in Families of Young Children With Disabilities and in this study 67 families were included. And the result of this study is that Most of the couples were experiencing average to above average marital adjustment. Husbands and wives viewed their marriages more negatively(24)

Another study was conducted in Social Security hospital in Zahedan and the sample size was 103. Aim of study is to determine the relationship between quality of life and marital satisfaction in nurses in Social Security hospital in Zahedan. Results of study demonstrated the importance of pay attention to family issues and marital satisfaction and in this regard, the promotion of all aspects of quality of life is essential. (25)

Emotional intelligence and marital adjustment:

H3: There will be correlation between emotional intelligence and marital adjustment in menopausal women.

Table B3 shows the correlation values and significant difference of emotional intelligence and marital adjustment in menopausal women. Result revealed positive correlation between emotional intelligence quotient and marital adjustment in menopausal women. Level of marital adjustment and emotional intelligence positively correlated with each other. Result shows significance correlation between marital adjustment and emotional intelligence means if women has low EQ (emotional intelligence ) she also have difficulty in marital adjustment. And other side if women has difficulty in marital adjustment that means she will definitely have a low EQ (emotional intelligence).

In low EQ women think that other people are overly sensitive and getting in lots of argument and often refusing to listen to other point of view so this all low EQ symptoms affect directly to the marital adjustment.

Hence: third hypothesis is accepted

A study conducted by Suvarna Joshi and Nutankumar S. Thinguajam in university of pune on perceived emotional intelligence and marital adjustment: Examining the Mediating Role of personality and social Desirability. The sample was 60 married couple. Results showed that cohesion and overall marital adjustment were related to all the sub-scales and overall emotional intelligence. Consensus and satisfaction subscales of marital adjustment were also related to overall and subscales of emotional intelligence except utilizing emotion subscale. Further results indicated that overall emotional intelligence’s correlation with overall marital adjustment remained significant after controlling for social desirability, extraversion, agreeableness, and conscientiousness.

VII. CONCLUSION

During this study it has been found that level of quality of life affect the level of emotional intelligence quotient and level of marital adjustment in menopausal women. Emotional intelligence (EQ), Marital adjustment (MA) and Quality of Life (Qol). These variables are closely associated with each other. Quality of life has major impact on area of emotional intelligence (EQ) and marital adjustment. Emotional intelligence areas include self awareness, managing emotion and self motivation and empathy this areas
affected in emotional intelligence. The marital adjustment includes difficulty in dealing with in laws and conflict with partner occurs when level of quality of life low in menopausal women.

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The Process of Representation of Junior High School Students’ in Solving Integers Word Problems

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Abstract- Research has an intention to describe the process of a student’s representation who has a high, medium, and low ability in solving integer word problems. The method used is qualitative. From 35 participants, three subjects are selected with each of them has either high ability, medium ability, and low ability. The data is retrieved by using ‘think aloud’ method. After that, the data will be analyzed after the interview with the three selected students. The process of representation problem consists of problem translation and problem integration. After going through the problem of representation, the problem-solution will take the role of external representation of the students. The research result shows that the low-ability student described in a pictorial way with the incorrect answer. Medium-ability students used schematic in problem-solving with the incorrect answer. And the high-ability student used both pictorial and schematic in problem-solving with the correct answer. The students' answers are affected by the process of representation so it’s possible to get either the correct answer and incorrect answer.

Index Terms- representation, integers, process

I. INTRODUCTION

Many students are afraid of math. Paradigm will be difficult to learn mathematics and will shadow creepy math teacher who is always in the minds of students. Thus making the students rigid in following math. Prediction will have difficulty in understanding mathematics students is the focus of teachers in mathematics [1]. Many students who take lessons and solving mathematical problems in a way that has been presented by the teacher without the use of a representation according to their own thoughts. Teachers should assign learning strategies for the success of learning [2]. Set of learning objectives NCTM [3] students to understand mathematical concepts and make the problem becomes easy to solve using the representation [4,5].

The representation consists of internal and external [6,7,8]. The internal representation is an image of the student's image stored in the mind [7,9]. As with the external representation of something written that students in the form of pictures, words or symbols [5,7,10].

Previous knowledge is required to build an internal representation of the students [7,10] and the information he had received [10]. The internal representation is unique because of the formation are not viewable by anyone else directly [7]. The representation shown is not the same students [11] and the students can show multiple representations [8,11,12].

In resolving the issue is the process through which the students. The first problem of representation and the second problem solution [13]. Translation problems consist of two phases: translation and integration [13]. Translational stages depend on the linguistic abilities of students, to understand the problem. [13] Stages of integration depends on the interpretation of the students in the form of visual representation. [1,13]. A visual representation of an advanced student is very important because it can determine the next step in solving the problem of students [1]. In problem solution, students can use some representation [8,11,12] as a visual representation [1,14,15,16,17] who have used students in the integration phase [13], verbal representations (written words) symbolic representation (mathematics expression) [8,11,12].
Researchers are particularly interested in the process of student representation. Because rarely examined regarding student representation. Starting from the representation of problems and problem-solving. Researchers chose the problem of word problems in the material integers. The integer is the basis used to further understand the material such as algebra, arithmetic, etc. [18]. So if essentially not strong then to proceed further material will also be difficult [18,19]. Students have difficulty in operating problems [14,15,16,19], word problems [13,19] and producing a model of integers with [14,15,16,18,19].

This study reveals the process of representation of students in problem-solving word integers. How students representation process of translation problems and the problems of integration. what are the representations used by students in problem-solving? This study is aimed at students who have math skills category is, low and high. So that raises the question of research, (1) how the representation of students with problems of mathematical ability is low, medium, and high? (2) what kind of representation that students use mathematics capable of the low, medium, and high in problem-solving?

II. THEORETICAL BACKGROUND

This study was motivated by previous research and current authors will further investigate the process of representation for word problems on integers.

a. Representation of internal and external

The author describes the representation shown by the students to understand the problem and resolve the issue so that it shows the students' answers. Comprising representation internal representation and external representation [4,6,7,8] appearing in parallel without any replacement between the two. Internal representation expresses the ideas in the minds of students [4,7], a part of mental activity [12], the image you have in mind. It's hard to express the internal representation of students because other people can not catch someone with direct internal representation.

External representation includes a visual representation that is used to solve the problem [1,14,15,16,17] can be either (1) images (2) table or graph [1,7], (3) verbally expressed in writing using the phrase student or orally [4,7,12]. Houses are represented by everyone in different ways. Internal representation works with the knowledge of the house through the shadow of the real house. Some people imagine the house is not like a house building, but imagine the room in the house. Internal representation may also appear as an imagined harmonious relationship with residents who are in the house. External representation may appear with the words 'home', or to describe the representation of the object of building a home, or can also describing the building complete with the garden. Or also can draw a plan of the room. It may be different for each individual. The internal representation can only be understood by the subjects who experience the event itself unless he tells the internal representation to others. However, the external representation can be felt or seen the senses themselves or others.

The internal representation can only be accessed by the five senses themselves and can be understood by others using external representation [4]. Others can understand the internal representation of a person if it is delivered orally internal representation that he had. Teachers transfer knowledge using external representation on the board, powerpoint slide, or other means. Students capture this information can then perform an internal representation, then students using external representation to write in their book. It was revealed that the internal representation can not be separated from the external representation. And the interaction between them in understanding a problem [4,20].

b. The process of representation

Troubleshooting conducted to find the correct answer [21]. The problem is understood to find what the problems were solved with the knowledge [1]. Math speaking, the operation can be done if it had been through
the mental process with the aim of solving the problem [1]. To resolve the issue is the process through which (1) the problem of representation (2) problem solution [13,22]. Problem representation describes how students understand the problem correctly to make a solution plan. When understanding the problem, visualizing a reliable strategy to solve the problem correctly [22]. Problem representation is divided into two stages: (1) the problem of translation, determine how to understand the problem by paraphrasing the problem using own words that are easy to understand, (2) problem integration, making visuals to make it easier to understand the problem correctly and make plans.

The picture presented by the students is categorized into two types (1) pictorial, produces images without regard to the relationship between the components of the problem (2) schematics, producing images with attention to relations with the components of the problem [22]. Students who only see the quantity of a problem without considering the relationship that plays a role in solving the problem will produce pictorial images and more not generate schematic

III. METHODE

a. Research design

This study uses qualitative research types. The aim is to describe how the representation process occurs in middle school students. A process referred to by the author are (1) the problem of representation (2) problem solution. Seeing the resulting images include pictures of students whether pictorial or schematic.

b. Participant

This study involved junior high school students in Surabaya who volunteered to play a role. 35 junior high school students participated in this study. Of the 35 students, the authors take each of the students with the ability level of high, medium, and low was made as a research subject. So there are three subjects in this study.

In determining the student's ability level is high, medium or low, the author first gives a mathematical ability test (TKM) to be able to classify in this category. Tests solving (TPM) are given after the students classified.

Students completing the TPM and solve problems according to their respective strategies. Researchers took the data using the think aloud. By using think-aloud researchers can tell what he was thinking by students. So that researchers know the internal representation of the external representation of the students then students write on paper. To obtain more information, researchers conducted interviews.

Once the data is obtained, the researchers analyzed the data with three-phase (1) condensing the data, select the data that is needed to be the focus and classify types of data obtained (2) data, (3) drawing conclusions, making inferences from the data analyzed [23]

IV. RESULT

35 students who participate to do TKM, researchers took three subjects to see the process of representation. The process of representation is described by the authors, as follows.

1.1. Subject SD with pictorial

Subject SD solving the problem by using pictorial and get the answer wrong. SD Subject belonging to the mathematical ability of students is low.
SD Subject depicting trees and flower pots overall. At the stage of problem translation, the subject reads the problem by looking at quantity and find the relationship that the 60-meter street trees will be installed with the same distance. Researchers concluded the subject focused on the 60 m long road and would be planted with trees and flower pots, but did not understands what to do for the next step.

P: after reading the questions, what do you think?
SD: road 60 m
P: is that all?
SD: there are trees and flower pots on the road
P: did you think of something else?
SD: no

SD wrote down what he understood the problem and rewrite the paper about what is known on the matter. After understanding the matter, SD writes down the questions asked by the use of words.

P: what did you do after reading the question
SD: write down what is known and asked

To solve the problem, SD directly visualizes the tree that will be installed along the road and describe the trees into paper. SD drew 10 trees and some of them contained flower pots. As follows the conversation.

P: do you imagine anything?
SD: yes
P: what have you imagined?
SD: trees
P: is there anything else that you imagine?
SD: flower pots
P: is there anything else?
SD: No
P: do you describe what you imagine?
SD: yes, like this

With the quantity of 60 meters and the distance between the trees of 6 meters, SD directly divides 60 by 6 to get the answer 10 trees. Then SD illustrates pictorially without recalculating whether the answers he did by drawing pictorial computationally are appropriate. To answer the distance between flowerpots installed between two trees, SD answered correctly that is 2 meters. Two pots of flowers drawn SD represents the distance that should be between two trees is 6 meters.
4.4. Subject AZ with schematic

Subjects AZ using schematic in problem-solving and obtained a wrong answer. Subjects AZ are medium-capable students of mathematics.

AZ read about and get that along the road 60 meters will be installed at a distance of a 6-meter tree, so he draws two trees with lines to represent what is known in the matter of the statement to be installed by trees. Then AZ draws a triangle to represent two flower pots between two trees. From these images, AZ identifies the quantity and relationship if the distance between two trees is 6 meters long and 60 meters of the road there, then AZ will describe the second image 10 times. AZ imagined a tree as big as 10 and discussed flower pots, therefore AZ imagined something like this.
It is a pity it turns out that do AZ after knowing that there is 10 times the figure 2, AZ computing 60: 6 to obtain answers to 10. AZ did not realize that that figure 2 only he repeated 9 times. AZ did not double-check what he imagined about the image 2 will be 10 by the external representation of the image which he described only 9 times, and computing which he did.

After AZ found that there were 10 trees, AZ calculates the distance between the trees as much as 9 and multiplying it by 2 to get the flower pots installed is 18. To determine the distance between the flowerpot, AZ calculates the distance between the flower pot by describing two trees as representative and describe triangle as a representative of the flowerpot, shines the pictorial perform calculations using to get the distance between the flower pot is 2 meters. He counted if the distance between the two pots of flowers are 2 meters he gets the correct answer to the other components, namely the relationship between tree 6 meters distance. The following is an illustration of the AZ representation process.
4.5. Subject SS with schematic

The Subject SS does the problem solving by describing the schematic problem obtained from the problem. SS getting the correct answer from the image that he created.

Subject SS read the problems with identifying the quantity and relationships between the components contained in the problem. The subject then SS wrote what he understood of the matter by writing with his own words he's easier to understand what is known. Then the SS subject writes what he understands from the problem by writing it in his own words which is easier for him to understand in the known. SS saw that the relationship between the 60-meter-long road would be installed by trees with a distance of 6 meters. For a distance of 6 meters drawn him get as many trees as 2, for a distance of 6 meters that he was drawing, he got three trees. So he gets every distance relationship that he had he would divide it by 2 and then he added with a 1. Therefore, he wrote that to get a lot of trees are mounted on 60-meter road he will get the calculation.
Afterwards he described the whole tree in all the way and get the correct answer as many as 11 trees. $60: 6 + 1 = 11$

![Picture 7](Image)

After getting 11 trees, SS calculates many flowerpots by drawing them in one of the pictures between two trees. He found that the distance between the flowerpots was is 2 meters by $6: 3 = 2$. Because he imagined flower pots will be installed at the same distance so that there were 3 breaks in the flower pots. After that he was drawing the appropriate flower pot flower pots hold a shadow she will be fitted with the same distance. And with the calculation that he can beforehand tree. He imagined there were 10 break in between two trees. So as to obtain the number of flower pots she computing. And preachers got the answer there 20 flowerpots installed along the road. $6: 3 = 22 \times 10 = 20$. And he got the answer there were 20 flower pots installed along the road. The following is the flow of the SS representation process.

- **Read**
- **Find quantity**
- **Write what is known**
- **Find relational**
- **Write down what was asked**
- **Imagined**
- **Illustrate**
- **Pictorial**
- **Trees and flower pots**
- **Math expression**
- **Trees $60: 6 - 10$**
- **Visual “pictorial”**
- **Flower pots “$\frac{22}{2}$”**

Information:
- : problem translation
- : problem integration
- : problem solution
- : activities performed
- : flow of activities

V. CONCLUSION

From the representation process that students go through, students get external representation by the internal representation he imagined. The resulting representation depends on the problem representation that it goes through. Students will get the answers correctly if students not only see a problem form the quantity alone but from the relationship of the components contained in the problem. These relationships are correctly identified to produce the right schematic external representation and produce the right computation in getting answers.

The resulting representation of students can be pictorial, schematic or a combination of pictorial and schematic. Students check the answers of the results of the representation he has then compute the results of his representation.

Low-ability students produce a rich pictorial and still not be able to use the schematic in problem-solving. The resulting answer is still not quite right. Students are capable of being able to produce schematic but still there is a misunderstanding between the representation that he produces in the shadows and external representation, and computing in solving the problem. So there are still errors in getting the answers. High-ability students can combine a pictorial and schematic to get the correct answer. High-ability students using the internal representation and link the components and identify, prioritize what should he use to get the results of the correct answer.

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Differences of Superoxide Dismutase (SOD) Enzyme Levels Based on the Severity of Androgenetic Alopecia in Men

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Abstract

Introduction: Androgenetic alopecia or male pattern hair loss is a progressive hair loss caused by genetic and androgenic factors in hair follicles with characteristic shortening of the anagen phase, telogen phase elongation, and miniaturization of hair follicles which causes the hair shaft to grow thinner in each cycle. Enzyme Superoxide Dismutase (SOD) is one of the body's antioxidant defense systems. Superoxide Dismutase is important in almost all cells that are exposed to oxygen, decreased levels or their activity can cause oxidative stress status of body cells including hair keratinocytes. The severity of androgenetic alopecia in men is classified on a Hamilton-Norwood scale consisting of types I to VII.

Objective: To analyze differences of SOD enzyme levels based on the severity of androgenetic alopecia in men.

Methods: This study was an observational analytic study with a cross-sectional design involving 30 men with androgenetic alopecia who was treated at Departament of Dermatology and Venereology H. Adam Malik General Hospital Medan. The severity of androgenetic alopecia of each participant was classified into mild, moderate and severe based on Hamilton-Norwood scale and we also performed examination of SOD level.

Results: There was no significant difference in SOD enzyme levels based on the severity of androgenetic alopecia in men.

Conclusion: Androgenetic alopecia is baldness which is influenced by internal factors such as genetic and androgen, and external factors such as microinflammation. SOD levels are strongly related to the characteristics of each individual such as aging and lifestyle.

index term: Alopecia androgenetica, severity, SOD, Hamilton-Norwood scale

I. INTRODUCTION

Androgenetic alopecia or male pattern hair loss is a common progressive hair loss caused by genetic and androgenic factors in hair follicles. Its characteristics are similar in both sexes characterized by shortening of the anagen phase, elongation of the telogen phase, and miniaturization of hair follicles which causes the hair shaft grow thinner in each cycle.1-3

The severity of androgenetic alopecia in men is classified with the Hamilton-Norwood scale consist of types I to VII.1,3 According to Colgecn E et al and Abbasi J et al, the severity can be categorized into mild (I and II), moderate (IIA, III, IIIA and IV), and severe (IVA, V, VA, VI and VII).4,5

The pathogenesis of androgenetic alopecia in men influenced by androgen hormone and genetic factors.1,3 Microinflammation also plays a role in the pathogenesis of androgenetic alopecia in which DHT will increase secretion of interleukin (IL) -6 and also TGF-β1. Later it will influence oxidative stress on dermal papilla cells and inhibits proliferation of hair matrix epithelial. In addition, environmental factors such as nutrition, metabolic syndrome, smoking and ultraviolet (UV) radiation also play a role in the pathogenesis of androgenetic alopecia.6 These environmental factors influence the occurrence of oxidative stress which in turn causes an increase in free radicals and reactive oxygen compounds in androgenetic alopecia.5,8 Oxidative stress is a state of imbalance between the production of free radicals or reactive oxygen compounds with antioxidant defense systems in the body.7
The body's defense system consist of antioxidant enzymes and non-enzymes. Antioxidant enzymes are Superoxide Dismutase (SOD) contained in the mitochondria and cytosol, Glutathione Peroxidase (GPX), lutathionereductase, and catalase (CAT). Whereas non-enzymatic antioxidant defenses are micronutrient like β-carotene, vitamin C and vitamin E. SOD is an antioxidant enzyme that is important in almost all cells exposed to oxygen, decreased levels or activity can cause oxidative stress status of body cells including hair keratinocytes.

Study of Roshdy OH et al showed that the mean serum SOD level in patients with androgenetic alopecia was 67.60 ± 12.49 U / g Hb, which decreased compared to control 85.60 ± 6.6 U / g Hb (p <0.001). It was supported by study of Amirnia et al. that examined level of zinc, copper, and SOD, GPX, and malondialdehyde in androgenetic alopecia, it was found that the mean serum SOD level in patients with androgenetic alopecia was 1816.57 ± 98.79 µg / dl which decreased significantly compared to the control of 2296.89 µg / dl (p < 0.005).

Prie BE et al in his study of oxidative stress in androgenetic alopecia showed that the mean serum level of SOD enzymes in patients was 441.35 ± 26.83 U / g Hb while control was 546.85 ± 21.99 U / g Hb (p <0.01).

Nowaday, there is only few literature which discusses the differences in SOD enzyme level based on the severity of androgenetic alopecia, so we interested to know about the difference of serum levels of SOD enzymes based on the severity of androgenetic alopecia in men.

II. METHOD

This research was conducted from June 2018 to December 2019. It was an observational analytic study with a cross-sectional design involving 30 men with androgenetic alopecia who came to Departement of Dermatology and Venereology H. Adam Malik General Hospital Medan. Each participant will sign an informed consent and will undergo anamnesis, dermatological examination and blood test for SOD levels. This research was carried out after obtaining permission from the Research Ethics Commission of the Faculty of Medicine, Universitas Sumatera Utara and a research permit from the Directorate of Human Resources and Education of the Research and Development Installation of H. Adam Malik General Hospital Medan.

III. RESULTS

A total of 30 subjects, with majority androgenetic alopecia in the age group of 60-69 years as many as 10 people (33.3%) while at least in the age group> 70 years (3.3%). From the above results it can be seen that there is an increase in the prevalence of androgenetic alopecia with increasing decades of age, except at> 70 years of age. (table 1)

Table 1 Distribution by age group

<table>
<thead>
<tr>
<th>Age Group (year)</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-39</td>
<td>5</td>
<td>16.7</td>
</tr>
<tr>
<td>40-49</td>
<td>7</td>
<td>23.3</td>
</tr>
<tr>
<td>50-59</td>
<td>7</td>
<td>23.3</td>
</tr>
<tr>
<td>60-69</td>
<td>10</td>
<td>33.3</td>
</tr>
<tr>
<td>&gt;70</td>
<td>1</td>
<td>3.3</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100</td>
</tr>
</tbody>
</table>

From all the subjects, majority had family history of androgenetic alopecia as much as 21 people (70%). (table 2)

Table 2 Distribution by family history

<table>
<thead>
<tr>
<th>Family history</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>21</td>
<td>70</td>
</tr>
<tr>
<td>None</td>
<td>9</td>
<td>30</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100</td>
</tr>
</tbody>
</table>

Based on our study, the mean of duration of alopecia was 24 months with a minimum value is 6 months and a maximum value is 72 months. (table 3)

Table 3 Distribution by duration of alopecia

<table>
<thead>
<tr>
<th>Alopecia duration</th>
<th>Median (Min-Max)</th>
</tr>
</thead>
<tbody>
<tr>
<td>24 months</td>
<td>24 months (6 months-72 months)</td>
</tr>
</tbody>
</table>

Based on table 4, the severity of mild androgenetic alopecia is predominantly found in the 30-39 years and 40-49 years age groups with 50% each, for the moderate severity majority in 50-59 years age group is 60%, and for the severity severe majority in the 60-69 year age group.

Table 4. The severity of androgenetic alopecia by age group

<table>
<thead>
<tr>
<th>Age group</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>N</th>
<th>%</th>
<th>n</th>
<th>%</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-39</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>40-49</td>
<td>5</td>
<td>0</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>50-59</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>60-69</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>&gt;70</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
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<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>
Based on table 5, participant with family history of alopecia, 90% had a moderate severity androgenetic alopecia, while study subjects who had no family history, 60% had mild androgenetic alopecia.

<table>
<thead>
<tr>
<th>Family history</th>
<th>Severity of androgenetic alopecia</th>
<th>N</th>
<th>%</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td></td>
<td>4</td>
<td>40</td>
<td>9</td>
<td>90</td>
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<tr>
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<tr>
<td>Total</td>
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<td>10</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Based on table 6 it can be seen that the highest SOD enzyme levels are at moderate androgenetic alopecia which is 106.51 (0.01-1054.80) U / L and the lowest level at severe androgenetic alopecia is 24.61 (0.04-595.37) U / L. The results of the kruskal-wallis test showed the value of p> 0.05 so, there was no significant difference in SOD levels based on the severity of androgenetic alopecia in men.

<table>
<thead>
<tr>
<th>Severity of androgenetic alopecia</th>
<th>Median (Min-Max)</th>
<th>p*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>35.89 (0.03-401.92)</td>
<td>0.679</td>
</tr>
<tr>
<td>Moderate</td>
<td>106.51 (0.01-1054.80)</td>
<td></td>
</tr>
<tr>
<td>Severe</td>
<td>24.61 (0.04-595.37)</td>
<td></td>
</tr>
</tbody>
</table>

Based on table 7 it can be seen that the highest SOD enzyme levels are in the 50-59 years age group which is 94.06 (0.01-492.07) U / L while the lowest levels in the 40-49 years age group are 9.22 (0.05-1054.80) U / L. The results of the kruskal-wallis test p value> 0.05 so there was no significant difference in SOD levels based on the age group of androgenetic alopecia in men.

Table 7. Differences of SOD enzyme levels by age group

<table>
<thead>
<tr>
<th>Age group (years)</th>
<th>Median (Min-Max)</th>
<th>p*</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-39</td>
<td>62.09 (0.03-113.52)</td>
<td>0.783</td>
</tr>
<tr>
<td>40-49</td>
<td>9.22 (0.05-1054.80)</td>
<td></td>
</tr>
<tr>
<td>50-59</td>
<td>94.06 (0.01-492.07)</td>
<td></td>
</tr>
<tr>
<td>60-69</td>
<td>49.82 (0.04-595.37)</td>
<td></td>
</tr>
<tr>
<td>&gt;70</td>
<td>62.09</td>
<td></td>
</tr>
</tbody>
</table>

Based on table 8 it can be seen that SOD enzyme levels are higher in men with a family history of alopecia that is 73.75 (0.02-1054.80) U / L. The results of the kruskal-wallis test showed p values> 0.05, so there was no significant difference in SOD levels based on a family history of androgenetic alopecia.

Table 8. Differences of SOD enzyme levels based on family history

<table>
<thead>
<tr>
<th>Family history</th>
<th>Median (Min-Max)</th>
<th>p*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>73.75 (0.02-1054.80)</td>
<td>0.402</td>
</tr>
<tr>
<td>None</td>
<td>9.22 (0.01-595.37)</td>
<td></td>
</tr>
</tbody>
</table>

IV. DISCUSSION

The increasing of androgenetic alopecia prevalence by decades of age shows a connection between the aging and microinflammatory processes in androgenetic alopecia. The accumulation of oxidative stress in aging activates the inflammatory pathway mediated by IL-1α, IL-6, IL-8, which causes cellular damage to the hair's peripherals. Family history of alopecia has an important role in the onset of androgenetic alopecia which genetic factors are considered has role that greatly influences the occurrence of androgenetic alopecia. The duration of androgenetic alopecia varies depending on the onset. The onset of androgenetic alopecia usually begins after puberty and before the age of 40. Study of Lee WS showed there is a link between the history of alopecia in families with early onset other than that the early onset of androgenetic alopecia otherwise the early onset will increases the risk more severe androgenetic alopecia.

Family history of alopecia has an important role in the onset of androgenetic alopecia. Genetic factors are considered as a very influential role in the occurrence of androgenetic alopecia. Polygenic inheritance patterns are considered important in clinical phenotypes and an increased risk of the number of family members affected by alopecia. According to this study there was no significant difference in SOD levels based on the severity of androgenetic alopecia in men. Rosshdy et al's study showed there were differences in SOD levels in androgenetic alopecia patients compared to controls (67.60 ± 12.49 U / L and 85 ± 6.60 U / L (p <0.05)). Armirnia et al also revealed the same, with a value of 1861.57 ± 98.79 U / L for patients with androgenetic alopecia and 2290.77 ± 286.89 U / L for control (p <0.005). However, many studies have revealed differences in SOD levels in each degree of severity of alopecia androgenticities are very limited.

Theoretical, there is no significant differences in SOD levels were found in each of the severity of androgenetic alopecia.

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Androgenetic alopecia is baldness which is influenced by internal factors such as genetics and androgens, as well as external factors such as microinflammation. Genetics play an important role in the family's history of androgenetic alopecia. Whereas the SOD level is highly related to the characteristics of each individual such as aging and lifestyle.

VI. SUGGESTION
This research can be done with a larger sample size and age distribution in each group that is similar and has no family history, other than that by minimizing the presence of bias factors such as smoking and the use of antioxidants.

REFERENCES


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Assessment of public awareness on e-waste management: A case study of Kigali.

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DOI: 10.29322/IJSRP.10.01.2020.p9735
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Abstract. E-waste generation in Kigali has significant increases as economic change, which means a lot of uses of ICT equipment in different domains with high population willingness to use technological materials, the change of technology makes loose of existing equipment value and increased waste electrical and electrical equipment. This study was carried out to determine and comprehend the e-waste awareness and disposal practices among residents of Kigali city. The findings revealed that consumer awareness in Kigali is generally fairly good but low. However, with regard to disposal methods, residents are not informed about e-waste collection facilities, appropriate disposal methods, and electronic waste regulations. As a result, residents most of them store their e-waste in homes and mix some e-waste generated with municipal solid waste, which ends up in dumpsite which is not constructed in an environment protection manner. Respondents had a variety of environmental concerns, but they did not know the consequences, as well as the disposal of electronic waste with municipal waste or stored in homes.

Keywords: environment consciousness; awareness; waste electrical and electronic equipment (WEEE); disposal; dismantling.

1. INTRODUCTION

E-waste or waste electronic equipment (EEE), is defined as equipment dependent on electric currents or electromagnetic fields to work properly, but also any for the generation, transfer, and measurement of such currents and fields, which is discarded or have reached its end-of-life[1], but there is no standard definition, countries define e-waste with their definitions, interpretations, and usage of the term “e-waste/EEE”[2]. These includes the following categories, temperature exchange equipment, screens and monitors, lamps, large household appliances, small household appliances, IT and telecommunications equipment discarded, missed some part, or reach their end-of-life[3].

Waste generated by EEEs is growing rapidly around the world[4], especially in developing countries, people are ready to be transferred to the current trend and those who use more developed and improved technologies of electrical and electronic equipment, make the large portion in degrading EEEs before its end-of-life and generate waste electrical and electronic equipment and some transferred in low-class and middle-class income with no knowledge and facilities of e-waste management, example of phones which is upgrade day to day and reduce end of life of phone, and resulting in rising of waste of phones[5].

The irresponsible management of waste electrical and electronic equipment has adverse environmental consequences, in particular, because of the harmful content of devices, including high concentrations of hazardous substances such as mercury (Hg), lead (Pb), cadmium (Cd), hexavalent chromium (Cr), PVC and brominated flame retardants etc..[6] and contains several parts with different values in feature use that can second resources to manufacture the other needed materials, the EEE’s fractions; it contains more than 1,000 different substances in the “dangerous” and “non-dangerous” categories. These include metal, metal, plastic, glass, wood and plate, print circuits, concrete and ceramics, rubber and other elements. e-waste consists of 50% steel, followed by plastics (21%), non-metallic ferrous metals (13%) and other constituents. Ferrous metals consist of copper and aluminium as well as precious metals such as silver, gold, platinum, and palladium[7,8]. The proper treatment of e-waste is vital; ecologically, socially and economically sustainable development for the future. Today, electronic waste management includes formal and informal recycling sectors that attempt to deal with electronic waste, but on the other hand, the informal sector has become part of an adequate economy and is involved in activities illegal. The activity destroyed the environment. There is no national control[9]. The formal process of e-waste recycling facilities it’s ethical and reliable for environment sustainability, it is regal work with recycling standards begins with sorting, testing, refurbishment and repair of received e-waste, component which can be reprocessed are disassembled and sometimes shredded and sorted by automatic machines or manually[10].

This paper aims to investigate the awareness of the general public in Kigali/Rwanda, forces that leverage and downplay the adoption of e-waste practices. We emphasize that the commitment to responsible waste management, such as recycling, is not just about environmental awareness, positive environmental goals, or a global attitude towards technologies. Instead, it takes a sense of personal effectiveness and social legality to take these steps to effectively involve people. A well understanding of the impact of setting up professional recycling practices can provide valuable information for policy development and help identify key points of contact that governments, businesses, and local initiatives can explore for a fight more effectively against environmental pressures.
As far as the author knows, this is the first study on the public awareness of recycling electronic waste in Kigali / Rwanda. Therefore, we first describe the background of e-waste in Kigali, illustrating the general numbers and public opinion on solid waste issues to characterize this society. Then we review the literature to assess the potential forces that lead to facilitate recycling and recognize the limitations and alternative readings of cumulative evidence. Given the lack of research in developing societies like Kigali, we use as many lessons learned from research based on similar emerging contexts as possible.

2. BACKGROUND

2.1. e-waste in Rwanda

Rwanda is a country in Central Africa, the capital Kigali. Geographically, Kigali is located at 1°57’S 30°4’E. In 2012 [11], Kigali was 10.7% of the country’s population, and Kigali is the largest city with 745,261 residents or more million persons living in the well urban area. The garbage portion is about 70% of organic waste, about 13% of non-recycled / imported waste, about 5% of plastics (plastic bottles), about 5% of packaging, 1% of metal and 1% of the waste of electrical and electronic equipment and 1% of the hazardous waste. The average waste production is from 1800 to 2000 tons per day[12].

Rwanda faces major challenges in solid waste management[12]. The quantity of waste produced increases and most is disposed of in inappropriate landfills, with negative consequences for the environment and health. Country waste management legislation is implemented and existing efforts to recover and dispose of the waste are properly coordinated and promoted, but the lack of suitable infrastructure rests a major challenge.

Kigali's demand for EEE has increased significantly due to overall economic development and transformation due to the strong demand for various ICT tools as end-user equipment, the increases of EEEs for the side of human health and environment protection needs further treatment strategies of waste from EEEs after end of life of the equipment, and this is very complicated and due to the high price of e-waste collection, facilities are still needed, which can handle e-waste from different sources. According to a survey conducted between November 2014 and January 2015, Rwanda’s imports of EEE increased fivefold. The annual growth rate of EEE imports during 2010-2014 is estimated to be approximately 5.95% and had annual generation of 9 417 tons of e-waste; 7 677 tons (81.52%) were from individuals, 1,143 tons (12.14%) were from public institutions, and 597 tons (6.34%) were from private institutions[13], the estimation per capita was 0.9kg/inh[14].

The political and legitimate framework for e-waste management in Rwanda was widely discussed and implemented in 2018, with specific descriptions; (1) National Health Policy - a framework policy for specific policies for the management of e-waste; and (2) National electronic waste policy; The policy guidance and guidance for legal and regulatory tools apply to the management of electronic waste, and (3) The Environmental Law approved by Parliament following the Producer Responsibility Principles (Article 16 - Electronic waste management) provides a legal program of e-waste management. Legal obligations of producers and other institutions, and (4) The Regulation on e-waste accepted by the governing board of the governing body establishes the functions of the various actors, including producers and recyclers, with emphasis on maintenance and renewal and minimum license requirements, as good as sanctions and penalties for violations[14]. However, these legal agreements are largely unknown to consumers (households) and implementation between manufacturers and the informal sector is weak.

E-waste management still presents major challenges. 1) Low consumer awareness: the general public is less aware of the environment, mostly about the challenges and management of e-waste. 2) Legislative and Regulatory Framework: no law obliges consumers and producers to treat and properly recycle electronic waste or compensate the engaged parties. 3) Limited national capacity: currently, the country's capacity to process e-waste is in its infancy and e-waste in developing countries is exacerbated by dumping in the form of donations, second-hand goods or poor quality.

Therefore, it is vital to study the WEEE production model of households considered as an important source of WEEE production. The author claims to be the first to study this questionnaire with topics such as awareness level, WEEE knowledge, reasons for rejection, preferences and WEEE treatment methods. The purpose of this study is to assess the general public awareness, disposal practices and the willingness to contribute to the management of WEEE at the domestic level, and then to imply the results of international regulations and trends in the production of WEEE. This document also provides an opportunity for the accumulation of scientific knowledge from a scientific perspective of developed countries then called for the promotion of the political agenda in the WEEE management system, taking into account international development.

2.2. RWANDA ELECTRONIC WASTE MANAGEMENT INFRASTRUCTURE

The government of Rwanda has set up a dismantling and recycling facility for e-waste which is in provision of helping all e-waste generated in EAC, the dismantling facility has attracted private investment and are currently working in partnership with Enviroserve Rwanda, a subsidiary of Recycling Powerhouse in the United Arab Emirates, in line with the PPP model, and now enviroserve is working forward to sets up collection points/centers across the country[14].

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3. METHODOLOGY

This survey aimed to understand general population behaviors and awareness about e-waste. Public knowledge, and environmental awareness, e-waste management practice disposal method, EEEs utilization, and intention for purchasing new EEEs. The data were gathered using questionnaires, the sample size of the population was calculated using the Slovin’s formula; 200 population samples were used in this study; the distribution of 200 well-structured questionnaires was distributed to the populace with different characteristics; sex, age group, education, and income. 135 responses were received.

Kigali city was selected because it is the capital and biggest city of Rwanda, is located near the geographical center of the country. The city is the economic, cultural and traffic region of Rwanda, it is the first place in a country that uses EEEs, data were collected in 3 different districts within 9 sectors. The study data was analyzing all the answers to each question and comparing demographic information such as gender, age, income, and education. Due to the different demographics of the respondents, the percentages were compared. Data collected from investigations should only be used as a tool to support qualitative information.

Table 1 shows the demographic information of respondents. The factors are grouped as shown in the questionnaire with sex, age, educational qualification and income as factors to be considered. 41.15% of the respondents are male and 51.85% are female. Also, most of the respondents are within the age range of 18-29 was 37.78%, 30-49 was 45.91% and 50 or above was 16.3% which implies all categories were taken into account. In terms of educational qualification, most of the respondents possess; 11.86% was high school, 41.46% was university, and 46.67% was others (Masters and PhD), income status was arranged by 3 categories; >200$, 200$-500$, and 500 and above with the same shared number of respondents.

4. RESULTS AND DISCUSSION

E-waste is the fastest-growing waste streams in the globe due to innovation, due to rapid growth in production and demand for EEE. However, once EEE becomes waste, proper disposal becomes a major problem as it contains many toxic metals. Inappropriate practices in developing countries have negative effects on the environment and human wellbeing. Then they need the most appropriate and efficient technology for the handling of e-waste. Besides, it’s necessary to increase stakeholder awareness and enhance the active participation of individuals in the e-waste management system.

This paper was about to investigate the level of awareness about e-waste in Kigali populace, the focused points were: knowledge about WEEE, willingness to help e-waste facilities, e-waste from household route, motivation for purchasing new EEEs, how EEE currently are in use and changed, and e-waste management policy knowledge.

4.1. EEE UTILIZATION

Table 2 explains how people use the device today. Many respondents noted that PCs, mobile phones, televisions, radios, and air condition are used first and that at least 80.52% of respondents said they owned them and use it often. Other devices such as Internet devices, electrical cooking stoves, water heater system, and cattle are used 53.3% as the remaining EEEs; washing machines, lamps, water dispensers, wires, car battery and electronic iron used at 34.1% shown in table 2. The survey revealed equipment that had been in use for 10 years 60.18%, 35.25% and 23.6 respectively.
4.2. REASON FOR PURCHASING NEW EEEs
Many publications showed the different reasons for growing e-waste most are technology and discarded devices. Technology can be the reason for certain devices to lose some functionalities, which is required even on the market use of these devices. These survey findings, 19.3% of respondents their reason for purchasing new EEEs were Physical damage, 40% of respondents are loss of function, 20.7% of respondents is needed for greater functionality, and 17.8% of the respondent is the desire for new technology.

4.3. PUBLIC KNOWLEDGE ABOUT WEEES AND THE HARMFUL EFFECTS OF CONTENT.
The survey was administered in households and was responded mainly by one member of household. Questions attempted to access how population consider unused EEE with regarding environmental sustainability, whether (i) can be taken as waste, (ii) discarded but with valuable things that can be removed for another purposes, (iii) not waste as can be repaired or reused and (iv) depend on devices functionality condition.

The respondents were asked to respond to the questions of general awareness about e-waste such as; how they consider unused Electrical & Electronic Equipment to be waste, or to have another purpose! Overall, 54.81% of respondents reported No, can be Repaired and/or Reused, 11.85% of respondents reported Can Utilize Components / Raw Materials, 11.11% of respondents reported Yes, It Is Waste and 22.22% reported that depend on equipment Conditional (dependent on whether the product is functioning) (Fig.1).

And second question about if they perceive any hazards or risks in e-waste, see any hazards or risks to the growing amount of e-waste in Rwanda (Fig.2), Overall, 15.56% of respondents reported No, 37.04% of respondents reported Yes (but no specific information), 9.63% of respondents reported Yes, Toxicity or Safety Hazard, Overall, 22.22% of respondents reported Yes, Environmental Problem, 15.56% of respondents reported Recognition of Both Health and Environmental Hazards. (Fig. 1 and 2).

![Figure 1: People that consider unused Electrical & Electronic Equipment to be waste, or to have another purpose.](image1)

![Figure 2: People that perceive any hazards or risks in e-waste, see any hazards or risks to the growing amount of e-waste in Rwanda.](image2)

4.4. E-WASTE DESTINATION ROUTE AND RECYCLING FACILITIES
E-waste source has been indicated, it is generated from 3 mains part of the community which is household (individual), public and private institutions, the survey conducted in 2014 shown hug amount of e-waste generated from the individual part which is 81.52%. This survey was about to examine e-waste from an individual since it’s helpful in recycling industries to identify strategies for the collection of this e-waste from home. Populace in responses they showed that most of them, 64.4% of respondents keep e-waste in home, 16.3% of respondents give or sell out to any person, 7.4% of respondents sold to informal system, 0% sold to formal system, 4.4% of respondents disposed in trash and 7.4% responded another manner (Fig.5).
Recycling facility is compared as the link between users and waste management facilities, and important step toward the other treatment such as recycling, removing valuable materials, dismantling and disposal of residuals. Findings of this survey 67.4% of respondents shown no collection Centre or company collect their e-waste, 17.8% of respondents shown their e-waste collected by the informal sector, while 14.8% of respondents showed their e-waste collected by formal sector (fig.6).

4.5. KNOWLEDGE ABOUT E-WASTE MANAGEMENT POLICY

Rwanda Government established State E-waste Management Policy to tackle E-waste dares, to build awareness of E-waste management, to support capacity building and knowledge in e-waste management, and to avoid an e-waste crisis. We attempted to assess the population knowledge about this policy which is very helpful in e-waste management.

The question was concerned about what people know about any electronic waste management policies currently implemented in Rwanda? If so, what do you know of these policies? 52% stated that they don’t know anything about it, 31% stated that no knowledge of policy or governing body and 17% stated that yes, they know any related policy or governing body. These portions illustrate the low awareness about e-waste management policy in the populace.

4.6. WILLINGNESS TO GIVE UNUSED EEE TO FORMAL RECYCLERS FOR FREE OR SELL FOR FURTHER TREATMENT.

Population willingness to give discarded or unused EEEs to e-waste facilities is extremely vital for e-waste management as a large stream or source of e-waste, willingness to give out e-waste could be the alternative option of taking back system in
Kigali due to takeback system doesn’t work. This survey showed a big part (69%) couldn’t give out e-waste to recycling facilities while a small part of people wills to give out e-waste to recycling facilities for free (31%) (Fig 4).

![Figure 4: willing to give unused EEEs to formal recyclers for free or by selling.](image)

### Table 1 demographic data of respondents

<table>
<thead>
<tr>
<th>Demography variables</th>
<th>N</th>
<th>Percentage(%)</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
</tr>
<tr>
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<td>65</td>
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</tr>
<tr>
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<td>70</td>
<td>51.85</td>
</tr>
<tr>
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<tr>
<td>18-29</td>
<td>51</td>
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<td>45.91</td>
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<td>&gt;200$</td>
<td>45</td>
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</tr>
<tr>
<td>200$-500$</td>
<td>45</td>
<td>33.33</td>
</tr>
<tr>
<td>&lt;500</td>
<td>45</td>
<td>33.33</td>
</tr>
</tbody>
</table>

Table 2. EEE and utilization in Kigali
5. CONCLUSION

E-waste management in Rwanda is still in its establishment and e-waste has become a major concern for the environment and human wellbeing all over the world, in developing countries is less compared to developed nations. Therefore, to develop new strategies requires effort of all stakeholders, local authorities approach should be important step to help recycling industries through sensitization of how e-waste should be managed to protect our environment and human wellbeing for the sake of healthier future. The results of this study can help to better understand the state of electronic waste with the general public awareness as to understand the management of electronic waste, in fact general public is immense generation of e-waste. We believe these results will help strengthen the decision-making process to minimize deficient household e-waste management in Kigali City. Besides, the city of Kigali has improved waste management in general but not concerns e-waste from household, its value and the safety of treatment. According to the survey results, it appears that most respondents are ready to be more environmentally conscious, but no knowledge about e-waste in general, regulation and its management. In addition, environmental authorities should adopt more control measures for e-waste management in the city. Moreover, a thorough investigation is needed to improve e-waste management in the city.

6. ACKNOWLEDGEMENT

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Phytogeographic Distribution of Sorghum in Nigeria

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Abstract- Sorghum cultivation and distribution in Nigeria spans the entire North and Southern Region (Savannah and Rain Forest Regions). Sorghum is generally not cultivated in the Southern region hence its attribute of not thriving in the Southern regions of Nigeria. Also, relegation of Sorghum to the S. bicolor is also responsible for this assertion since wild species such as S. arundinaceum, S. vogellianum, S. aethiopicum and S. vociflorum are grown as weeds and abound in most localities in the South except for the saline environment. Herbarium specimen review and field data collection were adapted as tools to determine the distribution of Sorghum in Nigeria. Results suggests that S. arundinaceum is the most abundant species of Sorghum (in terms of distribution) in Nigeria closely followed by S. vogellianum before S. bicolor. Field studies also accounted for localities where Sorghum species exists but not recorded in the flora or herbarium archives.

Index Terms- Sorghum, Forestry Herbarium Ibadan (FHI), Morphology.

I. INTRODUCTION

Sorghum is a cereal crop that has over the years adapted to Nigeria ecosystem whilst expressing varying forms of characteristics both at morphological and molecular level. Sorghum has capacity to withstand adverse environment which confers it with a dynamic survival strategy that enables the plant to thrive in the diverse ecosystems (especially the dry regions) of the world (Habindavyi, 2009). Sorghum is distribution spans the entire tropic and arid regions of the world (Wang et al., 2015). Some research works have also reported the occurrence of Sorghum in the temperate regions as well as tropics with altitudes of about 2.3 km (ICRISAT, 2012). Sorghum, grows in almost all the ecological zones of Nigeria, however, it is predominantly cultivated in the Northern part of Nigeria (House, 1985). The top ten sorghum producing country in the world account for about 71% of global Sorghum production (FAOSTAT, 2013) cultivated on 22.25 m ha (Reddy et al. 2011).

In Africa (particularly in Nigeria, Niger, Mali, Senegal, Ghana and Burkina Faso), sorghum is cultivated in a large belt that spreads from the Atlantic coast to Ethiopia and Somalia, bordering the Sahara in the north and the equatorial forest to the south. West Africa produces about 25% of the world’s sorghum. This figure has continuously increased over the past 25 years (Wang et al., 2015) at the rate of about 7%, due to release of improved varieties and resistant species as well as improved agricultural practices (CRP 3.6, 2012).

Nigeria ranks among the top seven major sorghum producer with others as; India, USA, Mexico, Sudan, China and Argentina (Wang et al., 2015). Similarly, in Africa countries like Burkina Faso, Chad, Ethiopia, Gambia, Ghana, Mali, Mauritania, Mozambique, Niger, Senegal, Somalia, Tanzania and Yemen also contribute their own quota to global Sorghum production.

Literature Review

Sorghum is a C4 (uses an alternative method of CO₂ uptake leading to a C4 carbon cycle and reduction of losses due to photo-respiration) plant having common ancestor with maize dating back to about 15 million years ago (Thurber et al., 2013). Sorghum is the fifth most important cereal crop grown globally (Doggett, 2008) after wheat, maize, rice and barley. Nigeria is the largest sorghum producer in West Africa and accounts for over 71% of output from the region and over 35% of the entire Africa as at 2007. Nigeria ranks third in terms of sorghum production globally after USA and India (Mohammed et al., 2011). However, most (90%) of the sorghum produced by USA and India are used for animal feed hence, making Nigeria the highest producer of sorghum consumed by humans globally (FAO, 2012).

Sorghum genus is made up of twenty (25) species (USDA ARS, 2007), tough different researchers have reported varying species numbers. Some authors classified the genus on the basis of wild and cultivated forms while others based on morphology (House et al., 1995). The conflicting and diverse classification from different researchers has resulted to dynamic taxonomic characteristics of Sorghum which includes Garber who classified the Sorghum genus into five taxonomic groups namely Eu-Sorghum, Chaetosorghum, Heterosorghum, Para-Sorghum, Stiposorghum (Garber, 1950).

Sorghum has the characteristics of a typical Poaceae and a striking resemblance with Zea mays and Setaria italica (Sally et al., 2007) but the stem is thin relative to those of Zea mays. Sorghum height generally ranges from 0.5-6 m (Habindavyi, 2009) with tillers and branching roots which are visible on its main axis. Most taxonomy of Sorghum has been centered around the panicle and grain colour (Harlan and de Wet, 1972). Doggett in his work reported that domestication of sorghum started over 10,000 years ago (Doggett, 1970). Similarly, Smith and Frederiksen reported that anthropological evidence exists which suggests that as far back as 8000bc hunters gathered sorghum for use (Smith and Frederiksen, 2000). Kimber reported that sorghum was first domesticated in North Africa (Nile and Ethiopian regions) as recently as 1000 BC (Kimber, 2000). Sorghum cultivation was pivotal in the migration of Bantu (black) group of people across sub-Saharan Africa (Diamond, 1998). Similarly, Ayana and
Bekele reported that Sorghum originated in North East (NE)-Africa this account is consistent with report of Kimber (2000) however, differed in the dates of domestication as dating back to 3000 bc in Ethiopia and Congo (Ayana and Bekele, 1998). Berenji and co-workers traced the secondary centre of origin to India, Sudan and Nigeria were Sorghum grain is mainly used for human food (Berenji et al, 2004). Sorghum is a viable and affordable food grain crop for many of the world’s most food deprived communities, especially in Sub-Saharan Africa (ICRISAT, 1994).

II. MATERIALS AND METHODS

The resources for this publication were sourced from field data gathering exercises, visit to Forestry Herbarium Ibadan and literature search.

III. RESULTS AND DISCUSSION

Sorghum cultivation has been restricted to the Northern part of the country. This as a result of *Sorghum bicolor* and its land races being the predominant species and the only species known by most agriculturist and botanist. The distribution of the Sorghum genus actually spans all the geopolitical zones of the country. Sorghum grows in a wide range of climate (particularly tropical climate) ranging from the very high temperatures in the North with low moisture to minimal temperature in the South with higher volume of rainfall.
### Table 1: Phyto-distribution of Sorghum species in Nigeria

| Species name                  | Collector name | State | Locality | Province     | Habit
|------------------------------|----------------|-------|----------|--------------|-------
| *S. lanceolatum*             | APD Jones      | Anambra | Onitsha | Onitsha | Onitsha bathing pool
| (FHI 6277) 01-03-1942        |                |        |          |              |       |
| *S. lanceolatum*             | J.T. Dovey     | Borno   | Dikwa   | Dikwa     |        
| (FHI 27126) 14-12-1949       |                |        |          |              |       |
| *S. lanceolatum*             | Sampson        | Sokoto | Kwarre  | Kagatum   |        
| *S. niloticum*              |                | Oyo    | Ibadan  | Ibadan    | Moor Plantation
| (FHI-39957) 08-01-1958       |                |        |          |              |       |
| *S. vogelianum*             | E.A. Macaule   | Kwara  | Illorin | Borgu     | 7miles, Shagun bus road
| (FHI 59929) 07-07-1966       |                |        |          |              |       |
| *S. vogelianum*             | J.H.B Appah    | Oyo    | Ejigbo-Iwo | Iwo   | Farmland
| 09/1950                     |                |        |          |              |       |
| *S. vogelianum*             | Lely           | Makurdi |        |            |        
| 778                         |                |        |          |              |       |
| *S. vogelianum*             | Ward           | Kogi   | Ajaokuta |            |        
| L135                         |                |        |          |              |       |
| *S. vogelianum*             | Sampson        | Benue  | Makurdi |            |        
| 37                           |                |        |          |              |       |
| *S. vogelianum*             | Vogel          | Bayelsa | Nun     | Nun River  |        
| 11                           |                |        |          |              |       |
| *S. vogelianum*             | Holland        | Bayelsa | Idu     |            |        
| 153                         |                |        |          |              |       |
| *S. vogelianum*             | Onochie        | Niger  | Jebba   | Bandekwoi |        
| FHI 40248                   |                |        |          |              |       |
| *S. vogelianum*             | Baldwin        | Anambra | Onitsha | Onitsha   |        
| 13733                       |                |        |          |              |       |
| *S. vogelianum*             | Tuley          | Bayelsa | Yenagoa |            |        
| 887                         |                |        |          |              |       |

Fig. 3: Sorghum distribution in Nigeria as recorded by Flora and Herbarium
<table>
<thead>
<tr>
<th>Species name</th>
<th>Collector name</th>
<th>State</th>
<th>Locality</th>
<th>Province</th>
<th>Habitat</th>
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<td>Borno</td>
<td>Wulge</td>
<td>Ngala</td>
<td>Riverine vegetation</td>
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<td>(FHI 27157) 05-1956</td>
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<td>Ondo</td>
<td>FUTA</td>
<td>Akure</td>
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<td>Ondo</td>
<td>Idanre</td>
<td>Akure</td>
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<td>Ido, Igo</td>
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<td>Benue</td>
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<td>(FHI 8143)</td>
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<td>(FHI 64974) 24-02-1972</td>
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<td>Riverine area</td>
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<td>(FHI 93843)</td>
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<td><em>S. caudatum</em></td>
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<td>Ibadan</td>
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<td>Gumare</td>
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IV. DISCUSSIONS

Contrary to the assertions that Sorghum thrives only in the Northern part of Nigeria, current study suggests that the unpopular nature of Sorghum in Southern Nigeria is associated with lack of interest for the crop. Also, most research work are centred around S. bicolor (cultivated Sorghum) which is not cultivated in Southern Nigeria due to its unpopular nature, has fueled the speculation that Sorghum does not thrive in the Southern part of Nigeria. Also, another unempirical/unscientific assertion is that rainfall duration is higher in the South. However, this is not true as the plant has been adjudged to thrive in moisture levels of between 100-600mm (Wang et al., 2015).

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AUTHORS

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Strategic and tactical level decision making styles and their impact on the company performance: A study in private sector apparel manufacturing firms in Sri Lanka

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Abstract- The apparel industry in Sri Lanka is reputed worldwide for producing top quality fashion apparel and trusted by the most reputed, iconic global fashion brands. While being a key contributor towards the Gross Domestic Product of the country it is also the largest foreign income generator to the Sri Lankan economy. Effective organizational decision making process plays a pivotal role in determining the successful performance of organizations in the competitive market today.

The objective of this study is to determine the impact of decision making styles adopted at the strategic and tactical levels of private sector apparel manufacturing companies in Sri Lanka on the performance of the organization.

As the study explores a behavioural aspect of decision makers, an Inductive approach was followed and the research was conducted as an Exploratory Study. The study was conducted with a sample of ten large companies operating in the private sector apparel manufacturing industry in Sri Lanka with a workforce over two thousand employees. One individual in strategic or tactical level of decision making was selected from each company to conduct an interview on decision making styles adopted and their impact on the performance of the company. A structured questionnaire was administered to ten individuals selected across the value chain of each company. The data collected through the questionnaire has been quantitatively analysed and the interview findings are qualitatively analysed through thematic analysis. Hence the researcher has adopted mixed methods in data collection and analysis.

Findings revealed that, companies do not restrict themselves to one decision making approach for their business decisions. Depending on the nature of the decision, its importance, the time constrains involved and the impact that is being exerted on the company performance, companies use a combination of decision making approaches including data driven decision making, intuition based and spontaneous decisions. Research findings strongly suggest that in all the above decision making circumstances group decision making plays a strong moderating role.

Index Terms- Decision making styles, Group think, Company performance, Triple bottom line, Apparel manufacturing companies

1. INTRODUCTION

Effective organizational decision making process plays a pivotal role in determining the successful performance of an organization. In view of the dynamic business environment, and competitive challenges faced by modern business entities it is important for organizations to adopt an effective decision making approach in order to be competitive and to capitalize on the market potentials.

In view of the above changes in business context, decision makers could adopt a conventional approach for decisions where the decisions are largely based on experience and intuition or rather the gut feel of the decision maker. On the other hand, decision makers also could use a fact based approach to support their decision where data, information and analytics would come in to play. Organizations would choose to base their decisions largely on data and analytics driven approach or in certain cases depend on intuition. While these two approaches have different degrees of success rates, both are widely accepted to be practical means of decision making for enhanced performance in organizations.

However it is a stressing question for such organizations to find out whether the effort that the company has put in to develop a data driven decision making culture has in turn supported towards the performance of the company and gear the company to face dynamism of the business effectively. Alternatively, whether intuition based decisions that are driven by gut feel and personal experiences have brought in better performance to the company and made organizations sufficiently equipped to face business dynamism. This would be one key stressing factor organizational stakeholders and strategic decision makers will be interested in knowing in order to support the specific form of decision making or to identify an ideal blend factual based and intuition driven approaches when faced with a corporate decision.
The Apparel Industry in Sri Lanka has enjoyed epic growth levels over the past four decades and is today Sri Lanka’s primary foreign exchange earner accounting to 40% of the total exports and 52% of industrial products exports [1]. This industry, entirely privately owned has successfully exploited the opportunities in the international market.

The decision making approaches adopted by private sector apparel companies in Sri Lanka for their strategic and tactical decisions will be a key aspect in determining the retention of the competitive position in the industry. The Impact on the performance of these companies as a direct result of the decision making approach will provide a significant insight in the subject of decision making. Further, this could be used to extrapolate the findings for other corporates and provide an avenue for further research in the subject of decision science.

In view of the above evidence it is notable that corporates use different degrees of data and intuition for decision making process at different management levels. Hence the companies have experienced various levels of outcomes as a result of the practice adopted. It is also apparent that organizations are working towards establishing a data driven culture and use information and communication technologies to support its decisions. However, the intuition aspect of the decision is also a significant driver when confronted with a decision requirement.

The aim of this research is to find the decision making styles adopted at the strategic and tactical levels of private sector apparel manufacturing companies in Sri Lanka and the impact made by the decision making styles on the performance of such companies.

2. REVIEW OF LITERATURE

2.1 Theories and Models on Decision-Making

2.1.1 General Decision-Making Styles (GDMS)

A large body of knowledge has been developed over the years on individual decision making styles. Scott and Bruce (1995) [2], being pioneers in the area of research on individual decision making styles identified, five decision making styles categorized based on individual behaviours. The five styles identified by extensive data analysis and validation across multiple samples were rational style, intuitive style, avoidant style, spontaneous style and dependent style. Rational style was found to be adopted by individuals with orientations on internal controls while dependent style was preferred by those with an external orientation. Avoidance decision-making style would portray individuals with lack of confidence in the decision-making ability. The intuitive decision-makers rely on gut feeling and proficiency on the decision being correct. Amount of time devoted in decision making was a key concern of spontaneous decision makers.

2.1.2 Decision Style Theory

Model for decision making styles introduced by Rowe and Boulgarides (1992) [3] focus on the cognitive and behavioural aspects of decision-makers. This theory yields four decision-making styles: directive, analytical, conceptual, and behavioural. Directive style (Low ambiguity tolerance Task focus) is associated with individuals who inherit an autocratic leadership personality and seeks more power in a situation. Individuals with such personality characteristics rely mostly on their intuition and gut feel. Analytical style (High ambiguity tolerance, Task focus) is preferred by individuals who are analytical minded and seek additional information to consider possible alternatives when making a decision. Such decision makers present thorough, detailed and comprehensive information and tend to produce novel reasoning. Individuals who follow Conceptual style (High ambiguity tolerance, Social focus) are creative and exploratory and possess novel habits. They are also comfortable in taking risks. They believe in their own opinions and intuition and also revolve upon opinions of others to have a broader vision and analyse different possibilities associated in a given decision situation. Behavioral decision makers (Low ambiguity tolerance, Social focus) rely on explicit information developed based on opinions of others and implicit information gathered during social interactions. They focus on social aspects, welfare and feelings and make decisions based on their emotions and intuitions.

2.1.3 The Rational Decision-Making Model

Robbins and Coulter’s (2002) [4] rational decision-making model defines six steps when approaching rational decision. The steps are:

1. Defining the problem clearly and accurately
2. Identifying the criterion by which to make the decision
3. Prioritize and allocating weights to the decision criteria accordingly
4. Develop alternative solutions that resolve the issue to on the table
5. Analyze and evaluate each alternative critically using the weighted decision criteria
6. Select the optimal alternative with the highest score using the weightages

Russ, McNeilly & Comer (1996) [5] assumed that rational decision making leads to higher quality decisions, whereas intuitive and spontaneous decision-making would lead to lower quality decisions, dependent decision making being participative would make positive contributions and avoidant decision making would have a negative impact on performance. They obtained that intuitive, dependent and spontaneous decision-making styles have no effect, rational style has positive and avoidant style has a negative impact.
on performance. Moreover, they found that the high performing managers show more of transactional and transformational leadership while low performers are more avoidance and less rational in their decision-making approaches.

2.1.4 Data Driven Decision Making (DDDM) Model
A considerable amount of information is required for an organization to frame their way to achieve its organizational goals. Decisions based on limited information are not an effective mechanism, and such decisions will consequently be reflected negatively on their performance [6]. It is under such circumstances that a Data Driven Decision-making Model (DDDM) is most suited. DDDM is a continuous process where data is collected and transferred into information and ultimately knowledge; this knowledge is then used to make decisions, while providing feedback for each process [7]. The relationship between information and decisions were broadly studied by Davenport (2009) [8]. Davenport’s study has resulted in a framework that identifies three distinctive forms of information contexts namely; loosely coupled environments, structured human decision based environments and automated decision environments.

Loosely coupled information environments – In this scenario, information has a loosely coupled relationship between information and decision. Consequently, information is made accessible to decision makers along with the necessary tools to analyse it. This approach is the most commonly used by organisations to aid their business intelligence systems.

Structured human decision environments – In this circumstance, decisions are continued to be made by professionals. However, specific elements are put in place to improve the decision-making process by determining particular information required to make better decisions [8]. Such environments have a narrow focus on precise decisions. This approach is identified as one that is not suitable for all types decision-making and should focus only on those that are critical to the organisational success due to its complexity involved.

An automated decision environment incorporates decision rules and algorithms embedded into the key business processes. Decision-making is made by the rule-engines while the manpower takes care of the exception handling. The main objective behind such an environment is to achieve an improved efficiency as the process is now fully automated. Moreover, this set-up only works where decisions are well structured and conducive to a set of rules. Implies that all information necessities could be determined prior, and each decision can be effortlessly operationalized via a blend of automated workflows and rule engines.

Davenport (2009) [8] argues that the above three types of environments, should be used as a guide for organisational implementation of business intelligence applications. In order to choose the most appropriate tools for a specific type of decision environment, it is essential to prioritize on critical decisions that have to be made in urgency, and also wholly comprehend the relationship between these decisions and necessary information.

2.2 Linking Decisions and Cognition
The power of information based logical decision making is strongly supported and widely accepted [9]. Current literature on decision making stresses the importance of using non-logical portions of the brain in decision making. Chester Barnard (1968) [10] states that the non-logical decision making capabilities are important especially when it is obvious that logical decisions may fail. These non-logical capabilities are now named as “intuition” in management theory. Evidence can be found of successful leaders who have relied on gutfeel. The former chairman and CEO of General Electric (GE), Jack Welch in his book “Straight from the Gut” defines intuition is believed as one of the ultimate skills of a corporate leader. According to Welch, gut decisions or intuition based decisions testify the confidence of a decision maker [11]. Welch states that gut decisions at GE, were mainly made at times of crisis when there was no time to weigh and calculate probability of each outcome in a decision making process. Agor (1989) [12] elaborated that intuition based decisions are mostly arrived at when there is a very high level of uncertainty and when there is very little previous precedence to problem in concern. In such situations, information is limited and there is pressure to make a correct decision. Thus, executives tend to use “intuition” over rationality for decision making. According to Bonabeau (2003) [13], intuition based decisions can be dangerously unreliable in complex situations in corporates. The research states that the human brain fuses information from the past and uses it to understand the present and the future. Bonabeau [13] states that the human mind’s unconscious desire to search for patterns is very strong. Therefore, when a new situation is faced, the brain attempts to categorize the new situation to one of the situations experienced in the past and fit it into a pattern already known.

If decision makers cannot rely on intuition and do not have the time or the analytical capability to analyze all facets of a complex problem, how can corporates make smart choices? According to literature technology has stepped in to answer this question to a greater extent. Complex software applications have been developed to supplement and reinforce human decision making in organizations.

2.3 Influence of Technology on Decision Making
Corporates also experiment new business ideas and attempt to base their decisions on scientifically valid data [8]. A preliminary study conducted on this area by Brynjolfsson et al (2011) [14] at Massachusetts Institute of Technology in USA on firms in United States of America, concludes that, a 5-6% increase in productivity improvement can be observed in organizations where data based decision making is practiced. Linking back to the problem statement of this research, the availability of information technology and information systems is not sufficient to make decisions. Davis (1986) [15] stated that the use of technology in corporates is influenced by employee behaviors. His research developed the Technology Acceptance Model (TAM) where, perceived usefulness
and perceived ease of use were considered as two key beliefs in using information systems by employees in the modern world today. The TAM defines the general elements of individual technology acceptance and has been widely used to predict technology based behaviours in a broad range of user groups in the corporate world.

2.4 The influence of Groups in Decision Making

Group decision making refers to a scenario where a group of people faced with a problem involve themselves in identification of alternatives, evaluation and selection of the most appropriate alternative for the purpose of achieving their objective. While research done by Scott and Bruce (1995) [2], Rehman (2012) [16] and Pacini & Epstein (1999) [17] highlight individual decision making styles, another school of thought on decision making is governed by decisions made by groups. Gunnarsson (2010) [18], state that a considerable amount of decisions in organizations are made by groups or teams. According to Robbins and Judge (2011) [19], groups generate more complete information that results in decisions with higher quality. This is mainly due to the diversity of views and opinions involved along with the sum of knowledge gathered. Many scholars indicate that group decision making has great advantages. While combining individual capabilities and knowledge it is also perceived that group decision making also results in the group’s commitment to the result of the decision making process [20]. However, group decisions have not been considered as the best method of decision making at all management decisions. Gudykunst (1997) [21] found that groups with more decision-relevant information made better decisions than groups with less information in a context where all information was shared.

2.4.1 Lunenburg Model

Lunenburg (2010) [22] presents three models used in decision making which helps to understand the extent to which group decision making is required in different situations. They included the Vroom-Yetton-Jago decision tree model, Tannenbaum and Schmidt’s decision-making pattern choice model, and The Nash's synergistic decision making model. However Lunenburg continue to state that group decision making also has adverse impact on the decisions and thus the organizations. Working within groups develops “in group” pressure. When “in-group” pressure leads to reduction in efficiency in individuals, reduction in motivation and rationality, the quality of the decisions made is significantly reduced impacting performance of organizations. This commonly witnessed phenomena is called “groupthink” in management theory and occurs due to giving prominence to cohesiveness within the group as opposed to rationality or cognitive capability involved in the decision making process.

2.5 Group Think

Management theorist Janis (1991) [23] coined the term “groupthink”, and indicated that it is commonly observed in highly cohesive groups. Interestingly, research by Janis, identified that extensively qualified and experienced people sometimes make very poor decisions in organizations. Janis quotes some poor decision making examples influenced by group think such as: NASA’s decision to launch the Challenger space shuttle in 1986, (which exploded with its crew after takeoff), President John F. Kennedy and his teams decision to launch the Bay of Pigs invasion of Cuba (1960) and NASA’s decision to launch the space shuttle Columbia which also resulted in an explosion when entering the earth’s atmosphere. With the above literature it is evident that group decision making has both advantages and disadvantages towards the process of making quality decisions.

2.6 Relating literature to the study

The theories and empirical findings discussed above lay resilient substance for the study. This section is intended to provide a critical review of each theory and model presented above.

Decision style theory is a perception driven theory, which looks into four distinctive types of decision-making styles: Directive, Analytical, Conceptual and Behavioural. This theory mainly focuses on the traits of leaders, and their decision-making behaviours in the context of strategic planning. The rational decision-making model is a sequential and structured approach to decision-making, aimed at seeking a precise solution to well-defined problems. Present day companies use ‘big data’ to make effective decisions on every aspect of their business, commencing from product development, to financing to marketing etc. Opinions are essential and are much in need in an organization, however, without numbers or data to support the opinions, they become suppositions. Data driven decision-making is a cycle where the investment in data gathering is guaranteed with returns. GDMS identifies five decision-making styles, which includes, rational style, intuitive style, dependent style, avoidant style and spontaneous style

Considering the decision making styles adopted by managers at strategic and tactical levels in apparel manufacturing companies in Sri Lanka, the styles described under GDMS appear to be most appropriate as it explains five different decision making styles of decision making. Further, Decision style theory is considered to be less appropriate as the main focus of this theory is on leadership traits. The rational decision making model only provides a structured approach to decision making but does not focus on different decision making styles. The Data driven decision making model supports the rational style of decisions under GDMS. Further, the data driven decisions are also supported by the findings of Brynjolfsson et. al (2011) [14] and Davenport (2009) [8]. The data driven decisions are supported with technological advancements as pointed out by Davis (1986) [15]. As per Lia, Song & Hall (2015) [24] capability in data driven decision making is most supported by capabilities in data governance, data analytics, insight exploitation, performance management and integration. According to Pacini & Epstein (1999) [17], most of the research on individual decision

making styles focus on two decision making styles, rational and the experiential or intuition style. The intuition based decisions described under GDMS are supported by many empirical findings as well. Agor (1989) [12] asserts that intuition based decisions are associated with situations with uncertainty while Bonabeau (2003) [13] argues that success of decisions based on gut feel is limited. Further, the former chairman of General Electric, Jack Welsh is found to be a great supporter of intuition based decisions. The spontaneous decision making style could also be applicable to the managers at strategic and tactical levels considering the agile nature of the industry where decisions are required within a limited time frame considering the circumstances. Although decision avoidance is associated with weak leadership positions, it was considered in this study considering its possible associations with low performing companies. Hence, an evaluation of the available theories and empirical findings, the most appropriate model to adopt for this study is found to be GDMS. However, although GDMS considers dependent decision making style as an option, considering the discussions and viewpoints presented under group think, it appears to be more appropriate to be considered as a moderator on the relationship between decision making styles and the organizational performance. The rational decision making model is considered in developing recommendations based on the findings of the study.

Therefore, the conceptual framework for the study is drawn with the four decision making styles data driven, intuition based, spontaneous and avoidance as independent variables. The dependent variable organizational performance is measured based on the triple bottom line including the economic, environmental and social sustainability while the group think being considered as a moderator.

3. RESEARCH METHODOLOGY

3.1 Conceptual framework and research propositions.
The conceptual framework for the study was developed based on the literature and preliminary investigations made on the problem context. Research propositions were formulated based on the relationships depicted in the conceptual framework.

Figure 1: Conceptual framework

Proposition 1: Decision making style adopted by managers at strategic and tactical levels has an impact on the organizational performance.
Proposition 2: Degree of group decision making can moderate the relationship between Decision making style and organizational performance

3.2 Operationalization of the variables
The variables in the conceptual framework are operationalized in order to measure the variables. The indicators for each variable are provided in table 1.

**Table 1: Operationalization of the independent and moderating variables**

<table>
<thead>
<tr>
<th>Concept</th>
<th>Variable</th>
<th>Indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Driven Decision Making</td>
<td>Perceived Usefulness of Information Systems</td>
<td>Job Efficiency</td>
</tr>
<tr>
<td></td>
<td>Perceived Ease of Use of Information Systems</td>
<td>Job Effectiveness</td>
</tr>
<tr>
<td></td>
<td>Perceived Attitude toward Usage</td>
<td>Attitude towards technology adoption</td>
</tr>
<tr>
<td></td>
<td>Rationality</td>
<td>Rational Ability of decision makers</td>
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<tr>
<td></td>
<td></td>
<td>Rational engagement of decision makers</td>
</tr>
<tr>
<td>Intuitive Decision Making</td>
<td>Experiential Capability</td>
<td>Experiential ability</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Experiential Engagement</td>
</tr>
<tr>
<td>Avoiding Decision Making</td>
<td>Degree of Decision Avoidance</td>
<td>Degree of decision postponing</td>
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<td></td>
<td></td>
<td>Level of last minute decision making</td>
</tr>
<tr>
<td>Spontaneous Decision Making</td>
<td>Degree of Spontaneous Decision Making</td>
<td>Degree of snap decision making</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Level of comfort entrusted on snap decisions</td>
</tr>
<tr>
<td>Organizational Performance</td>
<td>Economic performance</td>
<td>Profitability</td>
</tr>
<tr>
<td></td>
<td></td>
<td>productivity</td>
</tr>
<tr>
<td></td>
<td>Environmental performance</td>
<td>Use of renewable energy</td>
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<tr>
<td></td>
<td></td>
<td>Recycling of water and reuse</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Direct positive impact on nature</td>
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<tr>
<td></td>
<td>Social performance</td>
<td>Rate of new employee hires</td>
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<td></td>
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<td>Worker health and safety</td>
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<td>Employee development</td>
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<td></td>
<td></td>
<td>Employee discrimination</td>
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<tr>
<td>Group Decision Making</td>
<td>Degree of Group Decision Making</td>
<td>Perception on group decision making</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Effectiveness of group decision making</td>
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<tr>
<td></td>
<td>Group Think</td>
<td>Peer pressure on arriving at a decision</td>
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<tr>
<td></td>
<td></td>
<td>Level of cohesiveness among the team</td>
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</table>
The organizational performance was measured through the Triple Bottom Line (TBL) model where organizational performance can be measured through three dimensions; Economic, Environmental and Social sustainability. The indicators for each sustainability dimension considered in the study are shown in figure 2.

Figure 2. Indicators of triple bottom line.

- **Economic Sustainability**
  - Cost per Minute
  - Air Freight Cost
  - Production Line Efficiency
  - First Past Yield

- **Environment Sustainability**
  - % of Waste water purified
  - % of renewable energy used
  - % of Diesel Fuel and Furnaces Oil used

- **Social Sustainability**
  - % of workers recruited from within 10 Km radius
  - Expenditure spent on rural educational institutions
  - Expenditure spent on mobile health campaigns
  - No. of safety Audits conducted
  - No. of workplace accidents

3.3 **Research Design**

The research onion developed by Saunders et. al (2007) [25] elaborates the stages that needs to be covered when developing a research. While the research onion attempts to define the stages, the researcher should follow them in defining the research methodology. The layers of this model attempts to define the research philosophy, research approach, research strategies, choices, time horizon, and techniques and procedures used.

3.3.1 The Research Philosophy and Approach

A researcher’s philosophy towards a study depends on his/her personal view of what establishes as acceptable knowledge and the process by which this knowledge is developed.

A researcher with a concern for a laboratory like setting with identification of cause and effect relationships involving testing hypothesis reflects the philosophy of positivism. This philosophy requires the researcher to follow a scientific method to propose and test hypothesis with large amounts of highly structured and measurable data. Realism philosophical position is required when the study involves underlying complexities of the problem with varied data collection techniques using both quantitative and qualitative data. When the researcher is more concerned about gathering rich understandings and subjective insights into a problem with an intention of generalizing the meanings, the philosophy of interpretivism is followed. This philosophy is mostly adopted at times where a social phenomenon is studied in a natural environment. Therefore, data collection for such philosophies involves qualitative data from in depth investigations using a small sample. Pragmatism emphasizes the practicality of research findings at all times thus emphasizing on reliable, credible and relevant data being collected that supports subsequent actions of the research.

The next layer of the research onion defines the research approach where a decision is made to use either deductive or inductive approach. Deductive research relates to scientific research leading to testing theory whereas inductive approach leads to building theory.

In view of the first two layers of the research onion, the research methodology should follows a Pragmatism philosophy combined with an inductive approach. However, an element of deduction is also visible as the GDMS model is followed initially to identify the decision making styles to test. Findings made through interviews were used to understand patterns and formulate theories at the end of the research. The research involves understanding, how and under what conditions different decision making styles are adopted and attempts to search for patterns based on observations leading to development of explanations on the impact each decision making style has on the organizational performance.

3.3.2 The Research Strategy

Subsequent to peeling away the research approach layer, the research onion exposes the strategy layer. The strategy adopted could vary from experiments, action research, survey, case study, ethnography, grounded theory etc. According to Saunders and Tosey (2014) [26], the boundary between research strategies and the research philosophy adopted is often considered as permeable. Bringing in an example, ethnography is associated with realism and interpretivism whereas experiment and survey research strategy is considered to be closely associated with positivism. A case study strategy was followed based on a selected sample of companies to understand the decision making styles adopted by the Sri Lankan Apparel Industry in order to predict and explain certain behavioral traits to be used in the decision process. Further, case study research often involves combination of quantitative and qualitative...
methods. In this study, the findings based on qualitative data analysis is followed up based on quantitative data collected through a survey. Hence, the survey research strategy is also adopted within the case study.

3.3.3 The Research Choice and Time Horizon

A researcher can adopt qualitative, quantitative or a mixture of both during a research study. According to the nature of this research it is evident that this explores a behavioral aspect of decision makers in the apparel industry in Sri Lanka. Hence this has an inductive approach for the findings where it concerns with the generation of new theory and findings emerging from the data. A research questionnaire is also used to help develop and build theories along with structured interviews to strengthen the findings. Therefore, the researcher has applied a mixed method for the purpose of this research. A research could either be a snapshot taken at a particular time or be a series of snapshots taken over a period of time. A single snapshot is called a cross-sectional study whereas a series of snapshots taken over a period of time is considered to follow a longitudinal study. This research follows a cross-sectional study where data is collected at a particular time as this research is conducted for the purpose of academic studies and thus, time constrained.

3.4 Sampling, Methods of data Collection and analysis

Ten medium to large scale apparel manufacturing companies were purposively chosen for the study. The differences based on the triple bottom line and different preferences given to different decision making styles identified through a preliminary investigation were considered as criteria for selection of the companies. The data gathered were primarily qualitative consisting semi structured interviews and a survey was administered to follow up on the interview findings. The interview respondents were selected based on judgmental sampling where one respondent representing the strategic or tactical levels in each organization were chosen. Managers representing functions of finance, human resource management, merchandising and marketing were chosen considering their experience in industry. The interviews consisted of two sections where semi structures questions on the conditions under which each decision making style was considered most appropriate and business cases simulating industry dynamics were presented to justify most appropriate decision making style and how it could affect the triple bottom line. Quantitative data was collected through a structured survey where the questions were developed based on the indicators of the decision making styles operationalized and presented in a 1-5 likert scale. The questionnaire was administered on ten strategic and tactical level managers in each of the chosen companies totaling to 100 respondents. The organizational performance was measured through secondary data on the indicators of triple bottom line.

Qualitative data were thematically analysed to identify the patterns and themes emerging from the data while survey findings were initially analysed to identify the primary components, tested for reliability and validity and each decision making style was statistically analysed using SPSS.

3.5 Methods for testing reliability and validity of data

A confirmatory factor analysis helps to identify the measures of a latent variable share their variance and how they are different from others. The quantitative data collected through questionnaire were initially tested for unidimensionality based on factor analysis and the constructs identified were tested for reliability and validity.

Cronbach’s alpha is a measure of internal consistency or reliability. According to Kline (2011) [27] acceptable value of alpha in reliability analysis is 0.70 in the case of reliability tests. The validity of data can be tested through face validity, content validity, criterion validity and congruent validity. The aspects of validity except the construct validity were ensured by developing appropriate indicators during the operationalization of the variables. Construct validity consists of two types; convergent validity and the discriminant validity (Campbell & Fiske, 1959) [28]. The convergent validity is the degree of confidence that can be placed on the indicators to measure a trait correctly. Discriminant validity is the degree to which the measures of different traits are unrelated. Fornell & Larker (1981) [29] have suggested the Average Variance Extracted (AVE), which measures the level of variance captured by the construct against the measurement error and Composite reliability (CR), a less biased estimator of reliability than Cronbach’s alpha as measures of convergent validity. Fornell and Larker suggest AVE to be above 0.5 and CR to be above 0.7 for convergent validity to be satisfactory. In addition, Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO), is also suggested to be a measure of convergent validity. KMO values above 0.5 are considered satisfactory (Sekaran & Bougie, 2010) [30]. Further, the Bartlett’s test of sphericity can be used to test the strength of relationships among the indicators of a measure (Bartlett, 1937) [31]. This test can be conducted at a predetermined level of significance where, the p-value of the results can be compared with the level of significance to arrive at a conclusion. Commonly used level of significance is .05.

As explained by Lincoln and Guba (1985) [32], reliability and validity of qualitative findings were ensured by selecting trustworthy and knowledgeable individuals in the field. In addition, constant data comparison, comprehensive data use reputational analysis suggested by Silverman (2013) [33] were considered.
4. FINDINGS

4.1 Summary of findings from Semi Structured Interview Process

Table 2: Summary of findings from Semi Structured Interview Process

<table>
<thead>
<tr>
<th>Data Driven Decision Making</th>
<th>Potential Impact on Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Key Findings</strong></td>
<td><strong>Key Findings</strong></td>
</tr>
<tr>
<td>1. Decision making process</td>
<td>1. Better budgetary control process and thereby achieve cost efficiencies in terms of Cost per minute of the Company.</td>
</tr>
<tr>
<td>is largely supported by data</td>
<td>2. Setting up of key performance indicators which help to achieve productivity and quality targets such as improved production line efficiencies and increase in First Past Yield.</td>
</tr>
<tr>
<td>and analytics which are</td>
<td>3. Better overall performance monitoring in terms of Budgets vs. Actual and help to take corrective action timely.</td>
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<tr>
<td>considered to be an</td>
<td>4. Prevention of problems arising repeating as the problem root cause is addressed. Hence better overall cost savings such as reduction in Air Freight, reduction in overheads which in turn constitute towards competitive cost per minute.</td>
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<td>important aspect of overall</td>
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<td>decision making process of</td>
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<td>Companies.</td>
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<tr>
<td>2. Extensive dependability</td>
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<td>on decision support system</td>
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<td>in overall ERP of the</td>
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<tr>
<td>Company, budgeting process,</td>
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<tr>
<td>demand planning and KPI</td>
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<tr>
<td>monitoring.</td>
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<tr>
<td>3. Data and decision</td>
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<td>support systems are</td>
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<td>significantly applied to</td>
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<td>identify problem root causes</td>
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<td>and develop solutions.</td>
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<tr>
<td>4. Key factors drive data</td>
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<td>driven decisions in the</td>
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<td>companies were</td>
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<tr>
<td>identified as understandability of data, Attitudes towards use of data for decision support, extent of data being updated in the system, applicability and relevance of data in the system, real time availability of data, The extent that the data is forward looking, Reliability and Accuracy of data</td>
<td></td>
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<table>
<thead>
<tr>
<th>Intuitive Decision Making</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>Key Findings</strong></td>
<td><strong>Potential Impact on Performance</strong></td>
</tr>
<tr>
<td>1. Experiential ability and</td>
<td>1. Experiential ability based intuitive decisions are important to reduce wastages especially in the fabric cutting process. This would reduce overall cost and make the cost per minute of the company more competitive.</td>
</tr>
<tr>
<td>experiential engagement is</td>
<td>2. Better timely decision could exploit emerging opportunities in the market and would keep the company abreast in market dynamisms. This would allow the Companies to exploit and capitalize on business opportunities to increase shareholder wealth.</td>
</tr>
<tr>
<td>an important aspect of</td>
<td>3. Certain business circumstances such as commencing to work with new customers, adopting new fashion designs and introduction of new products to the market requires a high degree of intuition based decision approach.</td>
</tr>
<tr>
<td>Intuitive decision making.</td>
<td>4. Intuition is necessary when there are human aspects involved in the decision. This is mainly important in performance related human resources development such as performance related payments, career progression plans, succession plans where a person’s attitude, perception, ability to embrace change, adaptation aspects are being considered. However, decisions may carry a high degree of risk when compared to data driven decisions as it is largely individual experience based.</td>
</tr>
<tr>
<td>2. Time factor plays a key</td>
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<td>role in selecting intuitive</td>
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<td>approach for decision</td>
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<td>making</td>
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<td>3. Highly individualistic</td>
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<td>decision approach. Hence</td>
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<td>potential risk factor could</td>
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<td>be significant.</td>
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<tr>
<td>4. Even if the data is</td>
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<tr>
<td>available intuition aspect</td>
<td></td>
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<tr>
<td>of the decision is</td>
<td></td>
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<tr>
<td>important as it would</td>
<td></td>
</tr>
<tr>
<td>bring about certain</td>
<td></td>
</tr>
<tr>
<td>important vantage point for</td>
<td></td>
</tr>
<tr>
<td>the business decision.</td>
<td></td>
</tr>
<tr>
<td>5. Key factors that drive</td>
<td></td>
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<tr>
<td>data driven intuition in</td>
<td></td>
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<tr>
<td>the companies were</td>
<td></td>
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<tr>
<td>identified as extent of</td>
<td></td>
</tr>
<tr>
<td>proactiveness of data,</td>
<td></td>
</tr>
<tr>
<td>human aspect involved in</td>
<td></td>
</tr>
<tr>
<td>the decision, business</td>
<td></td>
</tr>
<tr>
<td>circumstances, individual</td>
<td></td>
</tr>
<tr>
<td>preferences, industry</td>
<td></td>
</tr>
<tr>
<td>changes &amp; trends and</td>
<td></td>
</tr>
<tr>
<td>pressure for time.</td>
<td></td>
</tr>
</tbody>
</table>
Avoiding Decision Making

Key Findings
1. General understanding was that business decisions should not be avoided. Decision makers have to act on a timely manner and make effective decisions and implement within the organization.
2. There is no ideology of “time will find a solution” when it come to a corporate decision although the idea may work in relation to personal decisions in certain cases.
3. Avoidance of decision is not a healthy alternative for existence of any business organization.

Potential Impact on Performance
1. The practice of avoiding decisions in an organization will lead to:
   - Loss of business opportunities
   - Loss of Confidence
   - Being Left Behind
   - Difficulty to Change
   - Loss of Organizational Value / Repute

Spontaneous Decision Making

Key Findings
1. Highly situation dependent decisions where decision makers would arrive at a spontaneous decision even if data is available.
2. Higher element of intuition is also involved where experiential ability and experiential engagement is high.
3. Spontaneous decisions are not applicable for certain decisions such as Finance related decisions where decisions should be made after careful evaluation and scrutiny.
4. Decision maker has to be an expert in the field the decision is made upon. Otherwise the decision itself will be irrational and would be a failure.

Potential Impact on Performance
1. Potential savings of time is noted as a key advantage for this type of decisions.
2. Decisions related to quality, waste emission, workplace safety are some key performance areas where spontaneous decisions are practiced.

Group Decision Making

Key Findings
1. This approach has an impact on all decision making approaches in the Organization. All the respondents participated in the interview indicated that they would involve functional departments in corporate decision making process.
2. Group decision making has a definite time advantage in the decision process. Multiple points of view are put forward and evaluation, think through is done at a faster phase and potential synergies are leveraged in order to make a quick effective well thought through decision.
3. Group decisions play an intermediary moderating role in the overall decision making process in the organization. In the case of the apparel industry where interlinked processes are involved in the overall value chain the importance of group influence over the decision is vital irrespective of the decision making approach being adopted by the organization.

Potential Impact on Performance
1. Better timely decisions in relation to key performance aspects of the industry such as first past yield, productivity, and cost management, environmental and social aspects.
2. Evokes participatory style of management where decisions are accepted among all stakeholders involved in the process. Hence better implementation and results are achieved.
3. Potential synergies available among decision makers are leveraged in order to make a quick effective well thought through decision.

4.2 Analysis of Responses to Business Case Scenarios

In order to establish the relationship between the decision making approaches adopted by apparel manufacturing firms and resulting impact on the triple bottom line performance of the Companies a set of business cases were developed which specifically addresses the performance related aspect of the Triple bottom line model. Each of the business cases related to an aspect of Triple bottom line for which measurements for the dependent variable is introduced. The dependent variable measurement and the aspect of the Triple bottom line it related to is presented hereunder in following tables.

Each of the business cases were linked to measurement criteria in the dependent variables. Hence the respondent’s response to the business case is measured by the measurement criteria established for the dependent variable. Following table indicated the link of the business cases to measurement criteria in dependent variables.
Table 3: Business Cases link to Measurement Criteria

<table>
<thead>
<tr>
<th>Business Cases</th>
<th>Dependent Variable / Measurement Criteria</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Business Case 1</strong></td>
<td><strong>Cost per Minute (USD)</strong>&lt;br&gt;[0.00-0.10] = Very Low, [0.11-0.14] = Low, [0.15-0.18] = Moderate, [0.19-0.22] = High, [0.23] = Very High</td>
</tr>
<tr>
<td></td>
<td><strong>Air Freight Cost (USD '000)</strong>&lt;br&gt;[USD 0-50] = Very Low, [USD 51-100] = Low, [USD 101-150] = Moderate, [USD 151-200] = High, [201] = Very High</td>
</tr>
<tr>
<td><strong>Business Case 2</strong></td>
<td><strong>Production Line Efficiency (%)</strong>&lt;br&gt;[0%-15%] = Very Low, [16%-25%] = Low, [26%-40%] = Moderate, [41%-55%] = High, [56%] = Very High</td>
</tr>
<tr>
<td></td>
<td><strong>First Past Yield (%)</strong>&lt;br&gt;[0%-50%] = Very Low, [51%-75%] = Low, [76%-85%] = Moderate, [86%-95%] = High, [96%] = Very High</td>
</tr>
<tr>
<td><strong>Business Case 3</strong></td>
<td><strong>Percentage of Waste water purified after being used in production operation</strong> (Washing &amp; Dying Process)&lt;br&gt;[0%-20%] = Very Low, [21%-40%] = Low, [41%-60%] = Moderate, [61%-80%] = High, [81%] = Very High</td>
</tr>
<tr>
<td></td>
<td><strong>Percentage of total energy requirement generated from renewable energy sources</strong> (Solar Energy)&lt;br&gt;[0%-10%] = Very Low, [11%-20%] = Low, [21%-30%] = Moderate, [31%-40%] = High, [41%] = Very High</td>
</tr>
<tr>
<td></td>
<td><strong>Percentage of Diesel Fuel and Furnaces Oil used for Boiler Operation</strong>&lt;br&gt;[0%-10%] = Very Low, [11%-20%] = Low, [21%-30%] = Moderate, [31%-40%] = High, [40%] = Very High</td>
</tr>
<tr>
<td><strong>Business Case 4</strong></td>
<td><strong>Percentage of workers recruited from within 10 Km radius from the factory location</strong>&lt;br&gt;[0%-10%] = Very Low, [11%-20%] = Low, [21%-30%] = Moderate, [31%-40%] = High, [40%] = Very High</td>
</tr>
<tr>
<td></td>
<td><strong>Expenditure spent on rural educational institutions as a percentage of overall CSR cost of the Company</strong>&lt;br&gt;[0%-10%] = Very Low, [11%-20%] = Low, [21%-30%] = Moderate, [31%-40%] = High, [41%] = Very High</td>
</tr>
<tr>
<td></td>
<td><strong>Expenditure spent on mobile health campaigns as a percentage on CSR cost of the Company</strong>&lt;br&gt;[0%-10%] = Very Low, [11%-20%] = Low, [21%-30%] = Moderate, [31%-40%] = High, [41%] = Very High</td>
</tr>
<tr>
<td><strong>Business Case 5</strong></td>
<td><strong>Nos. of safety Audits conducted per Annum</strong>&lt;br&gt;[0 Audits] = Very Low, [1-2 Audits] = Low, [3-4 Audits] = Moderate, [5-6 Audits] = High, [6&lt; Audits] = Very High</td>
</tr>
<tr>
<td></td>
<td><strong>Nos. of work place accidents per Annum (Reported to Human resources department)</strong>&lt;br&gt;[0 Accidents] = Very Low, [0-3 Accidents] = Low, [4-6 Accidents] = Moderate, [7-9 Accidents] = High, [9&lt; Accidents] = Very High</td>
</tr>
</tbody>
</table>

The dependent variable measurement criteria given in table 3 are connected to Economic Sustainability, Environment Sustainability and Social Sustainability aspect in the Triple Bottom Line Model (TBL). Therefore, by analyzing the response from Companies for these business cases the approach that they use for the purpose of decision making could be identified. Further this could be compared with the dependent variable measurement criteria and the operational performance of the company could be identified within the Triple Bottom Line framework. Hence the approach that the company could use to make decisions and its resulting impact on the operational performance criteria of the Company could be identified.
4.2.1 Discussion on the Analysis of Business Cases 1, 2 & 3

According to the analysis of business cases 1, 2 & 3 for the ten Companies in the sample it is evident that the Companies which use a combination of data, intuition and group influence in decision making has shown better operational performance.

In the case of Business Case 1, it is clearly evident that 70% of the companies have the cost per minute at either low or a moderate level. This is considered to be a very competitive cost per minute value as it makes the company cost competitive in devising pricing strategies. These Companies use a cognitive approach in decision making by the use of data, intuition and being moderated by group involvement.

Further the Air Freight cost incurred by these Companies is also either moderate or low (with the exception of 20% of Companies) which indicates a reasonable value in the Industry context. This indicates that the supply chain process and the production process are well monitored and managed within these Companies. However, in 20% of Companies where Air Freight values are at a higher end which could be due to last minute order from the buyers and in certain cases buyer incurred air freight costs.

In relation to Business Case 2 it is evident that most of the Companies which have achieved High or Very High efficiencies are using data driven decision making approach combined with intuition and group think. Accordingly, 50% of Companies are using this combined approach in implementing decisions in relation to enhancement of Production Line Efficiencies.

This behavior is also evident in Business Case 3 where 50% of Companies have recorded High and Very High first past yield values which in turn uses a combination of data, intuition and group in their quality control decision making. In these cases 20% of Companies also indicated that they use a spontaneous approach to the decision depending on the urgency, nature and potential down the line impact of the quality issue. As such certain quality issues in the production process needs to be sorted out in a matter of minutes.
In summary it is quite evident that strategic and tactical decisions relating to the aspects of Economic Sustainability within the apparel manufacturing companies in Sri Lanka are more successfully driven by a combination of data driven, intuition based and group moderated decision making approaches. As per the respondents in these Companies data is important to quantify the savings, compare improvements with past and monitor trend over a period of time. Intuition is important in this case to leverage on experience, come up with new initiatives and ideas. Group influence always act as a moderator in these cases as it brings in alternative points of view, better insights of possible pitfalls and makes the initiatives better accepted as group ideas were considered.

Table 5: Analysis of Business Cases 4 & 5

<table>
<thead>
<tr>
<th>Business Case</th>
<th>Decision making approach</th>
<th>Percentage adopted</th>
<th>Operational Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Criteria</td>
<td>Level</td>
</tr>
<tr>
<td>Case 4</td>
<td>Data Driven</td>
<td>80%</td>
<td>% of Waste water purified</td>
</tr>
<tr>
<td></td>
<td>Intuition</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Avoidance</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spontaneous</td>
<td>60%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

Case 5
In light of the increase in costs and pressure exerted from buyers, there is a significant interest on renewable energy sources and reduction of carbon emission from the use of fossil fuel. The company is deciding on its energy strategy and the potential use of alternative environmentally friendly energy sources. The key aspects considered here are:
- Potential use of renewable energy sources (Solar energy)
- Reduction in the use of fossil fuel

<table>
<thead>
<tr>
<th>Business Case</th>
<th>Decision making approach</th>
<th>Percentage adopted</th>
<th>Operational Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Data Driven</td>
<td>80%</td>
<td>% Solar Energy Used</td>
</tr>
<tr>
<td></td>
<td>Intuition</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Avoidance</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spontaneous</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Group</td>
<td>100%</td>
<td>% Fossil Fuel Used</td>
</tr>
<tr>
<td></td>
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</tbody>
</table>

4.2.2 Discussion on the Analysis of Business Cases 4 & 5
The above business cases are focused on the decision making approaches that companies use in order to make decisions relating to Environmental aspect of Triple Bottom Line model. Accordingly, three operational parameters are identified in order to evaluate the extent this approach has impacted the Companies.

Business Case 4 evaluates waste water emission management especially in relation to washing and dyeing processes in the company. The responses to this case reveal that most of the Companies predominantly use a data driven, intuition based and group moderated decision approach. This is evident in 70% of Companies which have recorded moderate or high percentage of waste water recycling. Hence these Companies purify at least 60% of their waste water from washing and dyeing process whilst 20% of Companies purify 80% of its production waste water. During the discussion with the respondents it was also noted that there is an element of Spontaneous decision making taking place in this process as toxic waste water can be an immediate threat to the environment and the households living in the vicinity of the factory. Hence decisions have to be taken swiftly, calculated and thoughtfully. Therefore, an element of spontaneous decision making also get involved in the process.

Business case 5 evaluates percentage of renewable energy namely solar energy used to power up the production factories which is highly environmentally conducive. Further it evaluates the percentage of fossil fuel used which relates to emission of toxic gases into the atmosphere. In both these cases successful companies use a combination of data, intuition and group involvement in decision making. This is evident in 60% of Companies as they have recorded a moderate to high level of solar energy application and a moderate level of fossil fuel usage as well.

In summary it is evident that the companies which use a combined approach of data, intuition and group element in decision making has resulted in better operational performance in relation to business cases 4 & 5 which addresses Environmental sustainability in the triple bottom line concept. They use data to evaluate the performance or improvement from the past, to identify trends, and assess the extent of capital expenditure if required. Further for Investment evaluation, payback calculation data is being used to support decisions. Intuition in this case is used to leverage on experiences in other companies to generate new ideas and to come up
with out of the box solutions. Group influence in the decision making process is always a moderator in this case as it provides wider acceptance, better idea sharing and equal platform for people to put forward their ideas and experiences. It should also be noted that as discussed above there is an element of spontaneous decision making also taken place in this context due to the urgency of the decision in certain cases as to portrait the company’s image of being an environmentally friendly player in the industry.

Table 6: Analysis of Business Cases 6 & 7

<table>
<thead>
<tr>
<th>Business Case</th>
<th>Decision making approach</th>
<th>Percentage adopted</th>
<th>Operational Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case 6</td>
<td>Data Driven</td>
<td>80%</td>
<td>% Workers recruit</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Very High</td>
</tr>
<tr>
<td></td>
<td>Intuition</td>
<td>100%</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Avoidance</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Spontaneous</td>
<td>0%</td>
<td>% Educational Expenses</td>
</tr>
<tr>
<td></td>
<td>Group</td>
<td>100%</td>
<td>Very</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Very Low</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Health care expenses</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Moderate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Very Low</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Business Case</th>
<th>Decision making approach</th>
<th>Percentage adopted</th>
<th>Operational Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Case 7</td>
<td>Data Driven</td>
<td>80%</td>
<td>Safety Audits (p.a)</td>
</tr>
<tr>
<td></td>
<td>Intuition</td>
<td>100%</td>
<td>Moderate</td>
</tr>
<tr>
<td></td>
<td>Avoidance</td>
<td>0%</td>
<td>Low</td>
</tr>
<tr>
<td></td>
<td>Spontaneous</td>
<td>0%</td>
<td>Very</td>
</tr>
<tr>
<td></td>
<td>Group</td>
<td>100%</td>
<td>Low</td>
</tr>
</tbody>
</table>

4.2.3 Discussion on the Analysis of Business Cases 6 & 7

Business Case 6 refers to the Social Sustainability aspect of the Triple Bottom Line model which evaluates to assess the types of decision making approach to best suit social sustainability parameters of the Company. In these context social indicators such as rural employment creation by the company, expenditure on rural education development and expenditure on rural health and welfare improvement is considered.

According to the findings in Business Case 6 it is evident that data, intuition and group decision making approaches are important to achieve effective decisions on these social parameters. The companies which use this decision making combination have recorded high or very high level of rural employment creation, moderate level of educational and health care expenses which is very conducive for the company in being a socially responsible citizen within the area it operates.

Whilst Business Case 6 focuses on external Social Sustainability business case 7 focuses on internal Social Sustainability aspect in terms of safety within the factory and work place accidents issues. Accordingly, most of the successful companies who have achieved better performance in these parameters use a combination of data, intuition and group involvement in decision making. During the discussion it was also discovered that the companies are more focused on intuition and group in making this kind of decisions as data will only be a factor used for monitoring purpose. However, the involvement of data also could not be ignored as it provides a basis for monitoring as well as an evaluation platform if any investment in this area is involved.
4.3 Analysis of Quantitative data

The quantitative data collected through survey questionnaire based on Likert scale were analysed using SPSS software package. The data were initially subjected to a factor analysis to identify the groupings developed. Each identified group were analysed for reliability and validity and descriptively analysed based on statistical measures.

4.3.1 Factor Analysis of Data Collected

The data collected from the questionnaire for the Independent variable was subjected to factor analysis. The factor loading from SPSS is presented below. The codes representing each variable are: DD- Data driven decision making, IN- Intuitive decision making, SP- spontaneous decision making and AV-avoiding decision making.

Table 6: Factor Analysis

<table>
<thead>
<tr>
<th>Component</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avoiding Decision Making</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>AV2</td>
<td>.811</td>
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<td></td>
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<tr>
<td>AV4</td>
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<td>AV5</td>
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<tr>
<td>AV3</td>
<td>.721</td>
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<td></td>
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<tr>
<td>AV1</td>
<td>.640</td>
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<tr>
<td>Intuitive Decision Making</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>IN4</td>
<td></td>
<td>.798</td>
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<td></td>
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<tr>
<td>IN1</td>
<td></td>
<td>.767</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IN2</td>
<td></td>
<td>.742</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>IN5</td>
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<td>.740</td>
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</tr>
<tr>
<td>IN3</td>
<td></td>
<td>.728</td>
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<tr>
<td>Data Driven Decision Making - Interaction with Decision Support Systems</td>
<td></td>
<td></td>
<td></td>
<td>.829</td>
<td></td>
</tr>
<tr>
<td>DD3</td>
<td></td>
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<tr>
<td>DD2</td>
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<td>DD1</td>
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<td>.707</td>
</tr>
<tr>
<td>DD4</td>
<td></td>
<td></td>
<td></td>
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<td>.582</td>
</tr>
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<td>DD6</td>
<td></td>
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</tr>
<tr>
<td>Spontaneous Decision Making</td>
<td></td>
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<td></td>
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<td>.842</td>
</tr>
<tr>
<td>SP1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.703</td>
</tr>
<tr>
<td>SP4</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.670</td>
</tr>
<tr>
<td>SP2</td>
<td></td>
<td></td>
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<td>.659</td>
</tr>
<tr>
<td>SP3</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Data Driven Decision Making - Personal Traits adopted in Data Driven Decisions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.764</td>
</tr>
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<td>.719</td>
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<td></td>
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<tr>
<td>DD7</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

According to the above factor loading output it is evident that responses for questions in relation to data driven decision making has two aspects. Questions DD1, DD2, DD3, DD4 and DD6 have one aspect whereas questions DD7, DD8, DD9 and DD10 have another aspect. Hence considering the indicators represented by the questions, the questions were grouped as:

Data Driven Decision Making - Interaction with Decision Support Systems
Data Driven Decision Making - Personal Traits adopted in Data Driven Decisions

During the reliability and validity testing process one question (DD5) was dropped from the data gathered as there was a misinterpretation of the question by the respondents.

4.3.2 Reliability Testing

Cronbach's alpha is a measure of internal consistency of the data collected in relation to one variable. This refers as to how closely relate a set of responses for a particular item within the variables. The table 7 indicates Cronbach's alpha calculated for dependent, moderating and independent variables relating to this research.
Table 7: Reliability Test Results

<table>
<thead>
<tr>
<th>Variable Description</th>
<th>Chronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Driven Decision Making</td>
<td>0.8449</td>
</tr>
<tr>
<td>• Interaction with Decision Support Systems</td>
<td></td>
</tr>
<tr>
<td>Data Driven Decision Making</td>
<td>0.80703</td>
</tr>
<tr>
<td>• Personal Traits adopted in Data Driven Decisions</td>
<td></td>
</tr>
<tr>
<td>Intuitive Decision Making</td>
<td>0.82828</td>
</tr>
<tr>
<td>Avoiding Decision Making</td>
<td>0.83641</td>
</tr>
<tr>
<td>Spontaneous Decision Making</td>
<td>0.83952</td>
</tr>
<tr>
<td>Group Decision Making</td>
<td>0.7727</td>
</tr>
</tbody>
</table>

The Cronbach's alpha calculated for all the variables are above 0.70 which indicates relatively high internal consistency. Hence it could be determined that all variables taken in consideration are acceptable and are valid for the purpose of this research study.

4.3.3 Validity Testing
This tests the degree of validity of the research instrument for the purpose of the research. In this context the validity test carried out in order to ascertain the validity of the questionnaire for the purpose of the research. In this context four validity testing measures are calculated namely, Kaiser-Meyer-Olkin Measure of Sampling Adequacy, P value of Bartlett's Test of Sphericity, Average Variance Extracted (AVE) and Composite Reliability. The descriptions of this measures and acceptable parameters are discussed under chapter three of this research paper.

Table 8: Convergent Validity test Results

<table>
<thead>
<tr>
<th>Variable Description</th>
<th>KMO</th>
<th>P value of Bartlett's Test of Sphericity</th>
<th>AVE</th>
<th>Composite Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Data Driven Decision Making</td>
<td>0.82709</td>
<td>0.0000</td>
<td>0.62885</td>
<td>0.89260</td>
</tr>
<tr>
<td>• Interaction with Decision Support Systems</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data Driven Decision Making</td>
<td>0.75674</td>
<td>0.0000</td>
<td>0.60757</td>
<td>0.86053</td>
</tr>
<tr>
<td>• Personal Traits adopted in Data Driven Decisions</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intuitive Decision Making</td>
<td>0.80703</td>
<td>0.0000</td>
<td>0.59621</td>
<td>0.88053</td>
</tr>
<tr>
<td>Avoiding Decision Making</td>
<td>0.84348</td>
<td>0.0000</td>
<td>0.64295</td>
<td>0.89958</td>
</tr>
<tr>
<td>Spontaneous Decision Making</td>
<td>0.78386</td>
<td>0.0000</td>
<td>0.68349</td>
<td>0.89601</td>
</tr>
<tr>
<td>Group Decision Making</td>
<td>0.68212</td>
<td>0.0000</td>
<td>0.69186</td>
<td>0.87059</td>
</tr>
</tbody>
</table>

According to the table 8 validity testing parameters it is evident that Kaiser-Meyer-Olkin Measure of Sampling Adequacy calculated for all variables are above 0.50 and P-value of Bartlett's Test of Sphericity is always less than 0.05 for all variables. Further Average Variance Extracted for all the variables indicate a value above 0.50 and Composite Reliability for the variables are greater than 0.70. Hence it could be concluded that the research instrument is valid and satisfies the purpose of the research.

4.3.4 Discriminant Validity Test Results
This is a test of validity of a variable if the variable is discriminated from the others. If the variable is to stand by its own how the variable can be measured as an independent entity. Discriminant validity occurs where constructs that are expected not to relate do not, such that it is possible to discriminate between these constructs.
Table 9: Discriminant Validity Test Results

<table>
<thead>
<tr>
<th></th>
<th>Correlations</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Data Driven Decision Making:</strong></td>
<td></td>
</tr>
<tr>
<td>Interaction with Decision Support</td>
<td>AVE = 0.628</td>
</tr>
<tr>
<td>Systems (DDSys)</td>
<td>0.63</td>
</tr>
<tr>
<td><em>Data Driven Decision Making:</em></td>
<td>Pearson</td>
</tr>
<tr>
<td>Personal Traits adopted in Data</td>
<td>Correlation</td>
</tr>
<tr>
<td>Driven Decisions (DDPer)</td>
<td>Sig. (2-tailed)</td>
</tr>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td>AVE = 0.607</td>
<td>.487</td>
</tr>
<tr>
<td></td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>100</td>
</tr>
<tr>
<td><strong>Intuitive Decision Making</strong></td>
<td>Pearson</td>
</tr>
<tr>
<td>(Intuition)</td>
<td>Correlation</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
</tr>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td>AVE = 0.596</td>
<td>.241</td>
</tr>
<tr>
<td></td>
<td>.016</td>
</tr>
<tr>
<td></td>
<td>100</td>
</tr>
<tr>
<td><strong>Avoiding Decision Making</strong></td>
<td>Pearson</td>
</tr>
<tr>
<td>(Avoidence)</td>
<td>Correlation</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
</tr>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td>AVE = 0.642</td>
<td>-.420</td>
</tr>
<tr>
<td></td>
<td>-.356</td>
</tr>
<tr>
<td></td>
<td>-.317</td>
</tr>
<tr>
<td></td>
<td>100</td>
</tr>
<tr>
<td><strong>Spontaneous Decision Making</strong></td>
<td>Pearson</td>
</tr>
<tr>
<td>(Spontaneous)</td>
<td>Correlation</td>
</tr>
<tr>
<td></td>
<td>Sig. (2-tailed)</td>
</tr>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td>AVE = 0.683</td>
<td>-.378</td>
</tr>
<tr>
<td></td>
<td>-.481</td>
</tr>
<tr>
<td></td>
<td>-.187</td>
</tr>
<tr>
<td></td>
<td>100</td>
</tr>
</tbody>
</table>

According to the above calculation the AVE (Average variance Extracted) for each variable is greater than the Co-efficient of correlation of other variables considered in the research. This is the condition to be satisfied for the discriminant validity of a set of data. Hence it is that the discriminant validity of the data gathered is in compliance (Fornell & Larker, 1981).

4.3.5 Descriptive analysis of variables

The responses for each variable were descriptively analysed based on statistical measures.

Table 10: Descriptive Statistics

<table>
<thead>
<tr>
<th></th>
<th>DD_Sys</th>
<th>DD_Trait</th>
<th>Intuition</th>
<th>Avoidence</th>
<th>Spontaneous</th>
<th>Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>4.1220</td>
<td>4.1725</td>
<td>3.6480</td>
<td>2.2220</td>
<td>2.3475</td>
<td>3.4860</td>
</tr>
<tr>
<td>Median</td>
<td>4.2000</td>
<td>4.2500</td>
<td>3.8000</td>
<td>2.4000</td>
<td>2.5000</td>
<td>3.4000</td>
</tr>
<tr>
<td>Mode</td>
<td>4.40</td>
<td>4.00</td>
<td>4.00</td>
<td>2.80</td>
<td>2.50</td>
<td>3.40</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>.58320</td>
<td>.55242</td>
<td>.74732</td>
<td>.82385</td>
<td>.77922</td>
<td>.57437</td>
</tr>
<tr>
<td>Skewness</td>
<td>-1.098</td>
<td>-.956</td>
<td>-.404</td>
<td>.207</td>
<td>.153</td>
<td>.400</td>
</tr>
<tr>
<td>Range</td>
<td>3.00</td>
<td>2.75</td>
<td>3.00</td>
<td>3.00</td>
<td>3.00</td>
<td>2.60</td>
</tr>
<tr>
<td>Minimum</td>
<td>2.00</td>
<td>2.25</td>
<td>2.00</td>
<td>1.00</td>
<td>1.00</td>
<td>2.40</td>
</tr>
<tr>
<td>Maximum</td>
<td>5.00</td>
<td>5.00</td>
<td>5.00</td>
<td>4.00</td>
<td>4.00</td>
<td>5.00</td>
</tr>
</tbody>
</table>

a. Multiple modes exist. The smallest value is shown

The descriptive analysis indicates that respondents have expressed a relatively high agreement with respect to adopting data driven decision making and intuition based decision making. Further, decision avoidance has the lowest mean indicating its low applicability. Spontaneous decision making stands at a level marginally above the decision avoidance. However, it is possible to note that during interviews and business case discussions the spontaneous decision making was found to be applicable at appropriate decision situations. Therefore, the result in quantitative data could be reflecting the general perception of its applicability. The group think involved in decision making also stands at a moderate level. The high negative skewness displayed by the data driven and intuitive styles indicate that responses were mostly on the higher side as supported by the measures of central tendency. On the other side, the positive skewness with avoidance and spontaneous styles have indicated those styles are less preferred.
4.4 Summary of Findings

In summary it was discovered that these companies do not restrict to one decision making approach for their business decisions. Based on the nature of the decision, its importance, the time constraints involved as well as the impact that is being exerted to the bottom line, companies use a combination of decision making approaches. Decisions related to economic aspects are largely driven by data as well as intuition in these companies. They consider data as an important aspect as it gives quantification to the problem, identify the extent of implementation as well as provide a quantified review of the degree of success in the decision.

This is similar to decisions involving the environmentally sustainable aspect as well. In this context the decision maker used a combination of data and intuitive decision making approaches to arrive at an effective business decisions. According to the research findings there is an element of spontaneous decision making also taking place in this area of decision making. It was highlighted that most of the environmental related decisions have to be spontaneous without excessive deliberations.

Social sustainability related decisions are also dominated by data driven and intuition based decision making styles. The research findings suggest that social sustainability decisions need to be carefully evaluated in terms of costs benefits as well as an element of intuition is important when making the most suitable decisions which provides maximum benefit to the community.

The research findings strongly suggest that in all the above decision making circumstances there is a high degree of group influence. This is due to none of these decisions can be made by one person as they require multitude of expertise in respective fields. Further it also requires experiential ability and experiential engagement of such disciplined resource personnel. Most importantly if the decisions need to be accepted across the company there should be a cross functional involvement in its making. Hence group decision making influences relationship between all aspects of the decision making styles and the performance of private sector apparel manufacturing companies in Sri Lanka. Therefore, group decision making is considered to be a strong moderator in the decision making process.

5. RECOMMENDATIONS

The aim of this research study was to identify strategic and tactical level decision making styles of private sector apparel manufacturing companies in Sri Lanka and their resulting impact on company performance. In order to achieve this aim, a comprehensive research was conducted within a selected sample of companies. Based on these findings and knowledge gained from the literature review the following recommendation is formulated by applying the decision making style of these companies to the established process of Rational Decision Making Model.

5.1 Application of Rational Decision Making Model

Rational decision making is a multi-step process, of decision making starting from problem identification, analysis, and generation of alternatives, evaluation, and selection of alternatives, implementation and monitoring. There are three fundamental aspects of the rational decision making model. These could be identified as follows.

1. Problem Identification
2. Alternative Generation
3. Implementation & Monitoring

Within these fundamental aspects, various steps of rational decision making model would be applied. According to this research study it was identified that there is no one unique style where private sector apparel companies in Sri Lanka adopt for strategic and tactical management decisions. It was evident that companies adopt a mix approach of data driven style, intuition style and spontaneous style in their business decisions which is again moderated by the influence of group decision making. However, these companies do identify the problem in hand, generate alternative decisions or solutions and implement, monitor the decisions to resolve the problem or to achieve the objective.

Therefore, various decision making styles are applied in each of these above stages of rational decision making model. Thus, the rational decision model being the core framework of decision making, various decision making styles will be applied in each stages of the framework. Figure 4 below identifies various steps involved in rational decision making model and how each decision making styles identified in this research impact the steps in the rational model.
5.1.1 Problem Identification stage

This stage involves problem definition, gathering of information, analysis and root cause identification. In the problem identification stage, a data driven approach is important to quantify the extent of the problem and to establish the extent of impact on the bottom line. An element of intuition is also necessary to identify the exact area of the problem which may not always be visible in terms of data in this stage. In the case of a spontaneous decision, the problem needs to be identified to provide a quick, snap solution for its resolution. Therefore, it is recommended that an effective decision should involve a significant element of data and intuition based styles in the problem definition stage of the rational decision making process.

Gathering of information refers to gathering of data in relation to the problem. This would mean that data will be gathered to further reaffirm the existence of the problem and to facilitate generation of alternative decision. Hence at this stage data driven style would be recommended for the decision approach.

The analysis and root cause identification stage also involve a combination of data driven and intuition decision styles. Root cause for certain decisions could be identified by quantitative data whereas some other root causes require intuition and experience for proper identification. However, this would be an important stage in the rational decision making process as the success of this stage would spell the success of the entire outcome of the decision itself. Thus, in this stage of the decision process it is recommended that companies apply a mixture of data and intuition driven approach in arriving at an effective decision which will positively impact performance.

5.1.2 Alternative Generation Stage

During the development of decisions alternatives, a highly intuition driven approach would be required. Decisions can be of various natures to suit the problem. This diversity of the decisions could only be best handled by experience and engagement which is a key intuitive aspect in decision making. Hence in this stage intuition style will be dominant. Therefore, in this stage of the decision
making process it is recommended for the company to weigh more on the intuitive decision making style as it would generate more thought through result specific decision which will be favorable for company performance.

Once decision alternatives are developed, they need to be evaluated in order to access its suitability for the solution intended. Hence in the evaluation of decision alternatives stage a data driven approach is necessary in order to assess the cost of implementing the decision, potential benefit and a quantification of possible risk areas. Further in this stage intuition approach is also necessary for the selection of best decision alternative and to understand which decision alternative would be best embraced by all the stakeholders involved in the process and to gauge on any non-quantifiable repercussions of the decision. Therefore, at this stage a data driven style coupled with intuition would be recommended for an effective decision.

5.1.3 Implementation & Monitoring Stage

This stage involves implementation of the selected decision alternative and review and monitoring of the progress. Implementation of the selected decision alternative is a solely based on intuition as it involves significant human interactions. This is similar when it comes to spontaneous decisions as well. Implementation involves experiential ability in relation to “getting things done” and experiential engagement in “being a part of the solution”. Therefore, at this stage of the decision making process it is recommended that the decision makers use an intuition based approach towards the decision.

Post implementation review and monitoring is also a key part in rational decision making process. This involves gathering data of the progress, review with original objectives and targets; identify variances taking further corrective measures. In this stage data driven approach plays a key role in gathering data, analyzing progress and identifying variances. Thus, a data driven approach is recommended for this stage of the decision process.

In all the above stages of the rational decision making model there is a significant level of influence exerted by group decision making styles and group think. This is due to better idea generation from knowledge synergies with the group, brainstorming, decision acceptance within the cross functional departments and to promote successful decision implementation. Hence according to the research findings it is recommended that the group moderation towards the decision making is recommended at all levels of the rational decision making model.

6. LIMITATIONS OF THE STUDY

The above research study was conducted to identify strategic and tactical level decision making styles for private sector apparel manufacturing companies operating in Sri Lanka and how it has impacted the performance of such organizations. The research is within a framework that identifies decision making styles as data driven, intuition based, spontaneous and being moderated or influenced by group decision aspect. Although the study is conducted within the above framework the following limitations could be identified which will be a contingency for the outcome of the study.

Organizational Culture – This is one of the key aspects in organizational decision making. The concept of culture is generally used in the corporate world to represent an established set of beliefs, values of society, behaviors that attribute to the performance of an organization [34]. Hence organizational culture would have a significant impact in the type of decision making style adopted within the organization. If the organization is used to a Hierarchy based cultures an element of power and authority would come in to play in decision making. Hence the decision style could be more prone to the beliefs at the top layer of the management structure. If the organization is driven by market oriented or result based culture there would be more independence in making decisions at lower level. Hence the style of decision making would vary significantly in this context. Therefore, organizational culture would have an impact on the decision making style which is not considered in this research study. To this extent the applicability of this research will be limited.

Emotional Intelligence – The level of emotional intelligence possessed by the decision maker will also have a significant impact on the decision styles which is not considered in this research. The level of emotional intelligence possessed by the decision makers can make a significant impact on using an appropriate decision making approach and thus superior performance in the organization [35]. Therefore, the emotional intelligence aspect is considered a limitation for this research study.

Leadership Styles – The leadership styles adopted by the management is also a key factor contributing to the decision making approaches in the organization. Various styles invoke different level of employee engagement, independence. This could affect the decision styles. This research does not factor in leadership styles influencing decision making in companies operating in the apparel sector of Sri Lanka.

Industry – This research study is limited to apparel sector decision making styles. However similar decisions are made in various other sectors such as financial services, FMCG manufacturing, conglomerates, etc. The scope of the research being limited to apparel sector also is considered as a limitation to the research study.

Sample Size & Respondents Profiles – The sample size of the research is ten companies operating in apparel sector in Sri Lanka. However according to apparel exporters association statistics there are approximately 70 medium to large scale apparel companies in Sri Lanka producing for the export market. Therefore the sample size would restrict the findings of this research which is a limitation. Further the respondents in this research were strategic and tactical level decision makers. However in the apparel industry many ground level decisions are made by operational level decision makers as well. This is also not considered in the research which limits the scope of this paper.
7. CONTRIBUTION TO THEORY AND PRACTICE

This study dealt with styles of decision making adopted by apparel manufacturing companies in Sri Lanka and its resulting impact on performance. The Study identified how the theory of decision making can be applied in a practical context especially in the domain of apparel industry. Thereby this study assessed the impact of such decision approaches exerted on organizational performance. The key theoretical contribution of this research was how each of the decision making approaches namely data driven, intuition and spontaneous approach would be applied to the established rational decision making model. This means the rational decision making model could be effectively applied to decision making in the apparel industry. In a practical context this study gives an insight to a decision maker on how to use the data driven decision approaches, intuition and spontaneous approaches for effective corporate decisions. This Paper also highlights the areas within the rational decision making model these styles could be adopted. These would be the key contribution from this research study towards theoretical framework and practical application.

8. DIRECTION FOR FURTHER RESEARCH

The direction for further research spinning off from this research study comes mainly from its limitations. Further research could be conducted to evaluate the impact of company culture influencing decision making styles of organizations. Further the level of emotional intelligence possessed by the decision makers influencing decision making styles. It would also be worthy to research on leadership styles and decision making in organizations and its impact on organizational performance. This research dealt with apparel industry in Sri Lanka. However further research could be conducted in other industries mainly financial services industry where the researcher assumes that data driven decision approach would play a more vital role. This research also was focused on companies producing for the export market. Therefore the decision making styles for companies operating in local market context and the resulting impact on their performance also could be an interesting area for further research study.

9. CONCLUSION

In the modern dynamic business environment organizational decision making is a vital element in determining the success or failure of competitive organizations. Businesses face challenging decisions which are extremely important and thus impact the core existence of organizations. However decision making is not always a scientific or a modular approach. It includes a behavioral aspect of the individuals involved in the process as well. Hence whilst the style of decision making would differ from person to person it would also differ from the type of the decision, the circumstance on which the decision is arrived on as well as the practices and established methodologies beliefs in the industry.

This research paper attempted to identify the decision making styles at strategic and tactical in private sector apparel manufacturing companies in Sri Lanka and its resulting impact on its performance. Further it also identified the key moderator in such decisions which was group think aspect. Thereby various decision making styles and approaches were identified during the progress of this research and the circumstances of such styles likely being used in the industry was also identified.

The insights gathered herein was them applied to the established rational decision making model and the transformation of the rational decision making model by the application of various decision making styles were also discussed. In conclusion the research has identified various decision making styles adopted in the apparel industry in Sri Lanka for its strategic and tactical decisions and had conferred the findings in to the rational decision making model to provide a holistic view of decision making in private sector apparel manufacturing companies in Sri Lanka. Thereby the researcher identified and recommended the best suited decision making styles that could be adapted at different stages of the rational decision making model for strategic and tactical decision making in private sector apparel manufacturing companies in Sri Lanka.
References


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Profile of Condyloma Acuminatum Patients with Syphilis and HIV/AIDS in Haji Adam Malik General Hospital January 2013 - December 2018

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Abstract- Introduction: Condyloma acuminatum (CA) is a sexually transmitted disease that is currently a worldwide epidemic. Data collected in the United States found about 20 million new cases of sexually transmitted infections (STIs), and about 14 million cases were Human Papilloma Virus (HPV) infections. Worldwide data collected by WHO, recorded about 1 million cases occur every day around the world. This phenomenon shows that CA is an STI that is quite common in the population.

Objective: To understand the profile of CA patients with syphilis and HIV/AIDS. Syphilis and CA also often occur together or coinfection in HIV/AIDS. Several studies, both research and case studies have found many cases of syphilis with CA. Both of these pathogens are very closely related to the integrity of the epithelium as the main barrier to infection infection.

The HIV/AIDS will interfere with the integrity of the mucosal epithelial barrier which allows the translocation of viruses and bacteria. The presence of HIV and HPV viruses can be a risk factor for syphilis infection, conversely syphilis, which is generally in the form of chancre/ulcer durum at the primary stage, is also a risk factor for the entry of HIV and HPV viruses. HIV/AIDS is currently a sexually transmitted disease that has become an epidemic throughout the world. Sexually transmitted infections that occur can be single to multiple due to the low resistance system against pathogens that enter the body.

Genital warts are a sexually transmitted disease that is also often found in patients with HIV/AIDS. Data collected in the United States found about 20 million new cases of STIs, and about 14 million cases were HPV infections. Worldwide data collected by WHO, recorded about 1 million cases occur every day around the world. This phenomenon shows that CA is a sexually transmitted infection which is quite commonly found in the population of sexually transmitted infections.

Immunologically this infection will directly deal with the cellular immune system. In patients with HIV/AIDS that are infected with CA will be difficult to experience healing and tend to develop with larger lesions. The prevalence of HPV infection will increase in patients with immunosuppression such as infection with the HIV, immunosuppressive therapy and pregnancy with longer manifestations and difficult virus clearance so that it becomes a persistent infection. The condition of the immune system decline will cause CA infection to become giant...
condyloma. Cellular immunity is very strong role to be a defense and clearance against CA infection. 6,7,8,9

II. METHODS

This study was descriptive retrospective. This study was conducted by looking at and re-recording medical record data from patients at the Department of Dermatology and Venereology, Division of Sexually Transmitted Diseases Haji Adam Malik General Hospital Medan from 1st January 2013 to 31st December 2018.

III. RESULTS

The number of CA patients with syphilis and HIV/AIDS who came for treatment at the Dermatology and Venereology Policlinic Haji Adam Malik General Hospital Medan from 2013 to 2014 based on medical record data in the Haji Adam Malik General Hospital in Medan which qualified for the study was 10 people. Based on the table above, the most gender was male as many as 6 patients (60%).

In a retrospective description study by Aswar at the Haji Adam Malik General Hospital recorded in the medical record section for the period of January 1st, 2008 - December 31st, 2011 there were 76 CA patients, the majority of which were women (53.9%). Research conducted by Nelwan et al at Prof. dr. R. D. Kandou General Hospital Manado in the January - December 2012 period reported that most of the new patients were 14 women (51.8%). While the retrospective study conducted by Lang et al in Canada from 2006-2016 reported the most syphilis cases in HIV/AIDS were found in 183 men (94.3%). The difference in the results of this study with other studies can be influenced by the small number of samples and the tendency to increase the number of cases of MSM each year. 5,6,10

Based on the table above, the most location was perianal as many as 6 people (60%).

CA infection usually occurs during the active sexual period of 1% and there is a possibility of a tendency towards changes in sexual lifestyle habits and changing attitudes or adding partners in this age group which has a role in increasing the prevalence of HPV infection, especially CA. According to the AIDS Commission in 2007 an important age distribution to note, because the younger a person is, the more susceptible to contracting sexually transmitted diseases. In the age group of men 20-34 years and women 16-24 years old are classified as high risk for sexually transmitted diseases. 11,12

| TABLE 3. FREQUENCY DISTRIBUTION BASED ON SEXUAL ORIENTATION |
|-----------------------------|--------|-------|
| Sexual Orientation          | n  | Percentage (%) |
| Homosexual                  | 4  | 40    |
| Heterosexual                | 3  | 30    |
| Bisexual                    | 3  | 30    |
| Total                       | 10 | 100   |

Based on the table above, the most sexual orientation was homosexual as many as 4 patients (40%). This is consistent with the literature that CA with anorectal lesions usually affects homosexual men infected with HIV/AIDS. The prevalence and recurrence rates of perianal condyloma are much higher in individuals with impaired immunity compared to healthy individuals. The incidence of HPV infection in homosexual men has doubled compared to heterosexuals. 11,12

Based on the table above, the most patient with sexual partners was >1 person as many as 6 patients (60%).

The results of this study are in line with studies conducted by Assi et al in Lebanon regarding the prevalence of HIV/AIDS and other STDs and their relationship with sexual practices in 2,238 MSM reporting that 78% of patients had more than one sexual partner in the last 3 months. The large number of sexual partners accompanied by inconsistent use of condoms will increase a person's risk factors for getting sexually transmitted infections. 13

| TABLE 4 FREQUENCY DISTRIBUTION BASED ON SEXUAL PARTNER |
|-----------------------------|--------|-------|
| Sexual Partner              | n  | Percentage (%) |
| 1 person                    | 4  | 40    |
| >1 person                   | 6  | 60    |
| Total                       | 10 | 100   |

Based on the table above, the most sexual partner was >1 person as many as 6 patients (60%).

According to research in Hong Kong, the highest incidence of CA patients in MSM or homosexual populations so that the most lesions are usually perianal and genital. While Nelwan et al reported the distribution of CA patients according to the location of lesions most often found in women is in the vulva (35.71%) and in men is most often on the penis as many as 4 people (30.77%). 4,5

| TABLE 5. FREQUENCY DISTRIBUTION BASED ON LOCATION |
|-----------------------------|--------|-------|
| Location                   | n  | Percentage (%) |
| Genital                    | 4  | 40    |
| Perianal                   | 6  | 60    |
| Total                      | 10 | 100   |

Based on the table above, the most location was perianal/anal as many as 6 people (60%).

Total 36
Male 26
Female 10

| TABLE 2. FREQUENCY DISTRIBUTION BASED ON AGE |
|-----------------------------|--------|-------|
| Age Group                  | n  | Percentage (%) |
| 17-25                      | 5  | 50    |
| 26-35                      | 4  | 40    |
| 36-45                      | 1  | 10    |
| Total                      | 10 | 100   |

Based on the table above, the most age distribution was 17-25 years old as many as 5 patients (50%).

Comparison of recurrence rates perianal condyloma are 260

| TABLE 1. FREQUENCY DISTRIBUTION BASED ON GENDER |
|-----------------------------|--------|-------|
| Gender                      | n  | Percentage (%) |
| Male                        | 6  | 60    |
| Female                      | 4  | 40    |
| Total                       | 10 | 100   |

Based on the table above, the most gender was male as many as 6 patients (60%).

Based on the table above, the most age distribution was 17-25 years old as many as 5 patients (50%).

CA infection usually occurs during the active sexual period of 1% and there is a possibility of a tendency towards changes in sexual lifestyle habits and changing attitudes or adding partners in this age group which has a role in increasing the prevalence of HPV infection, especially CA. According to the AIDS Commission in 2007 an important age distribution to note, because the younger a person is, the more susceptible to contracting sexually transmitted diseases. In the age group of men 20-34 years and women 16-24 years old are classified as high risk for sexually transmitted diseases. 11,12

http://dx.doi.org/10.29322/IJSRP.10.01.2020.p9738
Based on the table above, the most lesion shape was acuminatum as many as 5 patients (50%).

Research conducted by Oktaviyanti et al in the Division of Sexually Transmitted Infections in the Dermatovenerology Outpatient Unit of dr. Soetomo Surabaya, in the 2012 - 2014 period, reported that the most common form of acuminata was 283 (88.9%). The prevalence of HPV infection increased in patients with immunosuppression, one of which was HIV/AIDS infection with longer manifestations and virus clearance is difficult so that it becomes persistent infection. These conditions will also cause the development of CA lesions to be longer, easily recur and larger (giant condyloma).14,15

Based on the table above, the highest CD4+ counts was 500-200, as many as 5 people (50%).

The increased prevalence of HPV infection is not related to the low CD4+ cell count. CA caused by low-risk HPV also increases after infection with HIV/AIDS. However, there is a strong relationship between low CD4+ counts and an increased incidence of STIs. Syphilis infection in HIV/AIDS patients is associated with an increase in viral load and a decrease in CD4+ counts.14,16

Based on the table above, the most lesion treatment was TCA application as many as 10 patients (100%). The results of this study are in line with research conducted by Habibie et al who reported TCA as the treatment most often given to train patients accompanied by HIV/AIDS in dr. Soetomo Surabaya Period 2011 - 2014, as many as 62 people (98.4%). While Nelwan et al reported that therapy was most often given on new trains accompanied by HIV/AIDS at Prof. dr. R. D. Kandou General Hospital Manado, period of January 2012 - December 2012 was podophyllin as many as 14 patients (51.85%) and followed by TCA as many as 8 people (29.63%).5,17

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Abstract- This study is entitled the Socialization Effect of the Clean River by the West Jakarta Sanitary Office on Healthy Life Consciousness In Kedaung, Kali Angke Communities Period (2015-2016). The theory used in this research was firstly, the concept of socialization includes: the form of programs, content, methods, media, participation and participatory socialization. Secondly, the concept of consciousness includes: 1) Feeling obligatory or a must, 2) Rational, 3) Freedom, and 4) Individual responsibility. Then the method used in this study was the survey method. The findings of this study indicate that the clean river socialization by the West Jakarta Sanitary Office influences the healthy life consciousness in the Kedaung, Kali Angke Urban Community. Then finding of the study also found that the Angke River filled with assorted domestic waste distribution of household activity pose a problem, it was because the rapid growth and development was not be balanced by adequate arrangements.

Index Terms- socialization, clean river, healthy life consciousness, & society.

I. INTRODUCTION

 Jakarta has a land area of 661.52 square km and sea of 6,977.5 square km. Based on the 2010 Population Census, it has a population of 9.6 million. The official residents who live in Jakarta, are not including commuters from Greater Jakarta and other regions. In Jakarta, several rivers flow, such as Angke River, Pesanggrahan River, Grogol River, Krukut River, Cedeng River, Sunter River, Ciliwung River, Cipinang River, Buaran River, Cakung River, and so on.

 Kali Angke or Cikeumeuh is the name of a river in Jakarta, Indonesia. The name Kali Angke was given after the Chinese ethnic massacre for three days by the VOC in Batavia on October 9, 1740. Angke himself actually came from the Hokkien dialect, meaning Kali Merah. It is said that due to the incident the color of the river turned red by the ethnic Chinese blood. Since then the name has changed to Kali Angke.

 The river is tipped in East Cilendek sub-district, West Bogor, West Java. Then it passes through South Tangerang, Tangerang City and empties into West Jakarta in the Muara Angke area. This river never dries up during the dry season, because it originates directly in the mountainous region of Bogor, as is the Pesanggrahan River and Ciliwung River. But the change in the function of the River into a giant rubbish bin, not only makes people nervous, but also children. Many parents are worried that unhealthy river conditions can cause children to get ill.

 Along the river bank 2 km and width of 2 meters is almost full with piles of trash, residential trash heaps around the river. Various types of rubbish ranging from plastic, organic garbage to mount along the river, no wonder if the capacity of the river becomes not optimal. Many impacts that arise when the river turns into a giant trash can include: firstly, the shallow of the river, the impact on the capacity of the river when the rain decreases, not only does the earth’s capacity of rainwater cause flooding, silt is the main trigger in Jakarta and big cities the other flood occurs when the rainy season comes. Secondly, the spread of disease due to spoilage of garbage close to residential areas. Thirdly, it caused flooding waste disposal and industrial waste into rivers and ditches. Supposedly in dealing with this problem, it takes consciousness of all parties especially the community. So that negative activities will not continue, such as holding socialization, making artificial lakes, water catchments and many more. Certain agencies must also be responsible for determining that the river is always clean and not used as a garbage dump.

 For the realization of an environmentally conscious community, efforts must be made, ranging from promoting consciousness of environmental law, to imposing sanctions and strict laws against violators. This is important, because the rivers in Jakarta must be saved, and it is the responsibility of all parties, whoever without exception has the right to secure it. Data about the early 1990s showed that Ciliwung get waste supply no less than 1,654 kg per day, from 10 factories not including household waste. Likewise, the Cipinang River was flowed with 10,658 kg of waste every day, originating from 32 factories.

 It is proper for every industrialist in Jakarta to comply with the Jakarta Governor’s Decree regarding wastewater quality standards. To be fully operational in the field, Bapedal (the Environmental Impact Management Agency) must carry out its functions optimally. With the presence of Bapedal, the Jakarta Regional Government is expected to be more responsive and more able to act decisively against river pollutants.

 To minimize these problems, massive handling is needed and involves all levels of society and related stakeholders. The
Jakarta’s socialization will only be truly successful if it has the support of all members of the community. However all these rivers are guarantees for survival, especially concerning the fulfillment of water needs. Especially considering that underground water reserves (ground water) are increasingly depleted, even in several districts in North and West Jakarta, groundwater is brackish, turbid, acidic and salty due to seepage of sea water.

The socialization is not only a program owned by the Jakarta Regional Government, Bapedal, KLH or factory owner, but also a program for all Jakarta residents. It is only right that a relationship as a clear river province can be achieved. At one time, in addition to clear water, rivers in Jakarta can be used for transportation and tourism, as in Amsterdam.

The socialization conducted by the village of Kedaung, Kali Angke is carried out by the Sanitary Office to give direction to the residents of Kali Angke. This socialization program is not only owned by the Jakarta provincial government, but this socialization program is owned by all citizens of Jakarta, so it is very important for residents of the river to be self-conscious in order to better respect protecting an environment, especially in watersheds. This socialization program will continue to be implemented so that environmental cleanliness in the watershed areas is maintained, especially in the area of the Angke riverbank.

Based on the research problem, the researcher formulated the problem of this research i.e. “to what extent is the Effect of Clean River Socialization by the West Jakarta Sanitary Office on Healthy Life Consciousness in Kedaung, Kali Angke Community 2015-2016 Period?” Then the purpose of this study is to determine the Effect of Clean River Socialization by the West Jakarta Sanitary Office on Healthy Life Consciousness in Kedaung Kali Angke Community Period 2015-2016.

II. THEORITICAL REVIEW

2.1 Environmental Communication

Communication is an important component in all activities of human life. Communicating is a human obstacle to be able to interact with one another, as is the case for an institution or organization. According to Katz and Robert Khan, two social psychologists from the University of Michigan Survey Research Center, Communication is the exchange of information and the delivery of meaning which is the main thing of a social system or organization. So communication is a “process of delivering information and understanding from one person to another person and the only way to manage activities in an organization is through a communication process (Erlita, 2018: 19). In this description, it can be concluded that the communication process is a common meaning that must be mutually agreed upon by the public so that a good feedback/response appears so that the flow of information/messages is not interrupted and makes two-way communication achieved between communication actors.

Environmental communication can be realized with campaign activities aimed at educating the public by expanding public knowledge often depending on asymmetric tactics of public relations. Tactics that can be used through the use of controlled media (in the form of advertisements, web sites, direct mail, bulletins, and public service announcements) and uncontrolled media (such as media releases, opinion pieces, and publicity of events) (Henderson, 2005: 122). Robert further in Herutomo (2013) argues that environmental communication is a pragmatic and constructive media to provide understanding to the community about the environment. Therefore we need a message packaging strategy in certain communication media, this is intended so that public consciousness and participation grows in environmental management. The main communicators in environmental communication are government and non-government organizations that are committed to environmental management (Yuliatari & Irawan, 2018: 29).

2.2 Socialization

According to Elly M. Setiadi & Usman Kolip (2011: 156) Socialization is closely related to enculturation or the process of culture which is the process of learning from an individual to learn to recognize, appreciate, and adjust his mind and attitude towards customary systems, norms, language, art, religion, as well as all regulations and establishments that live in the cultural environment of society.

Another important thing that is also very necessary in developing a communication strategy is to determine the communicant’s situation and also pay attention to the specific things related to the culture or the variety of languages used by the communicant so that by paying attention to this important matter later strategies can be arranged diverse but right on target (Tarone, E 1977: 197) because it is right on target in the socialization process how an organization can transfer the purpose of the message from the socialization to many people of different cultures.

According to Fajar the process of socialization in the community has two functions, among others: a) Viewed from the interests of individuals. Socialization aims to make individuals recognize, acknowledge and adapt themselves to the values, norms, and social structures that exist in society, b) Viewed from the interests of the community. The socialization functions as a means of preservation, dissemination and inheritance of values and norms that exist in society, so that they remain and are maintained by the whole community. In other words socialization functions to: 1). Forming individual behavior patterns, 2). Maintaining the regularity of life in society, 3). Maintaining group integration in society (Haryati, 2018: 174).

The dimension of socialization consists of the form of programs, content, methods, media, participation and participatory socialization (Firdaus, 2017: 64 - 66). By understanding this dimension, the researcher easily determined the indicators on the operationalization of the concept, so that this dimension of socialization could be used as a reference in the preparation of the research questionnaire.

2.3 Consciousness

The term consciousness comes from the Latin word “conectia” which means “to understand” (Bambang. 2013: 16). In English there is the word “consciousness”. This consciousness comes from the word “conscious” which means feel, know, and understand. Consciousness is defined as understanding or a state of understanding and is something that is felt or experienced by someone.

The consciousness that God has given to humans is unique because with human consciousness can place themselves in accordance with the true and false beliefs. Human consciousness
is an important element in understanding reality and how to act and respond to that reality. The consciousness that humans have is consciousness of themselves, others, the past and the possibility of their future. The consciousness arises when the moral man must decide anything concerning the rights and happiness of others (Suseno, 1987: 22). This moral consciousness explicitly requires a person in accordance with his inner voice to do according to what is a true norm.

Furthermore Suseno (1987: 25) explains three elements of moral consciousness i.e. 1) The feeling of obligation or obligation to carry out moral actions is present and occurs in every human heart, anyone, anywhere, and at any time. 2) Rational, human consciousness can be said to be rational because it is generally accepted, and open to justification or denial. It is also stated as an objective thing that can be universalized, meaning that it can be approved, applies at all times, and places for everyone in a similar situation. 3) Freedom, or moral consciousness, a person is free to obey him. 4) The responsibility of the individual in dealing with his obligations.

III. RESEARCH METHOD

The research method used was a Quantitative Research Method of the type of survey method that is a research method that collects data using a questionnaire (questionnaire method) that is a list of written questions asked to a group of people called a sample (Bambang, 2013: 39). The reason the writers use this method is because this method is limited to the collection of data collected from a sample of the population to represent the entire population. And this survey method also helps in quantitative data collection on the Effects of Clean River Socialization by the West Jakarta Sanitary Office on the Consciousness of Healthy Life in Kedaung, Kali Angke Community for the period of 2015-2016.

In this study the author chose the residents of West Jakarta Kali Angke as the study population, by taking the level of Rt 01 to Rt 05. The reason the writers chose this population was because the writers can make measurements evenly starting from the level of Rt 01 to Rt 05. The population in the study was 150 people. Then the number of samples in this study was 110 people using the calculation of the proportional stratified random sampling formula.

Data collection techniques in this study were primary data collection through surveys, and secondary data collection through systematic and standard procedures to obtain the data needed in research. In this study, the writers used primary data and secondary data from the literature study of reference books relating to the research object, intranet, and thesis examples that have to do with things that would be discussed in accordance with the title of this study.

To determine the sample size, the writers performed statistical calculations using the Slovin formula. Slovin’s formula is to determine the sample size of a population whose number is known (Kriyantono, 2007: 160). The formula is:

\[ n = \frac{N \times \frac{N}{1 + \frac{N}{n}}}{N - n} \]

**Note**

- \( n \) = sample size
- \( N \) = sample size
- \( E \) = allowance of inaccuracy due to sampling errors that can be tolerated, which

The data validity technique used in this research was the use Logic Validity/sampling validity, because the instrument was reasonable and only questions items related to the attribute to be measured, while the attribute to be measured was related to the object research on sample attributes, so it is often called sampling validity. Then because the method used is a causal explanatory research method with a quantitative approach that aimed to assess the success of a program implemented, the writers use a Likert scale to analyze the data. To simplify the calculation of survey findings, the researcher uses SPSS 16 (Static Product and Solutions Service), where the data collected was first made in the questionnaire answer table list, then given a number or number code (because SPSS can only read numbers) after that, then inputted into the SPSS calculation system to get the findings in the form of a table.

IV. DISCUSSION

In the research on the effect of clean river socialization by the West Jakarta Sanitary Office on healthy life consciousness in Kedaung, Kali Angke Community period 2015-2016, the writers feels interested in knowing whether or not there was a healthy life consciousness in the angke river community that has been taken after the socialization process. Then this research was conducted in Kedaung, Kali Angke which is one of the river basins located in West Jakarta. So the author could find out how much influence the socialization carried out by the Sanitary Office in Kedaung, Kali Angke.

The general description of the respondents was the people of the Angke River from RT 1 to RT 5, whether male or female. The findings of the answers from respondents on the dimensions of the two variables were not yet relevant. For the variables of the influence of clean river socialization, it was a mean or method used to convey information or messages from the socialization itself. Whereas the variable of healthy life consciousness in the Angke River community is something that was expected after the program was implemented.

In general the findings of answers to questions that have been submitted had a positive response with the percentage of the number of answers agreeing and strongly agreeing to more than 50%, but there were still answers above 50% who disagree so that the question points were be concerned by the residents of the river and also the village of Kedaung, Kali Angke.

For the variable of healthy life consciousness is a picture of the findings received from the clean socialization program. In general, the findings of respondents’ answers had a positive response to the questions asked by the percentage of the number of answers agreeing and strongly agreeing to 60% and quite a few answers hesitating/disagreeing. This showed that the consciousness of healthy life in the Angke River community can be felt by the Angke River community. To prove empirically that the clean river socialization program influences the consciousness of healthy life in the people of the village of Kedaung, Kali Angke. Then the hypothesis test was done through statistical calculations with the help of the SPSS 23. The hypothesis testing method was found in the simple linear regression analysis, the T test method.
From the findings of the research that the writers got about the socialization effect of the clean river by the West Jakarta sanitary office on healthy life consciousness in Kedaung, Kali Angke communities period (2015-2016), it was stated positively or the socialization program implemented could affect the residents of the Kedaung, Kali angke.

Starting from the calculation of the first dimension, which was about Data and Information about Clean River Socialization, the findings of the analysis were from the information data obtained by the writers from respondents, which agree 80 people (53.3%), and strongly agree 70 people (46.7%). So it can be concluded from the data and information regarding the clean water the average of 4.19 of 150 respondents. Then from these findings it can be said the first dimension regarding data and information was valid.

The second dimension is about the contents of the Clean River program. Analysis of the second dimension is about the content and method of socializing the clean river of the numbers that strongly agree there are 65 people (43.4%), agree 75 people (50%), doubt 10 people (6.6%). From this analysis get an average of 4.19 of 150 respondents. Then from these findings it can be said the second dimension regarding the content and method of socialization was valid.

The third dimension is about How to Clean River Socialization. Analysis on this third dimension which was about how to clean river socialization was the respondent who answers doubtfully 50 people (33.3%), agrees 50 people (33.3%), disagrees 23 people (15.4%), and strongly disagree 27 people (18%), with an average of 4.19 out of 150 respondents. Then from these findings it can be said the third dimension regarding the way of socialization was valid.

The analysis on the fourth dimension regarding media socialization of clean river was that respondents answered strongly disagree there were 35 people (23.3%), disagree 15 people (10%), doubtful 60 people (33.4%), agree 35 people (23.3%) and strongly agree 15 (10%) with an average of 4.19 out of 150 respondents. Then from the findings it can be said that the fourth dimension was valid.

The fifth dimension analysis finding of Clean River Socialization Participation was that respondents answered from strongly disagree 40 (27%), disagree 60 (40%), doubt 20 (13%), agree 15 (10%), strongly agree 15 (10%) with an average of 4.19 out of 150 respondents. Then from the findings of the fifth dimension regarding the Socialization Participation, clean river could be said to be valid.

The analysis on the sixth dimension concerning participatory socialization was that respondents answered strongly disagree 70 people (44%), disagree 15 people (10%), doubt 25 people (16.7%), agree 20 people (13.3%) and strongly disagree 20 people (13.3%) with an average of 4.19 out of 150 respondents. Then the findings could be said to be valid.

The seventh dimension regarding the consciousness of healthy living at Angke River society with analysis that answers strongly disagrees 70 (44%), disagrees 15 people (10%), doubts 25 people (16.7%), agrees 20 people (13.3%), and strongly agree 20 people (13.3%) with an average of 99.8. So from these findings it could be said that the dimension regarding the existence of a healthy life in the Angke River community was valid.

The findings of the analysis on the eighth dimension i.e. freedom in responding to the socialization of clean river was answered strongly disagree 70 (44%), disagree 15 people (10%), doubt 25 people (16.7%), agree 20 people (13.3%), and strongly agree 20 people (13.3%) with an average of 99.8. So from these findings it can be said the dimension of freedom in addressing the socialization of clean river was valid.

The findings of the analysis on this dimension regarding healthy life consciousness were answered strongly disagree 70 (44%), disagree 15 people (10%), doubt 25 people (16.7%), agree 20 people (13.3%), and strongly agree 20 people (13.3%) with an average of 99.8. So from these findings it could be said that the dimensions of community responsibility in maintaining healthy living were said to be valid.

To use the parametric analysis tool, another condition is needed, which is a normality test. According to Sudarmanto Gunawan, that a study which proposes a hypothesis by using t-test and f-test, according to an assumption that must be tested, the population must be normally distributed. Because if you use the parametric method, then the normal requirements must be met, this is derived from the normal distribution. In this study the Kolmogorov-Smirnov sample one method was used with a significance level of 5% (0.05). Data is stated as normal distribution if the significance is greater than 0.05 or 5%. In table 4.14 the findings of the Kolmogorov-Smirnov Z calculation show that the significance values of the two variables are 0.000 so that the significance value is lower than 0.05, so it can be concluded that the two variables are normally distributed.

The variable questions for the Clean River Socialization Program (X) totaled 13 questions, as shown in table 4.1 below, the value of the product moment items ranged from 0.545 to 0.716 where the value was greater than the value of R table (0.361) then all items of variable X were declared valid. Variable question items Increased Consciousness of Healthy Life in Society (Y) amounted to 7 questions, where, the value of product moment (r-count) item questions ranged from 0.393 to 0.771 where the value was greater than the value of r table (0.361) then all the variable Y question was declared valid. The T test aims to test the significance of the regression coefficient values. The testing criterion as a requirement of the accepted hypothesis is that the calculated t-value must be greater than the t-table. Based on the findings of calculations, it was found that the t-value of 71.5 was greater than t-table (316).

V. CONCLUSION

From the findings of the research that the writers got about the effect of clean river socialization by the West Jakarta Sanitary Office on healthy life consciousness in Kedaung, Kali Angke community period 2015-2016, it was stated positively or the socialization program implemented could affect the residents of Kedaung, Kali Angke. The findings of the study found that the Angke River was filled with various kinds of distribution of domestic waste from household activities, causing a problem, it was due to the rapid development and development that was not matched by adequate arrangements. Pollution in the Angke River is due to the habit of people throwing garbage directly into rivers, houses that do not have septic tanks, industries that dispose of waste directly to the river without being processed first, showing
several parameters that exceed the quality standard threshold. The parameters were: 1) Detergent, 2) BOD, 3) COD, 4) Oil and Fat, 5) Lead, 6) Fecal Coli, 7) Total Coli

Various kinds of activities that occur around the Angke River certainly cause pollution impacts for the local residents, the environment, and the biota contained in the river. The impact of household waste pollution in Angke River in this case has a negative impact on the biota in Angke River water. Besides that, the impacts on the residents around Angke River are: firstly, the water became no longer useful. The water in Angke River was no longer suitable to use. Residents who were in direct contact with polluted water usually suffer from itching. Secondly, water is the cause of disease. Diseases caused by pollution in Kali Angke were: Hepatitis A, Poliomyelitis, Cholera, Typhus Abdominalis, Dysentery Trachoma, Scabies, Cadmium Poisoning, Cobalt Poisoning, and Malaria.

The participation of the government of Kali Angke and local residents were needed in handling household waste pollution. The Sanitary Office have made various efforts, one of which is river water neutralization, which is by conducting the consciousness raising of domestic waste to the people who live around Angke River, taking Angke River water samples and implementing the Clean River Socialization Program. In addition to the role of the West Jakarta Sanitary Office, residents around the Kali Angke also participated in river walks and the socialization activities carried out by the West Jakarta Sanitary Office.

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Prevalence of Cholelithiasis in Sickle Cell Hemoglobinopathy, Central Indian Scenario

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Abstract- Cholelithiasis is a well-known complication of sustained heme catabolism in Sickle cell anemia, which has frequency distribution between 22.5 – 44.4 % in central India.

This study was carried at Regional Hemoglobinopathy Detection And Management center, Indira Gandhi Government Medical College Nagpur. This study includes 120 patients with sickle cell disease and 30 cases with sickle cell trait. The prevalence of cholelithiasis in 120 sickle cell disease cases was found to be 28.33% as compared to 10% in each of the sickle cell trait and normal population. The cases were clinically evaluated for frequency of Vasoocclusive crisis (VOC), abdominal pain, jaundice, and biliary colic along with Cholecystosonography, hemoglobin Estimation, reticulocyte counts, peripheral smear, AST, ALT and AlkalinePhosphatase

Age of the youngest patient with gallstone, in the present series was 5 years and that of the oldest patient was 70 years. The reduced hemoglobin percentage, increased reticulocyte count, increased bilirubin concentration (indirect, direct and total) and raised AST were found to be significant factors related with cholelithiasis in homozygous sickle cell disease.

Sickle cell disease cases with repeated abdominal pain, voc coupled with low mean hemoglobin, high reticulocyte count, and bilirubin should be subjected to ultra-sonographic screening as early as at 2 yrs.

Index Terms – Sickle cell anemia, cholelithiasis, Central India

Abbreviations
1. VOC – Vasoocclusive crisis
2. AST – aspartate aminotranferase
3. ALT – alanine aminotranferase

I. INTRODUCTION

Cholelithiasis is a well-known complication of chronic hemolysis. Sickle cell anemia, a hereditary hemolytic anemia with sustained heme catabolism, leads to very high frequency of pigment gallstones. The prevalence of gallstones varies from 6.8% to 58.4%. This variability can be accounted to the variability in geographic location, dietary habits, environmental factors, genetic factors and the technique employed for detection. Ultrasonography has been considered as fairly sensitive technique for the radio opaque as well as radiolucent stones. In patients with sickle cell anemia, the presence of gallstones poses a medical and surgical dilemma, due to similarities of clinical and laboratory features between acute cholecystitis and acute abdominal crisis. The gallstones can be radiolucent or radio opaque and can be picked up by ultrasonography. Even though 10 to 15% of the patients have symptoms that can be attributed to the biliary tract elective cholecystectomy may lead to dramatic decrease in the frequency of abdominal crisis. Sickle cell disease especially the Asian – Indian haplotype has relatively benign course (have mild course) and hence the patients tend to live longer. The incidence of cholelithiasis increases with age and hence screening for gallstones is necessary to reduce gallstone related morbidity and mortality. The present study was carried out to find out prevalence of cholelithiasis in patients of sickle cell anemia from central India.

II. IDENTIFY, RESEARCH AND COLLECT IDEA

Material & Methods

This study was carried out for two years.150 patients that were positive by solubility test along with 30 control cases (solubility negative) were included. These cases were classified into homozygous (SS) and heterozygous (AS) and normal homozygous (AA), using hemoglobin electrophoresis at alkaline PH with agar gel as support media. The cases were clinically evaluated for frequency of Vasoocclusional crisis (VOC), abdominal pain, jaundice, and biliary colic. The cases were subjected for laboratory investigations like Hemoglobin Estimation, Reticulocyte counts, Peripheral smear, AlkalinePhosphatase AST and ALT and Cholecystosonography. Cholecystosonography was carried out using machine GE Logic 3 PRO with a curvilinear probe of frequency 3.5 MHz. The sonographic images and records were obtained. Examination of gallbladder was performed after a minimum of 4 hours of fasting, because ingestion of food, particularly of a fatty nature stimulates the gallbladder to contract. The contracted gallbladder may appear thick walled and may obscure luminal or wall abnormalities. Evaluation of the gallbladder was performed with routine agital and transverse sonograms. Small stones less than 5 mm did not cast shadow but were echogenic. Mobility was the key feature of stone, allowing differentiation from polyps or other entities. Scanning with the patient in the right or left lateral decubitus or upright standing positions allowed stone to roll within the gallbladder.
Observations

The 150 solubility positive cases on Hb electrophoresis, showed ‘SS’ pattern (sickle cell disease) in 120 cases and ‘AS’ pattern in 30 cases. The prevalence of cholelithiasis in 120 sickle cell disease cases was found to be 28.33% as compared to 10% in each of the sickle cell trait and normal cases group (Fig I). In gender wise distribution of cholelithiasis, males outnumbered females and the prevalence of cholelithiasis was also more in males as compared to females (Table I). The prevalence of gall stones in age group of 2 to 5 years was 6.25%, in age group of 6 to 10 years it was 10%, in age group of 11 to 13 years it was 14.29% and in age group of 14 to 18 years it was 31.58% (Table II) The 34 cases of cholelithiasis include the youngest patient of 5 years who presented with right upper quadrant pain, nausea, fever, leukocytosis & hepatomegaly. As against that oldest patient was 70 years, who was admitted with severe right upper quadrant pain, nausea, jaundice, leukocytosis and negative Australia antigen test. It was also observed that the prevalence of cholelithiasis increased with increase in age (Table II).

120 patients of homozygous sickle cell anemia were classified in two groups as

1) Group A: Patients with cholelithiasis
2) Group B: Patients without cholelithiasis

Both the groups were clinically evaluated for VOC and abdominal pain. Number of vaso-occlusive episodes was more in SS cases with cholelithiasis as compared to those without cholelithiasis (Table III). So also, SS cases with cholelithiasis had increased abdominal crises episodes as compared to those without cholelithiasis (Table IV). All the pointers of chronic hemolysis i.e. reduced hemoglobin percentage with increased reticulocyte count & increased bilirubin concentration (indirect > direct), were found to be statistically significant factors, related to cholelithiasis in homoygous sickle cell disease as compared to those without cholelithiasis (Table V). The mean ALT, AST and alkaline phosphatase levels were high in SS cases with gallstones as compared to those without stones (Table V). These differences between the two groups were statistically significant (Table V)

Discussion

Sickle Cell Anemia has frequency distribution between 22.5 – 44.4 % in central India12. Regional Hemoglobinopathy Detection And Management center was established in 2000 at Indira Gandhi Government Medical College Nagpur. Nagpur happens to be geographic center of India. This study was carried out to find out prevalence of cholelithiasis in this part of India. The present study comprised of total 150 patients of sickle cell syndromes and 30 normal AA patients. Cholecystosonography was performed in all the cases. Small stones less than 5 mm did not cast shadow but were echogenic. Sonography is currently the most practical and accurate method of diagnosis of acute Cholecystitis. The sensitivity and specificity of sonography when adjusted for verification bias is approximately 88% and 80% respectively13.

Overall prevalence of cholelithiasis in homozygous sickle cell disease was found to be 28.33% in age group 2 to 70 years. The prevalence in children was 16.13% (below 18 years). AL-Salem reported 19.71% cholelithiasis in 305 children below 18 years on sonography16 while Karayalcin G et al reported 17% prevalence in 47 children17. On the other hand Lachman BS et al18 reported 29% prevalence in 31 cases using sonography Cholecystosonography and abdominal radiography. The youngest child in their series was 4 years old. Age of the youngest homozygous sickle cell patient with gallstone, in the present series was 5 years and that of the oldest homozygous SS patient was 70 years. Perez N et al19, Akamguna AL19 et al also reported youngest patient of 5 years Diaigne I in 7 years and Nzeh DA20 in 10 years child. Incidence as quoted by Sarnaik et al21 is 12%. All these studies recommend use of, noninvasive technique of ultrasonography to be implemented in screening of all homozygous children from the age of 2 years and onwards. 10% of sickle cell trait patients (AS) showed presence of gallstones, which was comparable with prevalence of gallstone in normal control AA patients. Thus, prevalence of cholelithiasis was higher in homozygous sickle cell disease than sickle cell trait and general population. Various authors have reported prevalence of cholelithiasis that ranged from 6.18 % to 58%1-8 (Table VI). This wide range can be attributed to the features like sample size, age group, technique used, geographic location, dietary habits etc. Mohanty J et al3 reported prevalence of 22% in Western Orrisa-India, in their study on 50 cases of homozygous sickle cell disease.

When studied in different age groups, it was observed that there was a steady rise (Table II) in the Prevalence of cholelithiasis in homozygous sickle cell disease patients as the age advances. Repeated Vasoocclusive crisis (55.8%) was commonly associated with cases of cholelithiasis than those without cholelithiasis (15.1%) (Table III). Abdominal crisis was more common in patients with cholelithiasis (14.7%) than in the case without cholelithiasis (11.6%) (Table IV). The mean hemoglobin concentration in patients with cholelithiasis was lower than those without cholelithiasis (p value was highly significant). The mean reticulocyte count was higher in cholelithiasis patients than those without cholelithiasis (p value was highly significant). Total, direct and indirect bilirubin levels and AST was higher in patients with cholelithiasis than those without cholelithiasis. Thus, reduced hemoglobin percentage, increased reticulocyte count, increased bilirubin concentration (indirect, direct and total) and raised AST were found to be significant factors related with cholelithiasis in homozygous sickle cell disease. Sarnaik S et al in their study on 226 patients reported high mean bilirubin only, 3.8mg/dl in cases with cholelithiasis as compared to 2.6in those without cholelithiasis13. The authors also reported that mean hemoglobin and reticulocyte counts were not significantly different. Christoper G et al also did not found significant difference in total bilirubin, in their study on 100 homozygous cases of sickle cell anemia21.

Double heterozygous states with Hb S have variable effect on cholelithiasis. Co existent states like Hb C, β Thalassaemia increases the risk while co existent α Thalassaemia decreases the risk of cholelithiasis22. Hb C has not been reported in India so far
and Hb S-β can be diagnosed by quantitation of variant hemoglobins where Hb A2 will be raised beyond normal range. It is very difficult to diagnose co existent state of α thalassaemia with Hb S however such cases tend to have smaller, lighter cells with higher hemoglobin level and fewer reticulocyte. Homozygous sickle cell disease cases without gall stones needs to be evaluated for coexistent α thalassaemia in them. Sickle cell disease has variable clinical manifestations and fortunately is much milder in severity in India as compared to Africa. Analysis of clinical data in sickle cell research center (ICMR) at Burla in India, shows patient of all ages even beyond age of 40 years. Nearly 11% of cases in the present were above the age of 30 years and the eldest case had the age of 70 years. With increase awareness regarding disease and better health care facilities, the patients are expected to live/survive longer. As the risk of cholelithiasis and related complications increases with increase in age, cholecystosonography coupled with laproscopic cholecystectomy of all homozygous sickle cell cases is essential to reduce gall stone-related morbidity and mortality in these cases.

Cholecystosonography is fairly sensitive and specific method with added advantage as a noninvasive technique. Laproscopic cholecystectomy is well tolerated by younger cases.

Homozygous (SS) cases without gallstones need to be evaluated for co-existent α thalassaemia. Cases with repeated abdominal pain, voc and laboratory features like low mean hemoglobin with high reticulocyte count and bilirubin should be subjected to ultrasonographic screening and it should be undertaken as early as 2 yrs.

Table-II showing increase frequency of gall stones with increase in ageing SS cases.

<table>
<thead>
<tr>
<th>Age groups in Years</th>
<th>No. of Patients</th>
<th>No. of Patients with Gallstones</th>
<th>Frequency %</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-5 Years</td>
<td>16</td>
<td>1</td>
<td>6.25</td>
</tr>
<tr>
<td>6-10 Years</td>
<td>20</td>
<td>2</td>
<td>10.00</td>
</tr>
<tr>
<td>11-13 Year</td>
<td>7</td>
<td>1</td>
<td>14.29</td>
</tr>
<tr>
<td>14-18 Years</td>
<td>19</td>
<td>6</td>
<td>31.58</td>
</tr>
<tr>
<td>19-25 Years</td>
<td>32</td>
<td>11</td>
<td>34.38</td>
</tr>
<tr>
<td>26-30 Years</td>
<td>12</td>
<td>5</td>
<td>41.67</td>
</tr>
<tr>
<td>31-35 Years</td>
<td>6</td>
<td>3</td>
<td>50.00</td>
</tr>
<tr>
<td>36-45 Years</td>
<td>5</td>
<td>3</td>
<td>60.00</td>
</tr>
<tr>
<td>&gt; 45 Years</td>
<td>3</td>
<td>2</td>
<td>66.67</td>
</tr>
<tr>
<td>Total Cases</td>
<td>120</td>
<td>34</td>
<td></td>
</tr>
</tbody>
</table>

Table III Vasoocclusive crisis in Group A and Group B

<table>
<thead>
<tr>
<th>Vasoparalytic crisis</th>
<th>Group A (n=34)</th>
<th>Group B (n=86)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of Cases</td>
<td>%</td>
<td>No. of Cases</td>
</tr>
<tr>
<td>≤ 2 per year</td>
<td>15</td>
<td>44.12</td>
</tr>
<tr>
<td>3-5 per year</td>
<td>19</td>
<td>55.88</td>
</tr>
<tr>
<td>Total cases</td>
<td>34</td>
<td>86</td>
</tr>
</tbody>
</table>

Group A: SS Patients with Cholelithiasis, Group B: SS Patients without Cholelithiasis

Table IV Abdominal crisis in Group A and Group B

<table>
<thead>
<tr>
<th>Abdominal crisis</th>
<th>Group A (n=34)</th>
<th>Group B (n=86)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. Of Cases</td>
<td>%</td>
<td>No. Of Cases</td>
</tr>
<tr>
<td>≤ 2 per year</td>
<td>23</td>
<td>67.65%</td>
</tr>
<tr>
<td>3 to 4 per year</td>
<td>6</td>
<td>17.65%</td>
</tr>
<tr>
<td>&gt; 4 per years</td>
<td>5</td>
<td>14.71%</td>
</tr>
<tr>
<td>Total cases</td>
<td>34</td>
<td>86</td>
</tr>
</tbody>
</table>

Group A: SS Patients with Cholelithiasis, Group B: SS Patients without Cholelithiasis
Table No. V - Laboratory Investigations In Group ‘A’ & Group ‘B’

<table>
<thead>
<tr>
<th>Variables</th>
<th>Group A (n=34)</th>
<th>Group B (n=86)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>Hemoglobin</td>
<td>7.05</td>
<td>1.25</td>
<td>8.07</td>
</tr>
<tr>
<td>Reticulocyte count</td>
<td>7.28</td>
<td>2.02</td>
<td>5.05</td>
</tr>
<tr>
<td>Direct Bilirubin</td>
<td>0.81</td>
<td>0.88</td>
<td>0.42</td>
</tr>
<tr>
<td>Indirect Bilirubin</td>
<td>2.84</td>
<td>0.68</td>
<td>1.90</td>
</tr>
<tr>
<td>Total Bilirubin</td>
<td>3.65</td>
<td>1.12</td>
<td>2.33</td>
</tr>
<tr>
<td>SG OT</td>
<td>191.09</td>
<td>61.36</td>
<td>97.60</td>
</tr>
<tr>
<td>SG PT</td>
<td>130.53</td>
<td>99.39</td>
<td>61.28</td>
</tr>
<tr>
<td>ALK PO4</td>
<td>313.35</td>
<td>169.17</td>
<td>190.55</td>
</tr>
</tbody>
</table>

Group A: SS Patients with Cholelithiasis, Group B: SS Patients without Cholelithiasis

Table VI – Prevalence of Cholelithiasis in Homozygous Sickle Cell Disease by various authors.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Author</th>
<th>No. of Patients</th>
<th>Age Range (yrs.)</th>
<th>Prevalence in %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bond LR (1987)</td>
<td>95</td>
<td>10 to 65</td>
<td>58</td>
</tr>
<tr>
<td>1</td>
<td>Akamaguna AI (1985)</td>
<td>48</td>
<td>2 to 35</td>
<td>25</td>
</tr>
<tr>
<td>2</td>
<td>Durosimni MA (1989)</td>
<td>133</td>
<td>9 to 60</td>
<td>22.6</td>
</tr>
<tr>
<td>3</td>
<td>Billa RE et al (1991)</td>
<td>90</td>
<td>&lt; 20 and &gt; 30</td>
<td>28.9</td>
</tr>
<tr>
<td>4</td>
<td>Diagne I (1999)</td>
<td>106</td>
<td>11 to 22</td>
<td>9.4</td>
</tr>
<tr>
<td>5</td>
<td>Olatunji A A (2002)</td>
<td>97</td>
<td>Children &amp; Adult</td>
<td>6.18</td>
</tr>
<tr>
<td>6</td>
<td>Longo M (2004)</td>
<td>190</td>
<td>3 to 24</td>
<td>58.4</td>
</tr>
<tr>
<td>7</td>
<td>J Mohanty et al (2004)</td>
<td>50</td>
<td>3 to 48</td>
<td>22</td>
</tr>
<tr>
<td>8</td>
<td>Present Study (2005)</td>
<td>120</td>
<td>2 to 70</td>
<td>28.33</td>
</tr>
</tbody>
</table>

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Role of Project Managers in the Stakeholder Management

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Abstract – Stakeholders and project managers are key players in projects success. Therefore, the relationship among different stakeholders needs to be established and the project manager plays a key role in achieving stakeholder management. Current research shows that there is a need for stakeholder management and the responsibility lies on the project manager. Therefore, this study shows the factors that affect stakeholder management and role in which the project manager has on a successful stakeholder management. This study obtained data through questionnaire. The analysis shows a significant relationship between some variables.

Keywords: Project Manager, Stakeholder, Management.

I. INTRODUCTION

Project management is the application of acquired, skills, techniques, and tactics in overseeing a project process from its inception to its end. Stakeholder management is a monumental constituent of the project management process. It is therefore imperative for a project manager to facilitate active communication between, the project team and the stakeholders. Project managers are individuals in charge of supervising, facilitating, monitoring and executing a project. Project managers deal with all the stages of a project life cycle which include; initiating, planning, executing, monitoring and controlling, closing. They also work with all the nine project management knowledge areas, which include; Cost management, Communication management, Human resource management, Procurement management, Scope management, Quality management, Time management, Risk management and integration management.

Every project has stakeholders; stakeholders are people, individuals, organizations that are impacted one way or another by the outcome of a project. Stakeholders can be both internal and external. Internal stakeholders are people in the organization that are executing that project while External are the outside beneficiaries.

Stakeholder management provides knowledge about the prospects, functions and requirements of external and internal players who have the likely to either influence, or be influenced by a certain project/activity. This knowledge is an early step in the analysis of stakeholders' impact on the products or outcomes of an organization, project, or activity. The direction of influence stakeholders' power and interest or location in the communications network (Bourne, 2008). The management of the project stakeholders is considered the responsibility of the project manager. This task constitutes one of the largest components of their role. To mitigate the risk to the project that the stakeholders pose and to obtain the multitude of project – related benefits that follow the achievement of successful stakeholder relationship. It is critical that the project manager develops relationship with the stakeholders that are effective and of high quality (Mazur & Pisarski, 2015).

Stakeholder management also pays particular attention to the communication with stakeholders in other to understand their needs and expectation, to address issues as they arise, to manage conflicting interest, to promote a commitment of the stakeholders in the decision and activities of the project (Riahi, 2017).

In project management, it is regularly agreed that when a project is completely done according to the required specifications, within the given scope, time and budget as a successful project. Stakeholders are important input in any project therefore, the project manager should build communal relationship among different group of people to complete project. Since, project success doesn’t just depend on the performance on the project team, success or failure often depends on the involvement of top management, functional managers, customers, suppliers, contractors and others. (Dekkar & Qing, 2014)

II. STATEMENT OF THE PROBLEM

Projects are organizational strategic instruments that lead to innovation and create value however; their failures and challenges cause global businesses, governments and organizations fortune each year (Raiablu, 2014). Scholars have cited the ignorance of stakeholder management as one of the key reasons responsible for project failure (Raiablu, 2014). The issues with stakeholders having different interest on projects makes it quite difficult to manage all of them, therefore finding a balance and an environment where each stakeholders interest is represented and the success of the project is achieved. The difficulty in communication among
stakeholders needs to be resolved and also how ineffective stakeholder management can impact project success. Therefore, this research aims that identifying causes of ineffective stakeholder management, role of the project manager and provide a panacea.

III. OBJECTIVES OF THE STUDY

The objectives of this research are as follows

i. To examine the role of project manager on stakeholders
ii. To investigate the reasons of unsuccessful stakeholder management

IV. RESEARCH HYPOTHESIS

The following null hypotheses were formulated for this study is;

H0: There is no project manager role on stakeholder
H0: The reasons of unsuccessful stakeholder management is negative

V. LITERATURE REVIEW

A. Concept of Project Manager

A project manager is an individual that oversees the entire process of a project. These processes include, initiation, planning, executing and closing the project. The Project Manager is responsible for scoping, planning, and delivering a project supported and funded by the three key stakeholders. They will be working closely with representatives from each of the key stakeholders to scope, design, plan, and execute an initiative. They will also be involved in recruiting your team, as well as managing aspects of the project such as your team, budget, and schedule. (EWB-Robogals, 2012).

Project managers have different roles and responsibilities based on the job description therefore the following are a few;
Negotiate the performance of activities with team members and their managers if operating in an environment.
Prepare to clarify assignments and deliverables, mentor others in project management practices, analyze quality of work and manages integration of team members’ work.

Project Support Manager, strategize to optimize professional development for each team member.
Create a project charter with the team, together with the definition of completion criteria.
Manage and communicate a transparent vision of the project’s objectives, and motivate the project team to achieve them; create a project environment that enables peak performance by team members. Organize the work into manageable activity clusters (phases) and determines an efficient approach to finishing the work.
Organize estimation and compile a complete and accurate estimate of a project; using reserves appropriately. Organize the project plan and prepare project plan and obtain management approval. Analyze risks, create a contingency plan and identify trigger events and responsibility for initiating mitigating action. Supervise the activities of Risk Administrator. Gather neutral input; rank the highest project risks in terms of total impact.
Organize the work plan schedule and monitor and control the tracking and report on plan to proceed, cost, change control and schedule reporting. Analyze the actual performance against the plan and adjust consistent with plan objectives. Manage relationships with project stakeholders, including internal and external clients and vendors, keeping them stakeholders informed of progress and issues in order to manage expectations on all project requirements and deliverables.

B. Project Stakeholder

Every project has stakeholders; therefore, a stakeholder is person that is directly or indirectly affected by the result or output of a project.

According to (Riahi, 2017) Stakeholders are both internal and external actors, social and economic partners of a company. The activity of the company has a direct or indirect impact on these actors, and these partners have a more or less important influence on the company. The research also says that the company is accountable to all parties and must consider their opinions. The study concluded that it is therefore important to identify stakeholders but there is also a need to plan stakeholder management. Depending on the nature of the project, there may be several types of stakeholders; some stakeholders can play several roles at a time. Stakeholders may have a positive or negative influence on a project. Managing stakeholders in a proactive way is an important factor in their relationship.

A good project manager recognizes the key impact that stakeholders can have both to help and to hinder the progress of the project. Meticulous stakeholder analysis and a careful communication plan will maximize the project's chances of delivering deliverables on time and in budget. The management and communication strategies to be adopted for each type of stakeholder will be detailed in future works (Riahi, 2017).

Project stakeholders have been divided by type: organizational stakeholders (executives, line leaders, employees and unions), product stakeholders (customers, suppliers, governments and the general public) and capital market stakeholders (shareholders, creditors and banks). They have also been differentiated in terms of whether they are considered primary or secondary stakeholders (Mazur & Pisarski, 2015).

Project stakeholders may also be distinguished by where the project stakeholder is situated within a project manager's organization or outside of it. The position of the stakeholder may influence the project manager's management of that stakeholder. However, the position of the project stakeholders should have little practical impact as all stakeholders have to be identified, and have their needs and potential to impact the project assessed (Mazur & Pisarski, 2015). According to the study, stakeholder relationship quality as major project managers' overall assessment of the capacity of their stakeholder relationships to withstand project-related stressors from within and outside of the relationship (Mazur & Pisarski, 2015).

Communication is itself a human endeavor, and the complex communication that may be necessary for managing stakeholder relationships within an organization or around its activities requires planning, monitoring and also leadership. Furthermore, from

the study, for stakeholder relationship management it is better to take a little extra time to understand better the stakeholder community and how well to involve the important stakeholders, than to actually deal with the aftermath of disinterest or lack of support of neglected stakeholders (Bourne, 2008). The important thing in managing stakeholder relationships is in understanding that the stakeholder community is a network of people. Managing stakeholder relationships is difficult and takes more time than expected, but the costs of not engaging stakeholders, particularly senior management stakeholders are significantly higher (Bourne, 2008).

The influence stakeholders can have on organizational policy, strategy, and project is dependent on their relationship to either the organization itself or the issues of concern, or both. Project managers ought to acknowledge the reciprocity of efforts and rewards among stakeholders, and should attempt to achieve a fair distribution of the benefits and burdens of corporate activity among them, considering their respective risks and vulnerabilities (Hunt & Markwell, 2016).

According to the study, the project managers should listen to and openly communicate with stakeholders about their respective concerns and contributions, and about the risks that they assume because of their involvement with the corporation. Furthermore, managers should recognize and actively oversee the concerns of all legitimate stakeholders, and should take their interests appropriately into account in decision-making and operations (Hunt & Markwell, 2016).

Project managers ought to avoid altogether activities which may jeopardize inalienable human rights or bring about to risks that, if clearly understood, would be patently unacceptable to relevant stakeholders (Hunt & Markwell, 2016). Therefore, managers ought to acknowledge the potential conflicts between their own role as company stakeholders, and their legal and ethical responsibilities for the interests of stakeholders, and will address such conflicts through open communication, appropriate reporting and incentive systems and, where necessary, third party review (Hunt & Markwell, 2016).

C. Stakeholder Management

Stakeholders largely accounts for the success of projects, especially complex projects. The strong cooperation of stakeholders is necessary for project success, since a project can be regarded as a temporary organization of stakeholders pursuing an aim together. From the study, the purpose of stakeholder management is to achieve project success through the persistent development of their interrelationships. Therefore, identifying how stakeholders influence project success.

According to the study, Understanding the influence of stakeholders on project is essential in project management, particularly in projects with complex stakeholder relationships.

Stakeholder management is those processes that are necessary in order to identify the people, groups, or organizations that could be directly or indirectly affected by the project endeavor. These stakeholders are actors outside the authority of the project manager. The number of stakeholders interested in the project can dramatically increase the complexity. These stakeholders usually have individual interests, which may vary priorities (Karlsen, 2002).

Stakeholder management is often characterized by causal actions, which in some situations are not coordinated and discussed within the project team. The result of this practice is often an unpredictable outcome. To meet this challenge, several stakeholder management methods and guidelines have been introduced. These pointers embody the execution of the management functions of designing, organizing, motivating, directing, and dominant the resources accustomed with neutral methods (Karlsen, 2002).

Stakeholder management is about the management of the relationships with all stakeholders serving their benefits competitively and thus profitably in order to sustain and improve the contributions, resources they provide for the organization’s value conception. It’s all about relationship and experience management and, business excellence. Effective management of relationships with stakeholders is critical to resolving issues facing organizations. By using their influence, stakeholders hold the key to the environment in which an organization functions and the consequent financial and effective performance of the organization. Therefore, a proper management of stakeholder relations is an emergent focus of public relations and organizational activities (Itanyi & Ukpere, 2014).

Stakeholder and communication management literature to suggest that enlightened organizational strategy-making is best informed by a process of continuous dialogue with stakeholders and that “the social performance of any business should be judged not only by what it does, but by the extent to which it facilitates interested parties in negotiating what it does” (Itanyi & Ukpere, 2014).

Thus, management of communication with the various project stakeholders is very vital. It is imperative to manage key stakeholders attentively and keep them fully occupied. More than that there is a need to keep important stakeholders satisfied. Do not burden them with too much detail. Try and keep affected stakeholders informed. Communicate regularly to check that no major issues are appearing. Make efforts to monitor other stakeholders. It is good to communicate, but do not bother them with too much information (Itanyi & Ukpere, 2014).

Therefore, this study aims at relating the importance of a project manager on stakeholder management and also outlines few factors that affect stakeholder management.

VI. METHODOLOGY

The paper adopted a singular source of data collection. The secondary source of data generation, which include the use of textbooks written by different authors on the subject matter, journals, magazines, information from the internet and other published and unpublished materials relevant to work. The data was analyzed using the content analysis approach. This is because of its major dependence on the secondary source data.

This chapter grants the findings got from the research, by set out the results of the questionnaires. The research instrument used was a questionnaire. The information was examined with Excel to bring out a regression analysis. A total number of 70 stakeholders answered to the questionnaire.

VII. TEST OF HYPOTHESES
Hypotheses One

H\(_1\): There is a project manager role on stakeholder
H\(_0\): There is no project manager role on stakeholder

Table I: Table of correlation between project manager role and stakeholder

<table>
<thead>
<tr>
<th></th>
<th>Project manager role</th>
<th>stakeholder</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project manager role</td>
<td>Pearson Correlation</td>
<td>1.000</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>N 110</td>
<td>.536 **</td>
</tr>
<tr>
<td>stakeholder</td>
<td>Pearson Correlation</td>
<td>.536 **</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>N 110</td>
<td>1.000</td>
</tr>
</tbody>
</table>

**Correlation is significant at the 0.01 level (2-tailed).

According to above calculations it is observed that amount of correlation coefficient between levels of project manager role is equal to 53.6 per cent and considering that a significant level is less than 5%. Then we can say that there is a positive relationship between project manager roles on stakeholder. This implies that one per cent increase in project manager role will lead to 53.6% increase in level of stakeholder.

Regression analysis test of level of stakeholder and project and project manager role

Model Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.965*</td>
<td>.716</td>
<td>.586</td>
<td>3.79952</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), project manager role

Regression coefficient of R = .965 or 96.5% indicate that relationship exist between independent variables and dependent variable. The coefficient of determination R\(^2\) = 0.716 which show that 71.6% of variation in level of employee’s explained by project manager role. The adjusted R-square in the table shows that the dependent variable, (level stakeholder) is affected by 58.6% by independent variable (effective project manager role). It shows that effective project manager role is responsible for stakeholder.

Coefficients*

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(Constant) stakeholder</td>
<td>12.310</td>
<td>.901</td>
<td>13.656</td>
</tr>
<tr>
<td></td>
<td>1.056</td>
<td>.085</td>
<td>.536</td>
<td>12.426</td>
</tr>
</tbody>
</table>

a. Dependent Variable: level of stakeholder

The coefficient of determination for effective project manager role is positive (1.056) and is highly significant (0.001) in ensuring level of stakeholder. The p-value of 0.001 is less than the t-statistic value of 12.426 and the standard error value of 0.085. This implies that a unit increase in effective project manager role will lead to 1.056 increases in level of stakeholder. Therefore, the null hypothesis is rejected and alternative hypothesis accepted that there is a project manager role on stakeholder.

Hypothesis two

H\(_2\): The reason of unsuccessful stakeholder management is positive.
H\(_0\): The reason of unsuccessful stakeholder management is negative.

Table II: Table of correlation between stakeholder and management

<table>
<thead>
<tr>
<th></th>
<th>stakeholder</th>
<th>management</th>
</tr>
</thead>
<tbody>
<tr>
<td>stakeholder</td>
<td>Pearson Correlation</td>
<td>1.000</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>N 110</td>
<td>.473 **</td>
</tr>
<tr>
<td>management</td>
<td>Pearson Correlation</td>
<td>.473 **</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>N 110</td>
<td>.000</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).

According to above calculations is observed that amount of correlation coefficient between stakeholder and improving in the management is equal to 47.3 per cent and considering that a significant level is less than 5%. Then we can say that there is a
positive relationship between stakeholder and improving in the management. This implies that one per cent increase in stakeholder will lead to 47.3% increase in improving in the management.

Regression analysis test of unsuccessful stakeholder and management

Model Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.773 a</td>
<td>.624</td>
<td>.722</td>
<td>3.96426</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), stakeholder

Regression coefficient of R = .773 or 77.3% indicate that relationship exist between independent variables and dependent variable. The coefficient of determination R² = 0.624 which show that 62.4% of variation in improving the management is explained by stakeholder. The adjusted R-square in the table shows that the dependent variable, (improving the management) is affected by 72.2% by independent variable stakeholder). It shows that there are positive of stakeholder on improving the management.

Coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>management</td>
<td>15.036</td>
<td>.806</td>
<td>.473</td>
</tr>
<tr>
<td>1.319</td>
<td>.125</td>
<td>18.644</td>
<td>10.520</td>
<td>.000</td>
</tr>
</tbody>
</table>

a. Dependent Variable: improving the management.

The coefficient of determination for stakeholder is positive (1.319) and is highly significant (0.000) in improving in the management. The p-value of 0.000 is less than the t-statistic value of 10.520 and the standard error value of 0.125. This implies that a unit increase in stakeholder will lead to 1.319 increases in improving in the management. Therefore, the null hypothesis is rejected and alternative hypothesis that the reason of unsuccessful stakeholder management is positive.

VIII. CONCLUSION

According to this study, the factors affecting stakeholder management was examined and also the role of a project manager was identified. Further in-depth research needs to be conducted to establish the success of stakeholder management. Therefore, from the findings, the importance of communication, interest level and power amongst stakeholders affect stakeholder management.

Therefore, recommendations are as follows;

i. Project managers should establish strong communication skills amongst stakeholders.
ii. Project managers should identify key stakeholders.
iii. Project managers should identify influential stakeholders.
iv. Key stakeholders should be involved in decision making
v. Transparency amongst stakeholders is adopted.
vi. Project managers should avoid corruption and bureaucracy amongst stakeholders.

IX. RECOMMENDATIONS

It is necessary to offer the following recommendations.

i. It is recommended that more attention be placed on organizing project management processes according to their impact and influence.
ii. To preserve the construction projects after its completion, the quality of materials used in construction projects must not be compromised.
iii. More project management metrics recently developed in other research works like benefit to end users, benefit to national infrastructure should be included for performance Measurement.
iv. With this, the projects should not necessarily be organization based and will be more useful to all stakeholders. Embracing a tactical approach to engaging in project management practices is recommended through implementing customer satisfaction surveys, meetings and communication effectiveness evaluation forms and analysing the turnaround time for outstanding issues and informally through listening observing and conversing with relevant parties.
v. The function of identifying projects through systematic procedures should be encouraged on every individual project. This should not be left in the hands of only the end users of a project.

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Comparative performance analysis of machine learning models for breast cancer diagnosis

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http://dx.doi.org/10.29322/IJSRP.10.01.2020.p9742

Abstract- Breast cancer tumor is one the tumor discussed, researched and thought over by many recent time philosopher for it malignant and benign nature through manual and natural language methods. Due to the severity of tumor and increasing rate medical science has accepted this challenge and tried to diagnose it on early stage. Manual methods are not giving the results for mammographic images and statistical reviews for treatment. This study tends to evaluate the performance of seven machine learning classification models such as: Artificial Neural Network (NN), Bayes Network (BN), k-Nearest Neighbors Algorithm (KNN), Decision Tree (DT), Random Forest (RF), Logistic Regression (LR) and Support Vector Machine (SVM) are used to diagnose breast cancer symptoms. The accuracy for the prediction of breast cancer has remained the disputed research area. Many authors previously have worked and found the flaws in natural language and learning models of classification for breast cancer. Study debates on the accuracy and efficiency of machine learning models by comparing all seven methods using AUC values, K-Fold Cross Validation and F-measure metric. Study used F measure values, cross validation values and AUC (ROC) values for interpreting the results of performance measurement of all seven classification methods, results acquired suggested that all seven methods are better and efficient as compare to the manual methods of diagnosing the breast cancer and Random Forest as the highly recommended and most appropriate methods to yield the perfect results in AUC and Cross validation values for the diagnosing the Datasets of BCCD and WBCD acquired from the papers and used in many modules for analysis.

Index Terms- Breast Cancer, Classification Methods, Accuracy and Efficiency, Performance measurement

I. INTRODUCTION

Breast cancer in women is one of the deadly types of diseases worldwide/globally. For the prediction of survival indicators various researches have been showed that most of the evaluations were mainly performed using basic statistical techniques. According to world health organization in 2018, it is assessed that 627,000 women died from breast cancer that is approximately 15% of all cancer deaths among women [1]. Therefore it requires more scientific methods for diagnosing. Machine learning method; recently have taken part in medical treatment and predictions for the symptoms of cancers and other maleficent diseases. Breast cancer can be categorized Malignant and Benign. This study tends to calculate the performance of seven machine learning classification models such as: Artificial Neural Network, Bayes Network, k-Nearest Neighbors Algorithm, Decision Tree, Random Forest, Logistic Regression and Support Vector Machine are used to diagnose breast cancer symptoms. The accuracy for the prediction of breast cancer has remained the disputed research area. Many authors previously have worked and found the flaws in natural language and learning models of classification for breast cancer. Study debates on the accuracy and efficiency of machine learning models by comparing all seven methods using AUC values, K-Fold Cross Validation and F-measure metric.

In this study we used two datasets related to breast cancer; Wisconsin Breast Cancer Database (WBCD) and Breast Cancer Coimbra Dataset (BCCD) and WEKA is used for all the simulation and experiments to illustrate the results. This study compares the result and interprets that performance evaluation of seven methods which resulted in Random Forest as the highest ranked method for diagnosing the breast cancer patient as compare to other six methods.

The rest of the content of this paper is organized in following order. In section 2, we discussed related work about machine learning and breast cancer. We discussed research methodology in section 3 and in section 4 we discussed about data analysis and interpretation. In the last section we conclude this paper and present possible future work.

II. LITERATURE REVIEW

Globally, the second most cause of deaths is Breast cancer. In 2018, the most usual occurring distortions were in women’s (almost 22.9% of female cancers). Within them, more than 2 million cases were diagnosed newly. In Western Europe and North America, this disease is common but it’s also increasing in developing countries. The main causes are life expectancy, urbanization, and the implementation of western lifestyles. (Paola De Cicco, 2019) [2] Said five-year survival rate has improved from 63% in 1960 to 90% at present according to the American Cancer Society. Classification plays an important role in data mining and machine learning. Numerous researches have been conducted on the datasets related to breast cancer using data mining techniques and machine learning methods. For nearly 20 years, artificial neural networks and decision trees have been used in cancer discovery and diagnosis. (Cicchetti, 1992)[3]. Machine learning techniques have been used in many applications ranging from identifying and categorizing tumors through CRT images

and X-ray (Liotta, 2007) [4]. More than 1500 papers are published on the subject of machine learning and cancer as stated by latest PubMed statistics. But, many of these papers are related with machine learning methods to classify, to categorize, to detect and to distinguish tumors and other distortions. We can conclude that machine learning is primarily used as assistance for cancer diagnosis and detection (McCarthy, 2004) [5].

The growth of a cancer tumor is linked with its temperature. Many masses are benign that implies the irregular development restricts to a limited, single and growing mass of cells (Gokhale, 2009)[6]. Early stages breast cancer is commonly detect by Mammography. Mammograms are for the most part examined by radiologists to differentiate the early stage of cancer (Domínguez, 2009) [7]. In literature, for breast tumor conclusion in tissue level, multiple commitments were made concerning about the use of example pattern recognition techniques. A model is proposed by tumor (al-shamlan, 2010)[8] and his group for the extraction of feature values to examine the breast cancer mammogram images for the classification of breast. (Yixuan Li, 2018)[9] applied 5 methods to evaluate the performance of SVM, DT, ANN, RF and LR and resulted in identifying that Random Forest provides befitting results in predicting the cases of tumor patients in breast cancer. This study tends to evaluate the performance of seven Machine-learning classification models and diagnose breast cancer symptoms with the comparison of accuracy values of all methods with RF. (kiyan, 2004) [10] Explain that breast cancer diagnosis can be performed effectively by using statistical neural networks. (Lertworaprachaya, 2014) [11] A new model is proposed for composing decision trees by the use of interval-valued fuzzy membership values.

### III. Research Methodology

The chapter presents the research design and Datasets used in statistical treatment and performance evaluation of breast cancer patient. It also depicts the data analysis procedure and statistical treatment of data to achieve the objective of the study.

#### 1.1 Description of datasets:

This study uses 2 datasets relevant to Breast Cancer; Breast Cancer Coimbra Dataset (BCCD) and Wisconsin Breast Cancer Database (WBCD). Attributes of both the datasets are different but relevant to the breast cancer patient. First dataset is comprises of 117 entries identity is given as the age of the patient ranging from 34 to 89, frequency distribution is used to understand the classes as per the age group of the subject used in the dataset. Second dataset is comprised of 570 entries given a separate ID for each subject in the dataset. Both datasets are coded according to get the utmost result at similar frequency distribution classes.

<table>
<thead>
<tr>
<th>S/No.</th>
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<th>Code</th>
<th>Remarks</th>
</tr>
</thead>
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<td>1</td>
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<td>A</td>
<td></td>
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<tr>
<td>2</td>
<td>BMI</td>
<td>B</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Glucose</td>
<td>G</td>
<td></td>
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<tr>
<td>4</td>
<td>Insulin</td>
<td>I</td>
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</tr>
<tr>
<td>5</td>
<td>Homa</td>
<td>H</td>
<td></td>
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<tr>
<td>6</td>
<td>Leptin</td>
<td>L</td>
<td></td>
</tr>
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<td>7</td>
<td>Adiponectin</td>
<td>AD</td>
<td></td>
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<tr>
<td>8</td>
<td>MCP</td>
<td>M</td>
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<table>
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<th>S/No.</th>
<th>Characteristics</th>
<th>Code</th>
<th>Remarks</th>
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</thead>
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<td>1</td>
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<td>R</td>
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</tr>
<tr>
<td>2</td>
<td>texture mean</td>
<td>T</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>area mean</td>
<td>AR</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>parameter mean</td>
<td>PM</td>
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<td>5</td>
<td>smoothness mean</td>
<td>SM</td>
<td></td>
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<tr>
<td>6</td>
<td>compactness means</td>
<td>CM</td>
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<td>7</td>
<td>concave mean</td>
<td>C</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>concavity mean</td>
<td>CN</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Symmetry means</td>
<td>SM</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Fractal dimension</td>
<td>FD</td>
<td></td>
</tr>
</tbody>
</table>
1.2 Modeling method

Study intends to imply seven machine learning methods which respectively are NN, BN, KNN, DT, RF, LR and SVM. The aim of the study is to select a suitable primary model with maximum prediction accuracy.

For the selection of primary model we combined both the index of F measure metric and accuracy. We used random forest as a classification model for the prediction of breast cancer either benign or malignant. Ratio of both the datasets are distributed in subsets such 70% to 30%. Study implies 70 percentages as training set and 30 percentages as testing data. Firstly we trained classification model by applying training data and secondly we applied test data on a trained model. Later on we compared the results of prediction accuracy of RF with other models.

2. EXPERIMENTS AND INTERPRETATIONS

In this section we will elaborate the comparative analysis on experimental results of seven machine learning models. Dataset BCCD classification has malignant weight of 64 counts and benign weight of 52 counts in total they are 116 count distributed in different classes and sets. It is intended to apply all seven machine learning methods to examine the database.

For the selection of primary model we combined both the index of F-measure metric and accuracy. Accuracy depends on the measurements of classifier and it’s calculated by average of true positive items and false positive items and F-measure metric is measured by harmonic average of recall and precision.

Accuracy can be calculated by percentage of correctly classified occurrences (TP + TN) / (TP + TN + FP + FN), Whereas TN, FN, TP and FP represents true negatives, false negatives, true positives and false positives respectively. F-measure metric can be calculated by harmonic mean of the precision and recall.

A model consider to be more efficient if the value of F-measure will be high, where 0 represents as worst while 1 represent as high efficiency of model. Table 3 and table 4 shows the accuracy values and F-measure metric values of seven machine learning methods on BCCD, WBCD data. Figure 2 and figure 3 shows the comparison of all seven classification methods by accuracy and F-measure metric on WCCD and WBCD datasets.
As shown in both the tables and figure 2 that RF, random forest has been the highest predicting method for BCCD data set that has comparatively diagnosed highest number of accurate patients with malignant and benign tumor cancer from 116 cases, same specifications apply WBCD figure 3 for accuracy and F measure metric.
Figure 3 exhibits the values occurred in table 4 for WBCD data analysis of seven methods of machine learning algorithm which implies that Random forest is the fittest way of predicting the diagnosis patients amongst the seven algorithms although accuracy of Decision Tree algorithm is almost the same in accuracy measurement but for F-measure metric random forest is more efficient therefore overall it is concluded that Random Forest RF is better than other 6 methods NN, BN, KNN, DT, LR and SVM and efficient Natural Artificial Language that can Diagnose the cancer patient of category Malignant and Benign.

The verification of the performance of ensemble is done by performing predictions on random division of training and test data fifty times. When the first process is completed then ROC curve of every classification is placed in one graph to conclude the results instinctively. Both data’s ROC curve is given in Figure 4 and Figure 5. In the ROC curve specificity is taken on x-axis and sensitivity is taken on y-axis. If we check the area under the ROC curve then it’s showing the probability in the case when the true negative instance is lower than the prediction of true positive instance.

All the diagonal points presented in ROC curve of BCCD data set are above .5 and less than 1 that implies that all seven methods are fit for prediction of Breast Cancer Tumor and scale for ratings in difference of seven methods Random Forest is more accurate than other six methods comparatively that shows in the table of AUC values for BCCD and highlighting the symptoms and prediction of breast cancer tumor has reflected the higher values for Random Forest.

<table>
<thead>
<tr>
<th>Classification mode</th>
<th>NN</th>
<th>BN</th>
<th>KNN</th>
<th>DT</th>
<th>RF</th>
<th>LR</th>
<th>SVM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy</td>
<td>0.600</td>
<td>0.525</td>
<td>0.587</td>
<td>0.686</td>
<td>0.743</td>
<td>0.657</td>
<td>0.714</td>
</tr>
</tbody>
</table>

Table 5 AUC value of BCCD data
Figure 5 exhibits the values of ROC curve through AUC values and identifies the area under curve, it implies that random forest area under curve is greater than other methods of machine learning such as Artificial Neural Network, Bayes Network, k-Nearest Neighbors Algorithm, Decision Tree, Logistic Regression and Support Vector Machine. AUC values for the curves are given in table 6.

![ROC Curve](image)

Table 6 AUC value of WBCD data

<table>
<thead>
<tr>
<th>Classification mode</th>
<th>NN</th>
<th>BN</th>
<th>KNN</th>
<th>DT</th>
<th>RF</th>
<th>LR</th>
<th>SVM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy</td>
<td>0.956</td>
<td>0.435</td>
<td>0.712</td>
<td>0.961</td>
<td>0.961</td>
<td>0.937</td>
<td>0.951</td>
</tr>
</tbody>
</table>

Roc Curves for the both BCCD and WBCD data set indicate the values of AUC in table 5 and 6, implies that amongst all the machine learning languages and classifiers random forest covers diagnosis for breast cancer more efficiently and intelligently. Classes for both the sets are 1 for malignant and 2 for benign. Curves are sectioned with malignant classification and implementation.

IV. CONCLUSION

In this study, seven classifiers applied after converting nominal to numerical values of data set in BCCD and WBCD. Seven methods are Artificial Neural Network, Bayes Network, k-Nearest Neighbors Algorithm, Decision Tree, Random Forest, Logistic Regression and Support Vector Machine. Purpose of implementing machine learning algorithms on datasets was to evaluate the performance of natural language and analyze which method is more efficient in diagnosing the breast cancer. This study used two datasets BCCD with 116 volunteers and 9 attributes and WBCD with 699 volunteers and 11 attributes to produce results using WEKA tools. Study used Cross validation, F-measure and AUC values to compare mean result through histogram and ROC curves. Though there are limitations in study because of limited data regarding breast cancer but result produced are of greater benefit as it is not only serve the cause of humanity but also highlights the importance of technology in Medical science.

Study concluded that machine learning algorithms are efficient way of producing the results of the diagnosis of breast cancer which can also be applied to other medical issues. Study also compares the result and interprets that performance evaluation of seven methods which resulted in Random Forest as the highest ranked method for diagnosing the breast cancer patient. Furthermore, if we apply these machines leaning methods on bigger data then might be possible we can get more accurate and efficient results.

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Green synthesis and characterization of Ceria nanoparticles using Ricinus communis leaf extract

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Abstract: Nowadays, green synthesis of nanoparticles has great interest and achievement due to its eco-benign and low time consuming properties. In this work, Ceria nanoparticles is Synthesized using Ricinus communis (Castor oil) leaf extract. The Synthesized nanoparticles are characterized by UV-Vis spectroscopy, dispersive X-ray analysis (EDAX), which is attachment of scanning electron microscope (SEM). Crystalline nature and purity are revealed by X-ray diffraction (XRD) and their FTIR spectra are examined to identify the effective functional groups present in the synthesized nanoparticles. Raman studies show a characteristic peak at 461 cm$^{-1}$.

Index Terms- Ceria nanoparticles, Green synthesis, Ricinus communis, Raman spectroscopy

I. INTRODUCTION

Semiconductor oxide Nanoparticles play an important role in the recent research due to their interesting physical and chemical properties. Ceria is a semiconductor oxide with wide bandgap of 3.19eV at room temperature and high excitation binding energy. It is widely used in many applications like sensor, fuel cell, catalyst, cosmetic, antioxidant and bioimaging [1-6]. Ceria nanoparticles are less toxic compare to other semiconductor oxide nanoparticles. Generally Ceria nanoparticles were synthesized by physical and chemical methods. Phytosynthesis of ceria nanoparticles is more cost effective and ecofriendly. Cerium oxide has two different oxide forms, CeO$_2$ and Ce$_2$O$_3$. On the nanoscale, the cerium oxide has cubic fluorite structure with the coexistence of Ce$^{3+}$ and Ce$^{4+}$ ions on its surface. The surface Ce$^{3+}$ : Ce$^{4+}$ ratio is influenced by the microenvironment [7]. Recently, phytosynthesis of ceria NPs was reported using different plants. The plant extract acted as capping as well as stabilizing agent in ceria nanoparticles synthesis process[1,8,9].

Ricinus communis or the castor oil plant is a species of perennial flowering plant in the spurge family, Euphorbiaceae. Although it is indigenous to the southeastern and India today it is widespread throughout tropical region. Castor seed is the source of castor oil which has a wide variety of uses. Its leaf extract has many medicinal uses. Its seed contains a water-soluble toxin, ricin, which is also present in lower concentrations throughout the plant. In this paper, the synthesis of ceria nanoparticles using Ricinus communis leaf extract and its characterization studies have been reported for the first time.

II. EXPERIMENTAL DETAILS

http://dx.doi.org/10.29322/IJSRP.10.01.2020.p9743
2.1 Materials and methods

Cerium chloride heptahydrate was purchased from the nice company. Leaves of Ricinus Communis) were collected in the local area of Madurai, Tamilnadu, India. The leaves were washed, dried and cut into fine pieces. Then the fine pieces were put in the mixer to get the leaf extract. The extract was filtered through Whatman No. 1 filter paper and it was collected.

2.2 Synthesis of ceria nanoparticle using Ricinus communis leaf extract

Aqueous solution of 1.8629g of cerium chloride heptahydrate \( [\text{CeCl}_3.7\text{H}_2\text{O}] \) was used for the synthesis of cerium oxide nanoparticles. 10ml of Ricinus Communis leaf extract was added to 50ml of \( \text{CeCl}_3.7\text{H}_2\text{O} \) in a 250ml Erlenmeyer flask and stirred at 80°C for two hours. Ricinus Communis leaf extract acts as a precipitating agent which is responsible for the synthesis of the nanoparticle. The particle formed after adequate time of stirring was collected by centrifugation at 10000 rpm for ten minutes. The centrifuged particles were washed with water and again subjected to centrifugation at 5000 rpm for ten minutes. The centrifuged sample was dried in an air oven, was powdered using mortar and pestle. This powdered sample was calcined in muffle furnace at 400°C to get ceria nanoparticles.

2.3 Characterization of Ceria NPs

The phyto synthesized Ceria NPs were subjected to XRD analysis. The XRD pattern was recorded using Cu Kα radiation \((\lambda = 1.54 \text{ Å})\) in the range of \(2\theta\) from 20° to 80°. Fourier transform infrared spectroscopy (FT-IR) analysis was carried out in the range of 400-4000cm\(^{-1}\). The micro Raman analysis of the synthesized ceria NPs was also carried out. UV-Visible absorption spectra of the synthesized ceria NPs was recorded in the range of 190-800nm.

The energy dispersive spectroscopy (EDAX) associated with Scanning electron microscopy (SEM) of the synthesized NPs were also recorded.

III. RESULTS AND DISCUSSION

3.1 X-ray diffraction analysis

The X-ray diffraction peaks of ceria NPs synthesized using Ricinus communis leaf extract are shown in figure 3.1. The X-RD peaks are located at angles \((2\theta)\) of 28.9°, 33° and 47.36° corresponding to (111), (200) and (220) planes of ceria NPs. Similarly other peaks found at angles 56.56°, 59.34° and 69.71° are corresponding to (311), (222) and (400) planes of ceria NPs.

![Figure 3.1 X-RD Pattern of the ceria NPs](image)

The observed peak for ceria NPs matches with the JCPDS values (03-065-5923). Hence, the XRD pattern clearly shows that the synthesized ceria nanoparticles is identical and could be indexed to the standard ceria with fluorite cubic structure. The lattice constant ‘\(a\)’ of ceria NPs is calculated using the relation

\[
\frac{1}{d^2} = \frac{h^2 + k^2 + l^2}{a^2}
\]

The calculated value of the lattice constant ‘\(a\)’ of the ceria NPs is 5.402Å.

The average particle size of cerium oxide can be calculated using the Debye-Scherrer’s equation,
where $k$ is the Scherrer’s constant with the value from 0.9 to 1 (shape factor), $\lambda$ is the X-ray wavelength (1.5418 Å), $\beta$ is the width of the X-RD peak at half- height and $\theta$ is the Bragg angle and $D$ the grain size. The average crystalline size of the synthesized ceria NPs is found as 34 nm.

### 3.2 UV-Visible Spectra

Figure 3.2 shows UV - Vis spectra of synthesized ceria nanoparticles using Ricinus Communis leaf extract. Ricinus Communis leaf extract consists of phytoconstituents which act as capping agent. The sample displays an optical absorption peak at about 323nm in the UV region which is typical of absorption for metallic ceria nanocluster. Usually peak around 300 nm corresponds to the fluorite cubic structure of ceria. Additionally, UV spectrum showed no other peak related with impurities and structural defects which confirms that the synthesized nanoparticles are pure ceria. Further band gap energy was calculated on the basis of the maximum absorption band of ceria nanoparticles and found to be 3.84 eV according to equation

$$E_{bg} = \frac{1240}{\lambda} \text{ (eV)}$$

where $E_{bg}$ is the band gap energy and $\lambda$ is the absorbance wavelength (nm) of the ceria nanoparticles. The increase in the band gap of synthesized ceria NPs than the bulk ceria may be due to the charge transition of Ce ion.

#### Figure 3.2 Absorption peak of Ceria NPs synthesized from Ricinus Communis leaf extract

### 3.3 FTIR Analysis

Each molecule absorbs only IR light of certain frequencies based on its own characteristics. Hence it is possible to identify the molecule type qualitatively and quantitatively by studying the absorption spectrum. Figure 3.3 shows the FTIR spectrum of the ceria nanoparticles which were acquired in the range of 400–4000 cm$^{-1}$.

#### Figure 3.3 FTIR spectrum of Ceria NPs

The peak at 3429 cm$^{-1}$ corresponds to stretching vibration of O-H bonds in water molecules and the band at 1629 cm$^{-1}$ could be attributed to in-plane and out-of plane bending of O-H bonds present in the absorbed water molecule. The peak obtained at 2931 cm$^{-1}$ is assigned to be C-H stretching vibration[10] The absorption peak at 2355 cm$^{-1}$ is responsible for some trapped CO$_2$ from the environment. The peak at 1118 cm$^{-1}$ is due to the overtone band of the trace of Ce-OH. The peak at 482 cm$^{-1}$ is attributed to the O-Ce-O stretching mode of vibration[10-12].

### 3.4 Raman studies
The structure of the ceria nanoparticles is further explained by using Micro Raman spectroscopy which is shown in figure 3.4.

**Figure 3.4 Raman spectrum of synthesized ceria nanoparticles**

Ceria nanoparticles exhibited a strong intense band at 461 cm$^{-1}$ which generally corresponds to the F$_{2g}$ Raman active-mode due to symmetrical breathing mode of the O atoms around each cerium ions. Thus Raman spectrum confirms that the synthesized products have well crystalline fluorite cubic structure [13]. The particle size of the ceria NPs can also be calculated using Raman line broadening using the formula

$$\Gamma \ (\text{cm}^{-1}) = 10 + \frac{124.7}{D_R}$$

where $\Gamma$ is the full width half maximum of the Raman active mode peak and $D_R$ is the particle size[ 14]. On substituting, $\Gamma$ as 461 cm$^{-1}$, the calculated particle size is obtained around 3nm which is found to be lower than that of obtained from X-RD spectrum.

**3.5 EDAX Analysis**

Analysis through energy dispersive X-ray (EDX) spectrometer has verified the presence of elemental cerium and the oxygen in the synthesized ceria nanoparticles (Fig. 3.5). The vertical axis displays the number of X-ray counts and the horizontal axis displays energy in KeV. The peaks in the spectrum marks the major emission energies of cerium and oxygen. It is found that the atomic percentage of Oxygen is more than that of cerium.

**Figure 4.4 EDAX spectrum of synthesized ceria nanoparticles**

**3.6 SEM ANALYSIS**

The surface morphology of the Ceria nanoparticles is examined by scanning electron microscopy (SEM) and is shown in figure 4.5.

**Figure 3.6 SEM image of ceria nanoparticles**

SEM images reveal that there are various sizes of particles in the as-prepared sample. It can be clearly observed that many agglomerates with an irregular morphologies. The particles are connected to each other to make long complex systems with irregular porous size and shapes. There are numerous micro pores are present on the surface of the particles. The pores are formed due to the liberation of large amount of CO$_2$ and H$_2$O gases during
calcination process. These escaping gases are swelled the materials and resulted in the formation of pores in the materials.

IV. CONCLUSION

In summary, Ceria NPs have been successfully synthesized using Ricinus Communis leaf extract. UV studies indicated that the obtained absorption peak is of metallic ceria nanocluster. The XRD patterns, EDAX pattern and Micro Raman spectra suggest the formation ceria NPs with cubic fluorite structure. The functional groups in the ceria nanoparticles observed in FTIR spectrum confirms the presence of ceria. The SEM image clearly showed many agglomerates with an irregular morphologies. It is expected that the green synthesized ceria NPs can find many potential applications as bulk metal ceria in many fields.

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AUTHORS

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Influence Of Entrepreneurial Development Training Programme On Psycho-Social And Economic Stability Of Widows In South Senatorial District Of Ondo State, Nigeria

Erinsakin, Martins Ojo (Ph.D) *, Agun, Paulinah Olusola **, Mr. Akinbeije John ***

Abstract- This study was carried out to ascertain the influence of Entrepreneurial Development Training Programme (EDTP) on psycho-social and economic stability of widows in the south senatorial district of Ondo State, Nigeria. Descriptive survey research design was adopted for the study. The study population comprised, widows who were clientele of the programme. The sample size of the study was Ninety (90) respondents, selected through a multi-stage sampling technique. Two research instruments were used to collect data for the study. A well-developed questionnaire by the researchers, entitled “Questionnaire on the Influence of Entrepreneurial Development Training Programme on Psycho-Social and District of Ondo State, Nigeria” was used as quantitative research instruments. Focus Group Discussion (FGDs) was used as an instrument to collect data quantitatively. The research instruments were validated by an expert in test and test measurement at Adeyemi College of Education, Ondo, Ondo State, Nigeria. The reliability of the instruments used to collect quantitative data was determined through test retest method of two weeks interval and 0.72 coefficient reliability obtained. The research questions raised for the study were analysed using descriptive statistics (frequency counts, simple percentages and means), while the qualitative data was done qualitatively, through transcription. Based on the results of the study, it was concluded that EDTP could address the psycho-social and economic challenges of widows (unemployment, financial challenges) in Ondo State Senatorial District. Recommendations were made that more awareness should be created to widows on the relevance of the programme to their financial wellbeing and wellness by Ondo State Government. Also, the state should endeavour to embrace that more widows enroll for the programme and so on.

Index Terms- Entrepreneurial development, Training Psycho-Social, Economic Stability, Unemployment.

I. BACKGROUND TO THE STUDY

Women are often experiencing the challenges of widowhood, especially in Africa, Nigeria, inclusive. Widowhood is a situation where one of the others in marriage either man or woman loses his or her spouse. A widow is a woman whose husband has died and still remains unmarried. Widows are in most cases subjected to disharmonizing situations which poses a severe threat to socio-economic and psychological wellness or wellbeing of women.

The challenges of widowhood are enormously experience by women (Mathias, 2015). Ethiel (2016) noted that African women remain victims of harmful traditional risks that are associated with the passing away of their husbands. Ugweeze (1997) opined that, widows are targets of accusations of bewitchment or sorcery and they are often made to be responsible for the death of their husbands. The breemant of widow in Africa is very traumatic and evoke sympathy (Onyenuchie, 1999). Widowhood envokes both physical and psychological challenges to women. Widowhood period to women in most Nigerian communities are characterized by financial challenge, emotional and psychological deprivation, social alienation and other harmful practices.

After the death of men in most African communities their wives’ become victims of several challenges ranging from financial difficulty, health challenges inability to support or cope with the needs of the family materially and so on. It is on this sound that widows, especially become the participants targets of entrepreneurship development training programme (EDTP) of Ondo State, Nigeria, among others.

Poverty, unemployment and other socio-economic and psychological challenges remain topical and perennial issues in Ondo State and the country, Nigeria at large. These situations have unleashed serious problems to the people such as, destitution pains, hunger, joblessness, health challenges, social problems etc. This resulted into Implementation Entrepreneurship Development Training Programme (EDTP) as one of the remedies taken to address their situations. Olorunmola and Agbede (2012), states that the programme would enhance job creation, reduce high rate of joblessness alleviate poverty and so on. It is believed that if people are gainfully employed or self-employed, most challenges associating with unemployment will be reduced it not completely eradicated. Hence, in 1999, soon after the nation returned from political sabbatical and state government implemented EDTP.

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Each of the Eighteen (18) Local Government Areas of the state has at least a centre for the programme. The target participants are; the jobless graduates, civil servants, retirees, widows, artisans and so on (Erinsakin, 2014).

The main aim of the programme is to curtail an illusory life of people without job. Several studies had been carried on Entrepreneurial Development Training Programme (EDTP). Observable, little or nothing has been done on influence of EDTP on psycho-social and economic stability of widows in south senatorial district of Ondo State, Nigeria. Thus, necessitated this study.

II. STATEMENT OF THE PROBLEM

In African communities, Nigeria inclusive widows all over the country are experiencing myriads of challenges ranging from socio-economic to psychological problems. Thus, informed involving widows as clientele of Entrepreneurial Development Training Programme (EDTP) of Ondo State, Nigeria. EDTP centre spreads across the length and breadth of Ondo State. A Local Government has a least a centre.

It is a belief of Ondo State Government based on the implementation guidelines of the programme that a programme should be able to address poverty, unemployment, thus curb several negative consequential challenges associated with these problems (poverty and unemployment). It is against this backdrop this research was carried out on influence of (EDTP) on psycho-social and economic stability of widows in south senatorial district of Ondo State, Nigeria.

III. THEORETICAL FRAMEWORK

This study is anchored on Becker’s Human Capital Theory

The human capital theory was propounded by Becker in 1993. However, the origin of the theory has been traced to Adam Smith (Wikipedia Free Encyclopedia) who defined, Human Capital Theory as the acquired and useful abilities of all the inhabitants or members of a society. The acquisition of such talents and their maintenance by the acquirers. According to Adam Smith, it is through education, study or apprenticeship. Smith emphasizes that costs as real expenses, which are capital fixed and realized as they were in the person. Adam Smith opines, that these talents make persons to be fortunate and that of the society, they live or belong to (Becker, 1993 & 1996).

The human capital theory is defined as the activity that promotes or increases future consumption possibilities by increasing the resources in people, through training, which has been identified as one of such activities (Becker, 1993 and 1996). Human capital theory suggests that, education or training raises the productivity of workers by imparting useful knowledge and skill thus, raising workers’ future incomes by increasing their life-time earnings.

Human capital theory therefore observes that, education or training raises workers’ future incomes by raising or increasing their life-time earning (Becker, 1964). It is worth noting, that the use of the terms in the modern neo-classical economic literature is credited to Mincer (1958) in the Journal of Political Economy titled “Investment in Human Capital and Personal Incomes Distribution”. Becker’s Human capital theory states that, workers’ productivity is determined, through training acquired. Becker (1964), observes, that education or training raises the productivity of workers by imparting useful knowledge and skill, and provides different explanations on how education is related to workers’ productivity.

The human capital theory tends to attribute workers’ knowledge level to their level of knowledge acquired in formal schooling. This is the basis of Livingstone (1997) assumption that, more schooling could lead to productivity and micro-economic growth. However, it should be emphatically stressed, that formal schooling cannot sustain individuals in terms of giving skills, knowledge and developing one’s capacity to be effectively productive to himself or herself and to his or her employer.

It is interesting to note, that formal schooling has its own attendant problems in form of unemployed school graduates, despite its rapid expansion, throughout the world in recent times. However, as noted by Belanger and Tuijuman (1997) that adult education development in developed countries in recent years is focused on strengthening vocational skill acquisition, so as to meet the needs of skills development, across all occupational strata in the global, economy. There must be a mixture of education and training availability to actually give vocational skill acquisition opportunities to workers (Middleton, Zinderman and Adam, 1993; Zinderman and Horn, 1995). The position of critique of Human Capital Theory, rest on the fact that, workers’ productivity in their occupation may not be only through formal education or schooling rather, through the life-long learning. Effective employee must be life-long learners in an increasing globally competitive enterprise environment. The informal working related learning of workers and their cumulative bodies of tacit knowledge as symbolic relevance to their efficiency on the job (Livingstone, 1991).

The relevance of human capital theory to skill acquisition and entrepreneurial development training programmes therefore rests on the fact that the programmes fall within the scope of non-formal education and which skills and training acquisition is one of its objective. Also, that formal education to some extent may not be adequate to offer adequate trainings and skills needed for the optimal productivity of the workers, whether self-employed or employed

Review of Related Literature

Entrepreneurial Development Training Programme of Ondo State, Nigeria.

The location of Ondo State in Nigeria is at south-western part of Nigeria. The state lies within the latitudes of 50, 451 and 80, 151 with and longitude 40, 451 and 61 East. It is bordered in the north-west by Ekiti and Kogi States, West Central by Osun State; North-East and East Central by Edo State; South-West by Ogun State and South-East by Delta State.

The state is naturally endowed with natural mineral resources, abundantly. The climatic condition of the state is good for cash and food crops growing. The rainfall varies from 2,540mm in a year in the South-Eastern strip to 2,032mm along the remaining coastline, 1,524mm in the middle part and 1,270mm along the Northern part of the state (Ondo State Government, 2005).
Considering the climatic condition and natural mineral resources which the state is endowed with the state is expected to be very buoyant and economically developed. However, majority of people in the state are living in an extreme poverty and without gainful job. Agagu (2007), noted that there is a high rate of unemployment in Ondo State. One of the measures adopted to tackle this situation is implementation of (EDTP).

Obser (2006), stated that EDTP is principally arrived at capacity building in entrepreneurship. It is meant to train clientele of the programme in the following areas: identification of business opportunities and gaps in the markets that can be tapped for economic advantages; mobilization of finance and other resources for doing business; organization, implementation and management of business; coping with uncertainties and risks of business; inculcating the spirit of enterprise management in the target groups and encouragement of self-employment as a conscious and deliberate choice for self-reliance.

Ogundele, Akingbade and Akinlabi (2012) stressed that (EDTP) could boost productivity, motivation, create employment and prosperity and revitalizing economy of the nation. Further, that it could facilitate wealth creation, income generation for self-reliance. Awogbade and Iwuamadi (2010), asserted that (EDTP) could address the problem of searching for non-existing job and an urgent way to oriented people to imbibe entrepreneurship culture.

The United Nations Educational Scientific and Cultural Organization (UNESCO) (2012), stated the following as contributions of (EDTP) to a nations and individuals’ economic development; increase in productivity, enhancement of market competition, employment generation, promotion of effective domestic resource utilization, wealth creation and income generation, economic growth and development and so on. Garrett (2012); Elumilade and Asaolu (2006), contended that (EDTP) could increased sense of insecurity and achievement. Akpomi (2009), stressed that the programme would make job seekers to become job creators and to a large extent reduce poverty. Further, it was stressed that EDTP is very imperative to tackled poverty.

Aina (2008), opined that EDTP would make individuals to seek investment opportunity, profitably. In a nutshell, the implementation of EDTP by Ondo State Government is to revamp and resuscitate the economic status of both individual and Ondo State.

IV. PURPOSE OF THE STUDY

The purpose of the study is to ascertain the influence of Entrepreneurial Development Training Programme on psycho-social and economic stability of widows in south senatorial district of Ondo State, Nigeria.

V. SIGNIFICANCE OF THE STUDY

The following are the significance of the study to the stakeholders in the provision of EDTP in Ondo State, Nigeria.

1. The findings of the study will enable Ondo State Government to determine the effectiveness of EDTP on addressing the psycho-social and economic challenges of widows in Ondo State, Nigeria.

2. The findings of the study will enable other stakeholders in EDTP provision in Ondo State, Nigeria to know that through non-formal system of education widows’ socio-economic challenges could also be tackled.

3. The findings of the research will also enable EDTP programme to determine the extent at which the programme objectives have been achieved on the target participants, particularly the widows and so on.

VI. METHODOLOGY

Descriptive survey research design was adopted for the study. The study population comprised the clientele of Entrepreneurial Development Training Programme of Ondo State splitful into three senatorial district (North, Central and South). From each of the senatorial district, a centre that has a highest number of participants for the programme was selected. Then a simple random sampling technique was used to select thirty (30) respondent from the three selected centres. Thus, moving the respondents to be ninety (90).

Entrepreneurial Development Training Programme of Ondo State Government, Nigeria. The sample size was Ninety (90) respondents selected through a multi-stage sampling technique. Data was collected using both the quantitative and qualitative sampling techniques. For the qualitative technique, a self-developed questionnaire by the research entitled “Questionnaire on Influence of Entrepreneurial Development Training Programme on Psycho-Social and Economic Stability of Widows in South Senatorial District of Ondo State, Nigeria” was used, while Focus Groups Discussion (FGD) used as a qualitative research instrument to collect data for the study.

Both quantitative and qualitative instruments were validated by an expert in test and measurement at Adeyemi College of Education, Ondo, Ondo State, Nigeria and reliability of the quantitative instrument was determined through test retest method at two weeks interval. 0.72 coefficient reliability was obtained, this made the instrument to be adjudged as having a high reliability value that was good enough for the study, while that of qualitative instrument was done, using another group of respondents that were part of the first FGD. They were interviewed and data collected were correlated with FGDs for the study. The research questions for the study were analysed using descriptive statistics (frequency counts, simple percentages and means).

Research Questions

1. Can widows’ joblessness be eradicated through EDTP in Ondo State, Nigeria?

2. Will EDTP enhance widows’ financial status?

Presentation of Results and Discussion of Findings

Research Question One: Can widows’ joblessness eradicated through EDTP in Ondo State, Nigeria?

Table I: Showing frequency counts simple percentages and means on can widows joblessness be eradicated through EDTP in Ondo State, Nigeria.

<table>
<thead>
<tr>
<th>S/N</th>
<th>ITEMS</th>
<th>SD</th>
<th>D</th>
<th>A</th>
<th>SA</th>
<th>Mean Remarks</th>
</tr>
</thead>
</table>

On item (5) that states EDTP will not make me a job provider, 6 (7%) of the respondents strongly agreed, 14 (15.5%) agreed, 17 (19%), while 53 (59%) strongly disagreed. Finally, on item (6), that states training acquired through EDTP will engender entrepreneurship culture in me for job creation. 60 (67%) of the respondents strongly agreed, 20 (22.2%) agreed, 08 (9%) disagreed, while 2 (2.2%) strongly disagreed.

Generally, the results revealed an average, mean of the total respondents (x = 2.7) which is greater than the average mean of rating scale of four (x = 2.5). Thus indicated that through EDTP widow’s joblessness could be eradicated. This result is in consonance with the view of Ogundele, Akingbade and Akinlabi (2012) that apart from boosting productivity, motivation, EDTP can also create employment.

The results were further corroborated by the discussants during the FGDS.

The programme gives me succor after the demise of my husband. I because self-employed, thus assisting me in no small measure to meet the financial demands of my family (FGD) – A participant of the programme/Okitipupa Centre of EDTP.

Another clientele of the programme reported that: Unemployment is the major challenge I have while my husband died few years also. However, since I have availed myself with the opportunity offers by EDTP today, I can boast that I am an employment labour.

(FGD) – A participant of the programme / Owo Local Government Centre of EDTP.

Research Question Two: Will EDTP enhance my financial status?

Table 2: Showing frequency counts, simple percentages and means on will EDTP enhance my financial status?

<table>
<thead>
<tr>
<th>S/ N</th>
<th>ITEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>My financial status has been enhanced through EDTP</td>
</tr>
<tr>
<td>2</td>
<td>EDTP can not enhance my financial status</td>
</tr>
<tr>
<td>3</td>
<td>Training often by EDTP is not</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ITEM</th>
<th>SD</th>
<th>D</th>
<th>A</th>
<th>SA</th>
<th>Me</th>
<th>Rema</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>13</td>
<td>18</td>
<td>58</td>
<td>3.4</td>
<td>Accep</td>
</tr>
<tr>
<td>2</td>
<td>54</td>
<td>10</td>
<td>14</td>
<td>12</td>
<td>1.8</td>
<td>Reject</td>
</tr>
<tr>
<td>3</td>
<td>40</td>
<td>26</td>
<td>10</td>
<td>14</td>
<td>2.0</td>
<td>Accep</td>
</tr>
</tbody>
</table>

Table I above presents the results on can widows’ joblessness be eradicated through EDTP in Ondo State, Nigeria. On item (1) which states that EDTP can provide me job, 45 (50%) of the respondents strongly agreed, 26 (22.2%) agreed, while 10 (11.1%) strongly disagreed.

On item (2), that states that despite my enrolment for EDTP, I will still remain jobless. 15 (17%) of the respondents strongly agreed, 14 (15.5%) agreed, while 50 (55.5%) strongly disagreed.

Furthermore, on item (3), 40 (44.4%) of the respondents strongly agreed, 30 (33.3%) agreed, 12 (13.3%), disagreed while 8 (9%) strongly disagreed. On item (4), that states that EDTP can make me to be job creator.

On item (4), which states EDTP can make me to be job creator. 42 (47%) of the respondents strongly agreed, 28 (31.1%) agreed, while 10 (7%), strongly disagreed.

Table 2: Showing frequency counts, simple percentages and means on will EDTP enhance my financial status?
Table 2 showed findings on will EDTP enhance my financial status. On item (1), 58 (64.4%) of the respondents strongly agreed, 18 (20%) agreed, 13 (14.4%) disagreed, while 1 (1.1%) strongly disagreed. On item (2), 12 (13.3%) strongly agreed, 29 (32.2%) agreed, 41 (45.5%) disagreed, while 8 (9%) strongly disagreed. Furthermore, on item (3) 60 (67) of the respondents strongly agreed, 20 (22.2%) agreed, 6 (7%) disagreed, while 4 (4.4%) strongly disagreed. On item (4) 60 (67) of the respondents strongly agreed, 20 (22.2%) agreed, 6 (7%) disagreed, while 4 (4.4%) strongly disagreed. On item (5), 20 (22.2%) strongly agreed, 8 (9%) agreed, 24 (27%) disagreed, while 38 (42.2%) strongly disagreed. Finally, on item (6) that states that there is no connection between EDTP and my present improved financial status after my husband died. 41 (45.5%) of the respondents, strongly agreed, 29 (32.2%) agreed, 12 (13.3%) disagreed, while 8 (9%) strongly disagreed.

The result on table 2 above indicated that an average mean of total respondents (X = 2.6) is greater than the average mean of rating scale of four (X = 2.5). This portends that EDTP could enhance the financial status of widows in Ondo State, Nigeria. The results is in agreement with the submission of Agagu (2007) and Erinsakin (2014) that EDTP in Ondo State has positively impacted on financial level of the programme participants, widows inclusive by making them to be gainfully involving in small business for an improved financial strength.

The result was also corroborated by the participants during the FGDs.

FGD – A participant at Akure Local Government Centre of EDTP.

Another participant strongly maintained that:

I think the provider of EDTP in the state. My big challenge is ability to maintain my children financially, honestly, since acquiring skills through the programme, I have been able to overcome this challenge.

FGD – A participant of Okitipupa Local Government Centre of EDTP

VII. CONCLUSION

Based on the results of the study EDTP has been able to meet some psycho-social and economic challenges (poverty, unemployment, financial challenges, and so on) faced by the widows who constitute a target participant of the EDTP of Ondo State, Nigeria.

VIII. RECOMMENDATIONS

Based on the conclusion of the study, the following recommendations were made

1. Ondo State Government, the major stakeholder in the provision of EDTP should create more awareness to widows in the state on the relevance of the programme to their financial wellbeing and wellness.

2. Widows should be assisted to know that the programme (EDTP could make them to overcome their unemployment status.

<table>
<thead>
<tr>
<th></th>
<th>EDTP is the major means of getting money, since I became widow</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>4.</td>
<td>4 (4.4%)</td>
<td>6 (7%)</td>
<td>20 (22.2%)</td>
<td>60 (67%)</td>
<td>3.5</td>
</tr>
<tr>
<td>5.</td>
<td>My financial self reliance is not completely due to training through EDTP</td>
<td>38 (42.2%)</td>
<td>24 (27%)</td>
<td>8 (9%)</td>
<td>20 (22.2%)</td>
</tr>
<tr>
<td>6.</td>
<td>There is connection between EDTP and my present improved financial status after my husband died</td>
<td>8 (9%)</td>
<td>12 (13.3%)</td>
<td>29 (32.2%)</td>
<td>41 (45.5%)</td>
</tr>
</tbody>
</table>

Table 2 showed findings on will EDTP enhance my financial status. On item (1), 58 (64.4%) of the respondents strongly agreed, 18 (20%) agreed, 13 (14.4%) disagreed, while 1 (1.1%) strongly disagreed. On item (2), 12 (13.3%) strongly agreed, 29 (32.2%) agreed, 10 (11.1%) disagreed, while 54 (60%) strongly disagreed.

On item (3) that states training offers by EDTP is not enough to improve my financial status, 14 (15.5%) of the respondents, strongly agreed, 10 (11.1%) agreed, 26 (29%) disagreed, while 40 (44.4%) strongly disagreed.

Furthermore, on item (4) 60 (67) of the respondents strongly agreed, 20 (22.2%) agreed, 6 (7%) disagreed, while 4 (4.4%) strongly disagreed. On item (5), 20 (22.2%) strongly agreed, 8 (9%) agreed, 24 (27%) disagreed, while 38 (42.2%) strongly disagreed. Finally, on item (6) that states that there is no connection between EDTP and my present improved financial status after my husband died. 41 (45.5%) of the respondents, strongly agreed, 29 (32.2%) agreed, 12 (13.3%) disagreed, while 8 (9%) strongly disagreed.

The result on table 2 above indicated that an average mean of total respondents (X = 2.6) is greater than the average mean of rating scale of four (X = 2.5). This portends that EDTP could enhance the financial status of widows in Ondo State, Nigeria. The results is in agreement with the submission of Agagu (2007) and Erinsakin (2014) that EDTP in Ondo State has positively impacted on financial level of the programme participants, widows inclusive by making them to be gainfully involving in small business for an improved financial strength.

The result was also corroborated by the participants during the FGDs.

My financial ability has improved through the training acquired through EDTP.

FGD – A participant at Akure Local Government Centre of EDTP.

Another participant strongly maintained that:

I think the provider of EDTP in the state. My big challenge is ability to maintain my children financially, honestly, since acquiring skills through the programme, I have been able to overcome this challenge.

FGD – A participant of Okitipupa Local Government Centre of EDTP
3. Ondo State Government should embark on aggressive more to ensure that more widows among other targets groups for the programme enroll for it.
4. Widows should be encouraged also to put in practice skills acquired through EDTP for their improve standard of living and so on.

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Impact of Nutritional Health Services over the Nutritional Status of Under five Children in the City of Barishal, Bangladesh: A Community Based Survey

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Abstract- Purpose of the Study: To assess the nutritional status of the children before and after getting nutritional health services, to determine the health impact of nutritional status and to assess the dietary diversity of the children. Methodology: Data of 200 children of 0-5 years were taken before and after receiving nutritional health services and the data were collected from Barishal Sadar Upazilla, Barishal. Follow up data was obtained by anthropometric measurement, MUAC tape, health impact inspected by questionnaire including the dietary diversity by food groups and analyzed in Anthro-Plus and SPSS software. Major Findings: The study showed that 41% stunting present before health services were taken and 39% after health services received. Consequently, Wasting 15% and 11% respectively before and after health services rendered. Moreover, Underweight 18% and 14% respectively along with overweight 3% and 4% surrounding. The MUAC tape showed that all children were quite normal Vitamin-A consumption was 36% and 43% respectively and the handwashing for both mother and children were 58% and 75% respectively. Among them <4 food groups taken were 65% and 49% respectively. Food groups, Disease, worm infestation over the category of children either received health care services or not were seen which was statistically significant. Again handwashing, Vitamin-A consumption and worm infestation effects over the disease condition were also statistically significant. But the food groups and disease over the MUAC category were not statistically significant. Originality/Value: After performing our research it’s possible to determine the effectiveness of health services towards the nutritional status of under five children in Bangladesh, along which we could find out what short of improvement of the health services should be done to get a nutritionally sound under children and nation.

Index Terms- Heath services, nutritional status, under five children, dietary pattern, and effectiveness
II. MATERIALS AND METHODS

Data of 200 children of 0-5 years were taken purposively before and after receiving nutritional health services which was a follow up study. The 2nd slot data of same children were taken after 3 months of 1st slot data. The research continued from June 2018-December 2018 and the data were collected from Barishal Sadar Upazilla, Barishal. Data was collected from both primary and secondary sources. Primary data includes all the possible outcomes obtained from the questionnaire by direct interviewing of respondents. The secondary sources include govt. publications, papers, journals, published and unpublished thesis, and topic from various books, web site etc. The instruments used in data collection Questionnaire, Anthropometric measurement by height and weight machine, mid upper arm circumference (MUAC) tape measurement, Food groups chart to see the dietary pattern of the people including the health impacts.

Some ethical steps were taken which includes informing the local stakeholders previously for the co-operation of the respondents and also avoiding criticism.

Analysis was done in SPSS software. We find out the descriptive statistics of the subjects and Independent T test, one way ANOVA test for finding the comparison of their mean along with the different subjects to test the significant level.

III. RESULTS AND DISCUSSION

<table>
<thead>
<tr>
<th>Respondents Information</th>
<th>Children (Before Health Services)</th>
<th>Children (After Health Services)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WHZ</strong></td>
<td><strong>Numbers</strong></td>
<td><strong>Values</strong></td>
</tr>
<tr>
<td>Wasting</td>
<td>15</td>
<td>15%</td>
</tr>
<tr>
<td>Moderate Wasting</td>
<td>10</td>
<td>10%</td>
</tr>
<tr>
<td>Severe Wasting</td>
<td>05</td>
<td>5%</td>
</tr>
<tr>
<td>Normal</td>
<td>82</td>
<td>82%</td>
</tr>
<tr>
<td>Overweight (WHZ &gt;2)</td>
<td>03</td>
<td>3%</td>
</tr>
<tr>
<td><strong>HAZ</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stunting</td>
<td>41</td>
<td>41%</td>
</tr>
<tr>
<td>Moderate stunting</td>
<td>29</td>
<td>29%</td>
</tr>
<tr>
<td>Severe Stunting</td>
<td>12</td>
<td>12%</td>
</tr>
<tr>
<td>Normal</td>
<td>59</td>
<td>59%</td>
</tr>
<tr>
<td><strong>WAZ</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underweight</td>
<td>18</td>
<td>18%</td>
</tr>
<tr>
<td>Moderate Underweight</td>
<td>14</td>
<td>14%</td>
</tr>
<tr>
<td>Severe Underweight</td>
<td>04</td>
<td>04%</td>
</tr>
<tr>
<td>Normal</td>
<td>82</td>
<td>82%</td>
</tr>
<tr>
<td><strong>Disease</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Present</td>
<td>55</td>
<td>55%</td>
</tr>
<tr>
<td>Absent</td>
<td>45</td>
<td>45%</td>
</tr>
<tr>
<td><strong>Vitamin-A Intake</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Taken</td>
<td>36</td>
<td>36%</td>
</tr>
<tr>
<td>Not Taken</td>
<td>64</td>
<td>64%</td>
</tr>
<tr>
<td><strong>Handwashing</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The Table 1 showed the mean comparison of weight for height Z score (WHZ), height for age Z score (HAZ) and weight for age Z score (WAZ) of two category of children we found. Percentage of wasting of the children showed 15% and 11% respectively before and after health services taken. Moreover, stunting of the children showed 41% and 39% respectively before and after health services. Simultaneously the percentage of underweight showed that it was 18% and 14% respectively. Among the respondents the percentage of overweight was 3% and 4% respectively. The study of Asante and Nube, 1997 showed that wasting, stunting and underweight was 7%, 29.7% and 27% respectively compared to which showed that it was high in our study as well as the overweight condition (Asante & Nube, 1997).

It occurred because of the economic crisis to afford the health care services and their wrong perception over health care services that, it was very costly (Waters et al., 2003). After rendering the health care services the condition changed quite satisfactory because primary health care services was the best strategy for the improvement of the nutritional status within a short period of time (“Emhj_2000_6_2_3_238_245.pdf,” n.d.). Moreover, vitamin A intake over the study category were 36% and 43% respectively which was also according to the study of Malekafzali et al., which showed that if a successful awareness building program for the encouragement of health services could eradicate all health issues (“Emhj_2000_6_2_3_238_245.pdf,” n.d.). The disease condition of our study showed it was 55% and 48% respectively which showed the decreasing of the disease percentage which was according to the study of Basing et al., and it could be made by fruitful co-operation of the respondent family with the health care centers (Basing et al., n.d.). Simultaneously, the percentage of handwashing were 58% and 75% respectively which was changed by proper guidance of the health care centers by showing the appropriate handwashing practice and giving the knowledge of bad consequences of inappropriate hand washing (Bank et al., n.d.). Moreover, 4/4+ food groups taken were 65% and 49% respectively. The study of Asante and Nube, 1997 revealed that the economic crisis restrict people to afford 4/4+ food groups but for the wellbeing of their child they were counselled to give their children nutritious food with a very low cost and which will improve the health status of children (Asante & Nube, 1997).

### Table 2. Comparison of their Mean Along with the Different Subjects to Test the Significant Level

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean ± Std. Deviation</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Food groups over Category of Children</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before Health Service</td>
<td>1.35±0.48</td>
<td>.001&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>After Health Service</td>
<td>1.51±0.50</td>
<td></td>
</tr>
<tr>
<td><strong>Disease over Category of Children</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before Health Service</td>
<td>1.50±0.50</td>
<td>.000&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>After Health Service</td>
<td>1.86±0.35</td>
<td></td>
</tr>
<tr>
<td><strong>Worm infestation over Category of Children</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before Health Service</td>
<td>1.60±0.49</td>
<td>.000&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>After Health Service</td>
<td>1.85±0.36</td>
<td></td>
</tr>
<tr>
<td><strong>Handwashing over disease</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Present</td>
<td>1.16±0.37</td>
<td>.000&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Absent</td>
<td>1.42±0.49</td>
<td></td>
</tr>
<tr>
<td><strong>Vitamin-A intake over disease</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Present</td>
<td>1.48±0.50</td>
<td>.000&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Absent</td>
<td>1.67±0.47</td>
<td></td>
</tr>
<tr>
<td><strong>Worm infestation over disease</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Present</td>
<td>1.26±0.44</td>
<td>.000&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td>Absent</td>
<td>1.95±0.21</td>
<td></td>
</tr>
<tr>
<td><strong>Food groups over MUAC</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;11.5 cm</td>
<td>0.00±0.00</td>
<td></td>
</tr>
<tr>
<td>11.5-12.5 cm</td>
<td>0.00±0.00</td>
<td>.874&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>&gt;12.5 cm</td>
<td>1.43±0.50</td>
<td></td>
</tr>
<tr>
<td><strong>Disease over MUAC</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;11.5 cm</td>
<td>0.00±0.00</td>
<td></td>
</tr>
</tbody>
</table>

The Table 2 showed the food groups, disease and worm infestation, handwashing over the two category of children were seen and the P value obtained P<.05 which showed that there were significantly differences in the study area as expected but the study of Basing et al., showed it was not statistically significant because in our study the respondents were not aware of the health of children but the study of Basing et al., the respondent were fully aware because for more than 6 month intervention were carried out there (Basing et al., n.d.). In addition, food groups showed significantly different in the category of children because after the health services taken by the family they were fully aware of the fact about their children health and they were well known about the low cost nutritious foods which wouldn’t be costly (Asante & Nube, 1997). Moreover, handwashing, vitamin A intake and worm infestation over disease condition was seen and we obtained P value that was P<.05 and it showed a significant differences in disease condition. The study of Bank et al., revealed that an inappropriate handwashing and lack of fresh water causes diseases as well as if the worm infestation was not done then all the nutrients in the body will be absorbed by the worms which will make us malnourished and vulnerable to disease. Vitamin A intake negligence would suffer the children with different kind of diseases due to vitamin A deficiency like liver disorders, fat mal-absorption, night blindness etc. (Bank et al., n.d.). On the contrary food groups, disease over mid upper arm circumference (MUAC) tape categories wasn’t P<.05 which were not significant but the study of Bhandari & Chhetri, 2013 showed it was significant because in our study exclusive breastfeeding and taking health care was much more but in the study of Bhandari & Chhetri, 2013 it was unsatisfactory (Bhandari & Chhetri, 2013).

### IV. CONCLUSION

The problems of low standard of living, hunger, starvation, malnutrition, agricultural illiteracy, poor antenatal care, disease, unsatisfactory sanitary and housing facilities etc. of the family has to be developed totally by implementation of policy for the improvement of nutritional status of 0-5 year’s old children to have a positive health impact. Stunting in our study was much more than our national stunting condition which was really alarming. So, poor nutritional status should be halted or minimized at an acceptable level overcome such condition.

### REFERENCES


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“Learning Steps” An Innovative Teaching Technique Implementing STEM-AI Protocols

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Abstract- Learning is maximized when children are engaged in DF Player to play particular sensor’s music file. Thus, the tune plays and the children learn to the tune of music.

I. INTRODUCTION

With the gradual ushering in of the digital era in every walk of our life, it becomes a moral responsibility of the schools to implicate digital and online tools into the learning process. This article guides a stepwise walkthrough of our new innovative learning methodology which enables the concept of Learning is Fun. Project “Learning Steps” is a very helpful tool for children to easily understand and memorize difficult topics in sports and fun. Through learning steps, many other essential concepts/fundamentals can be taught to young children easily and recreationally. Further, it becomes a medium of skill development in children where we can make education more viable and enjoyable as well. This project incorporates the basic concepts of Artificial Intelligence and STEM (“science technology Engineering and Mathematics”). The learning steps tool is made up of ultrasonic sensors, Audino microprocessor and other electronic and electrical parts, which in itself is a complete learning tool. The learning steps have 12 Ultrasonic Sensors for 12 stair-steps. That have been connected to the microcontroller, and when the children go to the steps, the rays emanating from the feet reach back to the ECHO sensor which carries a current of 5 volts to the microcontroller and the basis of corresponding C++ program installed in the microcontroller enables

II. RESEARCH & IDEA

The role of technology in education:-
Learning with technology has become essential in today’s schools. Worldwide, governments, education systems, researchers, school leaders, teachers and parents consider technology to be a critical part of a child’s education. In Australia, it is acknowledged that advances in technology have an influence on the way people create, share, use and develop information in society, and that young people need to be highly skilled in their use of information and communications technologies (ICT). This educational aspiration is a cornerstone of the Melbourne Declaration on Goals for Young Australians (MCEETYA, 2008) and ICT competence is realized as one of the general capabilities in the Australian Curriculum (ACARA, 2011). Developing students’ knowledge and skills related to ICT in the school years provides an important grounding for later stages in life. It also provides equity of opportunity, regardless of background. General social commentary and the popular press tend to generalize about young people, their access to and use of technology. Recent literature have challenged these assumptions and acknowledge that, although students today may have been born into a technologically rich world, they may not be avid and skilled users of technology (Bennett, Maton & Kervin, 2008). Meaningful development of technology based knowledge and skills is important for all students, in order to avoid a phenomenon known as the ‘second-level digital divide’, whereby people have drastically differentiated skills, which in turn influence how people participate in society (OECD, 2010).

Learning with technological tools:-
The contemporary curriculum guides teachers to facilitate the development of adaptable and flexible learners who know how to take on new tasks and situations, quickly and easily. Students will need to be good communicators who can competently discuss topics with others and effectively share their ideas in many forms and for different purposes. Students will need to possess excellent collaboration skills and be able

Index Terms- Learning Steps, Education, Audeno, Learning is Fun.
to work together with many different types of people, each of whom has her or his own special disciplines and unique ways of learning and working together. Furthermore, students will need the ability to create in a variety of manners and bring their visions and ideas alive through different types of media. In this section, we discuss the ways in which students can learn to understand, communicate, collaborate and create using different modes of technology, and how teachers can use technology to assist their students in transforming knowledge and skills into products, solutions and new information.

III. STUDIES AND FINDINGS

When we make any innovative learning tool it should justify following principles:

- **Learners have to be at the center of what we are making** with activities focused on their cognition and growth. They have to actively engage in learning in order to become self-regulated learners who are able to control their emotions and motivations during the study process, set goals, and monitor their own learning process.

- **Learning is a social practice and can’t happen alone.** “By our nature we are social beings and we learn by interacting,” Groff said. “We learn by pushing and pulling on concepts with one another.” Structured, collaborative group work can be good for all learners; it pushes people in different ways.

- **Emotions are an integral part of learning.** Students understand ideas better when there’s interplay between emotions, motivation and cognition, so positive beliefs about oneself are a core part of reaching a more profound understanding. The power of emotions and motivation in the classroom are well documented, but often overlooked because they are “soft.” Still most teachers know that if a student is upset about something that happened at home or in school, he won’t learn well. Similarly, keeping students motivated should be the starting point of learning. If students understand why it matters, learning becomes more important to them.

- **Learners are different** and innovative learning environments reflect the various experiences and prior knowledge that each student brings to class. “You really want practices and processes that help teachers engage each student where they are,” said Groff. This principle is understood by every frustrated educator teaching to a “middle” that doesn’t exist.

- **Students need to be stretched, but not too much.** “It’s really critical to find that student’s sweet spot,” Groff Said. Educators should try to prevent both coasting and overloading. Students need to experience both academic success and the challenge of discovery. In a diverse classroom group work can help achieve this as students at different levels help one another.

- **Assessment should be for learning, not of learning.** Assessments are important, but only to gauge how to structure the next lesson for maximum effectiveness. It should be meaningful, substantial, and shape the learning environment itself. “Good teachers do this informally most of the time,” Groff said. “But when it’s done well and more formally it’s a whole structure and methodology where you collect feedback on the learning pathway and it drives the next step that you take.”

- **Learning needs to be connected across disciplines** and reach out into the real world. Learning can’t be meaningful if students don’t understand why the knowledge will be useful to them, how it can be applied in life. Understanding the connections between subjects and ideas is essential for the ability to transfer skills.

IV. METHODOLOGY

**Arduino mega 2560:** Arduino is an open source programmable circuit board that can be integrated into a wide variety of projects both simple and complex. This board contains a microcontroller which is able to be programmed to sense and control objects in the physical world. By responding to sensors and inputs, the Arduino is able to interact with a large array of outputs such as LEDs, motors and displays. Because of its flexibility and low cost, Arduino has become a very popular choice for makers and makerspaces looking to create interactive hardware projects.

**DF player mini:** The DFPlayer Mini is a small and low cost MP3 module with an simplified output directly to the speaker. The module can be used as a stand alone module with attached battery, speaker and push buttons or used in combination with an Arduino UNO or any other with RX/TX capabilities. The DFPlayer perfectly integrates hard decoding module, which supports...
common audio formats such as MP3, WAV and WMA. Besides, it also supports TF card with FAT16, FAT32 file system. Through a simple serial port, you can play the designated music without any other tedious underlying operations.

**Ultrasonic sensor:** - Ultrasonic sensors work by transmitting a pulse of sound, much like sonar detectors, outside the range of human hearing. This pulse travels away from the range finder in a conical shape at the speed of sound (340 m/s). The sound reflects off an object and back to the range finder. The sensor interprets this as an echo and calculates the time interval between sending the signal and receiving the echo. This interval is then computed by a controller to determine the distance of the object.

**Amplifier Unit:** - An amplifier is a circuit that receives a signal at its input and delivers an undistorted large version of the signal at its output, it is used to amplify the weak signal without changing any information means strengthen or boost the weak signal without changing any input or information. Negative feedback is used in amplifiers. Because of decreasing the gain of the amplifier.

V. CONCLUSION
The concept of Learning Steps, if incorporated into curriculum as highly effective TEACHING AID for all subjects especially at the Pre-Primary, Primary and Middle-School level, will certainly enable the Stake holders and the Associate Stake holders of all the schools to lay the desired foundation of scholastic ability among the students who can undoubtedly excel in their higher studies, and also carry further the concept in a more innovative way. Also taking cognizance of the fact that our children are becoming more and more susceptible to easy life style, this would intend to generate love for physical activity, as simple as climbing stairs, among children.

*Success is a journey, not a destination.*

VI. REFERENCES
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Capt. Shweta Singh received Masters Degree in History and Bachelor degree in Education and guided the project as Principal of Delhi world Public School, Raigarh (C.G.)
The Effect of Multisensory Methods of Early Childhood’s Fine Motor Development

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Abstract-This research aims to testing the effect of the Multisensory methods on fine motor of early childhood’s. The study used a quantitative approach with a quasi-experiment design with a non-equivalent group design. Sampling was carried out with a random sampling technique that selected 122 children aged 5-6 years each divided into experimental groups and control groups. Data analysis using non-parametric statistics with Kruskal Wallis’s test. The results showed that a significant value of 0.000 < sig 0.05 meant that there was an effect on the multisensory methods of fine motor development in children aged 5-6 years.

Keywords-multisensory methods, fine motor development, childhood.

I. INTRODUCTION

Early childhood developments included six aspects of religious and moral values, physical-motor, cognitive, language, social-emotional, and artistic; It is listed in the Ministry of National Education Regulation Number 137 year 2014 on national standards for Early childhood education [1].

The developmental aspect that can be stimulated in early childhood is the physical development of the motor. According to Musfiroh, the physical development of the motor is an important aspect of development in early childhood life [8]. Physical-motor is divided into 2 i.e. crude motor and fine motor. According to Gallahue, in fine motor activities are more dominant using limited movements in certain parts of the body that require precision such as cutting, chopping, sewing, and writing [9]. According to Sujiono, fine motor is a movement that uses only parts of small muscles, such as using the hand fingers and proper wrist movements [10]. Therefore, the movement in fine motor does not require energy, but it requires careful coordination of eyes and limbs.

In Permendikbud Number 137 year 2014 on National Standard of Early childhood Education Stated the level of development achievement of children aged 5-6 years on fine motor ability is to mimic the form [1]. Activities that stimulate the fine motor development at the time of kindergartens are activities to mimic the form of letters using stationery. According to Suyanto early writing activities include children try writing techniques by mimicking curves and lines forming letters, imitating writings or letters known, writing their own names, writing a few short words [11]. According to Susanto, there are five stages of writing at the kindergarten age, the stages of the strike through, linear repetition stage, randomized writing stage, writing stage name, and short sentence writing stage [12]. Thus, the emergence of child's interest in writing begins with Scribble, then the child attempts to write letters, and then mimics writing his own name, and imitating words or writings. According to Thaiss (in Dhieni, 2015) when in the delivery of information a child is given the opportunity to be able to discuss, write it down, then describe it, and then manipulate the information provided will be understandable and well remembered [13]. Can be drawn understanding that fine motor development at the age of kindergartens is to mimic a typeface or write letters using stationery.

The Multisensory method is a learning that has the basis of the assumption that the subject matter presented involving various modalities will help the child to be able to learn well and optimally. The modalities involved include vision (visual), hearing (auditory), kinesthetic, and feel (tactile), or often also known as VAKT [14]. The Multisensory method was developed by Fernald in 1943 whose activities use the various modalities of sensory instruments namely visual, auditory, kinesthetic, and tactile which is often also known as VAKT. This method uses the selected reading material of the words spoken by the child, and each word is taught in full. This method is believed when applied to normal children, so the Multisensory method can help to stimulate the development of the child's fine motor in mimicking the typeface.

The implementation of multi-sensory method is as follows:

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1. The teacher introduces the media board flannel. The board contains letters made of flannel, then pasted onto the board. The letters that are affixed contain the words that the child often hear. (e.g. "baju"). Then the teacher read aloud and clearly the word "baju", "Ba-ju", "B-A-J-U" then the child imitating the spoken word teacher.

2. The teacher invites the child to follow the letter pattern using the index finger. The teacher asks the child to see the word and say its sound. The child will practice the sense of the feel, and the movement because of the textured flannel letters are made of flannel.

3. The teacher gave an example of writing letters with markers on the board. The teacher mentions the letter name and demonstrates, the teacher explains how to write it.

4. The child is invited to make a letter using the index finger with the help of sand media, then the child can analyze the shape of the letter based on its memory.

5. The last activity is to write with the pencil to mimic the letters that have been taught on a sheet of paper. The teacher gave help to the child who is still unable to write, giving the dots on the paper, so that the child follows the pattern.

The results of the study conducted by Labat showed that the results of a significant increase in the percentage of children who use learning with visual approach, Visuo-haptic (touching letters with fingers), and Visuo-graphomotor [15]. Later, Lisnawati's research showed that the multisensory method gave rise to positive atmospheres to appeal to children and encourage parental involvement in literacy activities [16]. As well, the research on Ade's shows the results that the multisensory method enhances the ability of early literacy in kindergarten [17].

Based on the explanation above, it is necessary to study for improvement of previous research related to fine motor development for group B children in kindergarten using multisensory method. While the principle in the Multisensory method has several advantages in learning activities recognize literacy and mimic the form of letters.

II. IDENTIFICATION, RESEARCH AND COLLECT IDEA

This research uses the quasi experiment with non-equivalent control group design. There are 2 experimental groups and 2 control groups. The experimental group was given the learning treatment of the multisensory method, while the control group was given learning according to the teacher's method without using the Multisensory method. Measurement of observations conducted before and after learning using the rating scale calculation 1-4. Scale Rating is a scale used to collect raw data in the form of numbers that are then interpreted in a qualitative sense [18]. The scale rating used refers to the following table 1:

<table>
<thead>
<tr>
<th>Score</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Undeveloped</td>
</tr>
<tr>
<td>2</td>
<td>Start Growing</td>
</tr>
<tr>
<td>3</td>
<td>Evolving as Expected</td>
</tr>
<tr>
<td>4</td>
<td>Excellent Growth</td>
</tr>
</tbody>
</table>

The following observation grids are as follows:

Table 2. Fine Motor Capability Observation Grid

<table>
<thead>
<tr>
<th>Child’s Development Assessment Level</th>
<th>Indicator</th>
<th>Instrument</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emulate the shape</td>
<td>The ability mimic letter shape</td>
<td></td>
</tr>
<tr>
<td>1. Mimicking letters with index fingers.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Emulate letters with stationery.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Can mimic composing a word with stationery.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

III. RESULT AND FINDINGS

Based on the test results normality with Kolmogorov-Smirnov is smaller than the level of 0.05 significance. As such, the data is declared non-distribution normal and cannot be continued with parametric testing, in lieu of the use of the Nonparametric test with Kruskal Wallis [19].

Table 3. Results of Fine Motor Capability with Kruskal Wallis’s Test

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>Post Test Fine Motor Capability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Square</td>
<td>27.879</td>
</tr>
<tr>
<td>df</td>
<td>1</td>
</tr>
<tr>
<td>Asymp. Sig.</td>
<td>0.000</td>
</tr>
</tbody>
</table>

a. Kruskal Wallis’s Test  
b. Grouping Variable: Treatment

According to table 3, the results of Chi-Square were obtained at 27.879 while the P-value value indicated by the asymp value.
A Significance of 0.000 is that it explains that the P-value is < from the critical limit of 0.05, so H<sub>0</sub> is rejected and H<sub>I</sub> is accepted. It can be concluded that there is influence of the multisensory methods of fine motor ability of kindergarten children aged 5-6 years.

This research is in accordance with Susanto's opinion [3], there is a close relationship between the letters by impersonating them, when the child shows his activity in impersonating a pattern letter then recite it, then the ability in know it will increase. It is also in line with the research conducted by the British Audio-Visual Association (in the Age, 2011) suggests that information obtained by one through Visual senses (visually) as much as 75%, 13% through auditory, 6% through touch, and 6% through the senses of smell and tongue [20]. So using multisensory method can stimulate the function of the child's senses to obtain information, so that language learning (literacy) and fine motor (imitating the shape of the letters) will develop well.

IV. CONCLUSIONS

Based on data analysis and discussion, it concluded that the multisensory method affects the development of fine motor children aged 5-6 years.

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Public Sector Collaboration Management In Coremap Implementation In Kabupaten Buton, Southeast Sulawesi

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Abstract- The management of public sector collaboration emerged as an urgent approach adopted by the government at this time because it relates to the demands of the community related to the government's development performance which has not been able to reach the optimal point. The purpose of this study was to describe the implementation of collaborative management between the Buton District Government, including the regions that are now part of South Buton and other actors in coastal resource management, especially in the Coral Reef Management Program. This study uses a case study approach. The results show that the implementation of public sector collaboration management in the coremap program is a collaboration designed by the central government which is then followed up by the Buton District Government together with other parties from both formal and non-formal institutions in implementing the program. The implementation of public sector collaboration management that took place in the framework of the implementation of the coremap conducted from 2006 to 2012 in stages two and three from 2015 to now in the third stage both in terms of definitions, characteristics and processes in general has fulfilled the elements of public sector collaboration management.

Index Terms- Public Sector Collaboration Management, Coremap Implementation

I. PRELIMINARY

One model of collaboration in government efforts to improve its development performance is called "The Collaborative Management". Public sector collaboration management in a governance perspective has several issues that are relevant in the context of public sector management, including in coastal resource management and fisheries. There are several conditions that encourage the promotion of the collaboration principle. First, awareness that development management that only relies on one actor is a practice that is contrary to democratization of development. Secondly, the logic is that by relying on resources only from one party, on the one hand it is difficult to fulfill the needs, on the other hand to waste resources on the other side. Third, the demand that by promoting collaboration in development management the realization of good governance. Therefore, demands from the community so that the regional government must be able to carry out innovations in the management of government become a logical consequence, especially in the context of collaborative management of coastal resource management.

Departing from the background of the research that has been described, that is how important the Buton District Government carries out the management of public sector collaboration in managing public issues, especially related to the management of coastal resources. Collaboration management in the public sector is principally seen as being able to overcome the scarcity of resources owned by each collaborating party. Likewise, the effect of collaborative management is seen as being able to have the effect of strengthening the competencies of each party that collaborates in order to overcome problems that are still difficult to overcome independently. This study intends to focus on describing the implementation of public sector collaboration management in the implementation of the coral reef management program in Buton District, including in the South Buton section which has now become an autonomous region. Research on the management of coastal resource collaboration with the governance perspective in this study focuses more on the implementation of the coremap program with the first reason, since the establishment of South Buton Regency as a new autonomous region does not have a collaboration program for coastal resource management. There is only a program to distribute fishing vessels for fishermen and other routine programs carried out by the marine and fisheries services. This is quite reasonable because of various limitations as new autonomous regions both human resources and funds. On the other hand, there is a program that was once very massive carried out in the district of Buton as the parent region, the final stage of which is still occurring even on a very small scale in South Buton district as a new autonomous region. The program is called coremap. Therefore, the discussion of this research will occur with the locus of Buton and South Buton District, which cannot be separated from one another. Although the discussion of this research will focus a lot on the shading or the southern part of Buton with the focus there will also be more second phases, although as a whole the first and third phases will also be discussed.

II. LITERATURE REVIEW

1. Public Sector Collaboration Management
Changing perspectives and orientations in running the government from government to governance causes the attention of experts and practitioners to be more focused on the form of organizations that are capable of possessing capabilities and at the same time being able to reach beyond their authority. As a result of these changes, a government leader at all levels must also want to change, especially in terms of management capabilities and the desire to direct their attention to efforts to integrate and collaborate with other organizations in completing their development programs. This new perspective by O'Leary and Bingham (2009) is called the collaboration management (The Collaborative Management). Collaboration itself can be defined as the involvement of various parties with different institutional origins in an implementation of a development plan. The emphasis of collaboration is the different origins of the parties involved. With these different origins, an implementation of development will involve resources.

The promotion of the principle of collaboration in development management is accelerated by two epochs that define current development, namely globalization and decentralization. Globalization, although ideologically relying more on market mechanisms and private actors to finalize capitalism, is also pragmatically confronted with the urgency of finalizing state facilitation. In addition, agents of capitalism are also very aware of the threat of investment insecurity for capitalism if civil society marginalized in the praxis of development, therefore globalization also promotes the principle of collaboration in development management. Decentralization, which has the consequence of down-sizing development management, is also concerned with the promotion of the principle of collaboration, because when the development unit is more localized the resources of each party are also increasingly limited, especially the state. Because of this, the spirit of decentralization also finally trapped in the inevitability of collaboration. Regional autonomy, management of local resources to solve problems/local needs, are very much determined by managerial abilities in collaborating between development actors (Salman, 2004).

Associated with development management, the benefits of collaboration are not only related to the technical benefits of collaboration between actors in the implementation process, but especially on the resources emerging (emerging resources) produced by the collaboration. Based on experience in various cases, the benefits of collaboration in development management can be described as follows. First, collaboration presents new contributors to development management. With limited contributors, the burden is very large. At present, the resources owned by the government do not allow it to become a single contributor to development. The presence of private contributors and civil society in an area reduces the burden. Second, collaboration presents new resources, both physical and non-physical. Third, collaboration creates social capital. Social capital is the ability of development actors to organize and coordinate actions towards achieving goals.

2. Understanding Coremap and Coremap Program Implementation in Buton District

Coremap is a coral reef management program abbreviation. The COREMAP program is an effort to manage coastal and archipelago resources, especially coral reef ecosystems and fish resources in a sustainable manner, in order to improve the welfare of coastal and island communities. The importance of managing these resources can be seen from the results of a study which shows that in managed coral reef ecosystems 30 tons of fish can be produced per km. This value can be sustained if this resource is managed properly. Conversely, if the coral reef ecosystem is left to be damaged the results can drop dramatically to 5 tons per km. COREMAP itself emphasizes more on efforts to improve institutional and community capacity and the development of various alternative community activities in an effort to meet their needs from the sustainable use of coral reef ecosystem resources.

Buton Regency before divided was one of the COREMAP target areas in phase I to Phase III. Coremap in Buton district as in other regions is divided into 3 phases, coremap I, II and III. Coremap I is the initial stage of regulation from coremap. Coremap I explained the purpose of the meeting through socialization to regions and establishing a legal basis and encouraging local governments to be active in managing coral reefs. Coremap I has succeeded in Buton District. This starts from the establishment of the basic regulation of the implementation of the theme, which is the decree of the district head of Buton number 677 of 2006 concerning the management of coral reefs. The Buton District Government through the Decree of the Regent of Buton Number 1578 of 2006 has determined Liwutongkidi Island as a Regional Marine Conservation Area (Buton COREMAP II Report, 2007).

In phase II it was carried out since 2006. Previously the COREMAP Phase 1 program for Buton District was carried out since 2005, with the target area of one subdistrict namely the District of Lakudo. The COREMAP II target area consists of 7 sub-districts, from each subdistrict, four COREMAP target villages are determined. Determination of the target area is based on the Regent's Decree, by prioritizing the lagging regions (Buton COREMAP II Report, 2007). In the implementation of phase II, various villages form marine protected areas (DPL) which will be determined in various Village Regulations. The Coremap III program itself ran four years ago and is still running with the institutionalization stage. The final section of the COREMAP (Institutionalization) program aims to establish a reliable and operational coral reef management system, decentralized and encourages strengthening.

Coremap is a comprehensive program approach, combining approaches that bring together top down and bottom up. Coral reefs are protected and conserved, through natural rehabilitation efforts while the community is inspired to participate in maintaining and utilizing resources wisely and wisely. In the context of Buton Regency, the activities of community groups to support Coremap II were also carried out in various ways such as training in dodol processing from seaweed, conducting training in processing fish into Abon. The training is always attended by various members of the Pokmas (Community Group). The existence of community groups in the fields of cultivation, fishing, processing, marketing and supervision groups provides benefits for group members (ButonCoremap II, 2012 Report).

III. RESEARCH METHODS

This research was conducted using a qualitative design with the aim of describing objectively the public sector collaboration
management in coremap implementation in kabupaten buton, southeast sulawesi. This study, previously determined key informants where key informants were taken based on criteria according to Bungin (2002) which states that in determining key informants with consideration that the person concerned has personal experience in accordance with the problem under study and has extensive knowledge of the problem under study. Data sources used in accordance with the opinion of Moleong (2010) are primary data obtained from two sources, namely observation and interviews and secondary data obtained from searching documentation. The process of analyzing data by analyzing all available data from various sources according to Moleong (2010), namely interviews, observations, which have been written in field notes, personal documents and so on. After being studied, and then it has been arranged in units - units. The units are then categorized at the last stage which is checking the validity of the data.

IV. RESULTS AND DISCUSSION

Implementation of Public Sector Collaboration Management Between Buton District (Including South of Buton) Government and Parties in Coremap Implementation

In the context of collaborative management in coastal management in the coremap program in Buton District, including part of the area that is now part of South Buton, is a synergistic policy and program and needs to be implemented properly. Therefore, the Buton District Government is trying to make this happen. Conceptually it can be understood that there is no single organization/government that is able to meet its needs by using resources that are owned independently.

The researcher tried to describe the implementation of public sector collaboration management that took place between the Buton District Government and other parties in supporting the achievement of coral reef conservation, carried out through the disclosure of various facts in the field by digging up information about, among other things, how the idea emerged to collaborate. who first took the initiative to collaborate, what is the basis for the consideration of both parties to collaborate, do they understand the context so that they want to collaborate and how the process is so that the decision to collaborate.

In the context of coremap initiated by the central government, the program design is designed in a participatory and collaborative framework. Participation in COREMAP is active community involvement, especially fishermen and coastal communities, at every stage of COREMAP activities, starting from preparation, pre-planning, planning, implementing, monitoring and evaluating activities.

In the context of Buton district to follow up on the central direction and as a basis for implementing the coremap, the local government in this case the regent issued a Decree of the Regent of Buton number 677 of 2006 concerning Management of Coral Reefs which later followed up by the decision letter of the Buton district marine and fisheries number 24/ Q / VI / 2007 which regulates the organization, the main tasks of the party structures involved in coremap implementation. As for the reference, among others, Law No. 32 of 2004 concerning Regional Government, Decree of the Minister of Maritime Affairs and Fisheries No. 38 Men/2004 on General Guidelines for the Management of Coral Reefs and Decree of the Minister of Maritime Affairs and Fisheries Number Kep. 13 Men/2006about the establishment of a Steering Committee, the Technical Committee and the Management of the Coral Reef Rehabilitation and Management Project.

In the context of collaborative management for the implementation of coremap in Buton district (including South Buton) with related parties due to the decision of the Ministry of Maritime Affairs and Fisheries which appointed several regions, including Buton district to implement coral reef conservation programs in the Coremap program. Therefore, the Buton District Government through a regent's decree and followed by a decree from the head of the maritime and fisheries service followed up on the order by involving the level of the organization or government under its authority. Where both the Buton District Government and the marine and fisheries services and related agencies, sub-districts and villages, the community and related parties are obliged to succeed the instruction.

Departing from the instruction, it was then followed up by the maritime and fisheries service by holding a meeting and making a joint agreement at the level of the government that carried out the collaboration. At the village level, the initial idea so that the idea to collaborate in the framework of the implementation of coremap in South Buton as revealed by the informants included the head of the Bahari village of Sampolawa sub-district during the coremap program which stated that:

“Our involvement in a collaborative collaboration is a follow-up to the Regent's decree and the head of the maritime and fisheries service and mutual agreement between DKK and all relevant parties. Subsequently the regent and the head of the DKP office and the related SKPD collaborate with stakeholders to succeed in this program (L, 8 June 2018)”

In addition to information about who initiated the collaboration management of the public sector in the coremap program, it is also important to know what is the basis for the consideration of various parties so that they collaborate. Departing from the information gathered from various informants and documentation, it can be concluded that the basis for the consideration of why many parties include the Buton District Government, fisheries maritime service, transportation services, environmental services, sub-district and village governments, NGO members, private and community due to consideration other than refers to the regent's decree instructions and the decree of the head of the maritime and fisheries service that had been signed were also due to the consideration that the Buton District Government was given the mandate by the central government as one of the proponents of coral reef conservation. Therefore, the Buton District Government must continue to maintain coral reefs as a permanent fishery center in Southeast Sulawesi and even increase their production from existing ones. The role of Buton Regency (in this case including South Buton), can be a mainstay of how to maintain coral reefs without disturbing the lives and welfare of coastal communities on the other hand, where coral reefs that are maintained and even increase can be a guarantee for the long term.

Related to how the process is so that the decision to collaborate between various parties in the meeting in Buton District can actually be understood through the explanation of who
initiated and the substance of the purpose of the collaboration. As explained earlier that this collaboration occurs because of an order or instruction from above or topdown from the minister of maritime and fisheries decree that was followed up by the regent and the maritime and fisheries service of Buton Regency. Then followed up through mutual agreement and joint meetings between stakeholders. However, the top down orders or instructions are complemented by proposals from the parties from below in some ways or bottom up. This was revealed by the head of program and coastal affairs of the South Buton Marine and Fisheries Department which stated that:

"Our collaboration process refers to the regent's decree and the fisheries marine service decree and mutual understanding between the parties at the district level and its coordination to the center so that it adapts to the conditions and capabilities of the parties and staff (N., June 2 2018)".

However, the interesting information from the head of the satker coremap stated that there were still those who were not ready to commit to collaborating at the service level directly related to this program. This condition is certainly quite influential because it is related to field readiness when the program is implemented. This can be seen from the lack of effective coordination mechanism. Many schedules that should be carried out on time are finally delayed. Likewise at the village level there are villages that actually entered in the initial draft refused to be involved and some were involved but were less active in activities. Resistance in the form of unwillingness or laziness at the service level can be caused by the absence of benefits that can be obtained or perhaps their interests are not accommodated. At the village level there is resistance because it is considered to disturb their livelihoods in the short term and is familiar with the existing habit patterns.

In addition to how the process of collaboration occurs, also information about what forms of collaboration are part of the substance of the description of collaborative management. Based on the information obtained from various informants, it can be concluded that the form of collaboration that exists between various parties is in the form of support from parties in the structure to the Buton District government.

Further about how the forms of cooperation between the Buton Patent Government and various parties can be traced through the contents of the Decree of the Head of the Marine and Fisheries Department Office and the Joint Statement of Understanding between various parties regarding the support of the achievement of the target program where all parties agreed to succeed in achieving the goals and objectives wherein each party expresses its commitment to its contribution, for example, that the First Party in this case, the central party and the regional government, develops targets, regulations and general guidelines, infrastructure and costs for its implementation. Further explained in the statement that the parties are willing to help and support this program through supervision activities, carrying out mentoring, counseling and awareness, socialization and arousing and mobilizing community participation.

Related to how the process of formulating strategies, objectives, and targets as the national program has actually been compiled by the main person in charge in this case the marine and fisheries department assisted by Indonesian science institutions. In general COREMAP's goal is to ensure the availability of reef fish resources and to conserve their habitat (coral reefs) on an ongoing basis, as the main wealth and capital of coastal village development, to accelerate poverty reduction through increasing community and institutional capacity in the implementation of village and/or inter-village development and increasing provision socio-economic facilities and infrastructure in accordance with community needs, areas that have long existed. The specific objective or target is to first empower coastal communities and their institutions in the COREMAP region to be able to conserve coral reefs and other related ecosystems through joint management with government institutions. Second, increasing income through transparent business diversification, accountability and feasibility to be financed and thirdly increasing the government's active role in meeting the needs of coastal communities in the framework of joint management of marine protection and marine protected areas (DPL).

From the objectives, the COREMAP Strategy was mapped where the strategy was through the involvement of various stakeholders in the management of coral reef resources, the implementation of activities supported by COREMAP that needed to involve stakeholders, especially fishermen and communities whose lives depend on coral reef resources and other resources. The management of coral reef ecosystem resources is not only related to the procedures for utilization, but also by other things that affect the use procedures, all of which involve various stakeholders at different levels (national, provincial, district and village), including policy makers, universities, NGOs, fisheries businesses, fishermen associations, law enforcement. That way, the presence of stakeholders together by knowing their roles and functions in the context of managing coral reef ecosystem resources will facilitate the implementation of a responsive management model, oriented towards sustainable use and encourage the welfare process of fishing communities.

In order for a collaboration to have a clear direction and be a guide for all parties and can be realized, in the context of collaborative collaboration in Buton regency there is nothing specifically in the form of vision, policies, strategies, goals and common goals. The vision and mission in the coremap program in all regions refers to the vision - mission set by the center or the program as a whole. The vision of this program nationally is ensuring the sustainability of coral reef resources and the welfare of local communities through the application of the principles of environmentally friendly sustainable management and the development of economic enterprises for the local community. This is actually strengthened carefully from the regent's decree and the decree of the head of the maritime and fisheries service, so it can be concluded that the collaboration has a vision as expressed by the head of the coremap work unit "... realizing sustainable coral reef management(H., 29 June 2018)".

This vision is actually intersecting and is a description of the vision in the field of fisheries in Buton Regency namely: as a pillar of sustainable and competitive fisheries. In order for this vision to have a clear direction then it will be accompanied by a mission that includes: 1) increasing sustainable fisheries production; 2) optimization of infrastructure by encouraging optimization of fisheries resources and) improving the welfare of coastal communities and fishermen. Departing from the vision and mission, then it became a reference and director of collaboration.

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in realizing the achievement of coremap targets, especially in sustainable management of coral reefs.

Related to what policies are issued from the collaboration to support the effectiveness of the implementation of the collaborations that have been agreed upon, the duties of the regent and the fisheries marine service are clearly stated in the duties of each party involved in the collaboration. Another policy is that each government agency in the related districts, sub-districts and villages is emphasized to collaborate with other relevant parties to support the implementation of the coremap program and the agreements that have been stated in the meetings and meetings.

The policy that becomes the technical reference above is derived from the policies that have been issued by the central government the marine and fisheries department, namely: 1) integration and coordination between relevant agencies, including universities in supporting sustainable coastal resource management; 2) strengthening the policy network; 3) assistance and escort program.

The composition of organizational personnel in implementing collaboration between the two parties can be illustrated through the contents of the regent's decree and the maritime and fisheries department and the agreement signed in the meeting which certainly refers to the technical guidelines and written instructions of the program but also through a series of information sourced from informants. The Regent acts as the party who is committed in encouraging the policy of the leadership to remain consistent to realize the agreed targets.

As the technical executor, the Head of the Marine and Fisheries Service, the head of the coastal empowerment council and the head of the work unit coordinate again with the province and the main center. In addition, the inner city district government consists of the marine and fisheries service, the Environment Agency, Bappeda, Community Empowerment, Spatial Planning assisted by Universities, NGOs, sub-district and village governments and the community acts as the party implementing the coremap program. In Buton Regency as the Regency that implemented the program, the organization has an organizational structure consisting of a coastal community empowerment board, a national park, and a project management unit as the manager whose determination is determined by the regent's decree. In the implementation of the regent and regional legislative council will provide support for the effectiveness of the role and institutional functions of the coremap.

In full, the organizational structure is led by a coastal community empowerment board where the coastal community empowerment board is formed through the Decree of the District Head and chaired by the Regent or Chair of the District Bappeda. This board consists of 20 people with a balanced composition that comes from government and non-government elements in this case from the government element from the elements of DKP, Bappeda, DinasPendikikan, KSDA, Police, Navy, Camat. In addition, members can also be added from the Bapedala office, the Tourism Office, the empowerment and spatial planning agencies. there is also the village head fishermen, women, community leaders, traditional leaders, NGOs, and universities. The second element is the project management unit which is chaired by the Head of the DKP or other services that handle maritime and fisheries functions. Third, the power of the user of the unit's management program budget. In each sub-district, senior extension facilitators will be placed extension and training officer (SETO) which is assigned, among others, to assist PMU in the implementation of the COREMAP program and coordinate activities to be carried out by the Facilitator and Village Motivator. Community Facilitators (CF) and Village Motivators Community Facilitators (CF) and Village Motivators recruited and placed in the village to assist in the implementation of the COREMAP program in the village (General Guidelines for COREMAP Community-based Management, 2006).

In the context of collaboration in the match program in Buton District acting as the collaboration leader was the coastal empowerment council chaired by the buton regent and the head of the bappeda and assisted by the executive management unit chaired by the head of the maritime and fisheries service and the daily was run by the head of the work unit as the main actor of collaboration. This can be traced through information from informants and based on the decree of the regent and the maritime and fisheries service and mutual understanding.

Related to the mechanism of responsibility of each party that collaborates takes place as stipulated in a joint decree and agreement that is strengthened by a meeting agreed upon and signed by each party. Information is obtained that at the district level the mechanism of responsibility can be seen in several articles in the district head and marine and fisheries services as well as the MoU. Head of the program and coastal area of South Buton Regency stated that:

"The technical responsibility for activities and funding is carried out by the central marine and fisheries department which has been decentralized to the main implementers here, namely the coastal empowerment council chaired by the regent and the head of the bappeda and the management unit which is headed by the head of the regency. This is in accordance with the rules and skills that have been agreed upon (N., June 17, 2018 )."

In order for these responsibilities to be carried out according to the agreed terms, coordination is always carried out according to their respective functions. For example, between management units and coastal empowerment councils and the central government. Coordination took place at the sub-district level between sub-district heads and sub-district level administrators as well as at the village level facilitators and village motivators will always coordinate with village heads and community leaders. The form and mechanism of coordination are carried out through meeting activities and follow-up in the field.

Based on the foregoing description, it can be concluded that the implementation of public sector collaboration management in the coremap program is a collaboration designed by the central government which is then followed up by the Buton District Government where South Buton is still a part. Together with other parties both from formal institutions in the sense of service related also to non-formal institutions such as members of non-governmental organizations, community and adat leaders in the sub-districts and villages that are the location of program implementation. As is known that even though the order to collaborate comes from the central government and the Buton District Government as the parent of South Buton District since the beginning of implementing collaboration by involving a number of parties. Therefore, the Buton District Government and in this case including the government in southern Buton can be
categorized as a government that has adopted a governance governance approach. This is because governance is susceptible to use because of the internal awareness of an organization in this case the government that by relying on its internal resources it is impossible for the organization the government is now able to achieve its vision and mission.

Use of other organizational resources is important. Therefore at the same time when the local government has invited other resource owners that are needed by their government, it means that they have implemented the substance of governance, namely the importance of using networks and collaboration between actors. This is in line with the views of O’Leary and Gazley (2009) which states that governance that collaborates management is one of the characteristics of government organizations that apply the concept of governance. The desire of Buton District Government to utilize the network, how to make decisions with networks, how to determine tasks and targets with the network, and how to manage the impact of the policies made shows that the efforts made between the Buton District government followed by the southern Buton district as a division with various parties are categorized as a form of collaboration management.

The process that occurs in implementing the implementation of this program is one part of the obligations of the Government of Buton District and South Buton as a division in facilitating its citizens to be able to manage coastal resources in a sustainable manner and improve their standard of living which further aims to solve problems that cannot be resolved or resolved, by relying on himself. This process is in line with the definition of collaborative management proposed by O’Leary and Gazley (2009) that organizations in the context of governance must be oriented to organizations that act to facilitate and be able to operate in networks between organizations to solve problems that cannot be solved by themselves, or are able to finish easily compared to the organization itself.

An important aspect is analyzed in the context of collaboration between the Buton District Government and the terikait government, namely whether there is reciprocal interest. Field findings indicate that there are interests of various parties who want to be achieved with a sustainable coral reef management program in a coremap. The main interests of the Buton District Government as the parent and South Buton as pemekaran are overcoming the destruction of coral reefs and maintaining and even increasing the position as a fishery barn in Southeast Sulawesi in sustainable management of resources. While the objectives to be achieved from the parties so that they are willing to provide their resources to succeed in the coremap program are diverse, but overall there are parts of efforts to realize sustainable management of coastal resources and fisheries. Based on these interests, one meeting program activities achieved the achievement of the coremap target. The interests that collaborate in realizing sustainable management of coral reefs and coastal resources are in line with what was stated by Hull in Hjern, (1987).

Thus it can be concluded that the description of the implementation of public sector collaboration management that occurs in the framework of the implementation of the coremap conducted from 2006 to 2012 in stages two and three from 2015 to the present in the third stage both in terms of definition, characteristics and processes in general public sector collaboration management. Except for some aspects that are still not optimal in their implementation so that they have implications for outputs or targets that have been predetermined as previously described, for example coordination and communication.

V. CONCLUSION

The process that occurs in implementing the implementation of this program is one part of the obligations of the Government of Buton District and southern Buton as a division in facilitating its citizens to be able to manage coastal resources in a sustainable manner and solve problems that cannot be solved by relying on themselves. This process is in line with the definition of collaborative management proposed by O’Leary and Gazley (2009) that organizations in the context of governance must be oriented to organizations that act to facilitate and be able to operate in networks between organizations to solve problems that cannot be solved by themselves, or are able to finish easily compared to the organization itself.

The main interests of the Buton District Government as the parent and South Buton as pemekaran are overcoming the destruction of coral reefs and maintaining and even increasing the position as a fishery barn in Southeast Sulawesi in sustainable management of resources. While the objectives to be achieved from the parties so that they are willing to provide their resources to succeed in the coremap program are diverse, but overall there are parts of efforts to realize sustainable management of coastal resources and fisheries. Based on these interests, one meeting program activities achieved the achievement of the coremap target. The interests that collaborate in realizing sustainable management of coral reefs and coastal resources are in line with what was stated by Hull in Hjern, (1987).

Thus it can be concluded that the description of the implementation of public sector collaboration management that occurs in the framework of the implementation of the coremap conducted from 2006 to 2012 in stages two and three from 2015 to the present in the third stage both in terms of definition, characteristics and processes in general public sector collaboration management. Except for some aspects that are still not optimal in their implementation so that they have implications for outputs or targets that have been predetermined as previously described, for example coordination and communication.

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Committee and the Management of the Coral Reef Rehabilitation and Management Project


AUTHORS

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The Relationship between Serum Zinc Level and Severity of Melasma

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Abstract- Introduction: Melasma is an acquired, chronic, hyperpigmentation disorder which characterized by light-brown to bluish-gray macules and patches. Some researchers have reported an association between low serum zinc levels and various dermatological conditions including melasma. Zinc is one of the essential micronutrients known to play a role in the etiopathogenesis of melasma through its anti-inflammatory and antioxidant effects. To date, no research has been conducted to assess the relationship of serum zinc levels with the severity of melasma.

Objective: To evaluate the relationship between serum zinc levels and disease severity in melasma patients

Methods: This is an observational analytic studies using cross sectional design to assess the relationship between serum zinc levels and the severity of melasma in 30 melasma patients. MASI score calculation is done to assess the severity of melasma. Serum zinc levels was measured by Agilent 7700 Series Inductively Coupled Plasma - Mass Spectrophotometry (ICP-MS).

Results: The average serum zinc level in melasma patients with mild, moderate and severe melasma were 54.31 µg/dL, 53.56 µg/dL and 47 µg/dL, respectively. Most of the melasma patients were in the age group 36-45 years (43.3%), with occupation as a laborer/farmer (56.7%) and the main predisposing factor due to sun exposure (36.7%). Centrofacial and malar patterns were seen in 80% and 20% of patients, respectively, and no mandibular patterns were found. Most types of melasma are epidermal types (80%), followed by dermal types (20%) and no mixed types were found.

Conclusion: There was no significant relationship between serum zinc levels and the severity of melasma. This is the first study to assess the relationship between serum zinc levels with the severity of melasma, and can be a reference to conduct similar research with good methodological design.

Index Terms- melasma, zinc, serum level, MASI score

I. INTRODUCTION

Melasma is an acquired, chronic, hyperpigmentation disorder which characterized by light-brown to bluish-gray macules and patches. Melasma usually affects the chronically sun exposed area, especially the face and neck. Melasma is most often found in women and in darker skin types. The prevalence of melasma was reported to range from 8.8% among Latin women in the Southern United States to as high as 40% in Southeast Asia. In Indonesia, the ratio of cases of women and men was 24:1, with the highest incidence was in women aged 30-44 years. Cases of melasma are especially seen in women of childbearing age with a history of direct sun exposure.

Clinical features of melasma include brown to grayish patches on sun-exposed areas of the face. Three clinical patterns of distribution of melasma are described: centrofacial, malar and mandibular. Based on the location of pigment deposits, melasma is divided into 3 types: epidermal, dermal, and mixed types. The epidermal type is most often encountered and characterized by light brown hyperpigmentation, Wood’s light enhances the color contrast between hyperpigmented areas and normal skin. Dermal type melasma is characterized by bluish-gray hyperpigmentation and exhibits no accentuation of color contrast under wood’s light. Mixed type melasma is characterized by dark brown hyperpigmentation, and Wood’s light enhances the color contrast in some areas, whereas others show no change.

The severity of melasma can be measured by calculating the MASI score. The MASI score was first developed by Kimbrough-Green, et al in 1994 to assess the severity of melasma clinically. The MASI scores is calculated by subjective assessment of 3 factors: the area involved (area/A), darkness (D), and homogeneity (H), with the forehead (f), right malar region (rm), left malar region, (lm), and chin (c) corresponding to 30%, 30%, 30% and 10% of the total face, respectively (Fig 1).

Fig 1. Melasma Area Severity Index (MASI)
factors causing melasma. The acute effect of exposure to Ultra Violet (UV) light on human skin involves several mechanisms such as a direct effect on keratinocytes to release melanogenic and inflammatory factors on fibroblasts that stimulate melanogenesis.\textsuperscript{6} Exposure to UV light can also result in the formation of Reactive Oxygen Species (ROS), causes damages lipids, proteins and deoxyribonucleic acid (DNA), thus forming pyrimidine photoproducets, causing lipid peroxidation which ultimately produces nitric oxide (NO), as well as cytokines and enzymes that play a role in the inflammatory process.\textsuperscript{7} Furthermore, inflammatory cytokines and free radicals will increase proliferation melanocytes and increase melanin synthesis through tyrosinase activity.\textsuperscript{1}

Zinc is an essential trace elements for humans. It is an essential component of more than 300 metalloenzymes and over 2000 transcription factors that are needed for regulation of lipid, protein and nucleic acid metabolism, and gene transcription. Some researchers have reported an association between low serum zinc level and various dermatological conditions including melasma, acne vulgaris, rosacea, vitiligo, leprosy, verruca vulgaris, alopecia areata, and hidradenitis suppurativa.\textsuperscript{8} Zinc can be used as an effective agent for the treatment of several dermatological disorders, especially those that are associated with zinc deficiency, but there is little evidence to support the effectiveness of zinc as a first-line therapy in most dermatological conditions.\textsuperscript{9}

Zinc influences the immune response and shows anti-inflammatory and antioxidant activity.\textsuperscript{10} Several studies conducted in humans indicate that zinc has a protective effect against free radical formation and oxidative stress.\textsuperscript{11} Zinc is anti-inflammatory by inhibiting the production of cytokines and inflammatory mediators.\textsuperscript{1}

Research that reports the effectiveness of topical zinc therapy in melasma patients has been conducted although it is still limited. Sharquie et al, was evaluated the efficacy of 10% zinc sulphate solution in 14 patients and found a percentage improvement in Melasma Area Severity Index (MASI) score by 49.7% which was statistically significant.\textsuperscript{12} Another study was conducted by Iraji et al which comparing the effectiveness of 10% zinc sulphate solution with 4% hydroquinone. Of 72 melasma patients, there was a reduction in MASI scores in both groups after two months, but a more significant reduction was found in the group receiving hydroquinone.\textsuperscript{13} Similar results were obtained in a study conducted by Yousefi et al comparing 10% zinc sulphate with hydroquinone 4%. Of the 82 melasma patients, a significant reduction in MASI score was obtained from both groups, but a greater decrease was found in those who received hydroquinone.\textsuperscript{14} Research by Younas et al in 70 melasma patients treated with 10% zinc sulphate found a reduction in MASI score of 47.36%, and concluded that zinc sulphate was a cheap, safe and effective agent for the treatment of melasma.\textsuperscript{15}

Research on serum zinc levels in melasma patients conducted by Rostami et al states that there is a significant relationship between low zinc levels and melasma.\textsuperscript{16} To date, no research has been conducted to assess the relationship of serum zinc levels with the severity of melasma.
Table 1. Patient characteristics

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Subject Frequency (n)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>26-35</td>
<td>2</td>
<td>6.7</td>
</tr>
<tr>
<td>36-45</td>
<td>13</td>
<td>43.3</td>
</tr>
<tr>
<td>46-55</td>
<td>11</td>
<td>36.7</td>
</tr>
<tr>
<td>56-65</td>
<td>4</td>
<td>13.3</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housewife</td>
<td>4</td>
<td>13.3</td>
</tr>
<tr>
<td>Labourer/farmer</td>
<td>17</td>
<td>56.7</td>
</tr>
<tr>
<td>Professional</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td>Business</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Predisposing factor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td>Sun exposure</td>
<td>11</td>
<td>36.7</td>
</tr>
<tr>
<td>Contraception</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Pregnancy</td>
<td>2</td>
<td>6.7</td>
</tr>
<tr>
<td>Sun exposure and</td>
<td>7</td>
<td>23.3</td>
</tr>
<tr>
<td>contraception</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sun exposure and</td>
<td>1</td>
<td>3.3</td>
</tr>
<tr>
<td>pregnancy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Melasma pattern</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Centrofacial</td>
<td>24</td>
<td>80</td>
</tr>
<tr>
<td>Malar</td>
<td>6</td>
<td>20</td>
</tr>
<tr>
<td>Mandibular</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Melasma type</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Epidermal</td>
<td>27</td>
<td>90</td>
</tr>
<tr>
<td>Dermal</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Mix</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

Based on our study, the mean duration of the melasma was 91.70±72.145 months with a minimum value of 12 months and a maximum value of 240 months. The relationship of serum zinc levels with melasma duration were presented in Table 2. Based on our study, the result of Spearman correlation test showed the value of \( p > 0.05 \). There is no significant relationship between serum zinc levels with duration of melasma (\( p-value = 0.680, r = 0.079 \)).

Table 2 Relationship of serum zinc levels with duration of melasma

<table>
<thead>
<tr>
<th>Duration of melasma</th>
<th>min-max (months)</th>
<th>Mean ± SD (months)</th>
<th>r</th>
<th>( p )-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>12-240</td>
<td>91.70 ± 72.145</td>
<td>0.079</td>
<td>0.680</td>
<td></td>
</tr>
</tbody>
</table>

From the MASI score, the severity of melasma was mild in 13 patients, moderate in 16 patients and severe in 1 patient. Serum zinc levels in mild melasma patients ranged from 42-70 \( \mu g/dL \) (mean 54.31 \( \mu g/dL \)), moderate 34-72 \( \mu g/dL \) (mean 53.56 \( \mu g/dL \)), and severe 47 \( \mu g/dL \) (Table 3).

Table 3. Relationship of serum zinc levels with the severity of melasma

<table>
<thead>
<tr>
<th>Melasma severity</th>
<th>n</th>
<th>Min-Max (µg/dL)</th>
<th>Mean ± SD (µg/dL)</th>
<th>( p )-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>13</td>
<td>42-70</td>
<td>54.31 ± 7.307</td>
<td></td>
</tr>
<tr>
<td>Moderate</td>
<td>16</td>
<td>34-72</td>
<td>53.56 ± 0.542</td>
<td></td>
</tr>
<tr>
<td>Severe</td>
<td>1</td>
<td>47-47</td>
<td>47</td>
<td></td>
</tr>
</tbody>
</table>

Based on our study, the results of the kruskal-wallis test showed the value of \( p > 0.05 \). There is no significant relationship between serum zinc levels with the severity of melasma (\( p > 0.05 \)).

IV. DISCUSSIONS

In our study, the highest number of melasma subjects was 36-45 years (43.3%) and followed by 46-55 years (36.7%). A similar study by Umborowati et al reported the majority of melasma patients was 36-45 year (43%), followed by the 46-55 year. In our study, most subjects had working outdoors and often exposed to sunlight, especially in the laborers/farmers groups. Research conducted by Handel et al revealed a higher proportion of individual melasma who reported work with higher sun exposure. Chronic sun exposure is more important in developing melasma.

The most predisposing factors found in this study were due to sun exposure as many as 11 cases (36.7%) and the second most were combined factors of sun exposure and contraception as many as 7 cases (23.3%). Sun exposure is one of the important factors causing melasma with the formation of ROS which causes lipid peroxidation and produces free radicals and the release of inflammatory cytokines thereby increasing the process of melanogenesis. Hormonal factors are also referred to as important factors triggering the occurrence of melasma. Estrogen, progesterone and MSH may induce hyperpigmentary responses within melanocytes by increases tyrosinase and dopachrome tautomerase resulting in the process of melanogenesis.

Melasma involving sun exposed areas, such as face and less commonly on neck and arms. During exposure and after sun exposure, clinical manifestations are more clearly visible. Centrofacial melasma are more common because the appropriate area of focus is direct sun exposure. In our study, the most frequent pattern of melasma was the centrofacial pattern of 24 patients (80%), followed by the malar pattern of 6 patients (20%). Mandibular pattern was not found in this study. This result is similar with study by Kusumaningrum et al. Centrofacial pattern was the most common pattern (87.5%), followed by malar pattern (12.5%) and no subjects with mandibular type were found. The type of melasma is determined based on clinical examination and Wood's lamp. The epidermal type was found more frequently in (90%), followed by dermal types (10%) and no mixed types were found.

Based on table 2 it can be seen that there is no significant relationship between serum zinc levels with melasma duration (\( p-\)
value = 0.680, r = 0.079). This study is similar with research conducted by Rostami et al who stated that there was no significant relationship between serum zinc levels and duration of melasma (p-value = 0.182).  

Based on table 3 it can be seen that there is no significant relationship between serum zinc levels with the severity of melasma (p > 0.05). The previous study conducted by Rostami et al found that there was a relationship between low zinc levels in melasma patients. Serum zinc levels in control subjects ranged from 45.3 – 130.4 µg/dL with a mean value of 82.2 ± 23.9 µg/dL, while serum zinc levels in melasma patients ranged from 39.1 – 126.5 µg/dL with a mean value of 77.4 ± 23.2 µg/dL. Paired t test results showed that there were significant differences between serum zinc levels in melasma patients compared with control subjects (P-value 0.0001). Serum zinc deficiency was found in 54 (45.8%) in melasma patients and 28 (23.7%) in control subjects. Low zinc levels were also encountered in our study, where 24 subjects (80%) had serum zinc level below normal (<60 µg/dL). Etiopathogenesis of melasma is complex in which sun exposure is one of the main causative factors. UV light can cause the formation of ROS which in turn will cause lipid peroxidation and stimulate the release of inflammatory cytokines and subsequently stimulate the process of melanogenesis. In this case, zinc is a SOD enzyme cofactor which is one of the main antioxidants in fighting ROS.  

There is no significant relationship between serum zinc levels and the severity of melasma in this study, indicating that melasma is not only influenced by sun exposure, but is multifactorial, such as genetic, hormonal, and other factors (drugs, neural and psychological and lipid metabolism).

V. CONCLUSIONS

This study shows that there is no significant relationship between serum zinc levels and the severity of melasma. This is the first study to evaluate the relationship of serum zinc levels and the severity of melasma so that it can be used as a reference to conduct similar studies in the future with a better design methodology.

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Correlation between Serum 25-Hydroxyvitamin D Level with Acne Vulgaris Severity

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http://dx.doi.org/10.29322/IJSRP.10.01.2020.p9750

Abstract- Introduction: Acne vulgaris (AV) is a chronic inflammatory disease of the pilosebaceous unit characterized by the formation of open and closed comedones, papules, pustules, nodules and cysts. Vitamin D has an antiinflammation and antimcomedogenic effects. Correlation between vitamin D and AV is presumed to exists only in patients with AV inflammatory lesions.

Objective: To determine the correlation between serum 25-hydroxyvitamin D (25(OH)D) level and AV severity.

Methods: This is a cross-sectional analytic study, involving 30 subject AV patients. The Saphiro Wilk test is used to determine the normality of data distribution and the Spearman correlation test is used to determine the correlation between serum 25(OH)D level and AV severity. The severity of AV of each participant was classified into mild, moderate and severe based on Indonesian Acne Expert Meeting 2015 (Lehmann, 2002 modification).

Results: The highest proportion was women (80%), age group 17–25 years (83,33%), and AV with family history (80%). The lowest serum 25(OH)D level was men 16,68 (13,01 – 70,3) ng/mL, age group 17–25 years 16,7 (3,61 – 98,3) ng/mL, AV with family history 12,74 (3,61 – 27,2) ng/mL, and severe AV 5,63 (3,61 – 17,20) ng/mL, there was strong negative correlation between serum 25(OH)D level with AV severity (r= -0,792, p<0,05).

Conclusion: Lower level of serum 25(OH), the severity of acne vulgaris became an increasingly heavy.

Index Terms- acne vulgaris, 25-hydroxyvitamin D, severity, Indonesian Acne Expert Meeting

I. INTRODUCTION

Acne vulgaris (AV) is a disease of pilosebaceous unit characterized by the formation of non-inflammation lesions (open and closed comedones) and inflammation lesions (papules, pustules, nodules and cysts). The term acne is derived from Greek word “acme” which is used in the sense of skin eruption and vulgaris indicate the meaning “common”. AV affects the skin regions with the densest sebaceous follicles populations which include face, upper part of chest and the back.

The grading of AV based on the type of lesions, affected surface area and their severity that can help in deciding which therapies are needed in each individual. However, no grading system has been accepted universally. Indonesian Acne Expert Meeting (2015), modification Lehmann (2002) is a quantitative scoring system to assess the severity of AV. According to this score AV was graded as mild, moderate, and severe. The pathogenesis of AV is multifactorial, but there is four main pathogenesis: epidermal follicular hyperkeratinization, increased sebum production, Propionibacterium acnes (P. acnes) within the follicle, and inflammation. Vitamin D is a fat-soluble steroid hormone, which plays an important role in calcium homeostasis, immune system regulations, and cell growth and differentiation. Main source of vitamin D is de novo synthesis in the skin by ultraviolet B rays of sunlight (290-315 nm) and small proportion is obtained from dietary source. A few in vitro studies have published data that support the theory that vitamin D has a functional role in AV development. Vitamin D regulates the proliferation and differentiaion keratinocytes and sebocytes.

Study in Korea (2016) reported 48.8% of patients with AV had deficiency in serum 25(OH)D level, but only 22.5% of the healthy control. In subsequent trial, improvement in inflammatory lesions was noted after supplementation with vitamin D in 39 AV patients with 25(OH)D deficiency. Study in Egypt (2016) also reported serum 25(OH) level in patients with AV lower than healthy control. While study in Kuwait (2018) reported there is no significant correlation between serum 25(OH) level with AV severity.

Nowaday, studies about correlation between serum 25(OH)D level and AV severity are still controversial, so we interested to assess about the correlation between serum 25(OH)D and AV severity.

II. METHOD

This research was conducted from September 2019 until December 2019. It was an observational analytic study with a cross-sectional design involving 30 patients with AV who came to Departement of Dermatology and Venereology H. Adam Malik General Hospital Medan. Each participant will sign an informed consent and will undergo anamnesis, dermatological examination and blood test for serum 25(OH)D levels. The patients were then categorized into 3 groups according AV severity by Indonesian Acne Expert Meeting (2015), Lehmann (2002) modification.

Patients with polycystic ovaries, pregnant, thyroid, parathyroid, renal, cardiovascular, cancer, tuberculosis, diabetes mellitus, psoriasis, sistemic lupus erythematos, scleroderma disorders and also patients receiving drugs vitamin D supplement...
and AV therapy (oral and topical) in last 1 months were excluded from the study.

The Saphiro Wilk test is used to determine the normality of data distribution and Spearman correlation test is used to determine the correlation between serum 25(OH)D level and AV severity.

This research was carried out after obtaining permission from the Research Ethics Commission of the Faculty of Medicine, Universitas Sumatera Utara and a research permit from the Directorate of Human Resources and Education of the Research and Development Installation of H. Adam Malik General Hospital, Medan.

III. RESULTS

Patient's characteristics

This study included 30 subjects of AV, 24 patients (80%) were female and 6 patients (20%) were male. Most of patients were predominantly age group 17-25 years (83,33%) and the lowest was age group 36-45 years (6,67%). From all the subjects, majority had family history of AV as much as 18 people (60%) and among 30 AV patients, 10 patients (33,3%) with mild severity, 10 patients (33,3%) with moderate severity, and 10 patients (33,3%) with severe severity. The characteristics of AV in the study population are shown in Table 1.

Table 1. Patients characteristics

<table>
<thead>
<tr>
<th>Variables</th>
<th>Number of cases (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>6 (20)</td>
</tr>
<tr>
<td>Female</td>
<td>24 (80)</td>
</tr>
<tr>
<td>Age group (years)</td>
<td></td>
</tr>
<tr>
<td>17-25</td>
<td>25 (83,33)</td>
</tr>
<tr>
<td>26-35</td>
<td>3 (10)</td>
</tr>
<tr>
<td>36-45</td>
<td>2 (6,67)</td>
</tr>
<tr>
<td>Family history</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>18 (60)</td>
</tr>
<tr>
<td>None</td>
<td>12 (40)</td>
</tr>
<tr>
<td>AV severity</td>
<td></td>
</tr>
<tr>
<td>mild</td>
<td>10 (33,33)</td>
</tr>
<tr>
<td>moderate</td>
<td>10 (33,33)</td>
</tr>
<tr>
<td>severe</td>
<td>10 (33,33)</td>
</tr>
</tbody>
</table>

Serum 25-Hydroxyvitamin D Level

Table 2. Serum 25(OH)D levels

<table>
<thead>
<tr>
<th>Variables</th>
<th>25(OH)D levels</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Median (Min-Max) ng/mL</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>16,68 (13,01-70,30)</td>
</tr>
<tr>
<td>Female</td>
<td>18,5 (3,61-98,3)</td>
</tr>
<tr>
<td>Age group (years):</td>
<td></td>
</tr>
<tr>
<td>17-25</td>
<td>16,7 (3,61-98,3) (3)</td>
</tr>
<tr>
<td>26-35</td>
<td>19,89 (12,48-70,3)</td>
</tr>
<tr>
<td>36-45</td>
<td>26,37 (25,84-26,9)</td>
</tr>
<tr>
<td>Family history</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>12,74 (3,61-27,2)</td>
</tr>
<tr>
<td>None</td>
<td>25,34 (14,02-98,3)</td>
</tr>
<tr>
<td>AV severity</td>
<td></td>
</tr>
<tr>
<td>mild</td>
<td>26,37 (14,02-98,3)</td>
</tr>
<tr>
<td>moderate</td>
<td>18,34 (12,48-27,2)</td>
</tr>
<tr>
<td>severe</td>
<td>5,63 (3,61-17,2)</td>
</tr>
</tbody>
</table>

Correlation between Serum 25(OH)D Level with Acne Vulgaris Severity

There was a significant strong negative correlation between serum 25(OH)D serum with AV severity ($p = <0.05$, $r = -0.719$), shown in Table 3.

Table 3. Correlation between Serum 25(OH)D levels with acne vulgaris severity

<table>
<thead>
<tr>
<th>Variable</th>
<th>p</th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td>25(OH)D with AV severity</td>
<td>&lt;0.05</td>
<td>-0.719</td>
</tr>
</tbody>
</table>

IV. DISCUSSION

AV is a chronic inflammatory disease of pilosebaceous follicles, characterized mainly by comedones and inflammatory lesions such as pustules, papules, nodules, cysts, and scars. From a total of 30 patients AV in our study, the proportion of female (80%) was higher than male (20%). It was consistent with the study in Egypt (2017) reported that more proportion of female (60%) than male (40%). Otherwise, study in South India reported that the proportion of male (55,7%) was higher than female (44,3%). This discrepancy between these studies may be due to the difference in the number of samples. AV often heralds the onset of puberty. In girls, the occurrence of AV may precede menarche by more than a year.

AV can occur at any age. The highest distribution was age group 17-25 years (83,33%) and the lowest was age group 36-45 years (6,67%). This results were consistent with the Global Burden Disease reported that the most psoriasis patients were age group 12-25 years. Study in Malaysia (2018) also reported that that the most AV patients were age group 14-20 years (87,7%). AV prevalence hits its peak during the middle-to-late teenage period, with more than 85% of adolescents affected, and then steadily decreases. However, AV may persist through the third
decade or even later, particularly in women. It has been shown that females with high DHEAS levels are predictors of severe or long-standing AV.12

AV patients with family history (60%) was higher than AV without family history (40%). It was consistent with the study in China (2013) reported that 78% AV patients had father and mother with AV.19 AV usually occurs early and more severe in AV patients who had family history.1,20

According to the gender, serum 25(OH)D level in female 18.5 (3.61 -98.3) ng/mL was higher than male 16.68 (13.01-70.30) ng/mL. It was consistent with study in Denmark (2009) reported that serum 25(OH)D level in female was higher than men. Vitamin D Binding Protein (VDBP) in female was significant higher than men, and it had positive correlation with total 25(OH)D.21

The highest serum 25(OH)D level was age group 36-45 years 26,37 (25.84-26,9) ng/mL and the lowest was age group 17-25 years 16,7 (3.61-98,3) ng/mL. It was consistent with study in Denmark (2009), study of the global serum 25(OH)D status in the general population, it was found that the lowest serum 25(OH)D level was at an age group of ≤ 15, and the highest was at the age group of 66-75 years, but there was no significant relationship between the level 25(OH)D with age.21

In this study, serum 25(OH)D level in AV patients with family history 12.74 (12.61-27.2) ng/mL was lower that AV patients without family history 25.34 (14.02-98.3) ng/mL. It was inconsistent with study in Turkey (2018) reported that serum 25(OH)D level in AV patients with family history (14,21±0,5) ng/mL was higher than AV patients without family history (9,99±1.4) ng/mL.14

The lowest serum 25(OH)D levels was severe AV 5.63 (3.61-17.20) ng/mL and the highest serum 25(OH)D levels was mild AV 26.37 (14.02-98,3) ng/mL. It was consistent with the study in Egypt (2018) reported that the lowest serum 25(OH)D levels was severe AV (11.32 ± 6,45) ng/mL.15 Vitamin D has an antiinflammation and anticomedogenic effects. The presence of *P. acnes* in AV lesion leads to secretion of various inflammatory cytokines, including Interleukin (IL)-8 and IL-12 in addition to the recruitment of activated T helper 1 (Th1) and Th17 lymphocytes to the site of early AV lesions.14,15,22 Vitamin D also inhibits T-cell proliferation and suppresses the production of B-cell opsonizing antibodies, and reduces Th17.22 The association between vitamin D and AV is presumed only in between vitamin D level and AV severity in patients with inflammatory lesions.14

According to this study there was a significant strong negative correlation between serum 25(OH)D serum with AV severity (p = <0.05, r = -0.719). Study in Korea (2016) reported there was a significant strong negative correlation between serum 25(OH)D serum with AV severity (p = <0.001, r = -0.512).13 Study in Iran (2015) showed there was no significant correlation between serum 25(OH)D and AV severity (p = 0.45, r = 0.12).23 The difference in the correlation between serum 25(OH)D levels with severity of AV can be influenced by genetic factors, dietary intake or vitamin D supplementation, and the length of exposure to sunlight that varies in each individual.

V. CONCLUSIONS

The correlation between 25(OH)D serum level with AV severity has significant negative correlation. Lower level of serum 25(OH)D, the severity of AV became an increasingly heavy. These results may indicate that vitamin D play a potential role in AV. Further studies are needed to determine the benefits of vitamin D derivatives administration to AV patients, as a basis for consideration of additional therapy in the management of AV in health services.

VI. SUGGESTION

This research can be done with a larger sample size.

ACKNOWLEDGMENT

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Management of Recurrent Periapical Abscess with Platelet Rich Fibrin

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Abstract- In cases of recurrent periapical abscess occurring post peri-apical surgery, platelet rich fibrin presents a viable alternative to bone grafts for osseous defects. Bone grafts may act as a nidus in cases where there is incomplete removal of granulation tissue. It is a 2nd generation platelet concentrates, which is a natural scaffold, derived from an autogenous preparation of concentrated platelets from human blood. These case reports illustrate the use of PRF in management for recurrent periapical abscess following failed periapical surgeries with bone grafts.

Index Terms- Bone graft, Platelet derived growth factor, Platelet rich fibrin, Recurrent periapical abscess, Periapical surgery, Wound healing

I. INTRODUCTION

Chronic periapical abscess with draining sinus develops due to infection of necrotic pulp tissue which most of the time heals satisfactorily after non-surgical endodontic intervention [1]. Persistent chronic periapical abscess after non-surgical endodontic therapy requires surgical endodontics which frequently involves apicoectomy with placement of bone grafts to fill the defect and promote regeneration. Success of surgical endodontics with bone grafts depends on the reduction and complete elimination of the surrounding chronic inflammatory granulation tissue [2]. Placing of bone grafts in recurrent chronic periapical abscess can further act as nidus for infection and further bone loss may occur due to persistent infection [3]. Platelet rich fibrin presents a viable alternative in such cases. It is a 2nd generation platelet concentrate, that serves as a natural scaffold, derived from an autogenous preparation of concentrated platelets from human blood[4]. Leukocyte–platelet-rich fibrin (L-PRF) is a polymerized fibrin clot that contains a high number of platelets and leukocytes[5]. Platelets perform many other important functions other than simple homeostasis. Platelets contain important growth factors which promote collagen production, recruitment of progenitor cells at the injury site, initiate vascular ingrowth and induces cell differentiation which are crucial steps in wound healing[6]. These growth factors (GF) are released for at least 1 week [7] and up to 28 days, [8] thus serving as a bio-physiological scaffold in the process of wound healing.

The following case report describes the management of the chronic recurrent periapical abscess occurring post root canal treatment and peri-apical surgery with using PRF which acts as a source of GF at the healing site, thereby accelerating soft and hard tissue healing[9,10].

II. CASE 1

A 17 year old female patient, reported to department of Periodontology with chief complaint of pus release in respect to upper left lateral incisor region since 1 year[Figure 1a]. Patient gave a history of traumatic injury to the front teeth area three years back and had undergone periapical surgery with bone grafts twice in relation to 21 & 22 region followed by final extraction of 22 six months back. On clinical examination there was pus draining sinus with respect to missing 22. Radiographic examination revealed ill-defined radiolucency at peri apex of 21 & 22 & sinus tract was traced to peri apex of 21 using gutta percha [GP] cone [Figure 1b]. Head and neck examination showed no palpable lymph nodes. Patients vitals were normal.

Patient was diagnosed as Chronic periapical abscess with respect to 21 & missing 22.

Management

The treatment plan consisted of removal of old gutta percha [GP] cone and placement of calcium hydroxide dressing. Periapical surgery was planned following remission of acute signs and symptoms simultaneously with root canal obturation and retrograde restoration in relation to 21.

Surgical phase - Local anaesthesia with 2% lignocaine was administered and sulcular incision around 21 region extending to the ridge of 22 with vertical incisions were placed. A Full-thickness mucoperiosteal flap was raised[Figure 1c]. A large defect was visible in the buccal cortical plate with 21 & 22, which was widened to facilitate thorough curettage of the granulation tissue[Figure 1d]. Root canal was obturated with gutta percha cone and retrograde restoration using GIC in relation to 21 was done. The surgical site was irrigated with betadine and sterile saline solution.

PRF was prepared [Figure 1e] in accordance to the Choukroun et al (2001) protocol. Prior to the surgery, 10 ml intravenous blood (by veni-puncture of the antecubital vein) was drawn into a sterile tube without anticoagulant which was centrifuged immediately in centrifugation machine at 2700 revolutions per minute for 12 minutes. PRF formed was detached from red blood corpuscles base [keeping a small red blood cell (RBC) layer] using a sterile tweezers & scissors. PRF clot

collected was left into sterile dapen dish for 10mins to release the serum contained in it.

The degranulated bony defect was then packed with PRF clot {Figure 1f} and wound closure was achieved using 4-0 prolene sutures{Figure 1g} . Nonsteroidal anti-inflammatory analgesics were prescribed. Post 72 hours of surgery the patient was instructed to use .12% chlorhexidine mouth wash for 7days to maintain the oral hygiene. The sutures were removed post 7 days, and satisfactory healing was seen. On Recall visits at 3 and 6 months {Figure 1h}. follow-up radiographs showed adequate bone regeneration in the defect {Figure 1i} along with good clinical healing.

III. CASE 2

A 44 year old male patient reported to department of periodontology with chief complain of pus release in respect to upper left central incisor region since nine months {Figure 2a} . Patient gave a history of traumatic injury to the front teeth area five years back and had undergone periapical surgery with bone graft placement twice in relation to 21at one year and six months back. On clinical examination there was a pus draining sinus with respect to 21. Radiographic examination revealed ill-defined radiolucency at peri apex of 11 {Figure 2b} & sinus tract was traced to peri apex of 21 using gutta percha cone.

Head and neck examination showed no palpable lymph nodes. Patients vitals were normal. Case was diagnosed as Chronic periapical abscess with respect to 21.

IV. MANAGEMENT

The treatment plan consisted of removal of old gutta percha [GP] cone and placement of calcium hydroxide dressing. Periapical surgery was planned upon remission of clinical signs simultaneously with root canal obturation and retrograde restoration in relation to 21.

Surgical therapy- Local anaesthesia with 2% lignocaine was administered. Sulcular incision around 21 and 22 with vertical releasing incisions were placed and full thickness mucoperiosteal flap {Figure 2c} was reflected. The defect {Figure 2d} in the buccal cortical plate with respect to 21, was widened to facilitate thorough curettage of the {Figure 2e} of the unhealthy granulation tissue. Management of root canal-Root canal obturation with gutta percha cone and retrograde restoration using GIC in relation to 21 was done. The surgical site was irrigated with betadine and sterile saline solution.

The PRF was prepared{Figure 2f} as in case 1, following the protocol developed by Choukroun et al [2001].

The degranulated bony defect was then packed with PRF clot {Figure 2h} and wound closure was achieved using 4-0 prolene sutures {Figure 2g} . Nonsteroidal anti-inflammatory analgesics and chlorhexidine mouth wash was prescribed for a week. The sutures were removed post 7 days, and satisfactory healing was seen. On Recall visits at 3 and 6 months {Figure 2i} follow-up radiographs showed adequate bone regeneration in the defect {Figure 2j and k} and good clinical healing.

V. DISCUSSION

Periapical lesions are inflammatory reactions evoked due to irritants from infected root canal into the peri-radicular tissue. Depending upon the nature and quantity of irritants, duration of exposure, the lesion varies from simple periodontitis to granulomas, cysts or abscess. When nonsurgical root canal therapy fails to remove the lesion then surgery is the last option by which lesion is removed followed by placement of suitable bone graft substitute.

However, in cases of recurrent periapical abscess, which occur post peri apical surgery, bone graft may act as a nidus in cases with incomplete/difficult removal of granulation tissue.

The present case reports evaluated the clinical effectiveness of PRF in the management of recurrent periapical abscess post peri apical surgery.

PRF is a biological matrix of autogenous fibrin, rich in platelet and leukocyte cytokines. PRF provides the subsequent four advantages: First, the fibrin clot plays a mechanical role, by maintaining and protecting the site from epithelium invagination. Second, this fibrin network accelerates cellular migration of progenitor cells, particularly endothelial cells needed for the neo-angiogenesis (11) and vascularization. Third, the platelet growth factors (PDGF, TGF- α, IGF-1) which are slowly released as the physiological fibrin matrix resorbs, thus creating a perpetual healing process(12). Lastly cytokines and leukocytes in the fibrin network may have a important role in the regulation of infectious and inflammatory phenomenon(13).

VI. CONCLUSIONS

PRF is efficacious clinically and radiographically in the treatment of recurrent periapical abscess following periapical surgery where bone graft substitute used may act as a nidus. PRF is an autologous preparation which is clinically effective and economical than any other available regenerative materials. Although the role of growth factors, ideal ratio of the components and the exact mechanisms, are still being investigated, and more clinical research with long-term results are needed. PRF will definitely revolutionize the surgical dentistry with its clinical efficacy.

Appendices
Appendix 1: Case 1-Fig 1a,1b, 1c, 1d, 1e, 1f, 1g, 1h, 1i
Appendix 2 : Case 2-Fig 2a, 2b, 2c, 2d, 2e, 2f, 2g, 2h, 2i

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Fig 1a. Pus discharge from sinus i.r.t. missing 22 region

Fig 1b. Pre Operative IOPA
Tracing of sinus tract using GP point

Intra -Operative

Fig 1c. Full thickness flap

Fig 1d. Bony defect post degranulation

Fig 1e. PRF - Preparation at 2700 RPM -12 Min

Fig 1f. PRF placed into defect

Fig 1g. Flap repositioned
Post-Operative 6 months

Fig 1h. Clinical View

Fig 1i. IOPA
Pre-Operative

Fig 2a. Pus discharge from sinus i.r.t. 21 region

Fig 2b. Pre Operative IODA

Intra-Operative

Fig 2c. Full thickness flap

Fig 2d. Bony defect & granuloma i.r.t. 21

Fig 2e. Bony defect post degranulation i.r.t. 21

Fig 2f. PRF Preparation, 2700 RPM - 12 Mm

Fig 2g. PRF placed into osseous defect

Fig 2h. Flap repositioned
Investigating Gender Disparity between Female and Male Heads of Department (Infant) in Primary Schools in Botswana: The Perspectives of Primary Deputy School Heads

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Abstract- There are over seven hundred government primary schools in Botswana. In these schools, one of the managerial posts is Head of Department (Infant), for which the incumbents are responsible for supervising lower classes, of young children between five and eight years old. Despite the fact that these promotional positions are advertised for all qualifying teachers in the country, both female and male, the position is dominated by females. This is despite the definition by International Labour Office (2000) that gender equity means fairness of treatment for women and men including treatment of opportunities. It is in this regard that this research sought the views of both female and male primary deputy school heads in their final year of an undergraduate degree why the position of HOD (Infant) is dominated by females. Data were collected through participants’ responses to a semi-structured questionnaire and analysed using a thematic approach. Consistent with the literature, the findings revealed a range of reasons including traditional perceptions about the role of women in child upbringing, as to why the position is dominated by women, with an insignificant number of men holding the position.

Index Terms- Head of department Infant, Deputy School Head, Early Childhood Education, Gender disparity.

I. BACKGROUND

Under representation of men in Early Childhood Education (ECE) has become a topical issue for debate internationally (Yang, 2013). The literature on ECE shows that it is traditionally a profession mainly dominated by women. There is evidence of such under representation in different countries such as Canada with male teachers representing 3.4% of the ECE teachers, and 2% each in both New Zealand and USA. For the rest of Europe the representation is rated at 1.5%, except for Denmark and Norway with 7.6% and 11% respectively (Besnard & Letarte, 2017).

Africa is not an exception as the percentage of the male teachers in early childhood education is also very low in comparison to female counterparts. For instance, a study on gender divides in Early Childhood teacher education in South Africa reveals low representation of men in ECE (Mashiya, Kok, Luthuli, Xulu & Mtshali, 2016).

Different reasons have been advanced in the literature, which include cultural factors and the role of women in childrearing. One stereotype classification is that of “women as more suited to raising children and thus teaching in the early grades” (Petersen, 2014, p. 3). Others describe the role of ECE teachers as that of ‘nannies’ and ‘caretakers’, mainly associated with society’s stereotypes of ECE as a woman’s role and not that of a man (Petersen & Petker, 2011). In light of this over representation of women in ECE, this study sought the views of female and male deputy school heads regarding disparity between women and man holding the position of Head of Department (Infant) in primary schools in Botswana.

II. PURPOSE OF STUDY

To explore participants’ views about the disparity between men and women in the position of Head of Department (Infant) in primary schools in Botswana.

III. RESEARCH QUESTIONS

What are participants’ views about disparity of men and women in the position of Head of Department (Infant)?

What do the participants perceive as the duties of HOD (Infant)?

IV. METHOD

Participants were thirty-nine deputy primary school heads in their final year undergraduate degree of Bachelor of Educational Leadership and Management (BELM). It was important to seek the views of this group because as heads of academic they worked very closely with HODs (Infant) in a broad range of curriculum matters, including school-based professional development. Questionnaires were issued to all the thirty-nine
participants who comprised twenty-three female deputy school heads and sixteen male deputies. Only six of the female deputies were previously Heads of Department (Infant), while none of their male deputy school heads held this position. Thirty-eight participants completed and returned the questionnaire with only one not returned.

V. THEORETICAL FRAMEWORK

This study is guided by the theory proposed by Acker called Theory of Gendered Organizations (Acker, 1990, 1992). Basing on the idea that gender is socially constructed, Acker (1990) observed that organizations as part of the society are gendered meaning that norms and practices defining men and women stereotypical persist (Mastracci & Arreol, 2016). In addition, Britton, (2000) advance that gendered organizations implies that they are “defined, conceptualized and structured in terms of a distinction between masculinity and femininity and will thus inevitably reproduce gendered differences,” (p. 419). Thus, the extent to which ‘gendered characteristics are valued and evaluated in turn results in inequalities. The theory of gendered organization first mentioned by Kanter (1977, 2007) was used to interpret inequalities between women and men in the work places. These inequalities that include women’s lack of advancement were attributed to be resulting on the hierarchical situation of women in society and organizations. According to Mastracci and Arreol, (2016) Acker revolutionized Kanter’s thought, by observing that “rules and rituals internal to the organization produce and reproduce disparities between women and men” (p. 137). In addition based on the gendered societal norms about traditional divisions of labour, Acker (2006) argues that such norms continue to be seen in occupational fields and organizations as dictating who gets hired, promoted, and rewarded in the workplace.

The theory of gendered organizations is relevant in this study as Early childhood Education is generally a gendered field. Traditionally child care, care work and nurturing are associated with women and therefore are a female’s domain. Studies describe gendered occupational fields as those fields with a significant skew to the gender distribution of the employees (Kanter, 1977; Kessler & McKenna, 1978; Sargent, 2005). According to Sargent (2005) the work in such fields is “typically imbued with gendered meanings and defined in gendered terms” (p. 251).

Low representation of males in early childhood education has generally been observed internationally (Peeters, 2007; Sargent, 2005; Yang, 2013). Studies that have paid attention to low representation of males in ECE argue that the field is considered an extension of baby care which traditionally a woman’s role. This role is considered as work that women do naturally and intrinsically better (Peeters, 2007). Peeters (2007) examined what could be done to increase the employment of men in ECE. The findings revealed that the role of males in ECE in Europe is still undervalued by society hence the work is less inspiring to men.

In another study by Peeters (2007) an observation made about the low persisting gender disparity in ECE occupation is that the work is lowly paid and is still highly associated with women. For instance, when women consider taking up male dominated jobs, it is mostly because the occupations have a high pay and have opportunities for advancement. Peeters (2007) argues that men who take up ECE jobs would therefore be sacrificing in terms of pay and status. Furthermore, are the potential reservations about their masculinity and suitability for the job. As noted by Sargent (2005), in some instances, when men break the social taboo and do child care work, they implicitly attract negative labels such as feminine, homosexuals or pedophiles. In addition, Sargent, (2005) indicate that Early childhood Education is therefore viewed a feminine job, or ‘framed through the metaphor of motherhood, as such men cannot fit this metaphor while simultaneously living up to expectations of hegemonic masculinity and fatherhood’ (p. 255).

VI. LITERATURE REVIEW

Nurturing children is viewed as naturally a women’s job (Sargent, 2005). Female predominance in teaching is a global phenomenon (OECDE, 2005), with percentage of women highest at level of ECE (Drudy, 2008). Evidence of this is the 2010/2011 statistics on Kindergarten in Hong Kong that revealed that there were only 126 male teachers and 10,328 females in ECE (Education Bureau, 2012). Such gender imbalances in teaching are a major concern for governments in many countries (OECDE, 2005).

A study by Ho and Lam (2014) in China reveal societal divergent views whether kindergartens should also employ male teachers, with others maintaining that taking care of young children is only suitable for females, as it relates to a mother’s role. The same study shows that some in Chinese society believe that naturally, men are breadwinners while women are homemakers. This saying has been deeply rooted in societies where men play a dominant role in many aspects of life. It would seem that culture plays a major role in defining masculinity and femininity in a social context.

Sumson (2000) argues that where there has been lack of male teachers as role models, boys tend to be weak and timid with some of them showing the tendency of being feminine. The implication is that male role models are important for the personality of children. Mac Naughton and Newman (2001) therefore make a case for the need for male participation in ECE. They suggest males’ involvement in ECE not only to provide children with role models but also to cultivate the modern concept of gender roles. According to Yang (2013), with active participation of male teachers, children not only get to fulfill the need for physical exercise but also the need for psychological development.

The literature on ECE provides possible perspectives regarding potential initiatives to attract more males to early childhood education. Some point out that lack of men is a result of inappropriate career guidance and information, as well as societal prejudice and narrow-minded perceptions that early childhood education is a female profession and men are not able to care for young children. This leads men to think that they are not welcomed to ECE and that entry into the profession will be difficult for them (Rentzou & Zigianitioudou, 2009). Therefore, to overcome male teachers’ low participation in ECE, changes are required in deeply rooted institutional and management practices. This would entail among other things, the provision of better career prospects and some improvement in the professional status of kindergarten teachers (Ho & Lam, 2014). Other suggestions
aimed at attracting men include incentive grants to ECE services, provision of scholarships, and effective use of media campaigns (Farquhar, 2012; Yang, 2013).

VII. RESEARCH FINDINGS AND DISCUSSION

The findings answered all the three research questions and captured participants’ views which were in three categories. These were the perspectives of female and male deputy school heads without any previous experience as HoD (Infant), and female deputy heads with previous experience as HoD (Infant).

Disparity between female and male Heads of Department (Infant): The perceptions of female and male primary deputy school heads

Divergent perspectives were given to justify why the position of head of department attracted mainly women and few men. All deputy school heads were aware that the position of head of department (Infant) was mainly held by women, with all of them indicating that they came from schools where no man held this position. As noted by Yang (2013), under representation of men in early childhood education has also become an issue of concern in Botswana. They also unanimously agreed that advertisements for the post were not gender biased as they were open to all members of the teaching staff.

Participants indicated that, the overall role of HoD (Infant) is to supervise early childhood education classes, and that as part of their responsibility they organized “Breakthrough” workshops for all infant teachers, including newly appointed one. They are also expected to teach infant classes and help infant class teachers whenever they encountered difficulties.

Female deputy school heads’ views about potential causes of the disparity

Female primary deputy school heads advanced divergent views regarding the dominance of women in the position of head of department (Infant). Their perceptions were mainly on account of the traditional role of women in respect of children upbringing in comparison to men. For instance, one participant stated: “Women are too close to young learners. They can easily handle young ones as compared to men. Women are more patient with children.” Another one maintained: “Mostly women are more close to children than men. They are easily able to connect with mothers. Children feel more comfortable with women than men.” Participants’ comments are consistent with Peeters (2007) view of the women’s role being traditionally perceived as an extension of baby care.

There were other comments which were raised with specific reference to children learning such as: “Men believe that they are the best in upper classes. So normally they believe that women are better when dealing with young learners.” “Similar statements were made as follows: “Most women know how to handle small children in comparison to men and that is why most of them teach lower classes.” “Most of the women train for early childhood methods of teaching. Lady teachers can stand the mess of young learners.” The literature also reveals high percentages of women teachers at infant level in different countries (Besnard & Letarte, 2017). Women were also painted as people who are more loving as compared to their male counterparts. One participant pointed out that, “females have motherly love and know how to handle infants,” while another one argued that, “women by nature have the zeal and motherly love of dealing with children.”

Perspectives of female primary deputy school heads with previous experience as HoD (Infant)

The views of female primary deputy school heads with previous experience as HoD (Infant) were also sought, and they also gave different possible reasons. However their views regarding this trend did not differ much from those articulated by deputies with no experience of heading department at infant level. The traditional perceptions of linking child upbringing also emerged strongly, with strong sentiments that suggested that the tender age of children growth, is traditionally mainly a responsibility of women. One participant argued that, “there is a believe that ladies have an upper hand in handling children and children have fear towards men,” while another indicated that “women are the ones who raise kids from a tender age, so they are very close to the hearts of infants.”

Further emphasising the sentimental relationship that makes women want to work with children, some participants described women as “motherly to young children” and that “they have love and care for young ones.” They argued that it is against this background “that women usually teach lower standards than men, and men usually teach upper classes.” Men were described as “not as patient as women when it comes to nurturing of children” and that “the post is more entitled for taking care of young ones and that is why men feel they cannot afford to do that.”

“The bottom line” according to one participant is that “women are able to cope with situations at lower classes.” These stereotypes by participants about the role of women are also revealed in the literature (Petersen & Petker, 2011).

Male deputy school heads perspectives about women’s dominance of the position of HoD (Infant)

Male deputies also expressed views about the dominance of the position of HoD (Infant) by females. They expressed similar sentiments to those of their female counterparts. This includes strong perceptions about the traditional role of women in the development of the child as represented by the comment that, “females understand child development much better than males because it’s an inborn skill.” Another commented that, “this may be by virtue of females being child bearers by nature and have the skills of child caring as compared to males.” They also credit women for love towards children which makes them perfect candidates for the position of HoD (Infant) in comparison to men. One of the participants who held this view said; “They have the patience and love to deal with young ones. They love to teach lower classes which make it easier for them to be recommended for the post.”

Qualities of women’s as more caring and loving compared to men are implied in the following participant’s comments: “HoD Infant posts attract more women because at primary school infant classes that is, standard 1 to 3 are mostly taught by women. Women can handle small children than men and the department ends up being dominated by women, hence they are better qualified for the post of HoD Infant.” There was one participant whose comments seemed to undermine the intellectual capacity of women to teach higher classes as reflected thus; “Females like lower classes. The content is much easier to handle so women do

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not always go for challenging material. They think children like them because they equate them to their mothers.” The men express mainly traditional perceptions about the role women in society (Peeters, 2007; Petersen & Petker, 2011).

What can be done to attract more men to the post

Participants considered the role of men in early childhood education as very significant. This is also strongly recommended in the literature (Mac Naughton & Newman, 2001). When participants’ views were sought regarding potential initiatives to attract men to the position of head of department (Infant), they gave divergent responses. Female deputies’ suggestions included, training, introduction of an allowance and targeted advertisement. Several comments were captured that represented views on training. For instance, one participant commented: “Train them on handling infant classes.” Another one stated: “Develop them through seminars, showing they that can do the job despite their sex.”

Those who were for some incentives to attract men to apply for the post made such comments as: “Attach an incentive for teaching infant classes,” and “Attach allowances to the post.” The literature also makes reference to high paying jobs that attract men in comparison to low pay in early childhood education (Peeters, 2007). There was a participant who pointed out that, “once in a while the advertisement of the post should be specifically for men only.” It was also suggested that men should be assured that teacher aides will be provided “to help with nursing of the children.”

The views of male deputy school heads bore similarities to those of their female counterparts. They emphasised the need for training to help men appreciate that they can also handle infants and that handling children at any level was a responsibility of all regardless of gender. Comments such as “suitable training even at social gatherings levels to expose men to dealing with infants,” and “specific training for men is needed during teacher preparation programme,” capture men’s views about training. There were other male participants who also commented about the need for the introduction of incentives. This category of participants associated handling of infants with extra work that required them to be for such extra burden, with one stating that, “incentives such as allowance should be introduced to cater for extra work” while another one called such responsibility “extra job that calls for government to pay more.” It is expected that with such interventions more men could be motivated to apply for the post of HoD (Infant), and as emphasised in the literature, and become role models for children (Sumson, 2000)

VIII. CONCLUSION

The findings show that previous advertisements for the position of head of department (Infant) was not gender biased and that participants were aware that the position was mainly dominated by women. Participants advanced different reasons why women mainly held the position in comparison to man, and most of such reasons were based on traditionally held perceptions in society regarding women’s role in child development.

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An Unconventional Framework for Smile Detection using Eye States

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Abstract - Facial expression analysis plays a considerable role in under human emotions and behaviours. Analysing facial expressions accurately has board application areas like human behavior analysis, human-human interaction and human-computer interaction. Automatic identifying of smile or non-smile from images has been a challenging and actively studied problem over the past few decades. Since it has many uses like patient observation, camera photo capturing and more. In this research work the smile and non-smile face images classified through the proposed system which involves the following steps: First, extract the scale-invariant feature transform (SIFT) or speeded-up robust features (SURF) features, then construct the codebook which provides a way to map the descriptors into a fixed-length vector in histogram space. Second, extract the histograms of oriented gradient (HOG) features and Local Binary Pattern (LBP). Third, combine the extracted features and reduce the dimensionality. Finally, the binary-class classify the feature histograms using support vector machines (SVMs). The proposed system focus on detecting smiles from face images that contain either a smile or a non-smile efficiently with highest accuracy by reducing computational needs such as computational time, memory, and disk space.

Index Terms - Smile detection, feature fusion, Support Vector Machine, Local Binary Patterns, classifier, Extract Features.

I. INTRODUCTION

Smile is the most common facial movement that appears on the face. Smile detection can be used to measure the person’s mental state. Smile detection has many applications such as intensive care system, resistance training, and interactive systems. Nowadays, research attention has started to toward the more realistic problem of analysing of facial expressions. It seems very difficult to capture the complex decision boundary among facial expressions. When automatic recognition of emotion become feasible, novel challenges has evolved. One of them is the recognition whether a presented emotion is genuine or not. Many face detection methods are already developed and used in many applications. Most of these works focused on object based techniques, in which the facial expressions are identified using facial action coding system (FACS).

In this research, a novel approach will be proposed to identifying the smile and non-smile faces by considering eye state. The novel approach focuses the feature fusion and Bag-of-features (BoF) approach with dimensionality reduction which is to be enhanced the classification accuracy and reduce the time complexity and storage spaces.

The bag-of-features is the most popular approach in recent visual object recognition which makes use of local information extracted at several patches in an image. This BoF approach has proved to yield state-of-the-art performance in large evaluations such as the PASCAL Visual Object Classes and ImageNet Challenges. The general framework of a BoF approach can be summarised in the following four steps: (i) feature extraction from images (ii) cluster analysis on the extracted descriptors from training images (iii) BoF representation of training and testing image sets and (iv) classification of test feature vectors.

The rest of this paper is organised as follows. In Section 2, summarise different techniques that are closely related to smile detection. Section 3 provides the comparison of the previous results. In Section 4, the proposed technique for classifying smile faces is described in detail. Section 5 concludes the paper with a discussion of the findings towards future extensions.

II. LITERATURE REVIEW

A. Smile Detection using Local Binary Patterns and Support Vector Machines

In this paper [1], the authors have proposed an approach for smile detection using Local Binary Pattern (LBP) and Support Vector Machine (SVM). Different LBP s were used as main image descriptors for smile detection. Simplified LBP (SLBP) and Uniform LBP (ULBP) were used to reduce the length of the feature vector.

Rotation invariance is achieved in the LBP based representation considering the local binary pattern as circular. The author has used PCA for reduce the dimension and also k-nearest neighbor’s algorithm (k-NN) and SVM were used for classification. The best results came from the following approaches: LBP operator is applied to derive features.

- Two different approaches (SLBP/ULBP) were used to obtain PCA space as a result of the original grayscale
images.

- The concatenation of histograms retrieved from the original image encoded with ULBP and SLBP.
- The concatenation of pixel values from the image encoded with SLBP and ULBP.

For the experiment they have used a dataset of 2421 images of different smiling faces and 3360 images of different non-smiling faces with a size OD 59*65 pixels. They have considered two possibilities they are the whole normalized face image and the image parts such as both eyes and the mouth. The classification accuracy was reported 90% using support vector machines (SVM).

This paper said that the distribution of Simplified LBP can be used as a good representation for images with more or less uniform textures. But for the face image to increase the performance it should be restricted to just the mouth.

B. Facial Expression Recognition based on Edge Detection

In this paper [2], the authors have proposed an approach for facial expression recognition using Edge Detection. For the face detection from the images they have used the skin color detection technique which is namely as YCbCr color space. They have used four different edge detection techniques such as Robert, Sobel, Laplace and Canny and they have compared the performance.

The Roberts operator is performed a simple, quick to compute, 2-D spatial gradient measurement on an image. It thus highlights regions of high spatial gradient which often correspond to edges. The Sobel edge detector was made a gradient based method. The first order derivatives are worked with it. Unlike the Sobel edge detector, only one kernel is used by the Laplacian edge detector. It is calculated second order derivatives in a single pass. The Canny edge detector was made an edge detection operator that uses a multi-stage algorithm to detect a wide range of edges in images. And the canny edge detector having this last the best detection performance among the four algorithms.

This paper introduces a study and design of the system of facial expression recognition based edge detection algorithm, first for image preprocessing, image recognition processing allows easy back; and then locate the eyes and lips, individually marked and extract the edge shape feature; finally, the system was trained by using face database, achieve the purpose of identifying other face expression.

<table>
<thead>
<tr>
<th>Facial Expression Discrimination (%)</th>
<th>Normal</th>
<th>Sad</th>
<th>Smile</th>
<th>Surprise</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canny</td>
<td>100</td>
<td>91.3</td>
<td>99.4</td>
<td>95.7</td>
</tr>
<tr>
<td>Laplace</td>
<td>93.2</td>
<td>87.1</td>
<td>89.5</td>
<td>85.6</td>
</tr>
<tr>
<td>Sobel</td>
<td>63.4</td>
<td>49.7</td>
<td>66.8</td>
<td>64.9</td>
</tr>
<tr>
<td>Robert</td>
<td>49.8</td>
<td>30.1</td>
<td>42.5</td>
<td>48.2</td>
</tr>
</tbody>
</table>

They have chosen the suitable for the color of skin of Japanese Jaffe facial expression database as the material, and carries on the classification according to the requirements of the experiment, selecting four kinds of facial expression such as Normal, Sad, Smile, Surprise and each expression was selected three pictures, including two as the training group, the other as a test group. The obtained results are shown in the Table I.

C. Toward Practical smile detection

In this paper [3], the authors have presented a broad study on automatic smile detection in digital employing a Gabor filter approach. For the experiment, they were converted all images to grayscale and then normalized by rotating, cropping and scaling the face about the eyes to reach a canonical face of 48x48 pixels, which was based on the manually labeled eyes positions. They have compared five image representations for the feature extraction such as Gabor Energy Filter (GEF), Box Filters (BF), Edge Orientation Histogram (EOH), Combine BF and EOH, Local Binary Pattern (LBP). They have compared two popular classifiers such as GentleBoost and SVMs. GentleBoost is a boosting algorithm that minimizes the x-square error between labels and model predictions. When training with linear SVMs, the entire set of Gabor Energy Filters or Box Filters had used as the feature vector of each image.

Authors have collected two different data sets of facial expression for training set. DFAT data set contains 101 smiles and 848 nonsmiles and GENKI dataset contains 17822 smiles and 7782 nonsmiles face images. The smile detection accuracy on white faces was 97.5% whereas for black faces it was only 90%.

In this paper, they have focused on detecting smiles in poses within approximately ±20 degrees from frontal. As authors have mentioned developing expression recognition systems that are robust to pose variations will be an important challenge for the near future.

![Fig. 1. Block diagram of the proposed system](http://dx.doi.org/10.29322/IJSRP.10.01.2020.p9753)

D. Smile Detection: A Simple Approach

In this paper [4], they have proposed a simple image-based
approach to identify the smile face. To extract the face from the input image they have used three different feature extraction techniques such as feature-based approach, Eigenface-based method and Neural Network. The Principal Component Analysis applied to extracted image slices to reduce the dimensionality of the image data. Initially a number of different types of human smile pictures represented in gray scale format were collected for a dataset. The faces are extracted from the dataset using above mentioned face extraction techniques. The mouth region of all extracted face images is cropped and created the slices. The features are extracted from the sliced images. The extracted features from the mouth region are compared with smile features which were from various images. If more than 80% match is found in more than those features considered in a smile face. The block diagram of their proposed system is given in the figure 1.

SIMULINK has used to implement this and all the required functions were developed using MATLAB. First two steps were the Face extraction and the localization of the eyes. HSV color model was used to extract the face, while the eyes were detected using LAB color space thus eliminating unwanted areas using Region of Interest and labeling process. Converted the given image in RGB colour space into YCbCr colour space. The Y, Cb and Cr ranges for skin region were 50<Y<142, 107<Cb<124 and 135<Cr<152. Each pixel of YCbCr was compared against the limits of Y, Cb and Cr to determine if the skin is present and if so by means of thresholding, the face was identified and segmented. In order to eliminate non-skin regions in the image, it is required to erode and dilate the image using a structured element. Subsequently do filling operation to fill the area defined by locations with connectivity. They have compared the dimensions with certain thresholds for each region and percentage of skin in each region, which was helped in removing non-face object. For each region if height and width were within the range then the processed image was a face and otherwise it is not a face.

To find and track eyes, they have applied Lab transform to the extracted face to eliminate unwanted portion. And then applied morphological operations on the output of transformed image to remove noise. Finally, they have determined the region of interest which locates eyes and applied region properties to track the eye pair.

The vector of the pupil and iris area has less gray values than two other white areas. As a result, the mean and standard deviation of the “OPEN” were found and concluded that mean was always >0.2 and standard deviation was always <0.02. If the mean was <0.2 and standard deviation was >0.02, then the state of the eye was concluded as “CLOSE”.

A total of 36 different images from GTAV database and 30 images from local database have been tested in the laboratory. The success rate of the proposed algorithm is 89.5%.

E. Facial Smile detection based on Deep Learning Features

In this paper [6], the authors have proposed an approach for Facial smile detection using deep convolution networks. They have designed a 6-layer deep network (Basic structure of CNN) and then it was modified to a new structure of CNN which is used both recognition and verification signals as supervision to learn expression features. The recognition signal that was responsible for the classification task. The expression verification signal, which was effective to reduce the variation of features which was extracted from the images of the same expression class (smile or non-smile).

The network was trained via a two-way soft-max classifier to predict smile or non-smile. Rectified linear unit (ReLU) function was used as the activation function in the convolutional layers and fully-connected layers. To increase the translation invariance and avoid overfitting they have chosen max-pooling with a neighboring region. The two-signal guided structure of CNN is shown in the figure 3.

![Flow Chart of proposed algorithm](image1)

![The two-signal guided structure of CNN](image2)
which has greater than any accuracy attained by previous methods on the GENKI-4K dataset.

F. Smile Detection by Boosting Pixel Differences

In [07], the author has used the intensity differences between pixels in the grayscale face images as features. They adopt AdaBoost to choose and combine weak classifiers to form strong classifiers for smile detection. In their work, the weak classifier was defined based on the intensity difference of a pair of pixels.

Grayscale face images were normalized to catch a canonical face of 48×48 pixels, which was based on the manually registered eye positions. And they have adopted a fourfold cross-validation with similar number of “smile” and “non-smile” samples into four groups of 1000 images. Histogram Equalization was used for extract intensity difference features from face images.

GENKI-4K database was used as dataset for the experiment which consists of 2162 different smile images and 1828 different non-smile images. And they have provided 85% accuracy by examining 20 pairs of pixels and 88% accuracy with 100 pairs of pixels.

G. Efficient Smile Detection by Extreme Learning Machine

In [08], the author has proposed an efficient smile detection approach based on Extreme Learning Machine (ELM). For the experiment Viola-Jones face detector was used to extract the face from original images. The bicubic interpolation was used to normalize the detected faces to a particular image size. For the face registration they have used a method of holistic flow-based face registration which consist SIFT flow computation and flow-based affine transformation to automatically align the detected faces. They have examined three different feature descriptors such as Local Binary Pattern, Local Phase Quantization (LPQ), and Histogram of Oriented Gradients (HOG) to extract features from registered faces. Those extracted features were input to the ELM classifier to predict the smile status of a given face.

The authors have used two different databases for the experiment. One database called MIX database has generated from four publicly available databases. MIX database has 1534 different smile and 2035 different non-smile face images. The other database was GENKI-4K database which contains 2162 different smile face images and 1828 different non-smile face images.

They have compared ELM with two benchmark classifiers such as Linear Discriminant Analysis (LDA) and Support Vector Machine (SVM). They have achieved 94% of detection accuracy for the Mix database when LPQ combined with ELM and 88.2% of detection accuracy for the GENKI-4K database when using HOG + ELM.

H. Smile Detection using Multi-Scale Gaussian Derivatives

In [09], authors have used a methodology of the Multi-scale Gaussian Derivatives combined with Support Vector Machines to detect the smile faces as shown in the figure 4. The OpenCV face detector was used for the face detection from the given face image. The detected face was normalized into 64×64 pixels. That normalized face image was sent into Half-Octave Gaussian Pyramid which is also called Multi-Scale Gaussian derivative (MGD) to extract the features. PCA was used to reduce the dimension. Those extracted features were used by soft Margin Support Vector Machine (SVM) for the classification.

They have used two different datasets for this experiment. GENKI-4k dataset which has 2162 different smile face images and 1828 non-smile face images was used for trained the SVM. To the purpose of validation, they have used Cohn-Kanade dataset. They have achieved a classification accuracy of 92.97%.

III. COMPARISON

The Summary of experimental results based on previous methods as given in the Table II.

<table>
<thead>
<tr>
<th>Method used</th>
<th>Classifier</th>
<th>Extract Features</th>
<th>Image Size &amp; Pixels</th>
<th>Accuracy (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LBP [1]</td>
<td>SVM</td>
<td>-</td>
<td>OD 59×65</td>
<td>90%</td>
</tr>
<tr>
<td>Canny Edge Detection [2]</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>99.4%</td>
</tr>
<tr>
<td>Gabor Filter [3]</td>
<td>SVM or GentleBoost</td>
<td>GEF, or BF, or EOH, or BF+EH0 or LBP</td>
<td>8×8</td>
<td>White face - 97.5% Black face - 90%</td>
</tr>
</tbody>
</table>

In this paper [10], they have solved the smile detection problem by proposing more efficient CNN architecture. To make a deeper network they have suggested utilization of small filters, in combination with Bach Normalization and ReLu. For the experimentation they have suggested GENKI – 4K database. By using small filters, they were able to speed up their performance with real time applications. However, they were able to achieve 95.08% accuracy for the smile detection using Softmax classifier for image classification.

Fig. 4. Schematic of the approach

I. Facial Smile Detection using Convolutional Neural Networks

Table II- Product Comparison
### IV. PROPOSED METHODOLOGY

We have proposed more efficient approach to smile detection. Face images captured in real-world scenarios are going to use in our study. In our approach, we are trying to achieve highest accuracy in smile detection using eye state by comparing with existing applications.

**Evaluation Criteria**

$$\text{Accurate Smile Detection Rate} = \frac{\text{No. of detected Smile faces}}{\text{No. of Test images}} \times 100$$

Moreover, it is fully automated smile detection with higher detection accuracy implemented by using GENKI – 4K database which enables the potential for real time application.

### REFERENCES


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**Table:**

<table>
<thead>
<tr>
<th>Image Processing Technique</th>
<th>Method</th>
<th>Parameters</th>
<th>Accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Deep Convolution Networks [6]</td>
<td>Recognition signs as supervision</td>
<td>CNN</td>
<td>5x5</td>
</tr>
<tr>
<td>Multi-scale Gaussian Derivatives [9]</td>
<td>SVM</td>
<td>MGD</td>
<td>64x64</td>
</tr>
<tr>
<td>BKNet [10]</td>
<td>Softmax</td>
<td>CNN</td>
<td>224x224 RGB</td>
</tr>
</tbody>
</table>

---

Fig. 5. Framework of Proposed Methodology
Authors

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The Description of Wood’s Lamp and Dermoscopy on Patients suspected of Melasma in Adam Malik Hospital Medan

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Abstract- Background: Melasma is a common hypermelanosis condition that often occurs in areas of the skin that are often exposed to sunlight and the most common predilection on the face. The description of melasma lesions is often difficult to distinguish from exogenous ochronosis which can lead to misdiagnosis and treatment. Wood's light examination and dermoscopy are diagnostic tools that are often used in cases of melasma because they are non-invasive compared to histopathological examination by skin biopsy.

Objective: To diagnose and classification of melasma based on examination of Wood’s lamp and dermoscopy.

Methods: This is a descriptive case series study, the subjects are suspected melasma patients in Cosmetic Division of Dermatology and Venereology Outpatient Clinic of Adam Malik Hospital. This research was conducted for 2 months with a total of 30 samples that had been performed dermoscopy and Wood’s lamp examinations.

Results: From total 30 patients suspected of melasma in this study 24 patients (80%) with a final diagnosis of melasma and 6 patients (20%) with Exogenous Ochronosis. The most type of melasma through wood lamps was epidermal melasma in 19 samples (79.2%). Dermoscopic examination showed the most melasma with homogeneous brown color of 15 samples (62.5%). Besides dermoscopy can also be used to detect early the presence of ochronosis in patients suspected of melasma (6 of 30 samples) with typical features of telangiectasis and worm-like pattern.

Index Terms- melasma, wood’s lamp, dermoscopy.

I. INTRODUCTION

Melasma is a general condition of hyperpermelanosis that typically occurs in areas exposed to sunlight on the face. Melasma is a pigmentary disorder that is characterized by symmetrical hyperpigmented macules on the face that often occur in women of childbearing age, although it can also occur in men. 1 The accurate prevalence rate of melasma throughout the world is unknown. According to the American Academy of Dermatology, melasma affects 5-6 million people, most of whom are women in the United States. The highest incidence is owned by women with darker skin types (Fitzpatrick III-V) and most patients are of Hispanic, Latin American, Asian, Central European and African races and the prevalence of melasma in Southeast Asia is 40%. 2

In the Department of Dermatology and Venereology Adam Malik Hospital, Medan for the diagnosis of melasma is commonly using clinical examination and Wood's lamp. The current Gold Standard examination for melasma is a skin biopsy. However, because it is invasive, patients often refuse to do skin biopsy. Ponzio et al in 2003 assessed Wood's lamp to have a low accuracy (46%) compared to histopathology in identifying patterns and classification of 61 melasma patients. 2,3

Dermoscopy is a new diagnostic tool in melasma cases, a noninvasive method that was initially used to observe and diagnose skin pigmentation lesions such as melanocytic nevi and melanosomas with a diagnostic accuracy of 65-80%. Liu et al in 2014 and Manjunath et al in 2016 stated the use of dermoscopy in cases of melasma can help determine the classification of clinical types of melasma in more detail than the examination of wood lamps because it gives a clearer picture and better contrast colors and can detect it early for abnormalities; such as Exogenous Ochronosis (EO), which is often difficult to distinguish from wood lamp examination. 3,4

The purpose of this study was to evaluate the picture of Wood lamps and dermoscopy in patients suspected of melasma at Adam Malik General Hospital Medan. The specific purpose is to find out the profile and determine the clinical type classification of melasma patients based on the examination of Wood's lamp and dermoscopy in the Medical Cosmetics Division of Department of Dermatology and Venereology Adam Malik Hospital Medan.

II. METHODS

The study was conducted in a descriptive case series, through basic data, history taking, physical examination, dermoscopy examination results, and Wood's lamp. Obtained a sample of 30 patients with the criteria of the study population are all patients suspected of melasma in the skin clinic RSUP.H. Adam Malik Medan. The sample in this study were patients with suspected melasma who clinically met the following sample acceptance criteria: women aged ≥20 years and willing to participate in the study by signing an informed consent. Criteria for rejection of samples are patients with pregnancy and breastfeeding, hypermelanotic lesions on the face besides melasma. The study was conducted in December 2019 until the
number of samples were fulfilled in the Medical Cosmetics Division of Department of Dermatology and Venereology Adam Malik Hospital Medan.

III. RESULTS

Based on 30 research samples it was suspected that melasma was found 24 people (80%) with a final diagnosis of melasma and 6 people (20%) with Exogenous Okronosis (OE). The most female sex and age group is 30-49 years (75%).

The main complaint of 24 melasma patients in this study was brownish spots on the face. The area of predilection of most lesions was on the face with a malar pattern of 14 people (58.4%), centrofasial of 10 people (41.6%). (Table 1)

<table>
<thead>
<tr>
<th>Type of clinical appearance</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Centrofasial</td>
<td>10</td>
<td>41.6%</td>
</tr>
<tr>
<td>Malar</td>
<td>14</td>
<td>58.4%</td>
</tr>
<tr>
<td>Mandibular</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
<td>100%</td>
</tr>
</tbody>
</table>

Based on the wood lamp examination, the highest type of melasma was obtained, namely epidermal types as many as 19 people (79.2%) and dermal types as many as 5 people (20.8%). (Table2)

<table>
<thead>
<tr>
<th>Depth of the lesion</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epidermal</td>
<td>19</td>
<td>79.2%</td>
</tr>
<tr>
<td>Dermal</td>
<td>5</td>
<td>20.8%</td>
</tr>
<tr>
<td>Mixed</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
<td>100%</td>
</tr>
</tbody>
</table>

Risk factors for using contraceptives (birth control pills and injections) were found in all melasma samples. The use of bleaching agent was found in 21 patients (87.5%). (Table 3).

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>History of using contraceptives</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Using contraceptive</td>
<td>24</td>
<td>100%</td>
</tr>
<tr>
<td>- Never use</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>History of Using of bleaching agent</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Using bleaching agent</td>
<td>21</td>
<td>87.5%</td>
</tr>
<tr>
<td>- Never use</td>
<td>3</td>
<td>12.5%</td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
<td>100%</td>
</tr>
</tbody>
</table>

From the results of dermoscopy examination in this study, the results showed that most dermoscopic images were homogeneous brown color of 15 people (62.5 %), then faded brown color for 7 patients (29.2%) and homogeneous dark brown color for 2 patients (8.3%) (Table 4).

<table>
<thead>
<tr>
<th>Dermoscopic Examination</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree of color</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Homogeneous brown color</td>
<td>15</td>
<td>62.5%</td>
</tr>
<tr>
<td>- Faded brown colour</td>
<td>7</td>
<td>29.2%</td>
</tr>
<tr>
<td>- Homogeneous dark brown color</td>
<td>2</td>
<td>8.3%</td>
</tr>
<tr>
<td>Total</td>
<td>24</td>
<td>100%</td>
</tr>
</tbody>
</table>
The results of dermoscopic examination of lesions suspected of melasma obtained a typical picture of EO in 6 of 30 samples (20%), with the most characteristic description, namely: 2 samples (33.3%) showed a picture of telangiectasis, 2 samples (33.3%) showed telangiectasis, dark brown and 2 samples (33.3%) showed telangiectasis, worm-like-pattern.

In the examination of wood lamps found 3 patients (50%) with no clearly demarcated contrast and 3 patients (50%) contrast could not be assessed. On dermoscopy examination found better results in distinguishing melasma and EO compared to wood lamps. (Table 5)

| Tabel 5. Dermoscopy and Wood Lamp Examination Results in Exogenous Ochronosis Patients |
|-------------------------------|--------|--------|
| Dermoscopy examination        | n   | %       |
| - Telangiectasis              | 2   | 33.3%  |
| - Telangiectasis, dark brown  | 2   | 33.3%  |
| - Telangiectasis, worm like pattern | 2  | 33.3%  |
| Wood lamp Examination         | n   | %       |
| - no clearly demarcated       | 3   | 50%    |
| - contrast could not be assessed | 3  | 50%    |
| Total                         | 6   | 100%   |

Picture 1. Examination of epidermal melasma by: A. Clinical Appearance B. Wood Lamp C. Dermoscopy

IV. DISCUSSION

This study obtained patient data of 30 samples. All with female gender.

The largest age group is 30-49 years (75%) with an average age of 44.1 years, with the youngest age 33 years and the oldest 62 years. This is the research of Umborowati et al with the most age groups, namely 30-55 years by 43%.

The main complaint of patients is brownish spots on the face and symmetrical skin. Melasma is a dysfunction of melanogenesis obtained with clinical manifestations of macular hyperpigmentation, brownish, reticular patterned, symmetrical, chronic on the skin, in areas of sun exposure, especially regarding women with darker skin tones or Fitzpatrick III-VI skin types.

The etiopathogenesis of melasma is not yet fully known, it is thought that many factors from the internal and external environment are involved in the course of the disease. Some of the most important factors are genetic predisposition, sun exposure, hormonal, cosmetics and age. The main risk factors in this study besides sun exposure, is the use of contraception and the use of face whitening creams or bleaching agents.

In this study, in the group of melasma patients found all (100%) had a history of hormonal contraceptive use with pill types as much as 87% and others using pills and injections as much as 13%. This can be explained that the factors of estrogen, progesterone, MSH (Melanocyte Stimulating Hormone), and ACTH (Adrenocorticotropic Hormone) are important factors in the emergence of melasma, although the levels are not always elevated in patients with melasma. Estrogen plays a direct role in
melanocytes as one of its receptors in the skin. During pregnancy, the balance of hormones in the body also changes. During pregnancy, there is an increase in pigmentation in 90% of women and most are more prominent in darker skin types. Therefore in this study pregnant women were included exclusion criteria.9,10

Various studies evaluating hormonal features in patients with melasma have found significant increases in luteinizing hormone and low values of serum estradiol show subclinical evidence of mild ovarian dysfunction. No significant relationship has been reported between autoimmune thyroid and melasma, especially developing in women with conditions during pregnancy, or after ingestion of oral contraceptive drugs.9,10

The results of the same study conducted by Suhartono in Semarang also showed that of 182 hormonal contraceptive users, the use of oral contraceptives was less (17 people) than injecting contraception (94 people) and implants (71 people), but the incidence of melasma due to use oral contraceptives are higher than hormonal contraceptives, which is 35.5%.11

A history of using bleaching agent in 21 people (87.5%). Most of the active ingredients in over-the-counter bleaching agents are hydroquinone, super-potent topical steroids, and mercury. Inappropriate use of whitening creams has consequences of side effects, one of which is EO.9,12

From this study it was seen that the type of malar is the type of clinical picture that is most often found, as many as 14 people (58.4%). This study is the same as seen in the study of Umborowati et al. In melasma patients showing that most melasma predilection was in malar in 824 patients (62.7%) followed by centrofacial as many as 523 patients (39.8%) and mandibular in 53 patients (4.0 %).5 The study of Jagannathan et al also showed the distribution of melasma in 80 women with melasma who underwent clinical examination found malar type 65%, centrofacial 26.25%, mandibular 8.75.13 whereas different results in Krupashankar et al's research found type centrofacial 45% and malar type 39%.14

On examination of wood lamp found that the most is epidermal type melasma 79.2% and dermal type 20.8%. Jagannathan et al's research found that in the examination of Wood's lamp there were 48.75% epidermal types, 20% dermal types, 28.75% mixed types and 2.5% unclear types.13 Research by Reddy et al also showed the same thing, epidermal type 47%, dermal 34% and mixed 20%.15

The epidermal type will appear to increase fluorescence and color boundaries are clearly demarcated. Melasma type of dermal fluorescence decreases with indifferent boundary accentuation, whereas mixed type there is a melanin deposit in the epidermis and dermis layers causing an increase in color in some areas.5,16 Ponzio and friends in 1993 assessed the validity of Wood's lamp to identify the pattern of melasma compared to the melasma pattern compared to histopathology, showing a level of sensitivity, low specificity, and low accuracy (46%) in all three types of melasma pathology.16,17

On the dermoscopy examination in this study obtained the majority (62.5%) with homogeneous brown colors, followed by 29.2% with faded brown color and the lowest (6.3%) with homogeneous dark brown colors. Based on the score, it was found that most (70.8%) with a score of 4 and others with a score of 3 were 29.2%.

The use of dermoscopy techniques consists of 2 types, namely contact and non-contact. In this study using DermLite® 3N / HR (High Resolution) type dermoscopy which has advantages can be used with contact and non-contact techniques. Researchers used non-polarizing-contact techniques. Polarizing non-contact dermoscopy unlike contact dermoscopy, it can visualize deeper structures (blood vessels) more clearly, does not require excessive contact which can cause direct pressure on the lesion so as to prevent the effect of skin from appearing pale.16,17

In a comparative study between dermoscopy and Wood's lamp in the classification of melasma, dermoscopy is assumed to be more applicable, more precise, and helpful in routine diagnosis, assessment, and monitoring of patients with melasma. Dermoscopy can objectively classify melasma based on the color of the observed pigment.5,17

On dermoscopic examination in patients suspected of melasma, EO lesions were found 2 samples (33.3%) showed a picture of telangiectasis, 2 samples (33.3%) showed dark brown telangiectasis and 2 samples (33.3%) showed worm-like telangiectasis -pattern. In the examination of wood lamps found 3 patients (50%) with no clearly demarcated contrast and 3 patients (50%) contrast could not be assessed. On dermoscopy examination found clearer results in distinguishing melasma and EO compared to wood lamps. This is in accordance with the research of Shihab et al at Cipto Mangunkusumo Hospital where dermoscopic examination can more clearly distinguished between melasma and dermoscopic images of lesions in the form of light and homogeneous browns compared to EO which is dark brown in color, which can help avoid invasive actions such as skin biopsy which many patients refuse to do.17

V. CONCLUSION

From this study it was found that in patients suspected of melasma there were a number of risk factors other than sun exposure, namely in the form of use of contraceptives (birth control pills and injections) and the use of face whitening creams which are sold freely on the market that contain mercury and inappropriate use of steroids.

With the use of appropriate support tools can help establish a diagnosis of melasma, such as the use of dermoscopy which gives a clearer picture of the state of certain melasma compared to wood lamps, especially to distinguish it from EO.

However, this study still has several limitations: first, it requires repeated practice for dermoscopic examination in melasma because there is still subjectivity in reading the results. Secondly, this study is only descriptive in nature and is not compared with histopathological examination, so that it cannot be assessed the sensitivity and specificity of dermoscopy, and it cannot be stated that dermoscopy is better, more objective / accurate than Wood's lamp. Further research in the form of analytics using histopathology as the gold standard should be carried out. Dermoscopy can be an alternative to routine clinical examination of melasma because it can observe telangiectasia and early detection of EO in melasma lesions that cannot be observed with Wood's lamp.
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Effectiveness of Using Discovery Learning Model Assisted Tracker on Improvement of Physics Learning Outcomes Observed From Students’ Initial Knowledge

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Abstract- The purpose of this study is to determine the effectiveness of the use of discovery-assisted discovery learning models to improve physics learning outcomes in terms of students’ initial knowledge. This research was conducted at Senior High School 1 Talibura in the academic year 2019/2020. This research is an experimental research that uses a quasi-experimental design consisting of a nonequivalent (pretest-posttest) control group design. Sampling uses simple random sampling so that two sample classes are obtained, namely Level XI MIA 1 as an experimental class and class XI MIA 2 as a control class. The first knowledge instrument and learning outcomes are subjective tests (essays) that have been tested for validity and reliability. Hypothesis testing using ANCOVA test. Based on data analysis, the results showed that there was an influence of the use of the tracker assisted discovery learning model on student physics learning outcomes, where $F_{count}^{}$ is higher than $F_{table}$ (4.484 > 3.20) with the significant value obtained is smaller than the significance level (0.017 < 0.05). From this study, we can conclude that the discovery-assisted discovery learning model tracker is ready to be used in physics learning to improve student physics learning outcomes.

Index Terms- Discovery learning model, tracker, physics learning outcomes, initial knowledge

I. INTRODUCTION

Physics is the study of natural phenomena or phenomena. Physics has become one of the most fundamental sciences of knowledge. Physics expected to be able to direct the educated generation to have good observation and reasoning abilities. However, in learning physics, students tend to experience obstacles. Students consider physics as a complicated subject. Perspectives that physics is involved is the reason for the decline in students' interest in physics.

The students' initial knowledge determines the readiness of students in learning. Initial experience is the knowledge that students have before participating in the lesson. Initial knowledge becomes essential for teachers to know before starting education. Through fundamental knowledge, it can be known as the extent to which students already know the material to present. One study group indeed consists of students with different school backgrounds, so they can ascertain that their initial knowledge is different too.

Although some of the concepts of physics formed through mathematical analysis, in the end, the theory developed must be tested through experiments. Experimental activities with a discovery learning approach result in students being able to improve and enhance their skills and cognitive processes. If involved continuously in learning discovery, students will better understand and be able to develop aspects. On the other hand, discovery through experimentation becomes one of the methods often used to facilitate understanding. Still, in reality, this method encounters obstacles such as limited time, inadequate tools, and a lack of students' responses to problems encountered. In this case, it is necessary to use technology as a medium for learning physics.

In learning physics, supporting media needed that can facilitate the understanding of the material. The use of multimedia is considered able to improve student learning outcomes — various advantages offered by technology to enhance the quality of physics learning. The use of technology in learning physics is more productive than the lecture and demonstration methods. Technology can improve and develop the professional abilities of teachers, can be used as a source of learning, as a tool for learning interactions, as well as a forum for learning. Technology can improve and develop the professional abilities of teachers, can be used as a source of knowledge, as a tool for learning interactions, as well as a forum for learning. However, in reality, both students and teachers have not been able to utilize technology as a learning medium. Technology is still used only as a means of communication and social interaction. Most students use technology only to update news on social media. As a result, much of their study time not used as it should and wasted.

Problems are various in learning physics impact on the low learning outcomes of students. In Senior High School 1 Talibura, for example, physics learning outcomes are relatively small compared to other natural science subjects. Various attempts were made by
the teacher to improve student learning outcomes, but the results were not satisfactory. This condition spurred researchers to make reforms by optimizing the use of technology as a medium for learning physics. With technology, the material will present in the form of videos about physical phenomena. The video will be recorded by students who are then analyzed using a tracker to obtain accurate data. The tracker allows students to analyze the motion of objects in the video by making a trail that follows the movement of objects in video. In groups of students who were taught using video and analyzed using a tracker experienced increased competence and knowledge. That way, it is expected that physics learning outcomes can increase.

Associated with the above view, the researcher is interested in researching "the effectiveness of the discovery-assisted discovery learning model towards improving physics learning outcomes in terms of the students' initial knowledge."

II. THEORETICAL REVIEW

A. Discovery Learning Model

Discovery learning is a fundamental inquiry approach. The teaching method is inquiry-based and is considered a constructivist based approach to education. A literature review shows that discovery learning occurs whenever students are not provided with conceptual understanding and must find it independently and only with the material provided. Discovery Learning emphasizes students to find the concept of knowledge. In the process of finding, students guided to do a series of stages of learning from observing to organizing their findings into a theory of knowledge. Discovery learning encourages students to be active agents in their learning process. Education helps students to find out various sources through observation and not just being told. The aim is to build concepts and gain knowledge from experience. The experience introduced to increase relevance and meaning. Students guided by the teacher who directs questions to problems so as enable students to draw simple relationships, generalizations, or conclusions.

B. Conventional Learning Model

Conventional learning is a teaching and learning process that commonly used in schools. In traditional knowledge, students placed as learning objects that act as passive recipients of information. Conventional learning, in general, has certain peculiarities, for example, prioritizing memorization rather than understanding, emphasizing numeracy skills, prioritizing results rather than process, and teacher-centered teaching.

From some understanding, it concluded that the conventional learning model is a teacher center learning model, prioritizing results rather than processes. In this study, students placed as objects rather than subjects, so students are less confident in expressing their opinions. A learning concept that is used by teachers in conveying material in the usual way. This learning still carried out without utilizing technology as a medium education. This learning always carried out the assumption knowledge transferred in full from the mind of the teacher to the students.

C. Tracker

A tracker is a software that can analyze, and model motion and optical phenomena are free and developed by Open Source Physics (OSP) using the Java framework. Through a tracker, educators and or students can quickly analyze real-world problems, especially on the topic of motion and optics that are sometimes impossible to do without the help of technology.

D. Initial Knowledge

Fundamental knowledge is a collection of individual expertise and experience gained during their life journey and which they will bring to new learning experience. Student initial knowledge is a collection of information that can bridge the extent to which other understandings can be used.

The initial knowledge possessed by each student is different. Different individuals state different information according to their ways and present information differently in their memory based on their initial experience and knowledge. Student fundamental knowledge plays a vital role in learning because it supports the ease of students in accepting and understanding a new material or concept in education. Student's initial knowledge influences performance, academic results, and speed of completing studies.

The initial knowledge possessed by students obtained through the teacher's ability to process the stored information. The teacher needs to know the extent of the students' initial knowledge so that if the initial experience is good enough, then there is no need to be discussed in learning. In this study, initial knowledge measured through an analysis of the results of the pretest test. The test questions are in the form of multiple-choice questions given to students before the discovery learning model, and the conventional learning model is applied. It intended that researchers know the extent of students' fundamental knowledge in the two sample classes about the material to be taught.

C. Learning Outcomes

Changes in behavior mark learning outcomes. Although not all changes in behavior are learning outcomes, learning activities generally accompanied by changes in behavior. Learning outcomes must be observable and supported by a type of test called a learning outcome test. Learning outcomes are the results obtained by students after learning activities. Learning outcomes also said as the success of the learning system. The success of learning determined by the product side and the process side. Learning success that only seen from one side will not be perfect.
Based on the above understanding, it obtains a knowledge that learning outcomes are the actual abilities possessed by students after learning, which manifests in the form of cognitive, affective, and psychomotor skills. In this research, learning outcomes are only limited to the cognitive realm that refers to the Krathwol-Anderson taxonomy covering C1 through C6 (remembering, understanding, applying, analyzing, evaluating, and making).

Learning outcomes measured through analysis of the results of the posttest. The test questions are in the form of multiple-choice questions that are the same as the pretest questions and are given to students after the discovery learning model and the conventional learning model applied. It intended that researchers know the effect of using the two learning models in improving student learning outcomes.

D. Moment of Force (torque)

Torque is also called the moment of force and is a vector quantity. Torque is the result per cross between the position vector \( r \) and the force \( F \), which can be written:

\[
\tau = r \times F
\]

The formula states the amount of torque:

\[
\tau = rF \sin \theta
\]

Where \( \theta \) is the angle between direction \( F \) and direction \( \vec{r} \).

![Figure 1. Torque](image)

From Figure 1, it appears that the length of the torque arm expressed as

\[
\ell = r \sin \theta
\]

So, equation (3) can be written as

\[
\tau = F\ell
\]

The torque arm is defined as the distance from the axis of rotation to the workforce line, as shown in Figure 1.

D. The Law of Conservation of Angular Momentum in Rotation Motion

In rotational motion, analogous to linear momentum is angular momentum. Mass is comparable to the moment of inertia; the linear velocity is similar to angular velocity, then angular momentum \( L \) is equal to the result of the moment of inertia \( I \) with angular velocity \( \omega \)

\[
L = I\omega
\]

Thus, the law of conservation of angular momentum for rotating objects: "If the total torque acting on the object rotates to zero, then the total angular momentum of the object remains/is constant."

E. Balance of Rigid Bodies

A rigid body is in static equilibrium if at first, the object is at rest, and the resultant force on the object is zero, and the torque to any random point chosen as the axis is zero. Mathematically, it stated as follows:
\[ \sum F = 0 \]  
(7)

\[ \sum \tau = 0 \]  
(8)

**F. Center for Gravity**

Every particle in a rigid body has weight. The overall weight of an object is the resultant of all downward directed gravity of all particles. This resultant works through a single point called the center of gravity (center of gravity).

![Figure 2. The concept of emphasis](image)

The center of gravity can also express as a point where the resultant gravitational force of the particles concentrated at that point. Therefore, the resultant torque of the gravitational force of particles at their center of gravity must be zero.

### III. METHODOLOGY

**A. Research Model**

This study uses a quasi-experimental design consisting of nonequivalent (pretest-posttest) control group design, in which there are control classes and innovative classes that given different treatments. The procedure of this research is the test of questions at a level that has previously studied the material. In the sample class, a pretest conducted to determine the students' initial ability, treatment, and, finally, the posttest to find out the learning outcomes of students after surgery.

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre-test</th>
<th>Treatment</th>
<th>Post-test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experiment</td>
<td>R₁</td>
<td>X</td>
<td>R₂</td>
</tr>
<tr>
<td>Control</td>
<td>R₁</td>
<td>Y</td>
<td>R₂</td>
</tr>
</tbody>
</table>

**B. Research Subjects**

In this research conducted students of class XI odd semester of Senior High School 1 Talibura in the academic year 2019/2020. A simple random sampling technique was used in the sampling to obtain class XI 1 MIA as an experimental class and class XI 2 MIA as a control class. Is each course taken as many as 24 students.

**C. Analysis Techniques**

Before testing the hypothesis, the prerequisite test is in the form of a normality test using the Shapiro Wilk test and a homogeneity test using the Fisher test. If the prerequisite tests have completed, then the next hypothesis test is performed using an ANCOVA test.

### IV. RESULT

Based on the test results on the questions in class XII MIA Senior High School 1 Talibura, ten items obtained eight valid items with high reliable status. In the calculation of different power, one problem is excellent, two is good, four is enough, and three is terrible. In the calculation of the difficulty level, eight problems with medium difficulty level and two difficult questions obtained. From some estimates on the test items collected, six items used in the research sample. The initial knowledge of the experimental class students shown in Figure 3.
Based on Figure 3, it can be that most students in the experimental class get grades between 20-23. As many as two students got the lowest ranks of 8-11, and 1 student got the highest score of 28-31. The fundamental knowledge of the control class students shown in Figure 4.

Based on Figure 4, it can be that most students in the control class get grades between 21-24. As many as two students got the lowest grades 9-12, and 1 student got the highest grades 29-32. Student learning outcomes of the experimental class shown in Figure 5.
Used Figures 5 is seen that most students in the experimental class get grades between 75 - 80. A total of 2 students received the lowest score of 57-62, and 4 students received the highest score of 87-92 — the control class student learning outcomes in Figure 6.

![Figure 6 Frequency distribution of learning outcomes of control class students](image)

Based on Figure 6, it can be that most students in the control class get grades between 48-56. A total of 4 students received the lowest ranks of 30-38, and 1 student received the highest degree of 75-83. The results of the normality test in the experimental class and the control class shown in Table 2.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Experiment</th>
<th>Control</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early knowledge</td>
<td>0.272</td>
<td>0.514</td>
<td>Data normally distributed</td>
</tr>
<tr>
<td>Learning outcomes</td>
<td>0.186</td>
<td>0.443</td>
<td>Data normally distributed</td>
</tr>
</tbody>
</table>

Table 2. Normality Test Results in the Experiment Class and Control Class

Based on Table 2, the initial knowledge of the experimental class and control class students were 0.272 and 0.514, respectively. Test the normality of the value of student learning outcomes in the innovative class and power class students, respectively 0.186 and 0.443. Both fundamental knowledge and learning outcomes data obtained in both types stated to generally distributed because the significance collected is higher than the 0.05 significance level. Homogeneity test results in the experimental class and the control class shown in Table 3.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Sig.</th>
<th>Significance level</th>
<th>Conclusion</th>
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</thead>
<tbody>
<tr>
<td>Early knowledge</td>
<td>0.875</td>
<td>0.05</td>
<td>Homogeneous variant</td>
</tr>
<tr>
<td>Learning outcomes</td>
<td>0.134</td>
<td>0.05</td>
<td>Homogeneous variant</td>
</tr>
</tbody>
</table>

Table 3. Homogeneity Test Results

Based on Table 3, fundamental knowledge and learning outcomes are 0.875 and 0.134, respectively. Because the significance obtained is higher than 0.05, it stated that the initial knowledge data and learning outcomes have homogeneous variants. The results of hypothesis testing using the ANCOVA test shown in Table 4.

<table>
<thead>
<tr>
<th>Source</th>
<th>Type III Sum of Squares</th>
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<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
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<td>4.484</td>
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<td>106.890</td>
<td>.000</td>
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<td>1204,084</td>
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<tr>
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<td>139,507</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>249071,000</td>
<td>48</td>
<td></td>
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<tr>
<td>Corrected Total</td>
<td>7528,813</td>
<td>47</td>
<td></td>
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</tr>
</tbody>
</table>

Table 4. ANCOVA test

Based on Table 4, values of df1 = 2 and df2 = 47 are obtained so that the value of $F_{table} = 3.20$ is obtained. In the ANCOVA test, results obtained $F_{corrected}$ higher than $F_{table}$ (4.484$> 3.20$) with a significant value obtained is smaller than the significance level (0.017 $<$ 0.05). From these results, concluded that the discovery-assisted used discovery learning model is effective in improving physics learning outcomes in terms of students' initial knowledge.
V. DISCUSSION

Based on the results of the study, note the influence of the use of discovery learning models on student physics learning outcomes on the material balance and dynamics of rotation. The discovery learning model applied in the experimental class can influence student learning outcomes much better than the use of conventional learning models in the control class. The increase in physics learning outcomes in the innovative type using the discovery learning model is much higher compared to the control class using the conventional learning model even though the knowledge possessed by students in both categories is almost the same. Therefore, it can conclude that the discovery-assisted discovery learning model has more contribution to improving physics learning outcomes than conventional models.

Based on the results of data analysis, the normality test of the pretest and posttest values in both classes obtained a significant amount that is greater than the significance level 5%. Therefore, it can conclude that the data using discovery learning models and conventional models come from normally distributed populations. In the homogeneity test conducted, it found that the data had homogeneous variance because it was higher than the significance level of 5%.

Furthermore, in the hypothesis test using ana nova, it was found that the discovery learning model influence on the improvement of physics learning outcomes of students of class XI MIA Senior High School 1 Talibura. The application of the discovery learning model-assisted tracker can make students more active and independent in learning. Different from the classroom learning using conventional models, where students tend to be passive and get bored quickly when studying physics. The test results prove that the physics learning outcomes obtained by students greatly influenced by the application of learning models in the class. In this case, the discovery-assisted discovery learning model tracker considered to be more effectively used in physics learning on material balance and rotational dynamics.

VI. CONCLUSION

This study conducted to determine the effectiveness of the use of discovery-assisted discovery learning models on improving physics learning outcomes. Based on the result of the hypothesis test, it can conclude that the discovery learning model assisted by tracker considered more useful to be used in physics learning on the material balance and dynamic of rotation compared to using conventional learning models.

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Utilization of Health Facilities for Under-five Children with Diarrhea in Indonesia: Data Analysis of the IDHS 2017

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Abstract- According to the report issued by the Directorate General of Disease Control and Environmental Health, diarrhea is the second leading cause of death among children under-five in Indonesia after pneumonia, with a proportion of 17.4 percent in post-neonatal and 13.3 percent in infants. The proportion of children under-five with diarrhea those receiving treatment at a health facility has increased from 65 percent in the 2012 IDHS report to 80 percent in the 2017 IDHS report. The health system in Indonesia is a combination of service providers by the government and private sector. This study aims to obtain the determinants of the use of health facilities for children under-five with diarrhea in Indonesia. This study is a further data analysis from IDHS 2017. This study was an observational analytic study with a cross-sectional design. The sample in this study were children with diarrhea aged under-five years (0 - 59 months) who received treatment at the health facility within two weeks before the IDHS 2017 interview day, with a total sample of 1314 children under five. The data in this study were analyzed using multiple logistic regression. The results of this study indicate the use of previous health facilities (facilities where children are born) and the socioeconomic status of the mother is related to the utilization of health care facilities in children-under five with diarrhea. Children under-five with diarrhea those born in private health, the facility has a smaller chance (AOR: 0.39; 95% CI: 0.26-0.60) to receive treatment at a government health facility during diarrhea, in other words, children under-five with diarrhea those born in private health care facilities have 2.5 times the chance to get treatment at private health care facilities compared to children under-five those born at home. Children under-five with diarrhea from mothers with the highest socioeconomic status have a smaller chance (AOR: 0.13; 95% CI: 0.07-0.25) to get treatment at the government health facility, in other words, children under-five with diarrhea from mothers with the highest socioeconomic status has a 7.69 times chance of getting treatment at a private health facility compared to children under-five who came from mothers with the lowest socioeconomic status.

Keywords: Diare, balita 0 – 59 bulan, fasilitas kesehatan, IDHS

I. INTRODUCTION

Each year diarrhea causes of mortality in 525,000 children under-five and an estimated 1.7 billion cases of diarrheal disease are experienced by children in the world [1]. Diarrhea is the second leading cause of mortality in children under five in Indonesia after pneumonia, with the proportion of causes of death as large as 17.4 percent in postneonatal and as much as 13.3 percent in infants [2]. There has been a decrease in the Case Fatality Rate (CFR) of diarrhea in Indonesia between 2016 and 2017, which was 3.04 percent to 1.97 percent [3]. Over the past few decades, there has been a decrease in total global deaths from diarrhea, but morbidity due to diarrhea has not shown the same result [1].

Although diarrhea is easily treated and managed, diarrhea is still one of the public health problems in Indonesia, especially in infants and toddlers. According to a report from the Indonesian Demographic and Health Survey in 2017, there was 14 percent of children aged 0-59 months suffered diarrhea in the two weeks before the survey. The percentage of children under five suffering from diarrhea and receiving treatment at health facilities increased from 65 percent in the 2012 IDHS to 80 percent in 2017 IDHS [4].

The current health system in Indonesia is a combination of service providers by the government and the private sector [5]. The concept of health and sickness in the community determines the utilization of health service facilities. The utilization of health services is influenced by many factors. According to Anderson (1974) in Notomotodo (2003), there are three categories of individual determinants in utilizing health service facilities, namely: predisposing, enabling, and need. Predisposing is the tendency to utilize health services inherent in individuals. Individuals may use health services based on demographics, position in social structures, and belief in the benefits of health services. Enabling, this category includes resources in the family and community. Family resources consist of economic status and location of residence community resources combine with access to health care facilities and the availability of people to help. Need, this category includes perceptions of health service needs, whether individual, social, or clinical that are evaluated by perceptions of needs [6].
Based on the description above, this study aims to obtain determinants of the utilization of health care facilities for children under-five who had diarrhea in Indonesia from 2017 IDHS data, which is expected to produce important information in order to support
one of the government's strategies to achieve policy objectives to reduce morbidity and mortality rate due to diarrhea, through the management of standardized diarrhea sufferers in health care facilities.

II. MATERIAL AND METHOD

For this study, data were obtained from the 2017 Indonesian Demographic and Health Survey (IDHS). The Indonesian Demographic and Health Survey (IDHS) was jointly conducted by the United States Agency for International Development (USAID), Central Statistics Agency (BPS), the National Population and Family Planning Agency (BKKBN), and the Ministry of Health (Kemenkes) the Republic of Indonesia which can be downloaded from the source www.measuredhs.com. The population in this study were all children aged 0 - 59 months from female respondents who took part in the 2017 Indonesian Demographic and Health Survey [4].

The population in this study is households that had children aged less than 5 years with diarrhea were extracted from the 2017 Indonesian Demographic and Health Survey (IDHS). The sample in this study was children aged 0 - 59 months who issued diarrhea within a span of two weeks before the interview day for the 2017 Indonesian Health Demographic Survey. The number of samples in this study were 1314 children.

The dependent variable in this study is the utilization of health service facilities which are divided into two categories "0 = private health facilities" and "1 = government health facilities". The independent variables in this study are predisposing factors and enabling factors. Predisposing factors included in this study were maternal age (0 = 15-24 years; 1 = 25-29 years; 2 = 30-34 years; and 3 = 35 - 49 years), mother's education level (0 = none; 1 = primary; and 2 = secondary/higher), mother's occupation (0 = housewife/not working; 1 = agriculture; 2 = semi-skille/unskilled labor; and 3 = professional / technician), marital status (0 = not married; and 1 = married), age of child (0 = < 1 year; 1 = 1-2 years; and 2 = ≥ 3 years), sex of child (0 = male; and 1 = female), family size (0 = < 6 people; and 1 = ≥ 6 people), previous use of health service facilities (0 = home; 1 = government facility; and 2 = private facility), and knowledge of Oral Rehydration Solutions (0 = don't know; 1 = have heard; and 2 = have used). Enabling factors included in this study are socioeconomic status (0 = lowest; 1 = lower; 2 = middle; 3 = higher; and 4 = thickest), health insurance ownership (0 = do not have; 1 = social health insurance; 2 = government health insurance; and 3 = private health insurance), residential area (0 = Rural; and 1 = Urban), access to media information (0 = no; and 1 = yes), and distance (0 = problem; and 1 = no problem).

The stages in data management carried out in this study are data filters, the data obtained are filtered and adjusted to the inclusion and exclusion criteria of the study. If the respondent does not match the inclusion criteria and according to the exclusion criteria, they will be excluded from the data set. Cleaning data, double-checking filtered data. Missing data in variables that contribute to the dependent variable of the study will be adjusted to the provisions of handling missing data in the IDHS survey data. Recode data, the activity of changing the encoding data following the classification specified in the study. Activities create new variables from variables that exist in the data set. After the data management stage is carried out, the data obtained are analyzed including univariate, bivariate and multivariate analyses with a significance of 5% and 95% confidence intervals. At the bivariate analysis stage, the output of the dependent and independent variables is explained in the form of proportions. The bivariate analysis uses simple logistic regression while multivariate analysis uses multiple logistic regression.

III. RESULTS

UNIVARIATE

Table 1. Health facilities utilization of children under-five with diarrhea in Indonesia 2017

<table>
<thead>
<tr>
<th>Health Facilities</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private Health Facilities</td>
<td>733</td>
<td>55.8</td>
</tr>
<tr>
<td>Government Health Facilities</td>
<td>581</td>
<td>44.2</td>
</tr>
<tr>
<td>Total</td>
<td>1314</td>
<td>100</td>
</tr>
</tbody>
</table>

In this study, the variables of health facilities visited for treatment when children under five suffer from diarrhea come from the 2017 IDHS questionnaire in the form of the question "Where did you first seek help/care when a child had diarrhea?". Based on respondents' answers to the questions on the questionnaire, the category of health facilities that were first visited when a child had diarrhea was divided into two groups of health facilities, private health facilities and government health facilities. According to the 2017 IDHS report, 80 percent of children under five suffer from diarrhea and receive treatment at a health facility. In this study, it was found that 55.7 percent of children under five suffering from diarrhea received treatment at private health facilities, while 44.3 percent received treatment at government health facilities.
Predisposing Factors

Table 2. Characteristics of Health facilities utilization of children under-five with diarrhea Based on Predisposing Factors in Indonesia 2017

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Maternal Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 - 24 years</td>
<td>334</td>
<td>25.4</td>
</tr>
<tr>
<td>25 - 29 years</td>
<td>348</td>
<td>26.5</td>
</tr>
<tr>
<td>30 - 34 years</td>
<td>309</td>
<td>23.5</td>
</tr>
<tr>
<td>35 - 49 years</td>
<td>323</td>
<td>24.6</td>
</tr>
<tr>
<td><strong>Mother's Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>9</td>
<td>0.7</td>
</tr>
<tr>
<td>Primary</td>
<td>403</td>
<td>30.7</td>
</tr>
<tr>
<td>Secondary/higher</td>
<td>902</td>
<td>68.6</td>
</tr>
<tr>
<td><strong>Mother's Occupation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housewife/Not Working</td>
<td>673</td>
<td>51.2</td>
</tr>
<tr>
<td>Agriculture</td>
<td>128</td>
<td>9.8</td>
</tr>
<tr>
<td>Semi-Skille/Unskilled Labor</td>
<td>450</td>
<td>34.3</td>
</tr>
<tr>
<td>Professional/Technician</td>
<td>63</td>
<td>4.8</td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not Married</td>
<td>51</td>
<td>3.9</td>
</tr>
<tr>
<td>Married</td>
<td>1263</td>
<td>96.1</td>
</tr>
<tr>
<td><strong>Age Of Child</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 1 years</td>
<td>231</td>
<td>17.6</td>
</tr>
<tr>
<td>1 – 2 years</td>
<td>734</td>
<td>55.8</td>
</tr>
<tr>
<td>≥ 3 years</td>
<td>349</td>
<td>26.6</td>
</tr>
<tr>
<td><strong>Sex of Child</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>671</td>
<td>51.1</td>
</tr>
<tr>
<td>female</td>
<td>643</td>
<td>48.9</td>
</tr>
<tr>
<td><strong>Family Size</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 6 People</td>
<td>828</td>
<td>63</td>
</tr>
<tr>
<td>≥ 6 People</td>
<td>486</td>
<td>37</td>
</tr>
<tr>
<td><strong>Previous Use Of Health Service Facilities</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home</td>
<td>278</td>
<td>21.2</td>
</tr>
<tr>
<td>Government Health Facilities</td>
<td>432</td>
<td>32.9</td>
</tr>
<tr>
<td>Private Health Facilities</td>
<td>604</td>
<td>46</td>
</tr>
<tr>
<td><strong>knowledge of Oral Rehydration Solutions</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Don't Know</td>
<td>75</td>
<td>5.7</td>
</tr>
<tr>
<td>Have Heard</td>
<td>513</td>
<td>39.1</td>
</tr>
<tr>
<td>Have Used</td>
<td>726</td>
<td>55.2</td>
</tr>
</tbody>
</table>

The results in table 2. show the proportion of children under-five with diarrhea who received treatment at a health facility based on predisposing factors. Based on variables of the mother's age group, the largest proportion of children under-five with diarrhea who received treatment in health facilities comes from mothers in the age group of 25-29 years (26.5 percent). Meanwhile, the smallest proportion of children under-five with diarrhea who received treatment at a health facility comes from mothers in the age group 30-34 years (23.5 percent). Mother’s education, the largest proportion of children under-five with diarrhea who received treatment at a health facility came from the group of mothers with secondary/higher education (68.6 percent), while the smallest proportion came from the group of mothers who did not attend school (0.7 percent). Mother's occupation, the largest proportion of children under-five with diarrhea who received treatment at a health facility based on mother's work came from the group of housewives/unemployed (51.2 percent), while the smallest proportion came from the group of mothers who worked as professionals and technicians (4.8 percent). Mother's marital status, the largest proportion of children under-five with diarrhea and getting treatment in health facilities come from the group of mothers with marital status (91.6 percent). Age of child, the largest proportion of under-fives with diarrhea and receiving treatment in health facilities comes from the child in the 1-2 years age group (55.8 percent), while the smallest proportion comes from the under-five age group < 1 year (17.6 percent). Sex of child, the largest proportion of children under-five with diarrhea and getting treatment at a health facility based on sex comes from the group of children under-five who are male (51.1 percent). Family size, the largest proportion of children under-five with diarrhea and receiving treatment at a health facility comes from a household group of < 6 people (63 percent). Using previous health facilities (delivery places), the largest proportion of children under-five with diarrhea who received treatment at health facilities came from the group of mothers who gave birth to children in private health facilities (46 percent), while the smallest proportion came from the group of women who gave birth at home (21.2 percent). Knowledge of oral rehydration solution, the largest proportion of children under-five with diarrhea who received treatment in health facilities came from the group of mothers who had used oral rehydration solutions when the child suffered diarrhea (55.2 percent), while the smallest proportion came from the group of mothers who did not know about oral rehydration solutions (5.7 percent).
Enabling Factors

Table 3: Characteristics of Health facilities utilization of children under-five with diarrhea Based on Enabling Factors in Indonesia 2017

<table>
<thead>
<tr>
<th>Variabel</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Socioeconomic Status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lowest</td>
<td>290</td>
<td>22.1</td>
</tr>
<tr>
<td>Lower</td>
<td>302</td>
<td>23</td>
</tr>
<tr>
<td>Middle</td>
<td>279</td>
<td>21.2</td>
</tr>
<tr>
<td>Higher</td>
<td>274</td>
<td>20.9</td>
</tr>
<tr>
<td>Highest</td>
<td>169</td>
<td>12.9</td>
</tr>
<tr>
<td><strong>Health Insurance Ownership</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Don’t Have</td>
<td>546</td>
<td>41.5</td>
</tr>
<tr>
<td>Social Health Insurance</td>
<td>294</td>
<td>22.3</td>
</tr>
<tr>
<td>Government Health Insurance</td>
<td>453</td>
<td>34.5</td>
</tr>
<tr>
<td>Private Health Insurance</td>
<td>21</td>
<td>1.7</td>
</tr>
<tr>
<td><strong>Residential Area</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural</td>
<td>742</td>
<td>56.5</td>
</tr>
<tr>
<td>Urban</td>
<td>572</td>
<td>43.5</td>
</tr>
<tr>
<td><strong>Access To Media</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>197</td>
<td>15</td>
</tr>
<tr>
<td>Yes</td>
<td>1117</td>
<td>85</td>
</tr>
<tr>
<td><strong>Distance</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem</td>
<td>151</td>
<td>11.5</td>
</tr>
<tr>
<td>No Problem</td>
<td>1163</td>
<td>88.5</td>
</tr>
</tbody>
</table>

Based on the results shown in Table 3, the largest proportion of children under-five with diarrhea who received treatment at a health facility came from the lower group (22.1 percent), while the smallest proportion came from the highest group (12.9 percent). Health insurance ownership, the largest proportion of children under-five with diarrhea who received treatment at a health facility comes from the group of mothers who do not have health insurance (41.5 percent), while the smallest proportion comes from the group of mothers who had private health insurance (1.7 percent). Residential area, the largest proportion of children under-five with diarrhea who received treatment at health facilities comes from the group of mothers who live in rural areas (56.5 percent). Access to media, the proportion of children under-five with diarrhea who received treatment at a health facility comes from a group of mothers who watch television at least once a week (85 percent). Distance, the largest proportion of children under-five with diarrhea who received treatment at a health facility comes from the group of mothers who stated that distance to health facilities was not a problem (88.5 percent).

BIVARIATE

Relationship between Predisposing Factors and Utilization of Health Care Facilities for Children Under-five with Diarrhea in Indonesia 2017

Maternal age, there is no significant difference in proportion between the age group of mothers with the utilization of health care facilities for children under-five with diarrhea (p-value = 0.573). Mother's education, there is a significant difference in proportion between the level of mother's education and the utilization of health care facilities for children under-five with diarrhea (p-value = 0.001). Mother's occupation, there is a significant difference in proportion between the types of mother's occupation and the utilization of health care facilities for children under-five with diarrhea (p-value = 0.001). Marital status, there is no difference in the proportion between maternal marital status and the utilization of health care facilities for children under-five with diarrhea (p-value = 0.065). Age of child, there is a significant difference in proportion between the age of children in the group ≥ 3 years with the utilization of health care facilities for children under-five with diarrhea (p-value = 0.042). Sex of child, there is no significant difference in proportion between the sex of children under five with the utilization of health care facilities for children under-five with diarrhea (p-value = 0.678). Family size, there is no difference in the proportion between family size and the utilization of health care facilities in children under-five with diarrhea (p-value = 0.069). The use of previous health facilities (delivery places), there is a significant difference in proportion between the utilization of previous health care facilities or the place where the child were born and the utilization of health care facilities for children under-five with diarrhea (p-value = 0.001). Knowledge of oral rehydration solutions, there is a significant difference in the proportion between knowledge of oral rehydration solution and the utilization of health care facilities for children under-five with diarrhea (p-value = 0.001).
### Tabel 4. Relationship between Predisposing Factors and Utilization of Health Care Facilities for Children Under-five with Diarrhea in Indonesia 2017

<table>
<thead>
<tr>
<th>Variable</th>
<th>Swasta %</th>
<th>Pemerintah %</th>
<th>Total %</th>
<th>OR (95% CI)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 - 24 years (ref)</td>
<td>51.5</td>
<td>48.5</td>
<td>25.4</td>
<td>1.00</td>
<td>0.573</td>
</tr>
<tr>
<td>25 - 29 years</td>
<td>57.2</td>
<td>42.8</td>
<td>26.5</td>
<td>0.79 (0.54-1.17)</td>
<td>0.240</td>
</tr>
<tr>
<td>30 - 34 years</td>
<td>57.3</td>
<td>42.7</td>
<td>23.5</td>
<td>0.80 (0.54-1.18)</td>
<td>0.254</td>
</tr>
<tr>
<td>35 - 49 years</td>
<td>57.3</td>
<td>42.7</td>
<td>24.6</td>
<td>0.79 (0.54-1.16)</td>
<td>0.237</td>
</tr>
<tr>
<td>Mother’s Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None (ref)</td>
<td>40.4</td>
<td>59.6</td>
<td>0.7</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>46.1</td>
<td>53.9</td>
<td>30.7</td>
<td>0.79 (0.22-2.79)</td>
<td>0.715</td>
</tr>
<tr>
<td>Secondary/higher</td>
<td>60.2</td>
<td>39.8</td>
<td>68.6</td>
<td>0.45 (0.13-1.54)</td>
<td>0.203</td>
</tr>
<tr>
<td>Mother’s Occupation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Housewife/Not Working (ref)</td>
<td>56.1</td>
<td>43.9</td>
<td>51.2</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Agriculture</td>
<td>30.3</td>
<td>69.7</td>
<td>9.8</td>
<td>2.93 (1.79-4.82)</td>
<td>0.001*</td>
</tr>
<tr>
<td>Semi-Skilled/Unskilled Labor</td>
<td>61.2</td>
<td>38.8</td>
<td>34.3</td>
<td>0.81 (0.60-1.11)</td>
<td>0.186</td>
</tr>
<tr>
<td>Professional/Technician</td>
<td>65.6</td>
<td>34.4</td>
<td>4.8</td>
<td>0.67 (0.37-1.20)</td>
<td>0.178</td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not Married (ref)</td>
<td>41.4</td>
<td>58.6</td>
<td>3.9</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>56.4</td>
<td>43.6</td>
<td>96.1</td>
<td>0.55 (0.29-1.04)</td>
<td>0.065</td>
</tr>
<tr>
<td>Age Of Child</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 1 year (ref)</td>
<td>63.1</td>
<td>36.9</td>
<td>17.6</td>
<td>1.00</td>
<td>0.042</td>
</tr>
<tr>
<td>1 - 2 years</td>
<td>55.2</td>
<td>44.8</td>
<td>55.8</td>
<td>1.39 (0.95-2.02)</td>
<td>0.087</td>
</tr>
<tr>
<td>≥ 3 years</td>
<td>52.1</td>
<td>47.9</td>
<td>26.6</td>
<td>1.00</td>
<td>0.042*</td>
</tr>
<tr>
<td>Sex of Child</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male (ref)</td>
<td>55.1</td>
<td>44.9</td>
<td>51.1</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>female</td>
<td>56.5</td>
<td>43.5</td>
<td>48.9</td>
<td>0.95 (0.73-1.23)</td>
<td>0.678</td>
</tr>
<tr>
<td>Family Size</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 6 People (ref)</td>
<td>58.2</td>
<td>41.8</td>
<td>63</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>≥ 6 People</td>
<td>51.6</td>
<td>48.4</td>
<td>37</td>
<td>1.31 (0.98-1.74)</td>
<td>0.069</td>
</tr>
<tr>
<td>Previous Use Of Health Service Facilities</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home (ref)</td>
<td>39.8</td>
<td>60.2</td>
<td>21.2</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Government Health Facilities</td>
<td>41</td>
<td>59</td>
<td>32.9</td>
<td>0.95 (0.65-1.39)</td>
<td>0.799</td>
</tr>
<tr>
<td>Private Health Facilities</td>
<td>73.7</td>
<td>26.3</td>
<td>46</td>
<td>0.24 (0.16-0.35)</td>
<td>0.001*</td>
</tr>
<tr>
<td>knowledge of Oral Rehydration Solutions</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Don’t Know (ref)</td>
<td>63.6</td>
<td>36.4</td>
<td>5.7</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Have Heard</td>
<td>64.1</td>
<td>35.9</td>
<td>39.1</td>
<td>0.98 (0.51-1.87)</td>
<td>0.949</td>
</tr>
<tr>
<td>Have Used</td>
<td>49.1</td>
<td>50.9</td>
<td>55.2</td>
<td>1.82 (0.96-3.44)</td>
<td>0.068</td>
</tr>
</tbody>
</table>
* p-value < 0.05

### Relationship between Enabling Factors and Utilization of Health Care Facilities for Children Under-five with Diarrhea in Indonesia 2017

### Tabel 5. Relationship between Enabling Factors and Utilization of Health Care Facilities for Children Under-five with Diarrhea in Indonesia 2017

<table>
<thead>
<tr>
<th>Variable</th>
<th>Swasta %</th>
<th>Pemerintah %</th>
<th>Total %</th>
<th>95% CI</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socioeconomic Status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lowest (ref)</td>
<td>34.8</td>
<td>65.2</td>
<td>22.1</td>
<td>1.00</td>
<td>0.001</td>
</tr>
<tr>
<td>Lower</td>
<td>43.4</td>
<td>56.6</td>
<td>23</td>
<td>0.69 (0.46-1.04)</td>
<td>0.078</td>
</tr>
<tr>
<td>Middle</td>
<td>57.7</td>
<td>42.3</td>
<td>21.2</td>
<td>0.39 (0.26-0.59)</td>
<td>0.001</td>
</tr>
<tr>
<td>Higher</td>
<td>70.8</td>
<td>29.2</td>
<td>20.9</td>
<td>0.22 (0.14-0.34)</td>
<td>0.001</td>
</tr>
<tr>
<td>Highest</td>
<td>86.2</td>
<td>13.8</td>
<td>12.9</td>
<td>0.08 (0.05-0.15)</td>
<td>0.001</td>
</tr>
<tr>
<td>Health Insurance Ownership</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Don’t Have (ref)</td>
<td>57.9</td>
<td>42.1</td>
<td>41.5</td>
<td>1.00</td>
<td>0.001</td>
</tr>
<tr>
<td>Social Health Insurance</td>
<td>64.7</td>
<td>35.3</td>
<td>22.3</td>
<td>0.75 (0.51-1.10)</td>
<td>0.137</td>
</tr>
<tr>
<td>Government Health Insurance</td>
<td>46.9</td>
<td>53.1</td>
<td>34.5</td>
<td>1.55 (1.13-2.13)</td>
<td>0.006*</td>
</tr>
<tr>
<td>Private Health Insurance</td>
<td>67</td>
<td>33</td>
<td>17</td>
<td>0.68 (0.23-1.96)</td>
<td>0.471</td>
</tr>
<tr>
<td>Residential Area</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural (ref)</td>
<td>48.1</td>
<td>51.9</td>
<td>56.5</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>65.7</td>
<td>34.3</td>
<td>43.5</td>
<td>0.48 (0.36-0.65)*</td>
<td>0.001*</td>
</tr>
<tr>
<td>Access To Media</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No (ref)</td>
<td>44.1</td>
<td>55.9</td>
<td>15</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>57.8</td>
<td>42.2</td>
<td>85</td>
<td>0.57 (0.39-0.84)*</td>
<td>0.005*</td>
</tr>
<tr>
<td>Distance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Problem (ref)</td>
<td>54.8</td>
<td>45.2</td>
<td>11.5</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>No Problem</td>
<td>55.9</td>
<td>44.1</td>
<td>88.5</td>
<td>0.96 (0.62-1.48)</td>
<td>0.840</td>
</tr>
</tbody>
</table>
* p-value < 0.05

http://dx.doi.org/10.29322/IJSRP.10.01.2020.p9756

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Socioeconomic status, there is a difference in the proportion between socioeconomic status and the utilization of health care facilities for children under-five with diarrhea (p-value = 0.001). Health insurance ownership, there is a difference in the proportion of health insurance ownership and the utilization of health care facilities for children under-five with diarrhea (p-value = 0.001). Residential area, there is a difference in the proportion between the area of residence and the utilization of health care facilities for children under-five with diarrhea (p-value = 0.001). Access to media, there is a significant difference between the proportion of watching television at least once a week with the utilization of health care facilities for children under-five with diarrhea (p-value = 0.002). Distance, there is no significant difference in proportion between distance and utilization of health facilities in children under five with diarrhea (p-value = 0.840).

MULTIVARIAT

Multivariate analysis in this study aims to determine the relationship of independent variables in the form of Predisposing factors and Enabling factors together with the dependent variable in the form of utilization of health care facilities in infants with diarrhea by using multivariate logistic regression analysis of determinant models. The multivariate logistic regression determinant model is a model that aims to obtain a model consisting of several independent variables that are considered best for predicting the occurrence of the dependent variable. In this study, all the independent variables are considered important, so that the multivariate analysis of the utilization of health care facilities for children under-five with diarrhea includes all the independent variables in this study.

After the full model in a multivariate analysis that includes all the independent variables in the model is done, the next step is to conduct a confounding test by removing the independent variables who had p-value > 0.05. Expenditure of variables who had p-value > 0.05 is not done simultaneously but is done in stages starting from the variable that has the largest p-value. After certain variables are removed from the model, the next step is to evaluate the change in OR values for the variables that are still in the model. Calculation of changes in OR values is done between before and after certain variables are excluded from the model. If there is one OR value on the variable in the model changes > 10 percent then the variable that has been excluded is put back into the model. This process is carried out continuously for variables who had p-value > 0.05 and is stopped when all variables that have p-value > 0.05 have been tested.

Determinants of Health Care Facilities Utilization for Children Under-five with Diarrhea in Indonesia 2017

Tabel 6. Determinants of Health Care Facilities Utilization for Children Under-five with Diarrhea in Indonesia 2017

<table>
<thead>
<tr>
<th>Variabel</th>
<th>AOR</th>
<th>95% CI</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Previous Use Of Health Service Facilities</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Home (ref)</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government Health Facilities</td>
<td>1.36</td>
<td>0.91-2.04</td>
<td>0.132</td>
</tr>
<tr>
<td>Private Health Facilities</td>
<td>0.39</td>
<td>0.26-0.60</td>
<td>0.001</td>
</tr>
<tr>
<td>Socioeconomic Status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lowest (ref)</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lower</td>
<td>0.80</td>
<td>0.51-1.25</td>
<td>0.321</td>
</tr>
<tr>
<td>Middle</td>
<td>0.54</td>
<td>0.34-0.87</td>
<td>0.011</td>
</tr>
<tr>
<td>Higher</td>
<td>0.30</td>
<td>0.18-0.50</td>
<td>0.001</td>
</tr>
<tr>
<td>Highest</td>
<td>0.13</td>
<td>0.07-0.25</td>
<td>0.001</td>
</tr>
<tr>
<td>Residential Area</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Rural (ref)</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>0.85</td>
<td>0.59-1.19</td>
<td>0.348</td>
</tr>
<tr>
<td>Access To Media Information</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No (ref)</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>0.74</td>
<td>0.46-1.19</td>
<td>0.221</td>
</tr>
</tbody>
</table>

*: p-value < 0.05

Based on the results of the multivariate analysis in table 6, it is known, the variables that are significantly related to the utilization of health care facilities for children under-five with diarrhea in Indonesia are the utilization of health care facilities before (delivery place) and socioeconomic status. Whereas the variable area of residence and access to media is confounding. The children under-five with diarrhea who have been born in private health facilities have less chance (AOR: 0.39; 95% CI: 0.26-0.60) to get treatment at a government health facility, in other words children under-five with diarrhea who have been born in private health facilities 2.5 times more likely to get treatment at a private health facility when suffering from diarrhea compared with children who have been born at home after being controlled by socioeconomic status variables, appropriate areas of residence, and access to media. The children under-five with diarrhea from mothers with highest socioeconomic status have less chance (AOR: 0.13; 95% CI: 0.07-0.25) to get treatment at a government health facility, in other words children under-five with diarrhea from mothers with highest socioeconomic status group have 7.69 times the opportunity to get treatment in private health facilities compared to children under-five who come from mothers with the lowest socioeconomic status after being controlled by variables of the use of previous health service facilities (birthplaces), residential areas and access to media.
IV. DISCUSSION

Predisposing factors illustrate that each individual has a tendency to use different health services due to different individual characteristics. These characteristics can be classified into three groups named in the form of demographic characteristics, such as gender, age, marital status; social structure, which reflects a person's status in the environment such as education and employment levels; and Health belief or belief, that selected health services can heal. [6].

Among these predisposing factors related to the utilization of health service facilities for diarrhea infants in Indonesia is the use of previous health service facilities (delivery places). Previous experience in the use of health care facilities can be a reference for mothers in seeking medical care when their children had diarrhea. With direct experience with health facilities or health workers, mothers will know where medical help can be obtained when their child experiences pain. The results of this study indicate there is a relationship between the utilization of health care facilities before (delivery place) with the utilization of health care facilities for children under-five with diarrhea. In children who have been born in health facilities or private health workers are more likely to get treatment in health facilities or private health workers compared to children who have been born at home. This is in line with research conducted in India that compares the use of government health facilities with non-users as well as the utilization of private health care facilities with non-users found that compared with children who have been born at home, the group of children who have been born in health facilities tended to bring their child to health care facilities when children under-five suffer from diarrhea [7].

According to Anderson (1974) in Notoatmodjo (2003), enabling factors are a description of conditions or conditions that make a person able to take action to meet the needs of health services. Enabling factors to consist of family resources in the form of family income, the level of participation in health insurance, the ability to purchase health services and the knowledge of health care information needed. Community resources, such as the number of health service facilities available, the number of health workers available in the area, the ratio of population to health workers, and the location of residential areas. In this study, the variables used to describe the utilization of health care facilities in infants with diarrhea based on these enabling factors in the form of socioeconomic status, ownership of health insurance, residential areas, access to information media and distance to health care facilities [6]. Among these enabling factors, in this study, it was found that associated with the utilization of health care facilities for children under-five with diarrhea in Indonesia is socioeconomic status. Diarrhea patients with diarrhea originating from the top wealth index quintile tend to get treatment in private health facilities compared to diarrhea sufferers from the lowest group.

This shows that government health facilities are the choice to get treatment for most of the children under five with diarrhea from the group of mothers who come from the lower middle and lower socioeconomic status. This result is in line with research conducted by Bunsoth et.al (2013) in Cambodia which showed that the group of mothers who were in the middle. This shows that government health facilities are the choice to get treatment for most of the children under five with diarrhea from the group of mothers who come from the lower middle and lower socioeconomic status. This result is in line with research conducted by Bunsoth et.al (2013) in Cambodia which showed that the group of mothers who were in the middle significantly tended to utilize private health care facilities when their children were sick compared to mothers who were at the lowest level [8]. Similar results were also found in studies conducted by Thin (2005) in Indonesia, compared with toddlers who came from families with the lowest asset index scores, while children who came from families with the highest asset index scores tended to use private service facilities when their children have respiratory infections [9]. In line with this, research conducted in India found that, in the group of mothers who came from the richest households, they had almost 3 times the opportunity to bring their children to private health care facilities when experiencing diarrhea compared to mothers from the poorest households [7].

V. CONCLUSION

This study found that 55.7 percent of children under five suffering from diarrhea in Indonesia 2017 received treatment at a private health facility, while another 44.3 percent received treatment at a government health facility. Predisposing factors in the form of the use of previous health service facilities (delivery places) and enabling factors in the form of socioeconomic status are related to the utilization of health care facilities for children under-five with diarrhea in Indonesia.

VI. SUGGESTION

Factors related to the utilization of health service facilities for infants with diarrhea in Indonesia are in the form of mothers' experience in the use of previous health service facilities (delivery places) and the mother's socioeconomic status. The Indonesian government needs to make efforts to require every health worker who helps with the delivery process to provide sufficient information about the health of children under five to post-partum mothers by health workers who assist in the delivery process in health care facilities. The information conveyed includes symptoms of the disease to the actions that can be taken by the mother if a children has diarrhea. With the discovery of dominant factors related to the utilization of health service facilities for children under-five with diarrhea in the form of socioeconomic status, it is expected for the government to be able to provide maximum services for children under-five with diarrhea especially children who come from the lowest socioeconomic status.
VII. REFERENCES


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Phone: +628812107862

Accuracy Between Dermoscopy Overview And Moisture Checker In Assessing Skin Moisture Level On Pediatric Nephrotic Syndrome Patients

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Abstract- Background: Xerosis cutis (dry skin) is a common condition experienced by millions of people, influenced by exogenous and endogeneous factors. Excessive bathing as an exogenous factor can cause dry skin. Endogenous factors such as chronic diseases and the use of certain medications can also affect skin moisture. Nephrotic syndrome (SN) is a common kidney disease in children and is characterized by the presence of protein that is released from the blood vessels and into the urine due to glomerular damage. Manifestations of xerosis cutis in the form of dull-looking have also been linked to the use of high dose diuretics in SN. Skin moisture examination can be evaluted with dermoscopy and moisture checker. Methods: This is an observational study with cross sectional design which involved 40 research subjects in which patients with pediatric nephrotic syndrome who met the inclusion and exclusion criteria were examined for skin moisture using a moisture checker and then dermoscopy. The results of the study were then analyzed to determine the Kappa value. Result: The most subjects in this study were male, 27 people (67.5%) with the majority of the age group 10-15 years, as many as 17 people (42.5%) of a total of 40 research subjects. The results of the examination with a moisture checker showed as many as 24 people (60%) had normal skin moisture checker and as many as 26 people (65%) in the dermoscopy overview did not show any scale. The value of accuracy between dermoscopy overview and moisture checker in assessing skin moisture level on pediatric nephrotic syndrome shows a kappa value of 0.622. Conclusion: The value of accuracy between dermoscopy overview and moisture checker in assessing skin moisture level on pediatric nephrotic syndrome is good (kappa value = 0.622)

Index Terms- accuracy, dermoscopy, moisture checker, skin moisture.

I. BACKGROUND

Xerosis cutis or dry skin is a common condition experienced by millions of people. It could be an acute or chronic condition as the consequences of environment, drug consumption, aging or other diseases. Most people get dry skin in their life, with a wide range of moisture. There are three important keys take part in dry skin. They are: bounding substance called natural moisturizing factor (NMF), fat skin and ceramide, and viable network in epidermal layer mediated by aquaporin water channel.2,3

There are two factors involved in dry skin. They are endogenous and exogenous factor. Winter and summer are exogenous factors contributing to dry skin. Excessive bath also contributes to dry skin.4,7 There are many skin cleansers containing surfactant that could extract and emulsify fat in skin surface and intercellular fat between corneocyte and epidermis resulting in disruption of skin barrier.8 Endogenous factors also contribute to dry skin. The prevalence of dry skin increases with aging. This is caused by disorder in keratinization and depletion of lipid content in corneal layer. On the other hand, a chronic disease and certain medications could evolve in dry skin.3,4,7

Nephrotic syndrome is a common kidney disease found in children. It is marked with protein loss from blood to urin as the impact of glomerular disruption. Nephrotic syndrome is defined with proteinuria >40 mg/m²/hour or protein/creatini ratio >200 mg/mL or protein +3 on urine dipstic test, hypoalbuminemia <25 g/L and edema.8

Nephrotic syndrome in paediatric group could occur congenitally in the first 3 months of life.8,9 In such condition, a genetic mutation is usually the culprit, affecting podocytes of glomerular basal membrane. Even rare, the condition could also be caused by cytomegalovirus infection congenitally. Nowadays, it is yet unknown the most common etiology underlying it (idiopathic). Glomerular disorder, vasculitis, infection, toxin, malignancy, and genetic mutation might be the causative agent. Some complications could occur as direct impact of the disease or related to its medication. One of the complications on skin integument system is dermatitis. Its effect on skin moisture is not rare. The lack of NMF or aquaporin are the theory proposed by some experts.8,10

Until this day, there are still limited publications reporting the exact number of dry skin in nephrotic syndrome. The predicted prevalence of dry skin is 50-58% in kidney failure patient undergoing routine dialysis.11,12 It is stated that dry skin is the most common skin disorder found on patients with chronically ill kidney.13 One of the causes of dry skin is the decrease and disrupt of functions of sebaceous gland resulting in epithelial cell dehydration.13,14

It has been proved dermatologically and histologically that uremia could reduce sweat volume.12,14 In such patients,
atrophy of sebaceous gland has also been revealed. Some patients even suffered from ichthyosis and was linked to the tiers of kidney damage. Dry skin has also been linked to the use of high dose diuretic and excessive ultrafiltration. Dry skin are related to the change of skin barrier where the dry skin will be more vulnerable to irritation. A lesion on skin could be the source of infection which will exaggerate the primary disease. Because of that, patients suffering from dry skin need emolient to moisten their skin. Patients also need to be informed not to bath using too much soap because it will irritate the skin. Lotion application containing urea 10% with dexpantenol supposed to reduce eritema and scale on patients suffering dry skin.

Dry skin can be diagnosed clinically with additional tools. Arid and dull skin are the cardinal sign on clinical examination. Beside that, scale and fissure could be found also. The additional tools used in dry skin are dermoscopy and moisture checker. Dermoscopy is a non-invasif technique which can visualize the epidermal layer and structures underlying it with more magnification. However, dermoscopy is relatively more expensive and a long experience from the expertise is needed to get a more objective value. Contrary, moisture checker is relatively cheaper, more practical, and more objective.

In this study, the moisture of the skin of children suffering from nephrotic syndrome will be evaluated by moisture checker. Thus, the accuracy with the feature of dermoscopy will be analyzed.

II. OBJECTIVE

To assess the accuracy between moisture checker and dermoscopy in evaluating skin moisture in children suffering from nephrotic syndrome.

III. MATERIALS AND METHODS

This is an observational study with cross sectional design. This study was done from April till December 2019 in nephrology division pediatric outpatient clinic and dermatology venereology outpatient clinic, Haji Adam Malik General Hospital Medan, Indonesia. The subjects are children suffering from nephrotic syndrome who came to the clinics fulfilling the inclusion and exclusion criteria. The total of the subjects in this study are 40 people. They are taken with consecutive sampling method. All patients diagnosed with nephrotic syndrome in nephrology division pediatric and dermatology venereology outpatient clinic, Haji Adam Malik General Hospital are the inclusion criteria. While the exclusion criteria are patients that have been treated with emolient, have other keratinization disorders, and refused to participate in this study.

This study was begun with explanation of the disease to the patient and his/her family and the purpose, procedure, and benefit of the test. After obtaining the consent from his/her parent, the demographic features, history taking, clinical and dermatological examination of the patient will be recorded. Lastly, the moisture of the skin will be recorded by using dermoscopy and moisture checker. Moisture checker Scalar type MY-808S and dermoscopy with its brand firefly are the tools used in this study. The procedure was begun by swabbing the tested skin area with alcohol 70%, then the dermoscopy was put on the skin. Some aspects which was evaluated are scale, fissure, erythema, and wether the skin is arid or not. Moreover, a moisture checker was put on the skin measured. The results would be displayed on the form of percentage. The results would be classified into 3 interpretations which was adjusted with the part of skin test. The skin area choosen to be tested in this study was inner upper arm. The skin was classified as dry if the value of moisture checker was <37%, normal if the value was 37–45%, and moist if the value was >45%. The data obtained from this study will be analyzed statistically to get kappa value.

IV. RESULTS

All the subjects in this study was first diagnosed with nephrotic syndrome in the clinics stated above. All the subjects experienced history taking, clinical examination, dermatological examination using dermoscopy, and skin moisture measurement using moisture checker.

The demographic characteristics of the subjects were displayed based on gender and age.

Table 1. Subjects distribution based on gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
</tr>
<tr>
<td>Boy</td>
<td>27</td>
</tr>
<tr>
<td>Girl</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
</tr>
</tbody>
</table>

The total number of the subjects was 40 people, with the proportion of boys are 27 people (67.5%) and the proportion of girls are 13 people (32.5%). The results show that boys suffering from nephrotic syndrome is more than girls.

Table 2. Subjects distribution based on age

<table>
<thead>
<tr>
<th>Age (year)</th>
<th>Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
</tr>
</tbody>
</table>

http://dx.doi.org/10.29322/IJSRP.10.01.2020.p9757
www.ijsrp.org
The majority of subjects are in the age group 10 – 15 year, they are 17 people (42.5%), and the least subject is in the age group 16 -18 year, namely just 1 person (2.5%).

**Table 3. Subjects distribution based on skin moisture measured by moisture checker**

<table>
<thead>
<tr>
<th>Skin moisture measured by moisture checker</th>
<th>Subjects</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>24</td>
<td>60 %</td>
</tr>
<tr>
<td>Dry</td>
<td>15</td>
<td>40 %</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>40</strong></td>
<td><strong>100 %</strong></td>
</tr>
</tbody>
</table>

There are 24 people (60%) had normal skin and 15 people (40%) had dry skin measured by moisture checker.

**Table 4. Subjects distribution based on dermoscopic features**

<table>
<thead>
<tr>
<th>Dermoscopic feature</th>
<th>Subjects</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Scale negative</td>
<td>26</td>
<td>65 %</td>
</tr>
<tr>
<td>Scale positive</td>
<td>14</td>
<td>35 %</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>40</strong></td>
<td><strong>100 %</strong></td>
</tr>
</tbody>
</table>

In this study, there are 26 people (65%) children who have no scale on dermoscopic feature and 14 people (35%) who have scale on dermoscopic feature.

Figure 1a: Scale negative in dermoscopy examination and 1b scale positive in dermoscopy examination
It can be seen that there are 10 people (71.42%) whose tests are positive with moisture checker, 5 people whose tests are negative in dermoscopy (19.23%), and 21 people (80.77%) whose tests are negative in both dermoscopy and moisture checker.

V. DISCUSSION

Nephrotic syndrome affects 1-3/100,000 children less than 16 years old. In the literature, boys are twice more common affected than girls.20,23,24 The results are same with the study done in Dr. Kariadi General Hospital Semarang where the distribution of nephrotic syndrome for boys were 74.4%, girls were 25.6%, and the ratio was 2.9 : 1.23 A study in Khartoum, Sudan held on 2001-2014 showed the same results, where boys are more common affected than girls, with the ratio 3:1.24

Nephrotic syndrome is the most common kidney injury found in children. According to Kidney Disease Improving Global Outcomes (KDIGO), there are 1-3/100,000 children under 16 years old suffer from nephrotic syndrome.25 The incidence of nephrotic syndrome in USA and UK were 2-7/100,000 children.26 Five of 100,000 children per year in Japan suffer from nephrotic syndrome.24 The prevalence of nephrotic syndrome in Indonesia were reported 6/100,000 children under 14 years old.26

Fissure, fragile, and dry skin are common features found on dermoscopy. Scale can be found on dry skin, but sometimes do not on dermoscopy.18 Dry skin is an abnormality on the surface of skin caused by decreased of fluid or oil resulting in reduced skin moisture.27 Dry skin is marked by decreased water content on corneal layer. Healthy skin should have >10% water content.28 Increment of Trans Epidermal Water Loss (TEWL) caused by permeability defect on skin barrier could inflict dry skin. Defect on skin barrier can be caused by many factors. Disregulation of epidermal lipid content is one of the causes.17,28 Frequent bath with hot water and excessive soap usage are other factors contribute to skin barrier defect.1,29

The cardinal sign of dry skin are dull skin, greyish white skin, and increased topographic skin markings.30 The skin looks arid because it lacks its ability in refracting the light. When it becomes drier, scale could arise and the skin becomes rough.2,3

Skin moisture could be evaluated by measuring TEWL with tewameter. While the hydration status of corneum layer could be measured by corneometer or moisture checker. TEWL measurement with tewameter is done by positioning the patient in a chair at least 15 minutes before strating the measurement. The temperature of the room is set to be 21.9°C ± 2°C with mean humidity 35.5% (28-38%). The patient then instructed not to apply emolient or other applicants 4 hours before the examination.31 Moisture checker Scalar MY-808S is designed based on hydration status of corneal layer.15 It functions to give positive correlation between water content and dielectric percentage. Because of that, by measuring dielectric, the percentage of skin moisture could be measured.

Patients with nephrotic syndrome usually come with edema and hypertension.32,33 The treatment of edema in such patient is loop diuretic which will stimulate diuresis. It will in turn decrease intravascular volume and activate neuro-hormonal system. Hypertension could be found in the beginning of the disease or in the course of the disease because of steroid toxicity. Hypertension is first treated with Angiotensin Converting Enzyme (ACE) inhibitor, Angiotensin Receptor Blocker (ARB) or antagonist beta adrenagik. It is stated that anti-hypertension and diuretic also contribute to generate dry skin although the exact mechanism still unknown.25

Accuracy test is evaluated by using the value of Kappa whose interpretations described by Cohen are as follows:
- Kappa ≤ 0.20 means the accuracy is bad
- Kappa 0.21 - 0.40 means the accuracy is enough
- Kappa 0.41 - 0.60 means the accuracy is good enough
- Kappa 0.61 - 0.80 means the accuracy is good
- Kappa 0.81 - 1.00 means the accuracy is very good

The calculation of kappa value used in this study is processed by computer system. The Kappa value obtained is 0.622 which means that the accuracy between moisture checker and dermoscopy in evaluating skin moisture in children with nephrotic syndrome is good.

DERMOSCOPY IS A NON-INVASIVE PROCEDURE WHICH CAN VISUALIZE EPIDERMAL LAYER AND STRUCTURES UNDERLYING IT WITH MORE MAGNIFICATION. FIRSTLY, DERMOSCOPY WAS USED TO EVALUATE AND DIFFERENTIATE BETWEEN MELANOMA AND NON-MELANOMA SKIN CANCER.18 IN THE LAST DECADE, SOME STUDIES HAVE SHOWN THAT DERMOSCOPY IS A NON-INVASIVE PROCEDURE WHICH CAN HELP TO DIAGNOSE OTHER SKIN ABNORMALITY, LIKE ABNORMALITY IN HAIR (TRICHOLOGY), NAIL (ONICOSCOPY), INFECTION (INFECTIONAL DERMOSCOPY) AND INFLAMMATORY DERMATOIS (INFLAMMOSCOPY).18 THERE ARE SOME PRIOR STUDIES WHICH EVALUATE THE ACCURACY BETWEEN POLARIZED AND NON-POLARIZED DERMOSCOPY ON SEBORHOIC KERATOSIS LESION WITH A VERY GOOD KAPPA VALUE 0.895.34
Before this study was published, there was still no study assessing the accuracy between dermoscopic feature and moisture checker in evaluating skin moisture in children suffering from nephrotic syndrome. This study is the pilot study trying to look for their accuracy. In the end of this study, we found that moisture checker is a reliable, reproducible, sensitive, cheap, and practical tool for measuring skin moisture.

VI. CONCLUSION

The most subjects in this study are boys with 27 people (67.5%), while girls are 13 people (32.5%). The majority of the subjects are in the age group 10 – 15 year, with 17 out of 40 people (42.5%). Subjects with normal skin measured by moisture checker were 24 people (60%), while 15 people (40%) had dry skin. Accuracy value of dermoscopy and moisture checker in evaluating skin moisture in children suffering from nephrotic syndrome is 0.62 which means good accuracy. This result shows that moisture checker can be used to substitute dermoscopy in evaluating people suggestive of dry skin with lower cost.

VII. SUGGESTION

This study hopefully could be continued with diagnostic study comparing moisture checker with corneometer or tewameter to evaluate its sensitivity and specificity. The same thing can also be done to dermoscopy. In the next study, it is mandatory to avoid bias by performing the procedure systematically, especially while measuring TEWL or hydration status of corneal layer.

ETHICAL ISSUE

This study was done after obtaining the ethical clearance letter from the ethical committee of Medical Faculty, North Sumatera University, Medan, Indonesia.

CONFLICT OF INTEREST

The authors declare no conflict of interest, financial, or otherwise.

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Determine the Type of Diatoms in the Batangtoru River and Parsariran River in Tapanuli Selatan Regency by means of Acid Destruction

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Abstract- Victims of Drowning cases are still often found in the World of Forensic medicine today. Drowning is a condition where oxygenation occurs in the lungs due to the entry of water into the airways through the nose and mouth. In Forensic medicine, examination of diatoms in drowning victims is still very useful in diagnosis.

Diatom examination on drowning victims is used to determine whether the victim is still alive when entering the water or has died. This examination can also determine the scene of the incident or place of the victim's sinking.

This research uses a descriptive method. The sample material used came from the Batangtoru river and Parsariran river in South Tapanuli Regency. With the results of the study found 14 species of diatoms in the Batangtoru river and 14 species of diatoms in the Parsariran river.

Index Terms- Diatoms, Drowning

I. INTRODUCTION

Drowning is a condition in which oxygenation is disrupted in the lungs due to the entry of fluid into the airways through the nose and mouth.

WHO noted that in 2016 drowning cases there were 320,000 people lost their lives due to drowning. More than 90% of these drowning deaths occur in low and middle income countries. WHO also recorded the highest number of deaths in drowning cases was in Africa, with a ratio of 15-20 times higher than in Germany or the United Kingdom. In Indonesia, the death toll drowned due to natural disasters according to the National Disaster Management Agency (BNPB) of 180 people during 2017, that number is relatively more than the death toll drowning at sea according to the National Transportation Safety Committee (KNKT) in 2013 totaling 65 fatalities, while the victims died as a result of 2013 as many as 12 people. In the case of drowning which often creates difficulties for investigators is to determine where the victim first sank.

Definition of Diatoms

Diatoms are a type of algae that are only seen microscopically and contain silicon particles. The shape is usually round oval, triangle or rectangle. Along with water that enters the lungs, diatoms then penetrate the lungs and then enter the lymphatic channels. Through the circulation of these lymph channels diatoms are delivered to the heart and then spread to several body tissues.

According to Hendey, there are as many as 15,000 species of diatoms, half of which live in fresh water and the other half live in brackish water and sea water. Diatoms have a variety of sizes, ranging from 2µ to 1 mm in length or diameter. Some species have a length of 10-80µ, if long enough to have a width of 10µ.

Diatoms are included in the class Bacillariophyceae algae with the main constituent cell wall of silica. It is called a diatom because the cell consists of two valves (two atoms), where one covers the other like a can of pastilles. Diatoms are generally unicellular (solitary), but in some species there are those who live in colonies and co-operate with one another. Diatoms are very useful in environmental studies because their species distribution is influenced by water quality and nutrient content and their presence is very abundant in marine sediments such as at sea, estuary, lake, pond, or river, as well as diatom fossils that can be used as indicators of water quality better than water quality with saprobitas index because diatoms are more sensitive especially those related to the conductivity parameters, organic content.

Diatom classification according to lifestyle is divided into 8 groups: 1. Epiphytic known as the diatom group attached to other larger plants. 2. Epipsamic is known as a group of diatoms that live and grow on sand. 3. Epipellic are known as diatom groups that live and grow on the surface of clay (mud) or sediments. 4. Endopelic known as a group of diatoms that grow in cavities of clay (mud) or sediments. 5. Epilithic known as diatom groups that grow and attach to the surface of the fiber. 6. Endolitic, known as the diatom group that grows in cavities at the bottom of ships. 7. Epizoic which is known as diatom group which is attached to common animal invertebrate base coat. 8. Fouling, known as a diatom group attached to hard objects that are mounted or placed on the base of the mantle.

Definition of River
The river is the flow of air at the surface of the land that flows into the sea. The river based on its physical condition is divided into 3 namely:
1. Upstream: in the upstream condition of heavy water flow, the rocks are also large and the erosion that occurs is vertical downward erosion (waterfall).
2. Middle part: in this part the river water flow is rather calm, the rocks are also not big anymore and the erosion that occurs laterally / horizontally.
3. Downstream: in this part the flow of water is calm, the rocks are gone turns into thick / sand and is rare.

The Drowning Definition
Drowning is death due to the entry of fluid into the respiratory tract. Fluid that causes drowning is usually in the form of water, although a number of other liquids can also cause drowning. Sometimes a person who is unconscious will sink when he drops his face into a pool of water, such as epilepsy during a sudden attack but drowning generally appears as a result of total body submersion. In this case drowning denotes death from the entry of water into the respiratory tract, whether it is with a sinking body or not.

Drowning of Mechanisme
Understanding of the mechanism of drowning according to Brouardel quoted by Tedeschi et al (1977) found five stages as follows:
1. The surprise stage which lasts for 5 to 10 seconds.
2. The first stage of respiratory arrest that lasts about one minute.
3. The deep respiration phase which lasts for about one minute.
4. The second stage of respiratory arrest that lasts about one minute.
5. Gasps terminal stage (last breath) lasting 30 seconds.

Diatom's Relationship with Drowning
This diatom is used as a diagnostic tool for investigating drowning cases, because of this the diatom examination is intended:

a. Determine whether someone died by drowning or not.
b. Knowing whether people are still alive when drowning.
c. Knowing the location of the sinking body before dying, by comparing the diatoms found in the body of the victim with the water diatoms where the bodies were found or suspected as a place to drowning.

The pathophysiology of how people drown can be found diatoms in their bodies is through the media of water, basically when a living person sinks into water containing diatoms, some diatoms will enter the lungs and stomach, diatoms contained in water can enter the lungs the lungs and circulatory system and other internal organs such as the brain, kidneys, liver and bone marrow.

Procedure
Take water from the river at a depth of 1 meter to 2 meters from the surface of the water with plankton net (plankton net), then the netted plankton samples will be collected in a bucket which is then poured into a 20 ml bottle and preserved using 3 drops of lugol solution and labeled, then taken to the laboratory in each ingredient mixed with concentrated sulfuric acid solution with the same volume, then left for 24 hours, then heated with low heat until boiling and then dripped with concentrated nitric acid until the liquid is clear, then each is put into a centrifuge tube of the same size and the number of even tubes at a speed of 3000 rpm for 15 minutes the sediment (sediment) is washed with aquadest then in the centrifuge again for 15 minutes at a speed of 3000 rpm and then the sediment (sediment ) viewed under a microscope with magnification 100 times.
From the table above it can be seen that there are various different types of diatoms found at each station, but also found the same type of diatoms at each station.

Table 2. Distribution of diatom species in the Parsariran river in Tapanuli Selatan Regency

<table>
<thead>
<tr>
<th>Location</th>
<th>Diatom Type</th>
<th>Stasiun Upstream</th>
<th>Central</th>
<th>Downstream</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parsariran River</td>
<td>Navicula sp</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>Syndra sp</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>Bacillaria sp</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>Nitzshia sp</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>Cymbella sp</td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>Netrium sp</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>Cyclotella sp</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td></td>
<td>Asterionella sp</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Surirella sp</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Caloneis sp</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Eunotia sp</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Pinnularia sp</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Amphora sp</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Frustulia sp</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
</tbody>
</table>

Description:
+ : found  
- : not found

From the above data it can be seen that in the two rivers the same diatom species are found but there are also different diatom species found.

IV. DISCUSSION

From the results of the above study it can be seen that diatoms can be found in fresh and marine waters, in this case the study used freshwater samples. The abundance of diatoms in a waters varies greatly determined by environmental factors that influence it. The distribution that affects the abundance of diatoms include the following:

a. Temperature factor, where temperature can affect the process of photosynthesis in waters both directly and indirectly.

b. Waters currents, where currents largely determine the distribution of abundance of diatoms living as planktonics.

c. Turbidity, the more turbid the aquatic ecosystem, the level of O2 levels is also reduced and sunlight is difficult to penetrate a certain depth. Thus inhibiting the process of photosynthesis and diatom growth itself.

In addition to the factors above that can affect the presence and abundance of diatoms in a waters there are other factors namely: environmental factors that can affect the growth and spread of phytoplankton, both physical and chemical factors, such as salinity, light, nutrients and PH.

V. CONCLUSION

1. Found 14 species of diatoms in the Batangtoru river with the same diatom species distribution found at the upstream, central and downstream stations, namely, Navicula sp, Coscinodiscus sp, Aulacoseira sp, Fragillaria sp, Frustillia sp, Surirella sp, Netrium sp.

2. The type of diatom found at the upstream station but not found at the central and downstream stations, namely Navicula sp, this is very helpful in the application of the Determination of the first place where the victim sank, where if found diatoms in the lungs of a drowned victim, the type of navicula sp is confirmed to be the first victim the river was submerged in the Batangtoru river upstream station.

3. The type of diatom found at the central station but not found at the upstream and downstream stations namely Eunotia sp, Amphora sp, Achnanthes sp. then it is confirmed that the victim first sank, namely at the central station.

4. In the Parsariran river there were 14 diatom species found where the distribution of diatom species found at the upstream, central and downstream stations, namely Netrium sp and Cyclotella sp.

5. The type of diatom found at the upstream station but not found at the central and downstream stations, Eunotia sp. This is very helpful in the application to determine the location of the case where the victim first drowned at the upstream station.
6. The type of diatom that is not found in the Batangtoru river but found in the parsariran river, namely, Cymbella sp, Cyclotella sp, Asterionella sp, Pinnularia sp, this is due to the different turbidity levels in the river where the turbidity river is higher than the parsariran river which is very high affect diatom photosynthesis itself.

7. The abundance of diatoms in each river varies greatly because it is influenced by environmental, chemical and physical factors.

VI. SUGGESTION

1. The results obtained in this study do not provide an overall picture of the shape, type, and abundance of diatoms in the Batangtoru and Parsariran rivers. This causes the need for further research at different times, circumstances and locations.

2. The results of diatom photographs obtained in this study are less clear because it only uses a mobile digital camera that is less compatible with a microscope, so further research is expected to further diatom images need to use a special camera that is compatible with a microscope.

3. Such research is expected to be developed by other researchers in different rivers in the South Tapanuli Regency, especially in one stream.

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Determining The Types Of Diatoms Padang River And Bahlilang River In Tebing Tinggi City

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Abstract- Background : Drowning is a process that causes respiratory disturbances due to the entry of fluid into the airways or lungs. Until now, diatom examination is the gold standard examination to diagnose deaths because of drowning. The discovery of diatoms in tissue examination is one of the markers that shows the victim died from drowning.

Aim: To find out whether the person died from drowning or not, whether the person is still alive when drowning and to know the location of the drowned body before death so that it helps investigators determine where was the victim drowned for the first time by comparing the diatoms in the victim's body with the diatoms the water where the body was found or suspected to be a drowning death place.

Method : This research was conducted descriptively. The research sample was taken from rivers in Tebing Tinggi City, namely Sungai Padang and Sungai Bahlilang.

Results : 15 diatom species were found in the Sungai Padang and 11 diatom species were found in the Sungai Bahlilang. From the results of research in the Sungai Padang and Sungai Bahlilang, there are similarities and differences in the types of diatoms in each river

Index Terms- Drowning, Diatoms

I. PRELIMINARY

Sinking is a process that causes interference with the entry of fluid into the respiratory tract or lungs. Drowning is not limited to water, such as rivers, lakes or swimming pools, but may also be in a puddle or ditch with only a face below the surface of the air.1,2

In 2016 WHO recorded drowning cases recorded as many as 320,000 people lost their lives due to drowning, more than 90% of deaths due to drowning occurred in low and middle-income countries. Drowning is the third leading cause of death in the world where the case most often affects children aged 5-14 years.

In connection with the use of diatoms in the diagnosis of drowning, Revenstorf in 1904 was the first person to try to use diatoms as a test for drowning, although he stated that Hofmann was the first person to find it in pulmonary fluid in 1896. The basic view put forward was if someone drowned in water containing diatoms, the diatoms will penetrate the alveolar wall and bring it to the main organs such as the brain, kidneys, liver, and bones.8

Diatoms are microscopic creatures that live in almost every aquatic habitat. There is an enormous variety of living things. Diatoms are a class of plants, which is a single-celled alga found in water with sufficient lighting. With a size of 40-200 microns but maybe also with a size <4-5 micron/> 1 micron, with the shape that is owned varies.9,10,11,12

In a corpse submerged in water and suspected of having died due to drowning, it is necessary to determine whether the victim is still alive when drowning which is marked by intravital signs, whether there are other signs of violence, and the cause of death.3 In uncovering criminal cases, crime scenes (TKP) is an important source of information in revealing events that have happened to victims. This is due to the fact that there is a lot of evidence (corpus delicti) found at the crime scene which experts can speak to reveal about the events that occurred. However, the problem now, is difficult to determine where the crime scene itself, especially in the case of drowning because the victim was found far from the place where the victim drowned.

Some previous researchers have discussed the identification of diatoms, but there have been no studies or research on the types of diatoms that exist in the Padang River and Bahlilang River in Tebing Tinggi City.

II. LITERATURE REVIEW

Diatom

Diatoms are a type of alga that are only seen microscopically and contain silicon particles. The shape can be round oval, triangle or rectangular.15

Diatoms have a structure that contains SiO2 silicic acid. Silicate itself has resistance to decay. The peach alga enters the body through blood circulation so that the location of the alga shows whether the victim was drowned ante-mortem or post-mortem. Diatoms can also be searched for in the heart which has been diluted with water for hemolysis and then centrifuged and the sediment examined. When the victim is so rotten that the victim has sunk, both the skin and organs have been destroyed, the diatom examination is taken from the long bone marrow and then the same process is carried out.10

Diatom Identification

Diatoms are single-cell plants belonging to the Bacillariophyceae class of the Bacillariophyta phylum. Diatoms can consist of one single cell or a combination of several cells forming a chain. They usually float freely in bodies of water and also most of them attach to harder substrates. Diatom sticking is usually because this plant has a kind of gelatin (Gelatious extrusion) which provides adhesion to objects or substrates. We also sometimes find some diatoms that are very slow but have the power to move.14,15,16
It is called a diatom because the cell consists of two valves (two atoms), where one covers the other like a can of pastilles. Diatoms are generally unicellular (solitary), but in some species they live in colonies and co-operate with one another. From its shape, diatoms are divided into two orders based on their shape, namely circular diatom cells (Centrales diatoms) and elongated diatom cells (Penneales diatoms). The Central Order when viewed from above or below is symmetrical and circular in a radial shape. The cells can be round, oval, cylindrical, with a round, triangular or rectangular cross-section, while the Pennales Order is longitudinal or sigmoid shaped like the letter "S". Along with the median diatom cell fatigue there is a middle lane called rafe (raphe). 17,18

Diatom classification according to their lifestyle is also divided into 8 groups, namely: Epiphytic, Episamatic, Epipelic, Endopelic, Epilithic, Endolithic, Epizoic, Fouling. 14,16,18

Diatom Growth Factor

Diatom distribution varies which is determined by environmental factors that influence. The distribution that affects diatoms horizontally include the following: temperature, water flow and turbidity factors. 19

Drowning

Definition

Drowning is usually defined as death from asphyxia caused by the entry of fluid into the respiratory tract. In one case the victim sank in the water so that his respiratory system was disrupted by the result of loss of consciousness and threat to the victim's soul. 1

In general, drowning is a case of an accident, either directly or because there are certain factors such as the victim being drunk or under the influence of drugs, it could even be due to the result of a murder event. Every year, around 150,000 deaths are reported worldwide due to drowning, with annual occurrences perhaps closer to 500,000. Some of the most populous countries in the world fail to report near drowning incidents. This suggests that many cases have never been brought to medical attention, events around the world make an accurate approach almost impossible. 16,17

Drowning diagnosis

Until now, diatom examination is a gold standard examination to diagnose deaths from drowning. However, this examination is still controversial because diatoms cannot always be found on the examination of the lung. This can occur in atypical drowning cases such as dry drowning, disruptive climatic factors, procedures and use of chemicals that are destructive and diatom destruction and can also be caused by pollution of sea water or fresh water. 23,24

A comparison between diatoms found in the victim's body and those in the waters where the victim was found is useful to strengthen the diagnosis and location of the victim's death. The discovery of diatoms in tissue examination is one of the markers that the victim died from drowning. 1

Diatom's Relationship with Drowning

Diatom checks on suspected victims of drowning are routine procedures that must be performed. Diatoms are used as diagnostic tools to investigate drowning cases. Because of this, the diatom examination aims: ascertain whether a person died due to drowning or not, find out whether the person is still alive when drowning and know the location of the sinking body before dying. 29

III. RESEARCH METHODS

Research Types and Design

The type of research conducted descriptively is to determine the type of diatoms in rivers in the city of Tebing Tinggi

Location and Time of Research

The study was conducted in the Padang river and the Bahlang river in the city of Tebing Tinggi.

When the study was conducted from August to November 2019. Sampling was carried out at 09.00-11.00 WIB, because sunlight penetration for the process of photosynthesis of diatoms was considered optimal at that hour.

Sample and How it Works Research

The material used in this study is river water taken at 2 rivers in Tebing Tinggi City in different locations, namely in the upstream, middle and downstream areas at a depth of 1 meter to 2 meters from the surface of the river.

Take water from the river with a plankton net (plankton net), then the netted plankton samples will be collected in a bucket which is then poured into as many as 20 ml bottles, enter as much as 20 ml concentrated H2SO4 and leave for 24 hours. Heat with low heat until boiling, then pour into it a few drops of concentrated HNO3, until the color is clear yellow. The liquid is centrifuged for 15 minutes at 3000 rpm. The sediment (sediment) is washed with distilled water and then again the sediment (sediment) is seen under a microscope with a magnification of 100 times. Check the shape of the diatoms found, then identify.

IV. RESEARCH RESULT

Table 1. Distribution of Types of Diatoms in the Padang River at the Upstream, Middle and Downstream Stations in Tebing Tinggi City.

<table>
<thead>
<tr>
<th>NO</th>
<th>Types of Diatoms</th>
<th>Stations</th>
<th>Upstream</th>
<th>Middle</th>
<th>Downstream</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Navicula sp.</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Synedra sp.</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Caloneis sp.</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Nitzschia sp.</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Cymbella sp.</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Fragillaria sp.</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Cyclotella sp.</td>
<td>+</td>
<td>-</td>
<td>+</td>
<td></td>
</tr>
</tbody>
</table>
Asterionella sp.
Frustulia sp.
Surirella sp.
Netrium sp.
Eunotia sp.
Pinnularia sp.
Amphora sp.
Achnanthes sp.

Description : + : Found
- : Not Found

Table 2. Distribution of Types of Diatoms in the Bahilang River at the Upstream, Middle and Downstream Stations in Tebing Tinggi City.

<table>
<thead>
<tr>
<th>NO</th>
<th>Types of Diatoms</th>
<th>Stations</th>
<th>Upstream</th>
<th>Middle</th>
<th>Downstream</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Navicula sp.</td>
<td></td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>9</td>
<td>Synedra sp.</td>
<td></td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>10</td>
<td>Rhopaldia sp.</td>
<td></td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>11</td>
<td>Nitzschia sp.</td>
<td></td>
<td>+</td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>12</td>
<td>Cymbella sp.</td>
<td></td>
<td>-</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>13</td>
<td>Frustulia sp.</td>
<td></td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>14</td>
<td>Surirella sp.</td>
<td></td>
<td>-</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>15</td>
<td>Stauroneis sp.</td>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>16</td>
<td>Nitzschia sp.</td>
<td></td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>17</td>
<td>Caloneis sp.</td>
<td></td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>18</td>
<td>Pinnularia sp.</td>
<td></td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>19</td>
<td>Achnanthes sp.</td>
<td></td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>20</td>
<td>Achnanthes sp.</td>
<td></td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Description : + : Found
- : Not Found

Table 3. Distribution of Types of Diatoms in the Padang River and Bahilang River at the Upstream, Middle and Downstream Stations in Tebing Tinggi City

<table>
<thead>
<tr>
<th>NO</th>
<th>Types of Diatoms</th>
<th>River</th>
<th>Padang</th>
<th>Bahilang</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Navicula sp.</td>
<td></td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>2</td>
<td>Synedra sp.</td>
<td></td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>3</td>
<td>Caloneis sp.</td>
<td></td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Nitzschia sp.</td>
<td></td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>5</td>
<td>Cymbella sp.</td>
<td></td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>6</td>
<td>Frustulia sp.</td>
<td></td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>7</td>
<td>Cymbella sp.</td>
<td></td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>8</td>
<td>Surirella sp.</td>
<td></td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>9</td>
<td>Eunotia sp.</td>
<td></td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>10</td>
<td>Pinnularia sp.</td>
<td></td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>11</td>
<td>Terpsinoe sp.</td>
<td></td>
<td>-</td>
<td>+</td>
</tr>
<tr>
<td>12</td>
<td>Plagiotropis sp.</td>
<td></td>
<td>-</td>
<td>+</td>
</tr>
</tbody>
</table>

Description : + : Found
- : Not Found

V. DISCUSSION

Based on the above research conducted on the Padang River and Bahilang River in Tebing Tinggi City in different locations, namely in the upstream, middle and downstream areas, there are some different diatom species in both rivers, but several diatom species are found in both rivers.

In a study conducted on the Padang river at the upstream station, 12 diatom species were found, namely: Synedra sp. Caloneis sp. Nitzschia sp. Cymbella sp. Fragillaria sp. Cyclotella sp. Asterionella sp. Frustulia sp. Surirella sp. Netrium sp. Eunotia sp., At the middle station found 10 species of diatoms, namely: Navicula sp. Synedra sp. Caloneis sp. Nitzschia sp. Cymbella sp. Fragillaria sp. Eunotia sp. Pinnularia sp. Amphora sp. Achnanthes sp. Pinnularia sp.
sp., and at the downstream station 12 diatom species were found, namely: Synedra sp. Caloneis sp. Fragillaria sp. Cyclotella sp. Asterionella sp. Frustulia sp. Surirella sp. Nitzschia sp. Cyclotella sp. Synedra sp. Fragillaria sp. Paraphorisma sp. Plagiotropis sp. The central station found 6 species of diatoms, namely: Navicula sp. Synedra sp. Rhopalodia sp. Nitzschia sp. Staurospira sp. Frustulia sp. Achnanthes sp. Plagiotropis sp., and at the downstream station 10 diatom species were found, namely: Navicula sp. Synedra sp. Rhopalodia sp. Nitzschia sp. Cymbella sp. Gamphonema sp., and at the downstream station 10 diatom species were found, namely: Navicula sp. Synedra sp. Rhopalodia sp. Nitzschia sp. Cymbella sp. Frustulia sp. Achnanthes sp. Gamphonema sp. Terpsinoe sp. Plagiotropis sp.

Diatom distribution varies depending on the environmental factors that influence it. The distribution that affects diatoms horizontally include the following:

- Temperature factor
  Where the temperature can affect the photosynthesis process in the waters both directly and indirectly. Diatoms are widespread in subtropical climates.
- Water flow
  Waters currents, where currents largely determine the distribution of diatoms that live as planktonic.
- Turbidity
  The more turbid aquatic ecosystem, the level of O₂ is also reduced and the sunlight is difficult to penetrate a certain. Thus inhibiting the process of photosynthesis and growth of the diatoms themselves.¹⁰

VI. CONCLUSION

Based on the results of the research conducted, it can be concluded:

3. Diatom species in the Padang river that are not found in the Bahilang river are Caloneis sp. Fragillaria sp. Cyclotella sp. Asterionella sp. Surirella sp. Nitzschia sp. Eunotia sp. Pinnularia sp. Amphora sp.
4. Diatom species in the Bahilang river that are not found in the Padang river are Rhopalodia sp. Staurospira sp. Gamphonema sp. Terpsinoe sp. Plagiotropis sp.
5. In the Padang and Bahilang rivers, there are some different types of diatoms found in the two rivers, but there are several types of diatoms that are found in both rivers. This can occur because some diatoms can adapt quickly so that they can live in various environmental conditions, while some are only able to live in certain conditions.
6. There are differences in the types of diatoms found in the Padang river and the Bahilang river so that it can help the investigator in revealing the crime scene or where the victim was first found, especially in the case of the victim drowning.

VII. SUGGESTION

1. Diatom identification results in this study, have not provided a comprehensive picture of the type of diatoms and the abundance of diatoms in the Padang River and the Bahilang river in Tebing Tinggi City which have only been carried out in a limited time span. Therefore it is necessary to do further research in a longer time span.
2. Diatom images in this study are less clear because it uses a mobile camera, it is hoped that subsequent studies will use a special camera that is compatible with a microscope.
3. Doing the same next research on rivers in Tebing Tinggi City.

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[35] South GR & A Whittick. Introduction to Phycology; 1987, P. 96


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Knowledge And Practice Regarding Oral Hygiene Among Primary School Children Of Selected Schools, Dhangadhi, Kailali

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1Department of Pediatric Nursing, NMCNC, Birgunj, Parsa
1Department of Medical Surgical Nursing, NMCNC, Birgunj, Parsa

Abstract- Background: Oral hygiene is the practice of keeping the mouth and teeth clean to prevent dental problems, especially dental caries, gingivitis and bad breath. The purpose of maintaining oral hygiene is to prevent the build-up of plaque, the sticky film of bacteria and food that forms on the teeth.1 This research study was conducted to find out the Knowledge and Practice regarding Oral Hygiene among Primary School Children of selected school, Dhangadhi, Kailali.

Methods: A Descriptive co-relational research design was used. A total of 112 primary school children of Hill World English Boarding School, Dhangadhi, Kailali were included as samples and total enumerative Sampling technique was used for sample selection. Data was collected by using structured knowledge and practice questionnaire.

Results: The study results shows that 12.5% respondents had inadequate knowledge, 58% respondents had moderate knowledge and 29.5% respondent had adequate knowledge regarding oral hygiene. A least (1.8%) respondent had good practice where as majority (67.9%) students had satisfactory practice and 30.45% respondents had poor practice regarding oral hygiene. There is no significant association found between level of knowledge and selected socio-demographic variables as well as level of practice and selected socio-demographic variables. there is statistically significant positive correlation found between the knowledge score and practice score of respondents’ regarding oral hygiene (P<0.001).

Conclusion: Finding of current study showed that the knowledge and practice about oral hygiene among primary school children was not satisfactory and had to improved significantly. School based health promotion for oral hygiene is a must for improving oral health among school children.

Index Terms- Knowledge, Oral hygiene, Practice, Primary School children

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Conflict of Interest: None
Permission from IRC: Yes

I. INTRODUCTION

Dental caries is a multifactorial oral disease developed by the localized dissolution of the tooth hard tissues, caused by bacteria.2,3 The dental caries burden has been increasing among children due to the unlimited consumption of sugary substances, poor oral care practices and inadequate health service utilization. Dental caries is most prevalent and chronic oral disease of childhood having multifactorial etiology. The etiological factors are host factors, microorganisms, diet and time.4 Dental caries is a common disease with low mortality and high morbidity and has great impact in the general health of a population.5,6

Nepal has a high morbidity of dental caries in all age groups of both genders. The disease is on different factors such as lifestyle, diet and lack of dental health care.5,6,7 The National Pathfinder survey of Nepal 2004 shows that 57.5% of five to six years age group and 25.6% of 12 to 16 years age group suffer from dental caries. Pain and discomfort due to untreated dental caries was 18% in five to six year old.1

Many children fail to brush their teeth effectively and tend to consume cariogenic foods and may underestimate health risks despite having basic knowledge of dental health, such as importance of proper brushing and diet in preventing dental caries.8 Poor oral health can have negative impacts on children’s quality of life and academic performance apart from causing chronic pain and discomfort .If untreated it can impact daily activities in terms of play, sleep, eating and school activity.9 As dental caries is the most common dental disease with high prevalence it is necessary to control the disease by assessing and rendering the treatment required along with spreading awareness regarding its prevention.10

Nepal is currently facing an oral healthcare crisis. Fifty-eight percent of children and 69 percent of adults in the country suffer from bacterial tooth decay. This can lead to infections, gum disease, and chronic pain as well as heart disease and diabetes. A national Oral Health Care Plan was drafted in 2004, but is being implemented at a glacial speed. And thousands of Nepalese in rural villages have no access to basic care such as fillings or even fluorinated toothpaste and water. Meanwhile, intense superstition...
surrounds dental care, including the belief that tooth extraction can cause blindness.\textsuperscript{11}

School is a place of learning for the children and is in fact the ideal setting for integrating oral health instructions in the curriculum. Children are receptive to guidance and familiar with the learning environment and culture. School teachers can effectively influence student’s knowledge and practices regarding oral health and can bring change in behavior. It is very important to target oral health education to the children since the lifestyle and hygiene practices once established at an early age can go a long way in spending rest of the life in a healthy way. They should be empowered to take control of their own health early in their lives and encouraged to develop positive attitude towards preventive measures.\textsuperscript{12}

The researcher felt that oral hygiene contributes a major role in the prevention of dental diseases. Hence assessing the knowledge and practice of primary school children regarding oral hygiene is important to identify the dental problems in order to manage and prevent the problems associated with oral health.

II. METHODS AND MATERIALS

A Descriptive co-relational research design was used for the study to achieve the study objectives. The population included both male and female primary school children of age group 6-11 years of selected primary school, Dhangadhari, Kailali. The total sample size was 112 students, who met the sampling criteria. Total enumerative Sampling technique was used for sample selection. The study was conducted in Hill World English Boarding School, Dhangadhari, Kailali. The researcher used structured knowledge and practice questionnaire to collect the data. The content validity of the research instrument was ascertained before the data collection. The reliability of tool was determined by pre-testing it in 12 samples (10\% of total sample) and was tested by using Split half method and the reliability of the tool was found 0.97 for knowledge and 0.89 for practice items. The researcher herself collected the data from 15\textsuperscript{th} July 2019 to 30\textsuperscript{th} July 2019. The data was collected and recorded systematically and was organized in a way that facilitated computer entry.

III. RESULTS

The data were analyzed using descriptive and inferential statistics. The results have been organized and presented as given below:

Section A: Description of the demographic characteristics of the respondents

Analyzed data reveals that, most 86.6\% of students were in age group 8-9 years. Majority (56.3\%) of students were male where as 43.8\% were female. Maximum (92.9\%) of students were Hindu and least (0.9\%) were Christians. Majority (73.2\%) of students were from nuclear family and only 5.4\% from extended family. Most of the students (57.1\%) had one sibling and least (1.8\%) had no sibling. Majority 52.7\% of students fathers had achieved secondary level of education whereas only 3.6\% were illiterate. Regarding mother’s education 33\% had achieved primary level of education whereas as least (7.1\%) were literate but no schooling. Among them, 42\% of students fathers had their self business and least (2.7\%) were farmers and among mothers majority (73.2\%) were housewives and 1.8\% were laborer.

Section B: Assessment of the level of knowledge regarding Oral hygiene

Table 1: Frequency and percentage of Respondent’s Level of Knowledge regarding oral hygiene

<table>
<thead>
<tr>
<th>Level of knowledge</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inadequate knowledge &lt;50%</td>
<td>14</td>
<td>12.5</td>
</tr>
<tr>
<td>Moderate knowledge 50-75%</td>
<td>65</td>
<td>58</td>
</tr>
<tr>
<td>Adequate knowledge &gt;75%</td>
<td>33</td>
<td>29.5</td>
</tr>
<tr>
<td></td>
<td>112</td>
<td>100</td>
</tr>
</tbody>
</table>

Section C: Assessment of the level of practice regarding Oral hygiene

Table 2: Frequency and percentage of respondent’s Level of practice regarding oral hygiene

<table>
<thead>
<tr>
<th>Level of practice</th>
<th>Frequency</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Good practice &lt;50%</td>
<td>2</td>
<td>1.8</td>
</tr>
<tr>
<td>Satisfactory practice 50-75%</td>
<td>76</td>
<td>67.9</td>
</tr>
</tbody>
</table>
Section D: Association between level of knowledge & level of practice and socio-demographic variable of respondents.

Table 3: Association between level of knowledge and socio-demographic variable of respondents’ n=112

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency of Level of knowledge</th>
<th>$\chi^2$</th>
<th>p-value</th>
<th>Df</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Inadequate</td>
<td>Moderate</td>
<td>Adequate</td>
<td></td>
</tr>
<tr>
<td>Age (in years)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6-7</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>6.664</td>
</tr>
<tr>
<td>8-9</td>
<td>11</td>
<td>58</td>
<td>28</td>
<td></td>
</tr>
<tr>
<td>10-11</td>
<td>2</td>
<td>6</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>7</td>
<td>38</td>
<td>18</td>
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</tr>
<tr>
<td>Female</td>
<td>7</td>
<td>27</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Religion</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Hindu</td>
<td>13</td>
<td>59</td>
<td>32</td>
<td>1.269</td>
</tr>
<tr>
<td>Other than Hindu</td>
<td>1</td>
<td>6</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Type of family</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nuclear</td>
<td>9</td>
<td>48</td>
<td>25</td>
<td>0.691</td>
</tr>
<tr>
<td>Joint</td>
<td>5</td>
<td>17</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Number of sibling</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;=1 sibling</td>
<td>8</td>
<td>38</td>
<td>213</td>
<td>0.063</td>
</tr>
<tr>
<td>&gt;=2 siblings</td>
<td>6</td>
<td>27</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Father education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Up to primary</td>
<td>3</td>
<td>11</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Secondary</td>
<td>8</td>
<td>36</td>
<td>15</td>
<td>3.084</td>
</tr>
<tr>
<td>Above secondary</td>
<td>3</td>
<td>18</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Mother education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>1</td>
<td>6</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Literate but no school education</td>
<td>2</td>
<td>5</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>6</td>
<td>25</td>
<td>6</td>
<td>10.073</td>
</tr>
<tr>
<td>Secondary</td>
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<td>17</td>
<td>14</td>
<td></td>
</tr>
<tr>
<td>Above secondary</td>
<td>1</td>
<td>12</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>Father occupation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Business</td>
<td>5</td>
<td>30</td>
<td>15</td>
<td>2.650</td>
</tr>
<tr>
<td>Laborer</td>
<td>2</td>
<td>7</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Service</td>
<td>7</td>
<td>28</td>
<td>17</td>
<td></td>
</tr>
</tbody>
</table>
Mother occupation

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housewife</td>
<td>11</td>
</tr>
<tr>
<td>Service</td>
<td>2</td>
</tr>
<tr>
<td>Business</td>
<td>1</td>
</tr>
</tbody>
</table>

Housewife 45 26 5.231 0.264 4
Service 6 5 0.000 0.988
Business 14 36 1.712 0.789

*P < 0.05 statistically significant values

Data presented in Table 3 shows that there is no significant association between level of knowledge and age, gender, religion, type of family and number of sibling, education of father and mother, occupation of father and mother occupation.

Table 4: Association between level of practice and socio-demographic variable of respondents’
n=112

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency of Level of practice</th>
<th>( \chi^2 )</th>
<th>P-value</th>
<th>Df</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>16 47</td>
<td>1.676</td>
<td>0.195</td>
<td>2</td>
</tr>
<tr>
<td>Female</td>
<td>18 31</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Religion</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hindu</td>
<td>31 73</td>
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<td>0.955</td>
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<tr>
<td>Other than Hindu</td>
<td>3 5</td>
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</tr>
<tr>
<td>Type of family</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nuclear</td>
<td>26 56</td>
<td>0.264</td>
<td>0.607</td>
<td>2</td>
</tr>
<tr>
<td>Joint</td>
<td>8 22</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of siblings</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;=1 sibling</td>
<td>20 46</td>
<td>0.000</td>
<td>0.988</td>
<td>2</td>
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<tr>
<td>&gt;=2 siblings</td>
<td>14 32</td>
<td></td>
<td></td>
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<tr>
<td>Father education</td>
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<tr>
<td>Illiterate</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Literate but no school</td>
<td>1 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary level</td>
<td>2 7</td>
<td>1.712</td>
<td>0.789</td>
<td>4</td>
</tr>
<tr>
<td>Secondary level</td>
<td>21 38</td>
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<td></td>
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<tr>
<td>Above secondary level</td>
<td>9 26</td>
<td></td>
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<tr>
<td>Mother education</td>
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<tr>
<td>Illiterate</td>
<td>4 5</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Literate but no school</td>
<td>5 3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary level</td>
<td>13 24</td>
<td>8.243</td>
<td>0.083</td>
<td>4</td>
</tr>
<tr>
<td>Secondary level</td>
<td>6 29</td>
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<td></td>
<td></td>
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<tr>
<td>Above secondary level</td>
<td>6 17</td>
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<tr>
<td>Father occupation</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Business</td>
<td>14 36</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laborer</td>
<td>3 7</td>
<td>0.266</td>
<td>0.875</td>
<td>2</td>
</tr>
<tr>
<td>Service</td>
<td>17 35</td>
<td></td>
<td></td>
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<tr>
<td>Mother occupation</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Housewife</td>
<td>21 61</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Laborer</td>
<td>1 1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self business</td>
<td>7 10</td>
<td>8.541</td>
<td>0.074</td>
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</tr>
</tbody>
</table>
**Section E: Correlation between knowledge score and practice score of respondents regarding oral hygiene.**

Table 6: Correlation between Knowledge Scores and Practice Scores of Respondents Frequency regarding oral hygiene

<table>
<thead>
<tr>
<th>Knowledge Scores</th>
<th>Practice Scores</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean ± SD</td>
<td>Karl Pearson’s coefficient</td>
</tr>
<tr>
<td>11.81 ± 2.79</td>
<td>0.434</td>
</tr>
<tr>
<td>6.08 ± 1.68</td>
<td></td>
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</tbody>
</table>

*Significant at the level of (p=0.05)

Table 6 shows that there is statistically significant positive correlation i.e. r= 0.434 between the knowledge score and practice score of respondents’ regarding oral hygiene (P<0.001).

IV. DISCUSSION

Regarding socio-demographic characteristics findings, majority (86.6%) of the students were in age group 10-11 years. Majority (56.3%) of students were male. Most (92.9%) of students belongs from Hindu religion. Majorities (73.2%) of the students were from nuclear family and majority (57.1%) of the students had one sibling. Majority (52.7%) of the students’ father had achieved secondary level of education and 33% of student’s mother had achieved primary level of education. Regarding occupation, 42% of the students’ fathers had their self business and majorities (73.2%) of mothers were housewife.

The study results showed that 12.5% respondents had inadequate knowledge, 58% respondents had moderate knowledge and 29.5% respondent had adequate knowledge regarding oral hygiene. The present study findings is consistent with the cross sectional study conducted in Jalandhar district, Punjab by Manveer, (2013), which reported that (23.1%) of respondent had adequate knowledge regarding oral hygiene.

A least (1.8%) respondent had good practice where as majority (67.9%) students had satisfactory practice and 30.45% respondents had poor practice regarding oral hygiene. These findings is consistent with the cross sectional study conducted in Iran by Aziz, (2014) which reported that there is positive correlation (r=0.695, p<0.001) between knowledge and practice regarding oral hygiene among the students.

V. CONCLUSION

One of the burning issues regarding practice of oral hygiene is the seriousness of regular visits to the dentist, not only when there is some dental problem but also for routine check-ups as a preventive measure against disease such as caries. A poor dental and oral health and untreated oral disease can have a significant impact on quality of life according to WHO report. The systematic school and community-oriented oral health promotion programs are needed to target the needs of primary school children. Also, information regarding oral health should be included on wider basis in the school curriculum in an attempt to prevent and control dental and oral diseases. The study concluded that there is a great need for focusing on awareness programme and good practices among primary school children since primary school children lack adequate knowledge and practice regarding oral hygiene for the prevention and management of oral and dental problem and to prevent from further complications.

REFERENCES


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The Impact of Online Consumer Reviews Dimension on Online Purchase Intentions In Tokopedia

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http://dx.doi.org/10.29322/IJSRP.10.01.2020.p9761

Abstract- This study aims to determine whether the dimensions of online consumer reviews consisting of source credibility, review quality, review quantity, review valence affect the online purchases intention in Tokopedia. The population in this study were all Tokopedia application users, while the sample in this study were users who made purchases using the Tokopedia application in the last 2 months with a total sample of 190 respondents. This study uses multiple linear regression analysis to determine the effect of source credibility, review quality, review quantity, review valence on purchase intentions. The results of this study indicate that the source credibility, review quality and review valence partially have a significant effect on purchase intentions, while the review quantity has no significant effect on purchase intentions.

Index Terms- online consumer review, source credibility, review quality, review quantity, review valence, purchase intentions

I. INTRODUCTION

Internet usage nowadays has increased very fast. The We Are Social Survey as of January 2018 states that the number of global internet users now touches 4.021 billion users with 53 percent penetration of the total population in the world. The level of internet usage is also claimed to have risen by 248 million users, which was previously 3.773 billion users in January 2017 (kompas.com accessed October 21, 2018). Through the 2018 APJII survey, 64.8% of Indonesia's population or 171.17 million people have been connected to the internet. The number of internet users shows an increase of 27.91 million, which was 143.26 million users in 2017.

The high level of internet usage is what caused the offline store to start turning into an online store. The results of research conducted by HaloMoney noted several modern retail brands that closed their stores throughout 2017 such as the Lotus Department Store, Matahari Department Store, Debenhams and Ramayana. (halomoney.co.id accessed on October 21, 2018). Companies that close their outlets generally have their own websites and even online applications for purchasing products.

The trend of online shopping is also increasingly in demand in Indonesia. This can be proven from the number of transactions of internet users who do online shopping in Indonesia during 2018 which increased by 151% compared to the previous year (source: cnbcingonesia.com accessed on November 11, 2019). The number of e-commerce users in Indonesia has also increased rapidly. The number of e-commerce users reached 139 million users in 2017, then rose 10.8% to 154.1 million users in 2018. The number of e-commerce users is predicted to reach 212.2 million users in 2023. The same thing also occur at the level of e-commerce penetration that is always increasing. Until 2023, the e-commerce penetration rate is predicted to reach 75.3% of the total population (katadata.co.id accessed on Oktober 21, 2019).

Tokopedia is one of the most popular e-commerce sites in Indonesia as a place for online shopping. The proof is that Tokopedia was ranked first with the highest number of visitors in Indonesia until July 2019, beating Shopee and Bukalapak. In addition, in 2018 Tokopedia has also become a favorite application on Google Play with more than 10 million downloads (source: tribunnews.com accessed 11 November 2019). From the transaction value, Tokopedia also recorded the largest transaction value compared to other e-commerce, which was US $ 5.9 billion in 2018. Even that number is predicted to reach US $ 37.45 billion in 2023 (katadata.co.id accessed on Oktober 21, 2019). The high intention of online shopping in e-commerce is directly proportional to the high level of consumer confidence in shopping online. The BrightLocal survey states that 93% of consumers read online reviews to make decisions and 85% of consumers trust reviews as much as they trust personal recommendations. Meanwhile, APJII survey results show that 62.8 percent of internet user respondents in Indonesia believe that online transactions are safe. Based on these facts, reading online reviews is one of the factors that can increase consumer confidence so that it can affect consumers' intention to shop online. While the research conducted by the author, on Sriwijaya.

http://dx.doi.org/10.29322/IJSRP.10.01.2020.p9761
University students in Palembang in 2019 showed that most respondents intend to shop for products in Tokopedia, but only a small proportion of respondents stated that they read the reviews first before intending to buy products in Tokopedia.

Part of the information created by website users who have purchased products is also called Online Consumer Reviews (OCRs). OCUs contain information and recommendations regarding products from a consumer perspective. Online Consumer Reviews itself consists of 4 dimensions: source credibility, review quality, review quantity, and review valence (Park, Lee & Han, 2007). Source credibility relates to the message recipient's perception of whether or not the source of the message is reliable, does not reflect anything about the message itself (Schepers, 2015). Review quality contains an objective and logical review, the delivery of which is understandable and relevant information on related products and services (Park, Lee & Han, 2007). According to Bataineh (2015) Review quantity is related to how many reviews of a product seen by consumers to find out whether the product is popular and has value or not. Review valence regarding the way the online review is viewed, for example viewed negatively or positively (Schepers, 2015).

Various phenomena indicate the factors that influence purchase intention. Several previous studies have also examined the effect of source credibility, review quantity, review quality, review valence on purchase intentions. Research from Atika et al (2012), Arora and Sharma (2018), Hui (2017), Sutanto and Aprianingsih (2016), Erkan and Evans (2016), and Amandhari (2016) support that the source credibility variable significantly influences intention purchase. While Johansen's and Hovland's (2012) research cannot reveal a significant effect of source credibility on purchase intentions, which means that a reviewer's credibility is not a significant indicator used by readers to evaluate e-WOM messages and influence purchase intentions.


Research by Xiaorong et al (2011), Sutanto and Aprianingsih (2016), Lin et al. (2011), Zhou et al. (2013) and Lee (2009) support that review quantity has a significant effect on purchase intentions. In contrast, research from Arora and Sharma (2018) states that there is no significant effect of the review quantity on purchase intentions.

Research by Zarco (2015) states that the review valence has a significant effect on purchase intentions. Furthermore, Ketelaar et al (2015) and Somohardjo (2017) stated that a positive review has a significant positive effect on purchase intentions. Whereas Ketelaar et al (2015) and Amandhari (2016) state that negative reviews have a significant negative effect on purchase intentions. In contrast, Togas, et al. (2019) suggested that the review valence did not have a significant effect on hotel booking intentions.

Based on the phenomena mentioned above, the writer is interested in testing the influence of the Online Consumer Reviews dimension consisting of source credibility, review quality, review quantity, and review valence on purchase intentions in Tokopedia. Therefore the title of this research is "THE IMPACT OF ONLINE CONSUMER REVIEWS DIMENSIONS ON ONLINE PURCHASE INTENTIONS IN TOKOPEDIA"

Online Consumer Reviews

Online consumer reviews (OCRs) are one type of e-WOM, including positive or negative statements made by consumers about products sold in online stores. OCUs contain information and recommendations regarding products from a consumer perspective. Online Consumer Reviews itself consists of 4 dimensions: source credibility, review quality, review quantity, and review valence (Park, Lee & Han, 2007).

Source credibility

Source credibility relates to the message recipient's perception of whether or not the source of the message can be trusted (Schepers, 2015). Source credibility is defined as the extent to which information sources are seen as competent, reliable and can be trusted by recipients of information. Consumers generally trust credible opinions from other experienced consumers (Arora & Sharma, 2018).

Review Quality

Review quality contain reviews that are objective and logical, understandable and have relevant information on related products and services (Park, Lee & Han, 2007). Reviews that are objective and clear, greatly affect consumers compared to opinions that are emotional and subjective. Likewise, reviews with transparent and useful arguments are more reliable than reviews with emotional content (Arora & Sharma, 2018).

Review Quantity

According to Bataineh (2015) review quantity is related to how many reviews of a product seen by consumers to find out whether the product is popular and of high quality or not. The large number of reviews and information on online platforms supports them to be more observable (Cheung & Thadani, 2012). The number of reviews can meet consumer information needs to strengthen certainty and can reduce doubts about the risks of online shopping (Arora & Sharma, 2018).

Review Valence
Review valence regarding the way the online review is viewed, for example, viewed negatively or positively (Schepers, 2015). Review valence can be either positive or negative. When the contents of a review are recommending a product, this is can be defined as a positive review. Conversely, when consumers recommend other products, this can be defined as a negative review (Somohardjo, 2017).

Purchase Intentions

According to Durianto (2003) purchase intentions is something related to consumers' plans to buy certain products, as well as how many units of product are needed in a certain period. According to Kotler and Keller (2009) purchase intentions is a behavior that arises as a response to an object that shows the customer's desire to make a purchase.

Relationship between Source Credibility and Purchase Intentions

If a review has a high source of credibility, then consumers will trust the message from the review, in other words the source credibility is how much a review reflects the reality in accordance with consumer evaluations. The better the source credibility of a review, it will increase consumer purchase intentions (Atika, Kusumawati, & Iqbal, 2012). Sutanto & Aprianingsih (2016) research also states that the source credibility has an influence on purchase intentions

\[ H_1 = \text{There is a significant effect of source credibility on online purchase intentions in Tokopedia.} \]

Relationship between Review Quality and Purchase Intentions

Review Quality is the part that most influences purchase intentions. Review quality is very important because consumers want to minimize risk when buying products (Susanto & Aprianingsih, 2016). A review that is clear, easy to understand and complemented by supportive opinions will generate positive buying intentions. (Arora & Sharma, 2018). Information quality is a significant predictor of purchase intention. This means that the higher the quality of information provided, the stronger intention of customers to buy the product (Atika, Kusumawati, & Iqbal, 2012).

\[ H_2 = \text{There is a significant effect of review quality on online purchase intentions in Tokopedia} \]

Relationship between Review Quantity and Purchase Intentions

One of the factors that influence consumer decisions in buying products or services is the amount of information that consumers receive (Park, Lee & Han, 2007). The more amount of e-WOM information available, the higher the level of consumer confidence. In the internet environment, consumers influence each other. The influence on purchase intentions will be stronger when consumers have the same opinion. The quantity of e-WOM information has a significant positive effect on consumer trust and consumer trust is positively related to purchase intentions. That is, the greater the amount of e-WOM information, the greater the level of consumer confidence, and the stronger the consumer's purchase intention (Xiaorong et al, 2011). The more number of reviews of a particular product brand shows that more people have used the product. The results of the study show that the more reviews there are, the more popular and more attractive the product is in a community (Sutanto & Aprianingsih, 2016).

\[ H_3 = \text{There is a significant effect of review quantity on online purchase intentions in Tokopedia.} \]

\[ H_4 = \text{There is a significant effect of review valence on online purchase intentions in Tokopedia.} \]

II. MATERIALS AND METHODS

2.1 Research Model

Based on the explanation above, the research model in this study is:

![Research Model Diagram]

2.1 Research Hypothesis

\[ H_1 = \text{There is a significant effect of source credibility on online purchase intentions in Tokopedia.} \]

\[ H_2 = \text{There is a significant effect of review quality on online purchase intentions in Tokopedia.} \]

\[ H_3 = \text{There is a significant effect of review quantity on online purchase intentions in Tokopedia.} \]

\[ H_4 = \text{There is a significant effect of review valence on online purchase intentions in Tokopedia.} \]
2.3 The Scope Of Research
The scope of this research is more focused on the effect online consumer reviews dimension consisting of source credibility, review quality, review quantity, review valence on purchase intentions in Tokopedia in 2019.

2.4 Research Design
The research design included a descriptive causality study. Because seen from the main purpose of the variables to be studied this is to describe the causal relationship of the phenomenon or problem solving studied to see the effect of source credibility, review quality, review quantity, review valence on purchase intentions in Tokopedia

2.5 Data Types and Sources
The type of data used in this research is quantitative data. In this study, quantitative data were obtained from questionnaires distributed and filled out by respondents. This study uses primary data sources. The primary data in this study are in the form of answers to the questionnaire questions given to respondents of Tokopedia application users. Data collection techniques in this study is to use a questionnaire or questionnaire technique. The questionnaire in this study used closed questions that were distributed online in the Tokopedia application to prospective respondents. This data collection technique is used to determine the perception of the effect of source credibility, review quality, review quantity and review valence on online purchase intentions in Tokopedia.

2.6 Population and Sample
The population in this study is the Tokopedia application user. The sample size taken in this study is between 110 to 220 samples. According to Hair et. al (1998), the number of samples in a study is at least 5 to 10 times the questions for all variables or has a ratio of 5:1 to 10:1. Therefore a minimum of 95 samples (19 questions multiplied by 5) up to 190 samples (19 questions multiplied by 10) were obtained in this study. The sampling technique used by the author are non-probability sampling. While the non-probability sampling method used in this study was purposive sampling. The sample criteria chosen were respondents who made purchases using the Tokopedia Application in the last 2 months.

2.7 Data Analysis Technique
2.7.1 Instrument Testing
The instrument used in this study was a questionnaire, which is a list of statements given to Tokopedia users.

Validity Test
Validity test is used to measure the validity of a questionnaire. Criteria are said to be valid if the value of $r$ value > value of $r$ table.

Reliability Test
Reliability test is a tool to measure a questionnaire which is an indicator of a variable. A questionnaire can be declared reliable if the answers from respondents are consistent or constant.

2.7.2 Partial Test (t Test)
- If $F$ value < $F$ table then $H_0$ is accepted and $H_a$ is rejected. This means that there is no influence of the independent variables on the dependent variable simultaneously.
- If $F$ value > $F$ table then $H_0$ is rejected and $H_a$ is accepted. This means that there is an influence of the independent variables on the dependent variable simultaneously.

III. RESULT

Validity test

<table>
<thead>
<tr>
<th>Table 1 Validity Test Results</th>
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<tbody>
<tr>
<td>No.</td>
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</table>

The significance level in this study was 0.05, so the $r$ table was 0.1424. Based on table 1, it is known that all statements used are valid. This is because all $r$ value are positive and greater than $r$ table. Furthermore, researchers conducted a reliability test, where the results can be seen in the following table:

Reliability Test

<table>
<thead>
<tr>
<th>Table 2 Overall Reliability Test Results</th>
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<tbody>
<tr>
<td>No.</td>
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<tr>
<td>-----</td>
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<tr>
<td>1.</td>
</tr>
<tr>
<td>2.</td>
</tr>
<tr>
<td>3.</td>
</tr>
<tr>
<td>4.</td>
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</tbody>
</table>
Table 2 shows that all Cronbach’s Alpha research variables are worth more than 0.6, which is 0.878; 0.916; 0.912; 0.910 and 0.915, which means overall, each variable has a high consistency and reliability.

Normality test

Normality test can also be carried out using the Kolmogorov-Smirnov test. If Sig. > 0.05 in the Kolmogorov-Smirnov test, the regression model has a normally distributed residual. The normality test results can be seen in table 3 below:

<table>
<thead>
<tr>
<th>Model</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 (Constant)</td>
<td>0.107</td>
</tr>
<tr>
<td>Source Credibility</td>
<td>0.007</td>
</tr>
<tr>
<td>Review Quality</td>
<td>0.000</td>
</tr>
<tr>
<td>Review Quantity</td>
<td>0.059</td>
</tr>
<tr>
<td>Review Valence</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Based on table 6, it is known that there is a significant effect between the source credibility (X1), review quality (X2) and review valence (X4) on purchase intentions (Y), where this is evidenced by the value of each coefficient Sig. < 0.05. Whereas for the review quantity (X3) there is no significant effect on purchase intentions (Y), this is evidenced by the coefficient value Sig. > 0.05.

Determination Coefficient Test

Based on the determination coefficient test presented in table 7, it is known that the Adjusted R Square is worth 0.885 or 88.5%. This shows that the source credibility, review quality and review valence influence 88.5% of online purchase intentions in Tokopedia.

IV. DISCUSSION

The Effect of Source Credibility on Online Purchase Intentions in Tokopedia

Statistical test results show that the Source Credibility variable has a significance value of 0.002 (smaller than 0.05) so that the first hypothesis (H1) is accepted, namely source credibility has an effect on online purchasing intentions in Tokopedia. The results of this study are in line with the research of Atika, Kusumawati, & Iqbal (2012), Arora & Sharma (2018), Hui (2017), Sutanto & Aprianingsih (2016), Erkan & Evans (2016), and Amandhari (2016) which states that source credibility affects purchasing intentions.

The results of this study indicate that the credibility of the review given will affect one’s purchase intentions. This is also supported by a Speigel Research
Center survey in 2017, which shows that reviews given by verified reviewers increase the credibility of the review and also increase consumer purchase intentions. The survey suggests that intention to purchase can be increased by 15% when consumers read the reviews given by verified reviewer compared to when reading the reviews given by the anonymous reviewer.

The Effect of Review Quality on Online Purchase Intentions in Tokopedia

Statistical analysis showed that the variables Review Quality has a significance value of 0.009 (less than 0.05) so that the second hypothesis (H₂) is received, the review quality affects the purchase intentions in Tokopedia. The results of this study are in line with research by Atika, Kusumawati, & Iqbal (2012), Arora & Sharma (2018), Sutanto & Aprianingsih (2016), Johansen & Hovland (2012), Lin, Lee & Horng (2011), Zhou, Liu, & Tang (2013), Lee (2009), Erkan & Evans (2016) which states that review quality were significantly affect the purchase intentions.

Based on the results of this study, it can be concluded that the quality of the review will affect purchase intentions. Reviews that are objective and logical and their delivery can be understood and relevant will increase purchase intentions.

The Effect of Review Quantity on Online Purchase Intentions in Tokopedia

Statistical test results show that the Review Quantity has a significance value of 0.059 (greater than 0.05) so that the third hypothesis (H₃) is rejected, meaning that the review quantity does not significantly influence the online purchase intentions in Tokopedia. The results of this study are in line with the research of Arora & Sharma (2018) which also states that there is no significant effect between review quantity and purchase intentions.

Review quantity related to the number of reviews that exist on a product. The results of this study indicate that the large number of reviews does not significantly affect a person's purchase intentions. This is in line with the facts that the large number of reviews is not the important thing for consumers. Based on a survey conducted by BrightLocal, consumers only read an average of 10 reviews and only 20% of consumers want to read more than 11 reviews.

The Effect of Review Valence on Online Purchase Intentions in Tokopedia

Statistical analysis showed that reviews valence has a significance value of 0.006 (less than 0.05) so that the fourth hypothesis (H₄) is received, the review valence affect the online purchase intentions in Tokopedia. The results of this study are in line with research by Zarco (2015), Ketelaar et al. (2015), Somohardjo (2016), and Amandhari (2016) which show that review valence were significantly affect the purchase intentions.

The results of this study indicate that the valence review will affect person’s purchase intention. In other words, the positive reviews will increase a person's intention to purchase and the negative reviews will reduce a person's intentions to purchase. This is also supported by a survey conducted by BrightLocal in 2018 which stated that 68% of consumers would be more interested in what is being offered by the business after reading the positive reviews.

Conclusion

Based on the results of the research described earlier, the following conclusions can be drawn:

1. Source Credibility has a significant effect on online purchase intentions in Tokopedia.
2. Review Quality has a significant effect on online purchase intentions in Tokopedia.
3. Review Quantity has no significant effect on online purchase intentions in Tokopedia.
4. Review Valence has a significant effect on online purchase intentions in Tokopedia.

Recommendations

The suggestions that the author can give in this study are as follows:

1. Marketplace Tokopedia should pay attention to how the reviews are there in Tokopedia really reliable and actualy comes from consumers who purchase the product. Marketplace Tokopedia must crack down firmly shops online that do the fictitious transaction with the purpose of giving a good review for the products that they sell.

2. Marketplace Tokopedia should give appreciation to online store who sell products in Tokopedia that have good quality of service. It is intended that the consumers are satisfied with shopping in Tokopedia so they can provide positive reviews for the product they purchased.

REFERENCES


Sustainability in Nepalese Tourism Industry

Niranjan Ojha (Ph.D.)

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Abstract: Ecotourism, a burning issue and a concern of Nepal. Nepal has attempted it in the industry for sustainability. UN Sustainable Development Goals focuses on sustained, inclusive and sustainable economic growth. The goal 12 focuses on sustainable consumption and production and specifically calls out a role for Travel & Tourism. In Nepalese perspective, increased graph of tourist arrival indicates that it is the right time to implement the principles of sustainability in the industry. Nepal Tourism Policy 2009, prioritizes tourism industry as an important tool for its socio-economic development. Direction of the policy is quality improvement, foreign reserve collection and creating employment opportunities to improve the living standard of Nepalese people. Vision 2020, tourism strategy, focuses on sustainable tourism, expecting two million tourists and creating employment to one million on the year 2020.

Proper use of sustainable tourism principles in Nepalese tourism industry will be very beneficial for its sustainability. Sustainable tourism has been priorities by Nepal government since long and tried to implement its three major aspects but the outcome is not satisfactory. For its sustainability much more has to be done in coming days.

Keywords: Sustainable Tourism, Eco-Tourism, Tourism development.

Background

World Tourism Industry is in a flux. UNWTO estimated in 2018 that international tourist arrivals will increase 6% (1.4 billion) and 3.7% growths in economy. It reached 64million with (+10%) in the Middle East, 67million with (+7%) in Africa. Asia and the Pacific got 343 million and Europe 713 million (both at +6%) growth (UNWTO, 2019).

UNWTO focused 2019 on education, skills and job creation (UNWTO, 2019). UNWTO’s long-term forecast published in 2010 predicted that international tourist arrival will reach 1.4 billion by 2020 which was already achieved on 2018. Strong economic growth after recession, affordable air fare and easy visa facilitation around the world has accelerated it (UNWTO, 2019).

Tourism isn’t a new phenomenon in the world history. If we study prehistory or protohistory or archeology we will come to know that human beings have been moving from place to place for about 1 million years (Kunwar, 2012.P.17). After the First World War people became anxious to see the effect of destruction which curiosities people to travel on those places (Kunwar, 2012.P.17). International tourism has geared up after the Second World War.

Tourism is not new for Hindus. In Sanskrit literature, there are different types of tourism known as paryatan (going out for pleasure and a knowledge), deshatan (going to the places of religious importance) etc. derived from root atan (Negi, 1982.P. 22). Till Rana regime Nepal was isolated from international contact because of closed door Rana policy which continued till 1950. The democratic movement of 1951 marked a new era in Nepal. In 1950-51, a popular democratic movement was launched which overthrew the Ranas. After this, changes were witnessed in the country. Nepali people were liberated and Nepal was opened for the visitors (Ojha, 2018: 91). Before 1950’s only handful of tourist visited Nepal under strict permission of Rana regime. Now, tourism has been recognized as a highly paying industry and very important source of earning.

Basically, sustainable tourism expects minimum impact on socio-culture and environmental issue. It is expected that principles of sustainability must apply by the stakeholders while visiting. Sustainable tourism is also called a responsible tourism as each and every participant has to take responsibility (Thapa, 2012.P.17).

Ecotourism is a most concerned and a burning issue. Many developing countries like Nepal are trying to achieve sustainability through eco-tourism. Nepal has a lot of opportunities in the industry because of its diversity. Thus the concerned authorities must be integrative, collaborative and comprehensive to achieve real outcome of ecotourism by realizing importance of environmental, social and economic imperatives for its sustainability (Thapa, 2012.P.17).

Vision 2020, an ambitious plan of Nepal government to welcome two million tourist and creating job opportunities for one million people for its sustainability, was already forecasted. Tourist arrival has crossed the estimated target of (1million) in 2019. It seems vision 2020 meets its given target if the situation remained same as 2019 (NTB Press release).

Statement of the Problem

Nepal, a diversified Himalayan country, is a homeland for international visitors. The lowest point 59 meter above sea level in Terai region and the highest point Everest, 8848 meter above the sea level; the two points are in a straight line only 200k.m. apart, can only found in Nepal. Besides, homely environment, friendly people, natural beauty, national heritages, flora and fauna are the other products of Nepalese tourism Industry. Because of such diversity –

1. Tourism is the backbone of Nepalese hospitality industry.
2. Sustainable tourism model has been efficiently practiced in Nepal.

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Some national and international articles tried to address on sustainable tourism and its practice in Nepal but they don’t cover the overall aspects of sustainability. This article intends to identify some unidentified problems on sustainability in Nepalese tourism industry.

Research Question

So many such problems have been dealt by so many researchers listed in review of literature. There are some areas which are not addressed that are being focused by this research. The research tries to answer following question,

1. Why tourism is the backbone of Nepalese industry
2. How sustainable tourism is practiced in Nepal

Objective of the study

In order to present the study two main objectives were selected:

1. To analyze the sustainable tourism practice in Nepalese tourism industry.
2. To explore tourism as the backbone of Nepalese industry.

Methodology

This article is based upon a qualitative analysis. Descriptive, analytical as well as informative method has been used in this research. This research consists of present context data but some historical references are cited in the appropriate places. Basic source of information for this research is secondary but primary information has not been avoided in this research. Relevant books, journal articles and government publications have been used properly. Published government data has been used as primary sources. All the information collected has been classified, summarized, analyzed and some reflection will be made for this research.

Review of the Literature

Sustainable Development

A report by World Commission on Environment and Development (WCED, 1987) entitled “Our Common Future” is on sustainable development. The commission has defined “Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs”.

Ecotourism as sustainable tourism

Ecotourism is defined as the science of the relationships between organism and environment. The definitions about ecotourism reported in the Travel Industry Association of America’s study, Tourism and the Environment are as follows:

- Ecotourism is environmentally friendly travel.
- Ecotourism is a tool for conservation.
- Ecotourism is ecologically responsible tourism (Kunwar, 2012:125)

According to (Miller & Ward 2005), (WCED, 1987) suggested that sustainable development is largely a western invention in a widespread perception and a product of the US conservation movement. “Horochowski and Moisey(2008) defines sustainable tourism as present benefit with the protection of future opportunities to the people.

These literatures don’t support the raised research questions but it is partially helpful to fulfill theoretical aspects of sustainable tourism. Hence, I have reviewed the available literature for this research.

Discussion

193 countries in September 2015 agreed the strategies of UN Sustainable Development Goals. The 17 goals and 169 targets will guide the decisions that countries take over the years to 2030 in order to help them achieve strong economic foundations and a better future. Regarding of revenue, employee count, or geographic reach and even whether they realize it or not, every organization has a sustainability strategy (https://www.wttc.org, 2017).

Tourism is in flux. International tourist arrival reached 1.4 billion in 2018 in Europe which is an 6% growth than 2017. Arrivals in South Asia grew 5%, South-East Asia 7% and Oceania 3%. Arrivals to North-East Asia increased by 3%. 217 million international tourists visited The America in 2018 whereas 67 million tourists visited Africa in 2018. The Middle East increased by 10% in 2018 (UNWTO, 2019). 134 million Chinese tourists visited all over the world in 2018 and they spent about $ 120
billion USD (http://www.globaltimes.cn, 2019). In 2017, 2.5 million Chinese tourist visited Tibet. An average expense of the Chinese tourist is 100 thousand per person (Thapa, 2018.P.7) which is encouraging figure in tourism industry. According to World Travel & Tourism Council (2017), the Travel & Tourism generated 10.4 percentage of global GDP and supported 313 million jobs or 9.9% of total employment in 2017, equivalent to 1 in 11 jobs in the global economy (WTTC,2017).

Tourist Trend in Nepal

Trend of tourist arrival was in increased order up to 2012 which declined thereafter. Year 2015 was most shocking in Nepalese tourism industry having decrease by 32 percent compared to 2014(Nepal Tourism Statics, 2016:11). After 2015 it gradually geared up. According to the Nepal Tourism Board (NTB) totally 969,287 tourists visited Nepal via air and 203,785 tourists came via land in 2017(NTB Press release, Jan08, 2019). International tourist arrivals geared up in 2018 after the earthquake of 2015 and reached above the one million. A total of 1,173,072 visitors visited Nepal in 2018 which is of 24.77% increment of the same period in 2017(NTB Press release,Jan08,2019).

Tourist arrival from South Asian countries increased in 2018. Indian increased by 25.1%, Sri Lankan by 55%, Chinese by 46.8%, in 2018. The overall arrival from SAARC countries grew up to 26.4 % in 2018. Similarly, the visitors from Thailand, South Korea and Japan from Asia have also increased by 36%, 8.3% and 8.9% respectively in comparison to 2017 (NTB Press Release, Jan08, 2019). The European arrivals increased by 23.3%, American by 16% and Australian 15.1% in 2018 (NTB Press Release, Jan08, 2019).

Tourist arrivals from India in February 2019 increased by 92.5% in comparison to the figures of February 2018 and reached 14,571. Likewise, 14,831 Sri Lankan visitors came to Nepal in February 2019. SAARC countries contribute a growth of 85 % over the same month of 2018 (NTB Press Release, Feb.10, 2019). 16,205 Chinese tourists visited Nepal in February 2019, which is 5.3% more than February 2018. Visitors from Thailand, Japan and South Korea have also increased significantly by 109 %, 20 % and 47.2% respectively in comparison to February 2018 (NTB Press Release, March 11, 2019). Official data till February has been published by NB.

The European arrivals have also geared up in 2019. Arrival from the United Kingdom-5268(+8.7), Germany-3340(+27.9) and France- 1978(+7.6) reached respectively. The total European arrivals in February 2019 reached 17,789 with aggregated growth of 11.6 % (NTB Press Release, March 11, 2019). US visitors to Nepal in February 2019 were 7,133(+5%) than the figures of February 2018. Likewise, the number of Australians visitors to Nepal in February 2019 reached 2,978 which is 17.4% more than in February 2018 (NTB Press Release, March11, 2019).

Though India is the number contributor in Nepalese tourism but interestingly, more visitors came from China and Sri Lanka in February 2019 than from India, which is surprising incident for the industry the arrivals from India included only those who traveled by air to Nepal) ((NTB Press Release, March 11, 2019).

The above figure indicates that tourism is rapidly growing in Nepal.

Tourist Arrival in Nepal

<table>
<thead>
<tr>
<th>Indicators</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tourist Arrival by</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air</td>
<td>407412</td>
<td>572563</td>
<td>760577</td>
</tr>
<tr>
<td>Land</td>
<td>131558</td>
<td>180439</td>
<td>179641</td>
</tr>
<tr>
<td>Total</td>
<td>538970</td>
<td>753002</td>
<td>940218</td>
</tr>
<tr>
<td>Average Length of Stay</td>
<td>13.16</td>
<td>13.4</td>
<td>12.6</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>289158</td>
<td>399091</td>
<td>509598</td>
</tr>
<tr>
<td>Female</td>
<td>249813</td>
<td>353911</td>
<td>430620</td>
</tr>
</tbody>
</table>

(Source-Nepal Tourism Statistics 2018,.P:11)

Year 2019 seems remarkable improvement in tourist arrivals. Early data published by NTB in February 2019 has remarks a continuing growth trend. According to the Immigration Department (and its offices) a total of 124,421 (97,694 by air) and (26,727 overland) international visitors visited Nepal in February 2019 with increment of 39 % over the same period in 2018, is a good sign for Nepalese Tourism.

Eco-tourism as Sustainable Tourism

Sustainable tourism development guidelines and management practices are applicable to all forms of tourism in all types of destinations, including mass tourism. Sustainability principles refer to the environmental, economic, and socio-cultural aspects of
tourism development, and a suitable balance must be established between these three dimensions to guarantee its long-term sustainability (Kunwar, 2012: P.17) which has been practicing in eco-tourism.

**Sustainable Tourism Practice in Nepal**

Tourism for Rural Poverty Alleviation Programme (TRPAP) is an initiative of the Nepal Government toward eco-tourism in Nepal with technical and financial support from various international development agencies and non-government organizations which is contributing to the poverty alleviation objective of the government through sustainable tourism development that is pro-poor, pro-environment, pro-rural communities and pro-women, making the benefits of tourism reach grass-roots level in the specific programme sites (Ojha, 2018:175).

Eco-tourism is the only model that still shown constant improvement for its sustainability. Basic tourism infrastructure and facilities such as clean drinking water, sanitation, transportation system and roadways are fundamentals to attract more tourists for sustainable tourism development in Nepal. If basic infrastructures and facilities are provided into the country, the flow of tourists also increases. If the number of tourist increases, the economy of the local stakeholder will be increased (Ojha, 2018:177).

Recent developments on the major trekking trails especially on the Annapurna and Everest region have been a serious concern to both the environmentalists and locals and for the ecotourism. Because of the increased number of tourist and teahouses in the trekking trails and unplanned road connectivity, indirectly increased the demand of wood and fuel which led deforestation as well spoil the nature. Another problem is the solid waste management. Waste matter such as plastic materials, oxygen cylinder and so on, in the trekking trial has been increasing rapidly without the proper mechanism for disposal (Ojha, 2018:177) is a big challenge.

**Conclusion**

Nepal, a small Himalayan country, sandwiched between China and India is a land locked country. Government data shows that Nepal is importing a lot than its export. Thus, tourism is the backbone for national development which can also fulfill the sort of foreign reserve. If we compare the data of tourist arrivals in last few years we can see Nepalese tourism is heading towards mass tourism. Many tourists mean a big challenge to manage the balance between human and nature. In one hand tourism is creating opportunities and the other hand there is a big challenge for its sustainability. So it is the right time to implement the principles of ecotourism for its sustainability. Ecotourism is the only tool for sustainable tourism development providing maximum benefits for local communities with environmental conservation through maximum involvement of all stakeholders.

Though many national and international agencies have also been continuously supporting the development of ecotourism in Nepal but the outcome is not satisfactory.

Though ecotourism is the high priority of Nepal government and government is trying its best for sustainability but still there are many laps in this industry. Nepal is going to celebrate tourism year 2020, in this very situation, balancing human beings and nature, is a big challenge for its sustainability. Finally, Nepalese tourism has a lot of opportunities as well as a bundle of challenge.

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Correlational Study Of Mathematics And Physics 
Students’ Performance For 2015-2017 Mock 
Examinations: A Case Study Of Senior Secondary Two 
(SS2) Students In Ibesikpo Asutan Local Government 
Area Of Akwa-Ibom State, Nigeria.

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Abstract
The study correlated the performance of students in Mathematics and Physics in Senior Secondary Two (SS2) mock examinations for 2015, 2016, and 2017 in Ibesikpo Asutan Local Government Area of Akwa Ibom State. Four research questions and four hypotheses were formulated to guide the study. The study adopted correlational design. The population comprises 2561 physics students who partook in mock examinations for 2015, 2016, and 2017 sessions. Purposive sampling technique was used to select four (4) from sixteen (16) secondary schools in the study area. 723 (28.2%) physics students were obtained as sample for the study. Mathematics and Physics scores were extracted from the SS2 mock examination results for 2015-2017 obtained from the Examinations Division, Ministry of Education, Akwa Ibom State for the study. The Data were analyzed using Pearson’s Product Moment Correlation (r). The result revealed that students’ performance in mathematics and physics in (SS2) mock examinations for 2015, 2016, 2017 and 2015-2017 correlated significantly. It was recommended among others that guidance should be provided to the students on significance of mathematics as an instrument of communication in physics. This will lead to appreciation of mathematical calculations involved in physics and thus raise the performance of students in physics.

Keywords: Mathematics, Physics, Students Performance.

Introduction
Education in Nigeria is oriented towards achieving a better future for its citizens. It is an avenue of training and learning especially in schools or colleges, to improve knowledge and develop skills. According to FGN (2013), Education is a cornerstone for development which forms the basis for literacy, skills acquisition, technological advancement and ability to harness human and materials resources towards the achievement of societal goals.

Education could be termed as a process in which individuals’ physical abilities, emotional abilities, social abilities, and intellectual abilities are developed. It is to actualize human potential so that the individual can become something more than what he was before. Hence, Ugwanyin (2003) stated that education is the process were society establishes to assist the young to learn and understand the heritage of the past, participate productively in the society and contribute meaningfully for the development of
the society. It is an element that stimulates social economic development and advances several government policies documents and various scholars (Selina, 2012). Education prepares the individuals for the development of the right type of personality required for living in the society; equipped the individuals with knowledge, skills and values that are cherished and valued by the society.

The importance of education in the development of man cannot be overemphasized. Education is the mainstays through which science and technology tools that form the bedrock for any meaningful development of a nation is achieved. Science and technology is so dominant in the world to that almost everything is now scientific and technological in nature. Science is the basic tool for which the present-day technological development is accomplished. Science is the rational and systematic study of the environment through experimentation and observation with the view to understanding the environment in order to manipulate and control it for betterment of human conditions (Njoku, 2007).

Physics is one of the most important science subjects taught in senior secondary schools and higher institutions throughout the world due to its relevance to science and technological development. The importance of Physics as a subject in our schools and everyday life cannot be overemphasized. As appended in FGN (2013), Physics is a core science subject being offered in Nigerian schools and it forms the basis for the nation’s technological advancement and human resource development. In line with this, physics is the rudiment of all scientific careers which include medicine, pharmacy, engineering, and technological studies. It is the scientific study that deals with the relationship between energy and matter, and its knowledge has contributed greatly to the production of instruments and devices of tremendous benefits to human race.

Awodun and Ojo (2013) opined that almost every life fields have relation with Physics such as organisms or inanimate from engineering to mathematics, biology and chemistry. Mekonnan (2014) opined that without the knowledge of physics, human will face difficulties in exploring the universe. Siddiqui and Khatoon (2013) stated that understanding of Physics helps to understand the content of the universe and for students, it helps to develop observation skills, accuracy, analysis ability, creative thinking. Siddiqui and Khatoon (2013) further stated the acquisition of the knowledge of physics is very important for science students. Hence, no science student is admitted into the university, polytechnics, and colleges to pursue any science course among which are science education, engineering, medical and biomedical sciences, technological studies, computer science and pharmaceutical science without a credit level pass in Physics.

It is rather unfortunate that, in spite of the recognitions given to Physics as one of the compulsory science subjects at the secondary school level as contained in National Policy of Education (NPE), the performance of students in physics have been worrisome. This has become a great concern to many which include researchers, teachers, parents, administrators, physicists, mathematicians, physics educators, mathematics educators and government. The search of ways to improve the poor performance of students has resulted to attributing it to various factors which include inadequate resources, teacher’s professional commitment, creativity, mechanical skills, initiative and resourcefulness, poor laboratory facilities, poor thinking and learning environment and students’ attitude towards physics.
Physics is one of the science subjects that involve a lot of calculations. This is why Kaya and Boyuk, (2011) opined that the choice of science subjects mostly Physics in Nigerian schools is much dependent on the learner’s ability on mathematics because proficiency in mathematics is of basic importance to the study of Physics in particular and science in general. Mathematics have some relations with physics such as volumes, pressure, temperature, are revealed through the use of mathematical concepts and change of subject of formula in mathematics helps a great deal in understanding density in physics.

Mathematics is the study of quantity, structure, space and change. Oyedeji (2011) described mathematics as a creative language, a tool and a process. It operates with its own language, with signs, vocabularies, symbols as well as its structures (Effiong, 2015). The language of Mathematics can be looked at as the use of symbols, signs, rules, and formulas to represent ideas, concepts and relationship existing between concepts. It plays the role of verbal symbols, which can represent concepts and be used as stimuli for the internalized manipulation of concepts in science especially physics. However, Mathematics is a body of knowledge, denoted and enacted in terms of a standardized language. Ezenwean (2006) opined that mathematics is a branch of knowledge that seeks to improve on human perception and immediate environment by using clear, logical, precise and exact thinking processes.

Mathematics as a body of knowledge assist in the understanding of other subjects such as the physics. Thorndike and Woodworth (1901) in their theory of identical element stated that transfer of knowledge would take place from one situation to another if the two situations shared identical or common elements. Thus, two tasks which share some set of stimulus features are possible candidates for learning transfer. Looking at the numerous identical elements or features that exist between mathematics and physics, it can be that when learners are properly guided in mathematics learning, there may be the possibility for such group of learners to recall and transfer such concepts into physics learning. Harlow (1949) in his theory of learning to learn stated that individuals usually improve on their ability to learn tasks when they practice on a series of similar or related tasks. Badru (2004) suggested that the choice of science subjects mostly Physics in Nigerian schools is much dependent on the learner’s ability on Mathematics because proficiency in mathematics may be of basic importance to the study of Physics in particular and science in general. On this regard, the researchers examined the relationship between mathematics and physics on students’ performance.

Statement of the Problem

Nigerian science education system is plagued with lots of problems and one of the most serious problems is continuous poor academic performance of students in Physics particularly and science in general. This result has resulted to the search for various ways to improve the performance of students in physics by researchers, teachers, parents and government. It is on this note that the researchers intended to find if performance of students in mathematics will correlate with their performance in Physics in secondary school level.

Purpose of the Study
The purpose of this study was to investigate the correlation between the performance of students in mathematics and physics in senior secondary two (SS2) mock examinations 2015-2017 in Ibesikpo Asutan Local Government Area, Akwa Ibom State. The study specifically sought the following objectives:

(1) Ascertain the relationship between the academic performance of students in mathematics and physics in Senior Secondary Two (SS2) 2015 mock examination.
(2) Determine the relationship between the academic performance of students in mathematics and physics in Senior Secondary Two (SS2) 2016 mock examination.
(3) Investigate the relationship between the academic performance of students in mathematics and physics in Senior Secondary Two (SS2) 2017 mock examination.
(4) Examine the relationship between the academic performances of students in mathematics and physics in Senior Secondary Two (SS2) 2015-2017 mock examinations.

Research Questions

In considering the purpose of this work, the following research questions were formulated to guide the study.

(1) What is the relationship between students’ academic performance in mathematics and physics in Senior Secondary Two (SS2) 2015 mock examination?
(2) What is the relationship between students’ academic performance in mathematics and physics in Senior Secondary Two (SS2) 2016 mock examination?
(3) What is the relationship between students’ academic performance in mathematics and physics in Senior Secondary Two (SS2) 2017 mock examination?
(4) What is the relationship between students’ academic performances in mathematics and physics in Senior Secondary Two (SS2) 2015-2017 mock examinations?

Research Hypotheses

For this research work to have focus, the following hypotheses were therefore formulated.

(1) There is no significant relationship between students’ academic performance in mathematics and physics in Senior Secondary Two (SS2) 2015 mock examination.
(2) There is no significant relationship between students’ academic performance in mathematics and physics in Senior Secondary Two (SS2) 2016 mock examination.
(3) There is no significant relationship between students’ academic performance in mathematics and physics in Senior Secondary Two (SS2) 2017 mock examination.
(4) There is no significant relationship between students’ academic performances in mathematics and physics in Senior Secondary Two (SS2) 2015-2017 mock examinations.

Research Methods

Research Design

The study adopted correlational research design. Correlational research design has to do with the measurement of two or more factors to determine the extent to which the values of the factors are related. The design was chosen because the study
intended to examine the relationship between students’ performance in mathematics and physics and if there is any relationship, identify both the direction and magnitude of the relationship.

Population of the Study

The population of this study comprises of two thousand five hundred and sixty one (2561) physics students in sixteen (16) secondary schools in Ibesikpo Asutan Local Government Area, who partook in SS2 mock examinations for 2015, 2016 and 2017 sessions. The number of students that took part in the mock examination were 751 physics students, 842 physics students and 968 physics for 2015, 2016 and 2017 respectively making a total of 2561 physics students.

Sample and Sampling Technique

Purposive sampling technique was used by the researchers to select four (4) secondary schools in Ibesikpo Asutan Local Government Area. Two (2) schools out of the four (4) were selected from each of the two clans of the research area. From the two (2) schools selected from each clan, it was shared to be public and private. In summary, the criteria for selection was based on the population of science students in the schools, the location of the school in term of the clans in the study area and the school must be co-educational school. A total of 723 physics students were obtained for the three years making 28.2% of the population. 150 physics students for the years 2015, 269 physics students for 2016 and 304 physics students for 2017.

Instrumentation

Developing an instrument was not necessary because the research was to use secondary data, that is Senior Secondary Two (SS2) mock examination results on mathematics and physics for 2015, 2016, and 2017 obtained from Examinations and Certificates Division, Ministry of Education, Akwa Ibom State as all schools in the state takes a central mock examination coordinated by the ministry.

Validity of the Instrument

The instrument need not be validated because they were secondary data, that is, Senior Secondary Two (SS2) mock examination results on mathematics and physics for 2015, 2016 and 2017 collected from the Examinations and Certificates Division, Ministry of Education, Akwa Ibom State.

Reliability of the Instrument

Reliability was not necessary because there was no developed instrument for the study. Secondary data were used instead, that is, Senior Secondary Two (SS2) mock examination results on mathematics and physics for 2015, 2016 and 2017 collected from the Examination and Certificates Division, Ministry of Education, Akwa Ibom State.

Research Procedure

The research was carried out in four (4) purposive selected secondary schools in Ibesikpo Asutan Local Government Area, Akwa Ibom State. The source of data for this investigation consisted of 2015, 2016 and 2017 Senior Secondary Two (SS2) mock examination results of physics students for mathematics and physics collected from the Examination and Certificates Division, Ministry of Education, Akwa Ibom State.
Photocopies of these results were given to the researchers by the office of Examination and Certificates Division, Ministry of Education, Akwa Ibom State. The Ministry of Education scored the scripts of students as A1, A2 - A3, C4 – C6, P7, P8 and Fail while the researchers decided to use the five points scale to represents the grades as shown below.

- 100% - 75% = A1 = 5 points
- 74% - 65% = A2-A3 = 4 points
- 64% - 50% = C4-C6 = 3 points
- 49% - 45% = P7 = 2 points
- 44% - 40% = P8 = 1 point
- 39% – 0 = fail = 0 point

The grades were presented using the points and the obtained points were used for analysis.

**Method of Data Analysis**

The data obtained for this study were analyzed using Pearson’s Product Moment Correlation statistics.

**Results**

The results were based on the research questions and hypotheses.

**Research Questions**

The research questions are answered using Pearson’s Product Moment Correlation.

**Research Question One**

What is the relationship between students’ academic performance in mathematics and physics in Senior Secondary Two (SS2) 2015 mock examination?

**Table 1: Pearson’s Product Moment Correlation between Students’ Performance in Mathematics and Physics in SS2 Mock examination 2015.**

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>( \sum X \sum Y )</th>
<th>( \sum X^2 \sum Y^2 )</th>
<th>( \sum XY )</th>
<th>r-cal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics (X)</td>
<td>150</td>
<td>423</td>
<td>1495</td>
<td>1321</td>
<td>.40</td>
</tr>
<tr>
<td>Physics(Y)</td>
<td>150</td>
<td>428</td>
<td>1486</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1 showed that the calculated r-value is .40. This indicates a positive average correlation between Mathematics and Physics in mock examination 2015. It implies that as performance of students’ in mathematics increases, students’ performance in physics averagely increases.

**Research Question Two**

What is the relationship between students’ academic performance in mathematics and physics in Senior Secondary Two (SS2) 2016 mock examination?
Table 2: Pearson’s Product Moment Correlation between Students’ Performance in Mathematics and Physics in SS2 Mock examination 2016.

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>∑X∑Y</th>
<th>∑X²∑Y²</th>
<th>∑XY</th>
<th>r-cal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics (X)</td>
<td>269</td>
<td>1008</td>
<td>4232</td>
<td>2697</td>
<td>.20</td>
</tr>
<tr>
<td>Physics(Y)</td>
<td>269</td>
<td>694</td>
<td>2586</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2 showed that the calculated r-value is .20. This indicates a low positive correlation between Mathematics and Physics in mock examination 2016. This implies that as performance of students’ in mathematics increases, students’ performance in physics will increase slowly.

Research Question Three

What is the relationship between students’ academic performance in mathematics and physics in Senior Secondary Two (SS2) 2017 mock examination?

Table 3: Pearson’s Product Moment Correlation (r) between Students’ Performance in Mathematics and Physics in SS2 Mock examination 2017.

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>∑X∑Y</th>
<th>∑X²∑Y²</th>
<th>∑XY</th>
<th>r-cal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics (X)</td>
<td>304</td>
<td>1107</td>
<td>4401</td>
<td>2640</td>
<td>.33</td>
</tr>
<tr>
<td>Physics(Y)</td>
<td>304</td>
<td>677</td>
<td>2255</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3 showed that the calculated r-value is .33. This indicates an average positive correlation between students’ performance in Mathematics and Physics in mock examination 2017. This implies that as performance of students’ in mathematics increases, students’ performance in physics will increase averagely.

Research Question Four

What is the relationship between students’ academic performances in mathematics and physics in Senior Secondary Two (SS2) 2015-2017 mock examinations?

Table 4: Pearson’s Product Moment Correlation (r) between Students’ Performance in Mathematics and physics in SS2 Mock examinations 2015-2017.

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>∑X∑Y</th>
<th>∑X²∑Y²</th>
<th>∑XY</th>
<th>r-cal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics (X)</td>
<td>723</td>
<td>2538</td>
<td>10128</td>
<td>6658</td>
<td>.22</td>
</tr>
<tr>
<td>Physics(Y)</td>
<td>723</td>
<td>1799</td>
<td>6327</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4 showed that the calculated r-value is .22. This indicates a low positive correlation between students’ performance in Mathematics and Physics in mock examinations 2015-2017. This implies that as performance of students’ in mathematics increases, students’ performance in physics will increase slowly.

Hypotheses Testing

The hypotheses were tested using Pearson’s Product Moment Correlation.

Hypothesis 1
There is no significant relationship between students’ academic performance in Mathematics and Physics in Senior Secondary Two (SS2) 2015 mock examination.

Table 5: Pearson’s Product Moment Correlation (r) between Students’ Performance in Mathematics and Physics in SS2 Mock examination 2015.

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>∑X∑Y</th>
<th>∑X²∑Y²</th>
<th>∑XY</th>
<th>r-cal</th>
<th>r-cri</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics (X)</td>
<td>269</td>
<td>1008</td>
<td>4232</td>
<td>1321</td>
<td>.40</td>
<td>.20</td>
<td>Rejected</td>
</tr>
<tr>
<td>Physics(Y)</td>
<td>150</td>
<td>428</td>
<td>1486</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As shown in Table 5, the calculated r-value (.40) is greater than the critical value (.20). Therefore, the null hypothesis is rejected. This means that there is significant relationship between students’ performance in Mathematics and Physics in SS2 mock examination 2015.

Hypothesis 2

There is no significant relationship between students’ academic performance in Mathematics and Physics in Senior Secondary Two (SS2) mock examination 2016.

Table 6: Pearson’s Product Moment Correlation (r) between Students’ Performance in Mathematics and Physics in SS2 Mock examination 2016.

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>∑X∑Y</th>
<th>∑X²∑Y²</th>
<th>∑XY</th>
<th>r-cal</th>
<th>r-cri</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics (X)</td>
<td>269</td>
<td>1008</td>
<td>4232</td>
<td>2697</td>
<td>.20</td>
<td>.09</td>
<td>Rejected</td>
</tr>
<tr>
<td>Physics(Y)</td>
<td>269</td>
<td>694</td>
<td>2586</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As shown in Table 6, the calculated r-value (.20) is greater than the critical value (.09). Therefore, the null hypothesis is rejected. This means that there is significant relationship between students’ performance in Mathematics and Physics in SS2 mock examination 2016.

Hypothesis 3

There is no significant relationship between students’ academic performance in mathematics and physics in Senior Secondary Two (SS2) mock examination 2017.

Table 7: Pearson’s Product Moment Correlation (r) between Students’ Performance in Mathematics and Physics in SS2 Mock examination 2017.

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>∑X∑Y</th>
<th>∑X²∑Y²</th>
<th>∑XY</th>
<th>r-cal</th>
<th>r-cri</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics (X)</td>
<td>304</td>
<td>1107</td>
<td>4401</td>
<td>2640</td>
<td>.33</td>
<td>.09</td>
<td>Rejected</td>
</tr>
<tr>
<td>Physics(Y)</td>
<td>304</td>
<td>677</td>
<td>2255</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As shown in Table 7 the calculated r-value (.33) is greater than the corresponding critical value (.09). Therefore, the null hypothesis is rejected. This means that there is significant relationship between students’ performance in Mathematics and Physics in SS2 mock examination 2017.

Hypothesis 4
There is no significant relationship between students’ academic performance in Mathematics and Physics in Senior Secondary Two (SS2) 2015-2017 mock examinations.

### Table 8: Pearson’s Product Moment Correlation (r) between Students’ Performance in Mathematics and Physics in SS2 Mock Examinations 2015-2017.

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>∑X∑Y</th>
<th>∑X²∑Y²</th>
<th>∑XY</th>
<th>r-cal</th>
<th>r-cri</th>
<th>Decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics (X)</td>
<td>723</td>
<td>2538</td>
<td>10128</td>
<td></td>
<td>6658</td>
<td>.22</td>
<td>.09</td>
</tr>
<tr>
<td>Physics(Y)</td>
<td>723</td>
<td>1799</td>
<td>6327</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As shown in Table the calculated r-value is greater that the corresponding critical value. Therefore, the null hypothesis is rejected. This means that there is significant relationship between students’ performance in Mathematics and Physics in SS2 mock examinations 2015-2017.

### Discussion of Findings

From the results, it was found that there was significant relationship between students’ performance in Mathematics and their performance in physics in mock examinations for 2015, 2016, 2017 and 2015-2017. This is as a result of the identical concepts in both mathematics and physics, such as vector, geometry, graphs, statistics and calculus. It is also as a result of the mathematical symbols used in physics such as phi (φ), theta (θ), alpha (α), pi (π), plus and minus (±), delta (Δ), infinity (∞). The findings could also be attributed to the calculation which is common in both mathematics and physics. Hence, Bassey (2003) stated that calculations are very important in expressing physics contents and students with less ability in calculation will struggle in physics because of the relationship between mathematical calculations and physics.

The findings of the study agreed with the findings of Awodun and Ojo (2013), who investigated the predictive influence of mathematics skills (computation skills, geometry skills, algebra skills, probability, statistical skills, measuration skills, interpretation of graphs and table skills) on physics students’ performance in senior secondary schools and found that mathematics skills have strong positive influence and strong predictive value on physics students’ performance in senior secondary schools. The study is also in agreement with that of Wenno (2014) who studied the relationship between physics and knowledge of mathematics basic concepts with the ability to solve physics problems and found that there is positive relationship between physics and knowledge of mathematics basic concepts with students’ ability to solve physics problems. However, the findings of this study contradict the findings of Abdurrahman and Madugu (2014), who related the performance of students in mathematics and physics in senior secondary school and found no significant correction between students’ performance in mathematics and their performance in physics.

### Conclusion

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It can be concluded from the findings that mathematical knowledge has a relationship with physics. Thus, lack of mathematical knowledge could block some students from venturing into physics as subject.

**Recommendations**

The result obtained from this study has creates an avenue for the researcher to make the following recommendations:

1. Guidance should be provided to students on significance of mathematics as an instrument of communication in physics. This will lead to appreciation of mathematical calculations in physics and thus raise the performance of students in physics.
2. Physics teachers should constantly consult and work closely with mathematics teachers. This will help to identify and solve mathematics calculations involved in physics.
3. Science Teachers Association of Nigeria should organize seminars, conferences and workshops to enlighten physics teachers on the important of collaborating with mathematics teachers.

**References**


Performance Evaluation of Solar Bubble Dryer

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Abstract: Rice is an important cereal crop and staple food for more than half of the world's population. Drying and storage are two key post-harvest processes to improve yield in rice production. Farmers mostly perform drying of rice by sun drying. Sun drying has many disadvantages such as: over-drying, animals feeding on the grains, spillage and non-uniform drying. This experiment was conducted at Agricultural Engineering Division for performance evaluation of Solar Bubble Dryer. During experiment paddy was spread on the floor of dryer and was mixed periodically with roller bar. Sun drying was also carried out. The parameters such as moisture content and quality in terms of milling recovery and head rice yield were tested for both methods of drying. Results showed that moisture content of paddy was reduced from about 16% to 12% in six hours of operation. The rice quality was almost similar in both the drying methods. Therefore, we concluded that Solar Bubble Dryer can be one of the options for drying of spring rice. However, the initial cost of Solar Bubble Dryer is high.

Keywords: Paddy rice, Post-harvest handling, Solar Bubble Dryer, Grain moisture content

1. Introduction

Rice (Oryza sativa L.) is an important cereal crop and staple food for more than half of the world's population [1]. Rice cultivation covers 42% of total cultivable area under food grains and 51.6% of the total food grain production of Nepal [2]. Rice cultivation in Nepal contributes 7% and 20% of gross domestic product and agricultural gross domestic product, respectively [3]. In Nepal, rice is cultivated under varying topography, climates and altitudes; from 60 to 3050 meters above sea levels [3]. A total of 57 rice varieties have been released and 17 have been registered in the country [4]. About 20% of the total rice production in Nepal is contributed by spring rice. Due to the onset of rainy season during harvesting of spring rice, drying is one of the challenging tasks for the farmers. They can loss from 10 to 30 percent of rice produced due insufficient drying.

About 3-5% of paddy rice losses its quality due to improper drying of wet paddy [5, 6]. At the time of harvesting, the paddy is generally harvested at the moisture content of 20-28% wet basis (MC) depending on wet and dry seasons. The paddy should be dried within 24 hours of harvesting to the safe moisture content of about 14%. Storing paddy at 14% of moisture content prevents losses which occur due to respiration, germination, etc., during storage [6, 7]. About 20% of global rice production is contributed from Southeast Asia [8]. Commonly used mechanical dryers are the Solar Bubble Dryer, the flatbed dryer, the recirculating batch columnar dryer, and the two-stage drying systems (two-stage) described in RKB [9, 10].

Drying and storage are two key post-harvest processes to improve rice production. Farmers mostly perform drying of rice by sun drying. Sun drying has many disadvantages such as: over-drying, animals feeding on the grains, spillage and non-uniform drying. During the rainy season the possible problems in paddy cultivation are: delayed and incomplete drying.
yellowing of paddy, fungal propagation, and mycotoxin contamination [11, 12]. The fresh paddy market offers low farm gate prices to the producers [13, 14]. Therefore, farmers are attracted toward drying of paddy and storing them. They sell the paddy when the price becomes higher. The use of Solar Bubble Dryers (SBD) is one of option for drying of paddy. They have low energy consumption and operational costs compared to commercial dryers that use fuels or electricity for heating of the air [15]. The objective of this research was the performance evaluation of Solar Bubble Dryer. We also tested the quality such as milling recovery and head rice yield of dried paddy.

2. Material and Methods

2.1. Introduction on Solar Bubble Dryer (SBD)

In collaboration with International Rice Research Institute (IRRI) and the University of Hohenheim (UOH), the Grain Pro introduced SBD. It is designed in such a way that it can dry grain even during raining season. It is made of transparent polyethylene (LDPE) cover which is UV and water resistant. The SBD safely dries agricultural commodities against unexpected rain and also saves the commodities from contaminants. It acts like a bubble that traps solar radiation to heat the commodities. Moisture is vaporized and pushed out by ventilators. The drying floor is made of a proprietary watertight material to prevent water permeation from below. The top cover and the drying floor are joined together by heavy-duty zippers. They can dry grains and seeds of paddy and corn. During sunny day, the drying rate is faster than conventional sun-drying.

The commercially available SBD are found in market in two sizes. The model SBD25™ has a drying area of 25m² which is of half-ton capacity. The model SBD50™ has a drying area of 50m² which is of one ton capacity. It has both solar and electric models. Solar models use solar energy to run ventilator(s). However, in an electric-powered model, electricity is needed to run the ventilator(s).

2.1.1. Working of Solar Bubble Dryer (SBD)

The SBD uses the solar energy from the sun in two ways. Firstly, the drying tunnel serves as a solar collector to convert energy from the sun’s rays which enters through the transparent top of the drying tunnel to heat energy. This helps to increase the temperature of the air and enables the faster drying process. Secondly, the SBD consists of a photovoltaic system which has solar panels for generating electricity. In addition, it also has a rechargeable deep cycle battery for use at night and one or two small blowers to inflate the drying tunnel and move air through it. The hot air helps to remove water evaporating from the grains inside the tunnel. It also has roller with ropes attached on both ends which are periodically moved underneath the tunnel to mix the grains inside the tunnel. For mixing of grain inside the tunnel rake is used.

2.1.2. Benefits of use of Solar Bubble Dryer (SBD)

Solar Bubble Dryer (SBD) protects the agricultural commodities from unpredictable rainfall. It can dry the crops such as paddy, corn, coffee, etc. As it is closed system therefore prevents the commodities from contaminants mixing during drying process. It is portable and have collapsible and detachable components therefore it can easily carried from one place to other and assemble on any flat surface. It can be operated either by solar or electric power. Fig. 1 shows the photographic view of assembling of Solar Bubble dryer (SBD) before start of experiment. Fig. 2 shows photographic view of Solar Bubble dryer (SBD) during experiment.
2.2. Experimental set-up

The Solar Bubble Dryer was assembled on roof of Agricultural Engineering Division, Khumaltar, Lalitpur. Paddy rice purchased from Agronomy Division, Khumaltar, Lalitpur were used for this experiment. Experiment was started at 10:45 am and was completed at 4:45 pm on sunny day. Initial moisture content (wet basis) was about 16%. Fan was operated by electricity during experiment to keep the tunnel inflated. The paddy was mixed with the roller bar at a regular interval of one hour during experiment. One hundred kilograms of paddy was spread on SBD. Additional five kilograms of rice was sun dried for comparing the efficiency of SBD with sun drying methods. The lists of treatment in this experiment are presented in Table 1. We collect the paddy samples from four different locations along the length of SBD. The moisture content of paddy was measured by grain moisture meter.
Table 1: List of treatments

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>2.0 m away from fan of Solar Bubble Dryer</td>
</tr>
<tr>
<td>T2</td>
<td>4.5 m away from fan of Solar Bubble Dryer</td>
</tr>
<tr>
<td>T3</td>
<td>7.0 m away from fan of Solar Bubble Dryer</td>
</tr>
<tr>
<td>T4</td>
<td>9.5 m away from fan of Solar Bubble Dryer</td>
</tr>
<tr>
<td>T5</td>
<td>Sun drying method</td>
</tr>
</tbody>
</table>

2.3. Determination of milling quality of rice

Milling yield of paddy is the estimate of the quantity of the head rice and of the total yield of milled rice that can be produced from a unit of paddy [16].

Milling recovery was calculated as follows:

Milling recovery (%) = (Weight of milled rice (kg)/Weight of paddy (kg)) x 100% ……. (1)

Milling capacity was calculated as follows:

Milling capacity (kg hr⁻¹) = Weight of rice (kg)/ time (hr)

3. Results and Discussion

3.1. Effects of drying methods on grain moisture content before and after drying

The effects of drying methods on grain moisture content before and after drying are shown in Table 2. The moisture content before drying was about 16%. The moisture content after drying was about 12%. No significant difference was found among the treatments for grain moisture content (%) after drying.

Table 2: Effects of drying methods on grain moisture content before and after drying

<table>
<thead>
<tr>
<th></th>
<th>Before drying (%)</th>
<th>After drying (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>16.30 ± 0.28</td>
<td>12.45 ± 0.21</td>
</tr>
<tr>
<td>T2</td>
<td>16.10 ±0.42</td>
<td>12.20 ±0.49</td>
</tr>
<tr>
<td>T3</td>
<td>16.35 ± 0.49</td>
<td>12.40 ± 0.28</td>
</tr>
<tr>
<td>T4</td>
<td>16.25 ± 0.35</td>
<td>12.55 ± 0.42</td>
</tr>
<tr>
<td>T5</td>
<td>16.20 ± 0.42</td>
<td>12.70 ± 0.14</td>
</tr>
</tbody>
</table>
### Table 3: Effects of drying methods on grain quality

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Milling capacity (kg hr⁻¹)</th>
<th>Milled rice (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>115.43</td>
<td>68.69</td>
</tr>
<tr>
<td>T2</td>
<td>114.32</td>
<td>67.83</td>
</tr>
<tr>
<td>T3</td>
<td>114.78</td>
<td>68.13</td>
</tr>
<tr>
<td>T4</td>
<td>115.25</td>
<td>68.47</td>
</tr>
<tr>
<td>T5</td>
<td>114.09</td>
<td>67.31</td>
</tr>
</tbody>
</table>

#### 3.2. Effects of drying methods on grain quality of paddy

The effect of drying methods on grain quality is shown in Table 3. The milling capacity (kg hr⁻¹) was 115.43, 114.32, 114.78, 115.25, and 114.09 for treatments T1, T2, T3, T4, and T5, respectively. The milled rice (%) was 68.69, 67.83, 68.13, 68.47, and 67.31 for treatments T1, T2, T3, T4, and T5, respectively. Gagelonia *et al.* (2011) [17] reported similar results for drying of paddy using a flatbed dryer.

#### 4. Conclusions

Drying of spring rice is one of the major problems in Nepal. We did performance evaluation of Solar Bubble Dryer. Results showed that moisture content of paddy was reduced from about 16% to 12% in six hours of operation. The rice quality was almost similar in both the drying methods. Therefore, we concluded that Solar Bubble Dryer can be one of the options for drying of spring rice. However, the initial cost of Solar Bubble Dryer is high.

#### Acknowledgements

This study was financially supported by Nepal Agricultural Research Council (NARC). The authors would like to express sincere gratitude to all staff of Agricultural Engineering Division who directly or indirectly helped to conduct this experiment.

#### References

Effects of Milking Methods on Milk Yield, Milk Flow Rate, and Milk Composition in Cow

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Abstract: Cow milking is considered as laborious and time-consuming job at livestock farms. This experiment was conducted with an objective to know the effects of milking methods on milk yield, milk flow rate, and milk composition at National Cattle Research Program, Chitwan, Nepal. Four cows were selected randomly. All cows were maintained under uniform feeding and management conditions. The selected cows were milked with milking machines on the first day and the same cows were milked with hand on the second day. The results showed that there were no significant differences between hand and machine milking for milk yield (p > 0.05). However, significant differences were found in milking time and milk flow rate between hand and machine milking methods. We did not find any significant differences in milk composition between hand and machine milking methods. The machine milking saves time compared to hand milking. Therefore, we concluded that machine milking can be used in commercial farms of Nepal.

Keywords: Milking methods, Milk yield, Milk flow rate, Milk composition

1. Introduction

Nepal is located in South Asia and has economic dependency is on agriculture [1]. About eighty percent of its population works in the agriculture sector which contributes about 40% of Gross Domestic Product (GDP) [1]. Livestock is an integral part of Nepalese agriculture. The dairy sector contributes about 63% to the total Livestock Gross Domestic Products (LGDP) which is more than 5% of total National GDP (MOAD, 2009) [2]. Farmers are attracted to dairy farming recently. The productivity of the cattle is 519.56 Kg per lactation (MoAD, 2014) [3]. Milk demand in the country is increasing day by day which necessitates the need to increase the milk yield of the country. Almost three-fourths of the households in Nepal keep cattle and one-half keep buffalo for milk production [4]. Commercialization of livestock, especially dairy farming is crucial for the economic development of the country. Almost 1.5 million of the population is involved directly or indirectly in livestock production [5].

Cow milking is considered as laborious and time-consuming job at livestock farms [6]. Machine milking is gaining its popularity as it improves labor efficiency and reduces the costs [7]. Aslam et al., (2014) [6] reported that machine milking has the potential to increase milk production by up to 12%, reduce labor by up to 18%, and improve dairy cow welfare. Hillerton and Winter (1992) [8] and Pappe and Capuco (1997) [9] reported that milk yield can be increased by machine milking, and it is also beneficial for udder health. There is limited literature regarding the effects of machine milking on milk yield, milk flow rate, and milk composition of Nepalese cattle. Therefore, this study was conducted to know the effects of milking methods on milk yield, milking flow rate, and milk composition.
2. Material and Methods

2.1. Experimental site

The study was conducted at the National Cattle Research Program, Chitwan in July, 2019. It is situated in the central region of Nepal (27° 65’ N latitude; 84° 35’ E longitude and 187 mean sea levels) at Rampur, Chitwan.

2.2. Selection of experimental animals

Four lactating cows with almost similar average bodyweight, conditions, and production performance were selected. Cow milking was carried out by the hand and machine milking methods on alternate days. Animals were kept in separate pens under identical conditions.

2.3. Feeding and data recording during experiment

Animals were given standard diet according to their body weight. Before milking, the udder of each cow was thoroughly washed with moderately warm water and dried properly. The milking machine was thoroughly washed in lukewarm water every day after milking operation was completed. Milking data were recorded for two methods of milking in the morning time. Milk yields of all cows were recorded using an electric balance. The milking time in seconds was recorded with stopwatch. The milk flow rate was calculated as the ratio of milk yield per unit time. The following parameters such as milk yield (kg), milking time (sec), milk protein (%), milk fat (%), milk lactose (%), milk total solids (%), and milk density were studied to determine the responses of milking methods.

Milk composition analysis was carried out using a milk analyzer for the following milk constituents: milk fat, non-fat solids, milk protein, lactose, and total solids.

2.4. Information about milking machine

The machine was made in India. It is operated by electric current with one horse power motor. It can milk two cows in single operation and hence it saves time of milking.

2.5. Statistical analysis

The experiment was conducted in a completely randomized design with three replications. The data were analyzed using one-way ANOVA followed by Tukey’s HSD test ($p < 0.05$). All analyses were done with STATISTIX 8 (Analytical Software, Tallahassee, FL, US).

3. Results and Discussion

3.1. Effects of milking methods on milk yield of cow

The effects of milking methods on average milk yields are presented in Fig. 1. Milk yield between the machine and hand milking treatment groups were not significantly different ($p > 0.05$). The average milk yield by machine and hand milking were 6.05 and 5.85 kg, respectively. Aslam et al. (2014) [6] also reported that there was no significant difference in milk yield of cow between machine and hand milking.
3.2. Effects of milking methods on milking time of cow

The effect of milking method on milking time is presented in Fig. 2. The machine milking significantly lower \((p < 0.05)\) the milking time compared to that of hand milking. On an average the milking time by machine milking was decreased by 52.17% compared to that of hand milking.

3.3. Effects of milking methods on milk flow rate of cow

The effect of milking methods on milk flow rate is presented in Fig 3. Milk flow rate was higher \((p < 0.05)\) in cows milked with machine compared to those milked with hand. The milk flow rate by machine milking was increased by 50.57% compared to that of hand milking.
The effects of milking methods on milk composition are shown in Table 1. Milking method did not influence fat percentage in milk. Similarly, the percentage of total solids was also not significantly different among the treatment groups. The percentages of protein and lactose in milk were not significantly different (p > 0.05) among cows in the different treatment groups. The fat, protein, lactose, and SNF in hand milking were 3.98%, 2.97%, 4.48%, and 8.25%, respectively. However, the fat, protein, lactose, and SNF in machine milking were 3.69%, 3.03%, 4.56%, and 8.29%, respectively. Aslam et al. (2014) [6] also reported that there was no significant difference in milk composition of cow between machine and hand milking.

Table 1: Effects of milking method on fat (%), protein (%), lactose (%), SNF (%), and density in cow

<table>
<thead>
<tr>
<th>Treatments</th>
<th>Fat (%)</th>
<th>Protein (%)</th>
<th>Lactose (%)</th>
<th>SNF (%)</th>
<th>Density</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hand Milking</td>
<td>3.98 ± 0.4 a</td>
<td>2.97 ± 0.05 a</td>
<td>4.48 ± 0.07 a</td>
<td>8.25 ± 0.09 a</td>
<td>27.41 ± 0.74 a</td>
</tr>
<tr>
<td>Machine Milking</td>
<td>3.69 ± 0.37 a</td>
<td>3.03 ± 0.02 a</td>
<td>4.56 ± 0.03 a</td>
<td>8.29 ± 0.06 a</td>
<td>28.36 ± 0.61 a</td>
</tr>
</tbody>
</table>

Same letters are not significantly different at (p < 0.05) by Tukey’s HSD test.

4. Conclusions

This study was conducted to clarify the effects of milking methods on milk yield, milking flow rate, and milk composition. From the results of our study, we concluded that the machine milking is profitable for milking of cows as it saves time and also there were no significant differences in milk composition compared to hand milking.

Acknowledgements

This study was financially supported by Nepal Agricultural Research Council (NARC). The authors would like to express sincere gratitude to all staff of Agricultural Engineering Division and National Cattle Research Program, Chitwan who directly or indirectly helped to conduct this experiment.
References


Study on Zero Energy Cool Chamber (ZECC) for Storage of Mango

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Abstract: The zero energy cool chamber (ZECC) is used as storage for the extension of the shelf life of stored fruits and vegetables. However, there are limited researches on the use of ZECC for storage of mangos in Nepal. Therefore, the present study was conducted to qualify the quality and storability of mangos in different storage structures such as ZECC, room, and freeze conditions. We measured the physiological loss of water (PLW), TSS, and vitamin C of mango under different storage conditions. This study was conducted at Agricultural Engineering Division, Khumaltar, Lalitpur, Nepal. Mangos were purchased from local market. They were stored in three different storages such as in ZECC, room condition, and freeze conditions. The results showed that on eighth days of storage the highest PLW (%) was recorded for the room storage and the lowest was recorded for ZECC condition. The TSS and vitamin C significantly increased on the eighth day of storage compared to the first day for all types of storage. On the tenth day of storage, vitamin C was decreased compared to the eighth day in both ZECC and freeze conditions. The PLW was higher in freeze storage condition compared to that of ZECC condition. We concluded that mangos stored in ZECC can be stored until the eighth days of storage after considering both quality and PLW. Our result suggested that ZECC can maintain mango’s quality and extend its shelf life therefore it can be used as a temporary storage structure for fruits like mangos.

Keywords: ZECC, PLW, TSS, Vitamin C, Mango

1. Introduction

Mango (Mangifera indica L.) is originated from eastern India, Assam and Burma [1]. It is one of the important tropical fruits of Nepal which is cultivated in 9% of the total fruit cultivated area [2]. Mango is cultivated in about 14 thousand hectares with an average annual production of 100 thousand tons [3]. The local cultivars of mango are Sindhure, Kali, Supare, and Lohare from the lower hills, and Chinia, Sipiya, Chausa, and Safeda from the Terai and hills region [4]. To meet the consumers’ demand the production of mango is increasing day by day [5]. After harvesting, the storage of mango is a major problem due to lack of purchase capacity of farmers of an expensive cooling system in a country like Nepal. Besides, there is a lack of electricity in rural areas.

Zero Energy Cool Chamber (ZECC) can be a possible solution for storage as it does not requires electricity. Also, they are eco-friendly and require low cost for its construction [6, 7, 8]. ZECC is a simple type of storage structure which is used to store fruits and vegetables and consists of outer and inner brick walls with a gap between two walls which is generally filled with sand. Water is sprinkled on the sand for the cooling purposes [7]. Ganesan et al., (2004) [9] reported that the shelf life of eggplants was enhanced up to nine days by storing them in ZECC storage. Similarly, several other researchers reported that storing fruits and vegetables in ZECC increases their shelf life. For example, Narayan et al., (2002) [10] conducted research on banana; Prabha et al., (2006) [11] conducted research on lemon; Singh et al., (2010)
[12] conducted research on aonla fruit; Islam et al., (2012, 2013) [6, 7] conducted research on tomato; Murugan et al., (2011) [13] conducted research on grapes; Sharma et al., (2010) [14] conducted research on apple in ZECC conditions. All of them confirmed that the storage of fruits and vegetables in ZECC condition increases their shelf life. Dirpan et al., (2017) [15] reported that ZECC with watering 20 liters of water per day decreases temperature and increases relative humidity inside ZECC which helps to maintain the quality and storability of fruits and vegetables inside the ZECC. There is limited research on the quality and storability of mangos stored in the ZECC storage condition. Therefore, this study was conducted to qualify the quality and storability of mango inside the ZECC.

2. Material and Methods

2.1. Experimental design

This research was conducted at Agricultural Engineering Division, Nepal Agricultural Research Council, Khumaltar from June to July 2019. Zero Energy Cool Chamber (ZECC) was constructed by materials such as bricks, sand, bamboo, straw, gunny bag, etc. The double wall was erected and leaving a gap of 7.5 cm between two walls. The gap between the two walls was filled with river sand. House was constructed with bamboo and wheat straw to protect the ZECC from rainfall and sunlight. Mango was collected from the local market. Mango was washed with tap water to remove field heat soon after sorting for uniform size and undamaged product. About fifteen kilograms of mango with no fungal infection were selected, labeled and weighed initially. Finally, mangoes were stored into three different storage conditions such as ZECC, room, and freeze conditions.

2.2. Information about storage container

Three perforated crates made from high-density polyethylene were used to store mango. Mangos were placed inside the perforated plastic crates and stored inside ZECC, freeze and room conditions for evaluation of its quality.

2.3. Effects of storage types on quality of mango

2.3.1. Effects of storage types on physiological loss in weight (PLW) of mango

The physiological loss in weight was measured using an electric balance with an accuracy of 0.01 g. The PLW was measured by using the following formula:

\[ \text{Physiological loss in weight (PLW), } \% = \left( \frac{X_1-X}{X} \right) \times 100 ........... (1) \]

where, \( X_1 \) = Initial weight (g) \( X \) = Weight (g) at the end of storage time.

2.3.2 Effects of storage types on total soluble solids (TSS) of mango

The TSS was measured by using Abbe refractometer with a measurement accuracy of ° Brix ±0.1%, and three replicates of TSS samples.

2.3.3 Effects of storage types on vitamin C of mango

The vitamin-C content was determined by 2, 6-dichlorophenol-indophenol visual titration method [16]. Three replicates of vitamin C were taken.
2.4. Statistical analysis

The experiment was conducted in a completely randomized design with three replications. The data were analyzed using one-way ANOVA followed by Tukey’s HSD test ($p < 0.05$). All analyses were done with STATISTIX 8 (Analytical Software, Tallahassee, FL, US).

3. Results and Discussion

3.1 Room and Zero Energy Cool Chamber (ZECC) temperature during experiment

Room and Zero Energy Cool Chamber (ZECC) temperature during experiment is shown in Table 1. The room temperature ranges from 29.4 to 31.7 °C. However, the ZECC temperature ranges from 23.3 to 25.2 °C.

<table>
<thead>
<tr>
<th>Month</th>
<th>Day</th>
<th>Room temperature (°C)</th>
<th>ZECC temperature (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>June</td>
<td>23</td>
<td>29.4</td>
<td>23.3</td>
</tr>
<tr>
<td>June</td>
<td>24</td>
<td>30.6</td>
<td>23.9</td>
</tr>
<tr>
<td>June</td>
<td>25</td>
<td>31.7</td>
<td>25.2</td>
</tr>
<tr>
<td>June</td>
<td>26</td>
<td>30.5</td>
<td>24.4</td>
</tr>
<tr>
<td>June</td>
<td>27</td>
<td>29.5</td>
<td>24.5</td>
</tr>
<tr>
<td>June</td>
<td>28</td>
<td>30.3</td>
<td>24.2</td>
</tr>
<tr>
<td>June</td>
<td>29</td>
<td>29.6</td>
<td>23.5</td>
</tr>
<tr>
<td>June</td>
<td>30</td>
<td>29.4</td>
<td>23.4</td>
</tr>
<tr>
<td>July</td>
<td>1</td>
<td>31.5</td>
<td>25.0</td>
</tr>
<tr>
<td>July</td>
<td>2</td>
<td>31.3</td>
<td>24.7</td>
</tr>
<tr>
<td>July</td>
<td>3</td>
<td>30.5</td>
<td>24.4</td>
</tr>
</tbody>
</table>

3.2. Effects of storages types on physiological loss in weight (PLW) of mango

The physiological loss in weight (PLW) of mangos stored inside ZECC, room, and freeze conditions are shown in Fig. 1. We found significant differences in PLW (%) of mangos stored in the ZECC compared to mangos stored in room condition. The PLW of mangos stored inside the ZECC were lower than those stored in room and freeze conditions. On the eighth day of storage, the highest PLW was recorded for mangos stored in room conditions followed by freeze storage condition. The lowest PLW was discovered for mangos stored in ZECC condition. On the tenth day of storage, the PLW was 6.33% and 4.17% for mangos stored in freeze and ZECC conditions, respectively. On the tenth day of storage, the mangos stored in room condition almost decay therefore we did not consider the PLW. Our results were in agreement with Chien et al., (2007) [17] and Dirpan et al., (2018) [18] who reported that the mango with the higher moisture had lower PLW and vice versa.

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3.3. Effects of storage types on vitamin C and total soluble solids (TSS) of mango

The vitamin C of the mango in three different storage conditions is presented in Table 2. The range of vitamin C content was from 37.12 to 95.88 mg/100g. The vitamin C content on the first day was 49.06 mg/100g which was similar to the previous study [19]. The highest vitamin C (95.88 mg/100g) was found in ZECC treatment on the eighth day of storage; however, the lowest (40.72 mg/100g) was recorded in ZECC condition on the tenth day. In general, vitamin C content of the mango stored in ZECC conditions was significantly higher compared to the room storage condition (Table 2). This might be due to the lower temperature and higher humidity conditions retards aging through reduced respiration rate and other undesirable metabolic changes [18].

![Graph showing physiological loss in weight (PLW) of mango with storage days.]

**Fig. 1:** Effects of storage types on physiological loss in weight (PLW) of mango with storage days.

![Table 2: Effects of storage on Vitamin C (mg/100 mg) content of mango]

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1st day</th>
<th>8th day</th>
<th>11th day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room condition</td>
<td>49.06 ± 2.57</td>
<td>59.2±3.25</td>
<td>-</td>
</tr>
<tr>
<td>Freeze</td>
<td>-</td>
<td>82.93±3.54</td>
<td>37.12±3.44</td>
</tr>
<tr>
<td>ZECC</td>
<td>-</td>
<td>95.88± 4.39</td>
<td>40.72±4.02</td>
</tr>
</tbody>
</table>

Same letters are not significantly different \((p < 0.05)\) by Tukey’s HSD test.

The total soluble solids content (TSS) content in ZECC, freeze, and room storage condition is presented in Table 3. The TSS in this experiment ranges from 17 to 22 ° Brix (Table 3). There was no significant difference in TSS under ZECC, freeze, and room storage conditions on the fifth day of their storage. On the seventh day of storage, we also did not find any significant difference in TSS between ZECC and room storage conditions (Table 3).
Table 3: Effects of storage types on TSS (° Brix) content of mango

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1st day</th>
<th>5th day</th>
<th>7th day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room</td>
<td>17.0±1.41</td>
<td>21±1.41</td>
<td>-</td>
</tr>
<tr>
<td>Freeze</td>
<td>-</td>
<td>21.5±0.7</td>
<td>22.0±1.41</td>
</tr>
<tr>
<td>ZECC</td>
<td>-</td>
<td>22.0±2.83</td>
<td>20.0±2.83</td>
</tr>
</tbody>
</table>

Same letters are not significantly different (p < 0.05) by Tukey’s HSD test.

4. Conclusions

In study we clarify the quality and storability of mango under ZECC, freeze, and room storage conditions. Results revealed that the storage and quality (vitamin C and ° Brix) of mango were increased in ZECC storage conditions until eighth day of storage. Therefore, we concluded that ZECC can be used as storage structure for storage of mango.

Acknowledgements

This study was financially supported by Nepal Agricultural Research Council (NARC). The authors would like to express sincere gratitude to all staff of Agricultural Engineering Division who directly or indirectly helped to conduct this experiment.

References


Study on Zero Energy Cool Chamber (ZECC) for Storage of Vegetables

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3Food Research Division, Khumaltar, Lalitpur, Nepal

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Abstract: Two-third of the population of Nepal depends on agriculture which shares about 31% of gross domestic product. Although there is huge potential of vegetable cultivation in Nepal, however post-harvest losses of vegetable negatively affect the economy of Nepalese agriculture. The vegetables are vulnerable to high temperature. The adoption of newer storage techniques is necessary to prevent waste of fresh vegetables. The zero energy cool chamber (ZECC) is an ecofriendly system with low cost of construction. The present study was conducted to qualify the quality and storability of vegetables (pointed gourd and okra) in different storage conditions such as in ZECC, room, and freeze conditions. We measured the physiological loss of water (PLW) and vitamin C of vegetables under different storage conditions. The study was conducted at Agricultural Engineering Division, Khumaltar, Lalitpur, Nepal. Pointed gourd and okra were purchased from the local market. They were stored in three different storages conditions such as in ZECC, room condition, and freeze conditions. The results showed that the highest PLW (%) was recorded on fifth days of storage for the room storage and the lowest was recorded for ZECC condition. The vitamin C significantly increased on the fifth day of storage compared to the first day for all types of storage. On the seventh day of storage, vitamin C was decreased compared to the fifth day in both ZECC and freeze conditions. The PLW was higher in freeze storage condition compared to that of ZECC condition. We concluded that pointed gourd and okra stored in ZECC can be stored until fifth day of storage after considering both quality and PLW. Our result suggested that ZECC can be used as a storage structure for vegetables such as pointed gourd and okra.

Keywords: ZECC, PLW, Vitamin C, Pointed gourd, Okra

1. Introduction

Nepal is the sixth leading producer of fresh vegetables after China, India, Vietnam, Philippines, and Myanmar in 2016 [1]. Farmers are attracted to vegetable farming in Nepal [2]. Two-third of the population in Nepal depends on agriculture which shares about 31% of gross domestic product [3, 4]. Farmers can generate cash by cultivation vegetable crops even in a small plot of land in a short period and can improve their livelihood [5]. Although there is huge potential of vegetable cultivation in Nepal, however post-harvest losses of vegetable negatively affect the economy of Nepalese agriculture. (Gautam and Bhattarai, 2006) [6] reported that the post-harvest loss of fruit and vegetable in Nepal is about 20-50 percent. After harvest of vegetable, it is stored and transported under various environmental conditions before it reaches the retailer market. Post-harvest losses during handling, transportation, storage, and distribution are the major losses for perishable vegetable marketing. Turan (2008) [7] reported that improper harvesting and post-harvest practices cause the spoilage of vegetables which reduces the quality of vegetables such as deterioration in appearance, taste, and nutritional value before reaching the market. The vegetables are vulnerable to high temperature. The adoption of newer storage techniques is necessary to prevent waste of fresh vegetables.
The zero energy cool chamber (ZECC) is an ecofriendly system with low cost of construction. It also saves energy as it does not need electricity for its operation. It is constructed with locally available materials therefore these structures can be easily constructed in rural areas [8]. The evaporative cooling is suitable for storage of fruit and vegetables compared to refrigerators [9, 10]. ZECC can be used as short-term on-farm storage of perishable agricultural commodities as well as for pre-cooling of fruits and vegetables before transit and storage in cold storage [11]. Temperature and relative humidity in the storage chamber are important environmental factors affecting the ripening process of fruits and the final quality [12, 13]. Ganesan et al., (2004) [14] and Rajeswari et al., (2011) [15] reported that the storage of fruits and vegetables inside ZECC could reduce the water loss. In a semi-arid region, it is viable to use ZECC storage to retain freshness longer during storage. There are limited researches on the quality and storability of vegetables (pointed gourd and okra) stored in the ZECC storage condition. Therefore, this study was conducted to qualify the quality and storability of vegetables (pointed gourd and okra) inside the ZECC. We measured PLW and vitamin C for the fulfillment of our objectives.

2. Material and Methods

2.1. Construction of Zero energy cool chambers (ZECC)

ZECC was made from locally available raw materials such as bricks, sand, bamboo, dry grass, jute bags etc. The chamber is an above-ground double-walled structure made up of bricks. The cavity of the double wall is filled with riverbed sand. ZECC had a maximum efficiency during the summer season. The rise in relative humidity (90% or more) and fall in temperature from the ambient condition could be achieved by watering the chamber twice a day. The photographic view of ZECC constructed at Agricultural Engineering Division is shown in Fig. 1.

![ZECC Construction](image)

Fig. 1: Photographic view of Zero energy cool chamber (ZECC) constructed at Agricultural Engineering Division, Khumaltar.

2.2. Experimental design

This research was conducted at Agricultural Engineering Division, Nepal Agricultural Research Council, Khumaltar from June to July 2019. Pointed gourd and okra were collected from the local market. About five kilograms of pointed gourd and okra each with no fungal infection were selected, labeled and weighed initially. Finally, they were stored in three different storage conditions such as ZECC, room, and freeze conditions.
2.3. Information about storage container

Three perforated crates made from high-density polyethylene were used to store vegetables. Vegetables were placed inside the perforated plastic crates and stored inside ZECC, freeze, and room conditions for evaluation of its quality.

2.4. Effects of storage types on quality of vegetables

2.4.1. Effects of storage types on physiological loss in weight (PLW) of vegetable

The physiological loss in weight was measured using an electric balance with an accuracy of 0.01 g. The PLW was measured by using the following formula:

\[
\text{Physiological loss in weight (PLW), } \% = \frac{(X_1 - X)}{X} \times 100 \quad \ldots \ldots \quad (1)
\]

where, \( X_1 = \text{Initial weight (g)} \) \( X = \text{Weight (g) at the end of storage time.} \)

2.4.2. Effects of storage types on vitamin C of vegetable

The vitamin-C content was determined by 2, 6-dichlorophenol-indophenol visual titration method [16]. Three replicates of vitamin C were taken.

2.5. Statistical analysis

The experiment was conducted in a completely randomized design with three replications. The data were analyzed using one-way ANOVA followed by Tukey’s HSD test \((p < 0.05)\). All analyses were done with STATISTIX 8 (Analytical Software, Tallahassee, FL, US).

3. Results and Discussion

3.1 Room and Zero Energy Cool Chamber (ZECC) temperature during experiment

Room and Zero Energy Cool Chamber (ZECC) temperature during the experiment is shown in Table 1. The room temperature ranges from 29.4 to 31.5 °C. However the ZECC temperature ranges from 23.4 to 25.0 °C.

<table>
<thead>
<tr>
<th>Month</th>
<th>Day</th>
<th>Room temperature (°C)</th>
<th>ZECC temperature (°C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>June</td>
<td>26</td>
<td>30.5</td>
<td>24.4</td>
</tr>
<tr>
<td>June</td>
<td>27</td>
<td>29.5</td>
<td>24.5</td>
</tr>
<tr>
<td>June</td>
<td>28</td>
<td>30.3</td>
<td>24.2</td>
</tr>
<tr>
<td>June</td>
<td>29</td>
<td>29.6</td>
<td>23.5</td>
</tr>
<tr>
<td>June</td>
<td>30</td>
<td>29.4</td>
<td>23.4</td>
</tr>
<tr>
<td>July</td>
<td>1</td>
<td>31.5</td>
<td>25.0</td>
</tr>
<tr>
<td>July</td>
<td>2</td>
<td>31.3</td>
<td>24.7</td>
</tr>
<tr>
<td>July</td>
<td>3</td>
<td>30.5</td>
<td>24.4</td>
</tr>
</tbody>
</table>
3.2. Effects of storages types on physiological loss in weight (PLW) of pointed gourd and okra

The physiological loss in weight (PLW) of pointed gourd stored inside ZECC, room, and freeze conditions are shown in Fig. 2. We found significant differences in PLW (%) of pointed gourd stored in the ZECC compared to room storage condition. The PLW of pointed gourd stored inside the ZECC were lower than those stored in room and freeze conditions. On the fifth day of storage of pointed gourd, the highest PLW was recorded for room storage conditions followed by freeze storage condition. The lowest PLW was discovered for pointed gourd stored in ZECC condition. On the seventh day, the PLW was 10.60% and 30.54% for pointed gourd stored in freeze and ZECC conditions, respectively. Our results were in agreement with Chien et al., (2007) [17] and Dirpan et al., (2018) [18] who reported that the mango with the higher moisture had lower PLW and vice versa.

![Fig. 2: Effects of storage types on physiological loss in weight (PLW) of pointed gourd with storage days.](image)

The physiological loss in weight (PLW) of okra stored inside ZECC, room, and freeze conditions are shown in Fig. 3. We found significant differences in PLW (%) of okra stored in the ZECC compared to okra stored in room condition. The PLW of okra stored inside the ZECC was lower than those stored in room and freeze conditions. On the fifth day of storage of okra, the highest PLW was recorded for okra stored in room conditions followed by freeze storage condition. The lowest PLW was discovered for okra stored in ZECC condition. On the seventh day of storage, the PLW were 22.89% and 43.17% for okra stored in freeze and ZECC conditions, respectively. Our results were in agreement with Chien et al., (2007) [17] and Dirpan et al., (2018) [18] who reported that the mango with the higher moisture had lower PLW and vice versa.
3.3. Effects of storage types on vitamin C of pointed gourd and okra

The vitamin C of the pointed gourd in three different storage conditions is presented in Table 2. The range of vitamin C content was from 38.58 to 61.22 mg/100g. The vitamin C content on the first day was 45.15 mg/100g. The highest vitamin C (61.22 mg/100g) was found in ZECC treatment on the fifth day of storage; however, the lowest (39.71 mg/100g) was recorded in ZECC condition on the seventh day. In general, vitamin C content of the pointed gourd stored in ZECC conditions was significantly higher compared to the room storage condition (Table 2). This might be due to the lower temperature and higher humidity conditions retards aging through reduced respiration rate and other undesirable metabolic changes [18].

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1st day</th>
<th>5th day</th>
<th>7th day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room condition</td>
<td>45.15 ± 2.82</td>
<td>41.99±3.28 b</td>
<td>-</td>
</tr>
<tr>
<td>Freeze</td>
<td>-</td>
<td>50.66±3.93 ab</td>
<td>38.58±4.28 a</td>
</tr>
<tr>
<td>ZECC</td>
<td>61.22± 4.56 a</td>
<td>39.71±2.94 a</td>
<td></td>
</tr>
</tbody>
</table>

Same letters are not significantly different (p < 0.05) by Tukey’s HSD test.

The vitamin C of the okra in three different storage conditions is presented in Table 3. The range of vitamin C content was from 20.02 to 67.87 mg/100g. The vitamin C content on the first day was 33.58 mg/100g. The highest vitamin C (67.87 mg/100g) was found in ZECC treatment on the fifth day of storage; however, the lowest (22.34 mg/100g) was recorded in ZECC condition on the seventh day. In general, vitamin C content of the okra stored in ZECC conditions was significantly higher compared to the room storage condition (Table 3). This might be due to the lower temperature and higher humidity conditions retards aging through reduced respiration rate and other undesirable metabolic changes [18].
Table 3: Effects of storage on Vitamin C (mg/100 mg) content of okra

<table>
<thead>
<tr>
<th>Treatment</th>
<th>1st day</th>
<th>5th day</th>
<th>7th day</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room condition</td>
<td>33.58±2.96</td>
<td>37.70±2.93b</td>
<td>-</td>
</tr>
<tr>
<td>Freeze</td>
<td>-</td>
<td>48.28±3.69b</td>
<td>20.02±0.94a</td>
</tr>
<tr>
<td>ZECC</td>
<td>-</td>
<td>67.87±2.96a</td>
<td>22.34±1.4a</td>
</tr>
</tbody>
</table>

Same letters are not significantly different \((p < 0.05)\) by Tukey’s HSD test.

4. Conclusions

This study was conducted to qualify the quality and storability of vegetables (pointed gourd and okra) under ZECC, freeze, and room storage conditions. We concluded that storing vegetables in ZECC enhances the quality and storability of vegetables until the fifth day of storage. Therefore, we concluded that ZECC can be used for storage of vegetables such as pointed gourd and okra.

Acknowledgements

This study was financially supported by Nepal Agricultural Research Council (NARC). The authors would like to express sincere gratitude to all staff of Agricultural Engineering Division who directly or indirectly helped to conduct this experiment.

References


Performance Evaluation of Onion Grader

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Abstract: Onion is one of the important vegetable crops. A global review of area and production of major vegetable crops shows that the onion ranks third in area and production. Onion is one of the important condiments which are widely used all the year round in Nepal. Grading of onion is done on the basis of size and shape and is important for marketing of uniform high quality products. Manual grading takes long time to do the grading process and hence labor charges is high. This study was conducted with an objective of the performance evaluation of grader at Agricultural Engineering Division. The onion was purchased from the local market. The grading machine is simple in design which is manually operated. The size, weight, and percentage of onion received at individual size openings B varies from 3.39-3.68 cm, 25.71-27.95 g, and 0.60-0.80%, respectively. The size, weight, and percentage of onion received at individual sieve opening C varies from 4.43-4.72 cm, 36.87-42.93 g, and 6.20-7.80%, respectively. The size, weight, and percentage of onion received at individual sieve openings D varies from 5.23-5.33 cm, 59.10-63.99 g, and 52.40-57.20%, respectively. The size, weight, and percentage of onion received at outlet of grader which as denoted by E varies from 5.67-6.03 cm, 78.17-89.25 g, and 34.20-41.40%, respectively. The grading capacity varies from 0.20-0.22 kg sec⁻¹. The grader shows better results in terms of size of onion. However, we saw few onions of size C and D was received from the outlet point of grader which is denoted by E. Therefore, we concluded that there is still room for some modifications in the grader. We recommend reducing the slope of the grader which will allow the product to travel for longer period of time inside the cylinder of grader and better results can be expected. In addition, some modifications on sieve openings are necessary for the better results in the future.

Keywords: Postharvest handling, Onion, Grading capacity, Size of onion, Weight of onion

1. Introduction

Onion (Allium cepa L.) is one of the important vegetable crops worldwide. A global review of area and production of major vegetable crops shows that the onion ranks third in area and production [1]. Onion is one of the important condiments which are widely used all the year round in Nepal. It is rich source of phosphorus, calcium and carbohydrate [2]. The area, production, and productivity of onion in Nepal was 20,070 ha, 2,38,590.7 t, and 11.9 t ha⁻¹, respectively [3]. This production fulfilled around 41.15% of national demand and remaining 58.85 % demand is fulfilled by importing fresh or chilled and dry onion from other countries. In Nepal, based on the domestic production and import from other countries, the per capita consumption of onion in fiscal year 2018/19 was 12.86 kg which was lower than the average annual consumption 30.7 kg per person across the world [2]. The demand of onion is year round but it is grown seasonally only [4].

Grading plays a vital role in the food processing industries. Grading of fruits and vegetables is one of the most important operations which adds the value to the product and gives better income to the growers of fruits and vegetables. Manual grading is time consuming process and it requires huge amount of labors. Manual grading is also affected by non-availability of labors during peak seasons [5]. Manual grading is less efficient and inconsistent as human perception varies from one another. It is also laborious job and causes muscle fatigue and stress to the farmers. In manual grading, huge amount of energy is invested and the product is handled for number of times which results in increasing of wastage
and may decrease marketing value [6]. Mechanical grading saves time and money. It is gaining popularity in large scale marketing to fetch higher prices. Good mechanical grading equipment can do grading of product based on various criteria like size, shape, weight, colour etc. [7]. Gunathilake et al., (2016) [8] reported that there is an appreciable difference in the market price of big onion according to the size of bulbs. Big size of graded onion bulbs fetches a higher price than the un-graded onions [8].

Many researchers designed and fabricated grader such as Roy et al., (2005) [9] fabricated a potato grader with oscillating sieve. The average capacity of the grader was 2030 kg hr\(^{-1}\) in the laboratory and 1500 kg hr\(^{-1}\) in the field. Similarly, Ghanbarian et al., (2010) [10] reported a potato grader could grade products in three sizes: small (below 50 g), medium (50 to 80 g), and large (above 80 g) with gradation accuracy of 74% and mechanical damages of 5.5%. Hossain et al. (2013) [11] reported that capacity of the grader was 1.3 ton hr\(^{-1}\) with 95% grading efficiency.

The mechanical graders operated by electricity are expensive and sometimes beyond the purchase capacity of Nepalese farmers. The manually operated grader is usually less costly and can be purchase by Nepalese farmers. The quality of processed product and cost of processing efficiency of machine depend on uniformity in size and shape of raw material. This study was carried out with an objective of performance evaluation of grader for grading of onion.

2. Material and Methods

2.1. Experimental site

This research work was conducted at the Agricultural Engineering Division, Khumaltar, Lalitpur.

2.2. Information about grader and data collection

The machine consisted of main frame, feeding unit, grading unit, collection unit. The slope of the grader was about 8 per cent. The grading of sample was done on the basis of size and was graded into three different sized grades. The grades are classified into three different grades as, first grade (big size onions) which was denoted by D, second grade (medium size onions) which was denoted by C, third grade (small size onions) which was denoted by B and finally oversized onions were collected from the outlet point which was denoted by E. There were three outlets or collection units for collecting the graded samples according to the grades. After completion of grading, the tubers were collected at each collection unit. Ten kilograms of onion was purchased from the local market. Performance evaluation of grader was done at the three speeds of grader, i.e. 17 revolutions per min., 20 revolutions per min., and 22 revolutions per min. The revolution per minute was measured by digital techo-meter. The size (diameter) of graded onion was measured by vernier caliper. The weight of grader onion was measured by weighing balance. Fig. 1 shows photographic view of grader.

![Fig. 1: Photographic view of grader](image_url)
2.3. Measurement of grading capacity

The grading capacity was determined by noting the time required to grade 10 kg of onion. The grading capacity of the grader was determined by using the following formula as suggested by Cochran and Cox (1975) [12].

Grading capacity (kg sec\(^{-1}\)) = Total weight of grader sample (kg.) / time (sec)

Percentage of onion received at individual sieve openings (%) = mass of onion collected from individual sieve openings (kg) / total mass of onion (kg) * 100.

3. Results and Discussion

3.1. Size, weight, and percentage received at individual sieve openings and outlet point E of grader

Table 1 shows size, weight, and percentage received at individual sieve openings and outlet point denoted by E of grader at 17 rpm. The size of onion at openings C and D were 4.57 ± 0.23 cm and 5.33 ± 0.36 cm, respectively. The weight of onion at openings C and D were 42.93 ± 3.76 g and 59.72 ± 8.92 g, respectively. The percentage of onion received at individual sieve openings C and D were 6.20% and 52.40%, respectively.

Table 1: Size, weight, and percentage of onion received at individual sieve openings and outlet point of grader at 17 rpm

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Sieve openings C</th>
<th>Sieve openings D</th>
<th>Outlet point of grader denoted by E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size of onion (cm)</td>
<td>4.57 ± 0.23</td>
<td>5.33 ± 0.36</td>
<td>5.78 ± 0.41</td>
</tr>
<tr>
<td>Weight of onion (g)</td>
<td>42.93 ± 3.76</td>
<td>59.72 ± 8.92</td>
<td>78.17 ± 14.81</td>
</tr>
<tr>
<td>Percentage received at individual sieve openings (%)</td>
<td>6.20</td>
<td>52.40</td>
<td>41.40</td>
</tr>
</tbody>
</table>

Table 2 shows size, weight, and percentage received at individual sieve openings and outlet point denoted by E of grader at 20 rpm. The size of onion at openings B, C, and D were 3.68 ± 0.14 cm, 4.72 ± 0.19 cm, and 5.27 ± 0.16 cm, respectively. The weight of onion at openings B, C, and D were 27.95 ± 2.09 g, 40.84 ± 4.23 g, and 59.10 ± 5.18 g, respectively. The percentage of onion received at individual sieve openings B, C, and D were 0.6%, 6.20%, and 55.40%, respectively.

Table 2: Size, weight and percentage of onion received at individual sieve openings and outlet point of grader at 20 rpm

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Sieve openings B</th>
<th>Sieve openings C</th>
<th>Sieve openings D</th>
<th>Outlet point of grader denoted by E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size of onion (cm)</td>
<td>3.68 ± 0.14</td>
<td>4.72 ± 0.19</td>
<td>5.27 ± 0.16</td>
<td>6.03 ± 0.37</td>
</tr>
<tr>
<td>Weight of onion (g)</td>
<td>27.95 ± 2.09</td>
<td>40.84 ± 4.23</td>
<td>59.10 ± 5.18</td>
<td>89.25 ± 13.30</td>
</tr>
<tr>
<td>Percentage received at individual sieve openings (%)</td>
<td>0.60</td>
<td>6.20</td>
<td>55.40</td>
<td>37.80</td>
</tr>
</tbody>
</table>

Table 2 shows size, weight, and percentage received at individual sieve openings and outlet point denoted by E of grader at 20 rpm. The size of onion at openings B, C, and D were 3.68 ± 0.14 cm, 4.72 ± 0.19 cm, and 5.27 ± 0.16 cm, respectively. The weight of onion at openings B, C, and D were 27.95 ± 2.09 g, 40.84 ± 4.23 g, and 59.10 ± 5.18 g, respectively. The percentage of onion received at individual sieve openings B, C, and D were 0.6%, 6.20%, and 55.40%, respectively.

Table 3 shows size, weight, and percentage received at individual sieve openings and outlet point denoted by E of grader at 22 rpm. The size of onion at openings B, C, and D were 3.39 ± 0.21 cm, 4.43 ± 0.27 cm, and 5.23 ± 0.31 cm, respectively. The weight of onion at openings B, C, and D were 25.71 ± 5.14 g, 36.87 ± 4.60 g, and 63.99 ± 8.02 g,
respectively. The percentage of onion received at individual sieves openings B, C, and D were 0.8%, 7.80%, and 57.20%, respectively.

Table 3: Size, weight and percentage of onion received at individual sieve openings and outlet point of grader at 22 rpm

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Sieve openings B</th>
<th>Sieve openings C</th>
<th>Sieve openings D</th>
<th>Outlet point of grader denoted by E</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size of onion (cm)</td>
<td>3.39 ± 0.21</td>
<td>4.43 ± 0.27</td>
<td>5.23 ± 0.31</td>
<td>5.67 ± 0.37</td>
</tr>
<tr>
<td>Weight of onion (g)</td>
<td>25.71 ± 5.14</td>
<td>36.87 ± 4.60</td>
<td>63.99 ± 8.02</td>
<td>79.25± 10.54</td>
</tr>
<tr>
<td>Percentage received at individual sieves openings (%)</td>
<td>0.80</td>
<td>7.80</td>
<td>57.20</td>
<td>34.20</td>
</tr>
</tbody>
</table>

3.2. Effects of grader rpm on grading capacity

Table 4 shows the effect of grader rpm on grading capacity. The grader was tested at the rpm of 17, 20, and 22. The grading capacity at 17 rpm was 0.20 kg sec\(^{-1}\). Similarly, the grading capacity at 20 rpm was 0.21 kg sec\(^{-1}\). The grading capacity at 22 rpm was 0.22 kg sec\(^{-1}\). There were no losses in onion except some onion cover was seen during grading of onion.

Table 4: Effect of grader rpm on grading capacity

<table>
<thead>
<tr>
<th>S. N.</th>
<th>Grader (rpm)</th>
<th>Grading capacity (kg sec(^{-1}))</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>17.0</td>
<td>0.20</td>
</tr>
<tr>
<td>2</td>
<td>20.0</td>
<td>0.21</td>
</tr>
<tr>
<td>3</td>
<td>22.0</td>
<td>0.22</td>
</tr>
</tbody>
</table>

4. Conclusions

In this experiment we conducted the performance evaluation of grader. The size, weight, and percentage of onion received at individual sieve opening C varies from 4.43-4.72 cm, 36.87-42.93 g, and 6.2-7.8%, respectively. The size, weight, and percentage of onion received at individual sieve opening D varies from 5.23-5.33 cm, 59.10-63.99 g, and 52.4-57.2%, respectively. The grading capacity varies from 0.2-0.22 kg sec\(^{-1}\). The grader shows better results in terms of size of onion. However, we saw few onions of size C and D was received from the outlet point of grader which is denoted by E. Therefore, we concluded that there is still room for some modifications in the grader. We recommend reducing the slope of the grader which will allow the product to travel for longer period of time inside the cylinder of grader and better results can be expected. In addition, some modifications on sieve openings are necessary for the better results in the future.

Acknowledgements

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3. VDD. 2073/74. Annual Progress report of Potato, Vegetables and Spices Development Program Published by Vegetable Development Directorate, Khumaltar, Nepal.
Development Electronic Four Tier Diagnostic Test Based Multirepresentation Using Model 4-D For Measuring the Level of Conception of Prospective Physics Teacher Candidates on Force Concepts

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Abstract- This study aims to develop instruments electronic four tier diagnostic test (E-FTDT) use the Google Form to measure the level of student teachers conception of physics (MCGF) on the concept of style. Development uses a 4-D model that consists of define, design, develop, and disseminate. Validation was carried out for three material experts and three media experts, small-scale trials were conducted at 15 MCGF, and large-scale tests were conducted at 36 MCGF. The result of material expert validation was 85% with A value, media expert was 89.39% with A value, and MCGF response on small scale test was 80.20% with B value. Based on a large-scale test showed that the percentage level MCGF conception, namely; understand the concept well by 17%, to understand the concept, but less convinced by 3%, to understand the concept, but not a whole by 16%, do not understand the concept of 14%, and misconceptions by 47%, and there is an answer that can not be encoded by 3%. The conclusion of this study explains that E-FTDT is feasible to use and has the potential to measure the level of MCGF conception in the concept of force.

Index Terms- Diagnostic Test, Conception Level, 4-D Model, Style.

I. INTRODUCTION

In physics, the right concept refers to conception as physics scientists. Misconceptions that improper or different from the concept of the scientists called misconceptions. Misconceptions can be caused by several factors, including experience, teachers, teaching materials, and learning media are involved in the learning process [1]. In addition, the use of non-standard language into one the obstacles that led to the concept of physics is difficult to read by the students [2]. Misconceptions in science lessons focused on potential areas of physics happen because of some abstract concept [3]. Misconception occurs in all areas of physics, from 700 studies on alternative theories of physics, there are 300 who studied the misconceptions in mechanics; 159 on electricity; 70 about heat, optics and material properties; 35 about earth and space, and ten studies about modern physics [4]. These data show that the mechanics are a field of physics most experienced misconceptions.

Force is one of the concepts in mechanics that is most tested [5-7]. It means that this concept also has great potential in the occurrence of misconceptions. It is consistent with research showing that most college students have misconceptions on the concept of style [8-11]. In line with this, three international seminars have been held at Cornell University, Ithaca, New York, USA in 1981, 1987 and 1993 by presenting papers totalling more than 600 titles, which are based on research and theories on how to help eliminate misconceptions. Various techniques can be used to identify misconceptions in students of them are using concept maps, multiple-choice test with open grounds, a written essay test, diagnostic interviews, discussion in the classroom to practice questions and answers[12].

One tool that often used to evaluate learning is a diagnostic test. The diagnostic test is a test used to determine the weaknesses of learners so that based on these weaknesses can be given the appropriate treatment [13]. The diagnostic test can improve learning outcomes and can overcome learning difficulties and reduce misconceptions learners. The purpose of this test is to determine the teaching that needs to be done in the future [14]. It is supported by research showing that the use of diagnostic tests can provide information about the level of understanding of the concept [15].

There are four types of the diagnostic tests data rate of up to four levels. But the diagnostic test that is most capable of providing a clear picture of misconceptions in students is a four-level diagnostic test [16-17]. The first level is multiple choice questions with four deceiver and an answer key. The second level is the level of confidence in the answers at the first level. The third level is the reason that must be given in answering questions at the previous level. The reasons provided are open.
While the fourth level is the level of confidence in the reasons given at the third level. In some studies, the mostly four-tier diagnostic test still non-electronic form, which usually presented in the form of paper/sheet [11,17,18,19]. Some of the difficulties arising from a test like this are during the process of examination answers learners; proofreader sometimes experiences problems such as difficulty in writing illegible students perfect and human-error factor of the corrector itself. In addition, other obstacles that also arise are that much paper is needed, securing the confidentiality of questions is relatively tricky. It requires a large amount of money, processing the results requires a relatively long time, especially for the use of diagnostic tests. Therefore, these tests are then modified form of an electronic four tier diagnostic tests.

In line with this, the development of information and communication technology (ICT) era of the industrial revolution 4.0 is now increasingly complex and evolving. We are required to be more competitive with the times so that in this case the implementation of the research will make it possible for learners to more easily work tests and make it easier for researchers or teachers too in examining the results of these tests. It is in line with the results of research suggest that the use of ICTs such as the Internet or a computer will make it easier in terms of both effectiveness research or efficient [20,21]. One feature that is often used and is familiar to the broader community are Google, Google Form. This feature is one of the highlights of Google that allows one to make a reliable evaluation test sheet, and also in its implementation will be more effective and efficient [22]. Some research indicates that the use of a Google Form as an electronic instrument in the study is very useful in helping and facilitate analysis or assessments performed in an agency for practical, free, and easy to use [23, 24].

Instruments developed in this research instruments adopted from the paper entitled Representational of the Force Concept Inventory (R-FCI) [25]. R-FCI is a development of the instrument Force Concept Inventory (FCI) [26]. R-FCI is an instrument that has been standardized and designed to assess the students understanding of the basic concepts of physics that deals with forces and motion. R-FCI is also a concept test standard for mechanics that have proven validation and reliability and have been used repeatedly in different countries. However, this instrument cannot be used to diagnose student conception levels because the format is in the form of multiple-choice questions so that it only tests student conceptions. Therefore, researchers developed it into a test instrument to diagnose potential student conception level. In the instrument, there are 27 items with multiple choice about the concept of force (Newtonian Mechanics) with nine themes, each theme consisting of 3 representations. The concept in the theme ninth consecutive test on; (1) gravitational force, (2) Newton’s third law, (3) Newton’s second law, (4) gravitational force, (5) Newton’s first law, (6) Newton’s second law, (7) Newton’s first law, (8) Newton’s third law, and (9) gravitational force [25].

The level of confidence that is presented on the second and fourth-tier in these diagnostics tests using methods Certainty of Response Index (CRI) is a method used to measure the level of confidence/assurance respondent in answering each question/aspect questions provided. Respondents asked to provide the level of certainty of their ability to associate a confidence level with the knowledge, concepts, or law [27]. It is possible to minimize the guesswork out of student answers due to the shape of the FCI only multiple-choice only. It is supported by the results of research which states that the CRI method can be used to identify students’ misconceptions and who do not know the concept. In addition, its use in the teaching and learning process is possible because the process of identifying and analyzing the results does not take a long time [19,28].

However, the methods that have been prepare have weaknesses. Weakness contained in this method lies in the categorization, which has a low confidence level, and the amount of guess factor in answering the question because of the form of items used are multiple-choice tests. The presence of the actual respondents characterizes it was able to explain and understand the concepts contained in the matter. But because it has a low level of confidence led him to choose a small CRI scale, so it divided into categories does not understand the concept / deemed to guess the answer. By considering this condition, the category of the understanding level that has been compiled is then modified by adding a category that is understanding the concept but not sure [29]

II. METHOD

This research is a Research & Development study that aims to produce a product and test the feasibility of the product [30]. This study uses a model development procedure 4-D [31]:

1. Define
   This stage includes field studies and literacy. The field study aims to obtain information about the implementation of physics learning in class and information about the characteristics of prospective physics teacher students — literacy studies conducted to assess the relevant concepts and related studies. The results are used as material to identify problems in learning activities.

2. Design
   After getting the problem and information from the definition phase, then performed the design stage. The purpose of this stage is to produce an E-FTDT design that can be used to measure the level of conception of prospective physics teacher students on the concept of force. This designs first made input from the supervisor. This feedback will be used to repair instruments developed before entering the next stage

3. Develop
   a. Expert Validation

The purpose of this validation is to get an assessment of experts who are competent in the development of the instrument. In addition, to take input so that the instruments developed are better. The data analysis was done by tabulating data obtained from the results of expert validation for every aspect of the assessment items based on research instruments. Data analysis was conducted referring to the calculation formula (1) and the following eligibility criteria.

\[ \bar{x} = \frac{\sum x}{n} \]  

(1)

Where:

- \( \bar{x} \): Average score
- \( \sum x \): Score total
- \( n \): Number validator

The assessment of product development is carried out in the form of scores. Assessment by the quantitative data obtained from the scoring converted into qualitative data that consists of five categories. The conversion process is done with the formula contained in the following Table 1 [32].

**Table 1. Conversion into a quantitative score qualitative score**

<table>
<thead>
<tr>
<th>Score Scale</th>
<th>Score</th>
<th>Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>( x &gt; \bar{x} + 1.80 \times SBi )</td>
<td>A</td>
<td>Very good</td>
</tr>
<tr>
<td>( \bar{x} + 0.60 \times SBi &lt; x \leq \bar{x} + 1.80 \times SBi )</td>
<td>B</td>
<td>Good</td>
</tr>
<tr>
<td>( \bar{x} - 0.60 \times SBi &lt; x \leq \bar{x} + 0.60 \times SBi )</td>
<td>C</td>
<td>Good enough</td>
</tr>
<tr>
<td>( \bar{x} - 1.80 \times SBi &lt; x \leq \bar{x} - 0.60 \times SBi )</td>
<td>D</td>
<td>Poorly</td>
</tr>
<tr>
<td>( x \leq \bar{x} - 1.80 \times SBi )</td>
<td>E</td>
<td>Not good</td>
</tr>
</tbody>
</table>

Where:

- \( \bar{x} \): Average score = 1/2 (ideal maximum score + ideal minimum score)
- \( SBi \): Ideal standard score = 1/6 (ideal maximum score - ideal minimum score)
- \( x \): Average score

The feasibility of the product is determined by the value of at least C with a category quite well. Thus, if the results of the expert judgment give the final result C, then this development product is considered suitable for use [32].

**b. Limited trial**

Tests carried out is limited to 15 student teachers of physics. Analysis of the results of diagnostic tests in a limited test is also based on the calculation formula (1) and assessing the feasibility of the development of products in Table 1

**4. Disseminate**

After validation by experts and a limited test and the instrument has revised, the next stage is the stage of dissemination. The purpose of this stage is to disseminate the E-FTDT instrument that has been developing to be used as an evaluation instrument in measuring the level of conception of prospective physics teacher students on the concept of force. This process was carried out at the large-scale trial stage with 36 MCGF respondents. The analysis of the results of this stage is guided by the modification of the conception level categories as in Table 2 below [29].

**Table 2. Modification of the conception level category**

<table>
<thead>
<tr>
<th>Answer Combination</th>
<th>Description</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tier-1 Tier-2 Tier-3 Tier-4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benar CR1 &gt; 2.5 Benar CR1 &gt; 2.5</td>
<td>Understand the concept well</td>
<td>PK</td>
</tr>
<tr>
<td>Benar CR1 &gt; 2.5 Benar CR1 &lt; 2.5</td>
<td>Understanding the concept but not sure</td>
<td>PKKY</td>
</tr>
<tr>
<td>Benar CR1 &lt; 2.5 Benar CR1 &gt; 2.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benar CR1 &lt; 2.5 Benar CR1 &lt; 2.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benar CR1 &gt; 2.5 Salah CR1 &gt; 2.5</td>
<td>Understanding the concept but not intact</td>
<td>PKTU</td>
</tr>
<tr>
<td>Benar CR1 &gt; 2.5 Salah CR1 &lt; 2.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benar CR1 &lt; 2.5 Salah CR1 &gt; 2.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benar CR1 &lt; 2.5 Salah CR1 &lt; 2.5</td>
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<tr>
<td>Salah CR1 &gt; 2.5 Benar CR1 &gt; 2.5</td>
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</tr>
<tr>
<td>Salah CR1 &gt; 2.5 Benar CR1 &lt; 2.5</td>
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<td></td>
<td></td>
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<tr>
<td>Salah CR1 &lt; 2.5 Benar CR1 &lt; 2.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salah CR1 &gt; 2.5 Salah CR1 &gt; 2.5</td>
<td>Misconception</td>
<td>M</td>
</tr>
<tr>
<td>Salah CR1 &gt; 2.5 Salah CR1 &lt; 2.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salah CR1 &lt; 2.5 Salah CR1 &gt; 2.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Salah CR1 &lt; 2.5 Salah CR1 &lt; 2.5</td>
<td>Don't understand the concept</td>
<td>TPK</td>
</tr>
</tbody>
</table>
Combination | Description | Code
--- | --- | ---
Tier-1 | Tier-2 | Tier-3 | Tier-4
There is a combination of answers that are not appropriate. | Cannot be encoded | TDK

CRI scale used is based on a scale according to Table 3 below [28].

<table>
<thead>
<tr>
<th>Scale</th>
<th>Category</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Totally Guess Answer</td>
<td>BBT</td>
</tr>
<tr>
<td>1</td>
<td>Almost Guess</td>
<td>AT</td>
</tr>
<tr>
<td>2</td>
<td>Not Sure</td>
<td>TY</td>
</tr>
<tr>
<td>3</td>
<td>Sure</td>
<td>Y</td>
</tr>
<tr>
<td>4</td>
<td>Almost Sure</td>
<td>AY</td>
</tr>
<tr>
<td>5</td>
<td>Certain</td>
<td>SY</td>
</tr>
</tbody>
</table>

### III. RESULT AND DISCUSSION

1. **Define**

   In this stage of the discussion with the supervisor obtain information about physics teaching. In the classroom as well as the characteristics of physics student teachers who will serve as the respondent in a limited test. Based on these discussions shows that learning in the classroom generally going well in which a student equipped with the physical sciences and science education. But they rarely do an evaluation of the level of conception owned the physics student teachers.

   The results of the discussion also showed that student teachers of physics the most suitable as the respondents are students who will conduct teaching practice in schools that practice VI semester students. In addition to the knowledge of physics, especially on subconcepts particle kinematics have been obtained on the basic physics course, they also provided academic about education/teaching and have made micro-teaching practice as a first step before plunging into the field directly. so that if after the tests are limited and there is an indication that the student does not understand the concept or even occur misconceptions will be immediate remedial action.

2. **Design**

   Before development, the initial design of the instrument can be seen in Figure 1 below.

   **Figure 1. Initial design of diagnostic tests before development**

   After operating through a defining phase, the draft produced by advice that has been given is like Figure 2 below.
Figure 2. Design of four-tier diagnostic test development

One form of a question from a theme of the results of development carried out is as follows.

Figure 3. The first-tier problem page is in the form of verbal representation. This page shows a way of delivering verbal shaped concept at the first tier.
Figure 4. Page about the first tier representation shape drawing/diagram

This page shows a way of delivering shaped concept drawings/diagrams on the first tier.

Figure 5. Problem pages with the first tier are graphical representations

This page shows a way of delivering a graphic concept in the first tier.

Gambar 6. Second tier

The second tier is the level of confidence of participants to answer selected in the first tier.
The third tier is the reason the answer given to the participants of the answers given to the first tier.

The fourth tier is the level of confidence of participants to answer the reasons given in the third tier.

3. Develop
a. Expert Validation
The instrument validation developed involved three material experts and three media experts. The results of the validation by experts and media materials are presented in Table 4 and Table 5.

<table>
<thead>
<tr>
<th>Assessment Aspects</th>
<th>∑ Per Aspect</th>
<th>∑ Ideal aspects</th>
<th>Percentage Assessment (%)</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instrument instructions</td>
<td>33</td>
<td>36</td>
<td>91.67</td>
<td>A</td>
</tr>
<tr>
<td>Content</td>
<td>53</td>
<td>60</td>
<td>88.33</td>
<td>A</td>
</tr>
<tr>
<td>Presentation</td>
<td>46</td>
<td>48</td>
<td>95.83</td>
<td>A</td>
</tr>
<tr>
<td>Linguistic</td>
<td>27</td>
<td>36</td>
<td>75</td>
<td>B</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>159</strong></td>
<td><strong>180</strong></td>
<td><strong>88.33</strong></td>
<td><strong>A</strong></td>
</tr>
</tbody>
</table>

From Table 4, the results obtained from the material experts indicate that the average score of the developed test instrument as a whole is 159 (88.33% of the ideal score) with an A (Very good). It means that according to the three material experts, the developed test instrument categorized as suitable as a test instrument in measuring the level of conception of students of physics teacher candidates on the concept of force.

<table>
<thead>
<tr>
<th>Assessment Aspects</th>
<th>∑ Per Aspect</th>
<th>∑ Ideal aspects</th>
<th>Percentage Assessment (%)</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instrument instructions</td>
<td>32</td>
<td>36</td>
<td>88.88%</td>
<td>A</td>
</tr>
<tr>
<td>Presentation</td>
<td>52</td>
<td>60</td>
<td>86.66%</td>
<td>A</td>
</tr>
<tr>
<td>Linguistic</td>
<td>34</td>
<td>36</td>
<td>94.44%</td>
<td>A</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>118</strong></td>
<td><strong>132</strong></td>
<td><strong>89.39%</strong></td>
<td><strong>A</strong></td>
</tr>
</tbody>
</table>

From Table 5 above, the results obtained from the material experts indicate that the average score of the developed test instruments as a whole is 132 (88.33% of the ideal score) with an A (Very good). That is according to the three media experts, developed test instruments categorized suitable as test instruments for measuring the level of the conception of physics student teachers to the concept of style.

b. Limited Tests
The results of the small-scale trials on the response of 15 MCG on E-FTDT presented in Table 6.

<table>
<thead>
<tr>
<th>Assessment Aspects</th>
<th>∑ Per Aspect</th>
<th>∑ Ideal aspects</th>
<th>Percentage Assessment (%)</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operation</td>
<td>187</td>
<td>240</td>
<td>77.92%</td>
<td>B</td>
</tr>
<tr>
<td>Content</td>
<td>151</td>
<td>180</td>
<td>83.89%</td>
<td>B</td>
</tr>
<tr>
<td>Display</td>
<td>235</td>
<td>300</td>
<td>78.33%</td>
<td>B</td>
</tr>
<tr>
<td>Linguistic</td>
<td>143</td>
<td>180</td>
<td>79.44%</td>
<td>B</td>
</tr>
<tr>
<td>Usefulness</td>
<td>102</td>
<td>120</td>
<td>85.00%</td>
<td>B</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>818</strong></td>
<td><strong>1020</strong></td>
<td><strong>80.20%</strong></td>
<td><strong>B</strong></td>
</tr>
</tbody>
</table>
Based on Table 6, the results obtained from the MCGF response show that the average score of the developed test instrument as a whole is 1020 (80.20% of the ideal score) with a B (Good) score. It means that according to the MCGF, the developed test instrument is categorized as suitable to be used as a test instrument in measuring the level of conception of physics teacher candidates on the concept of force.

4. Disseminate

Overall, the percentage ratio of the conception physics student teachers in the 27 questions that tested the concept of force can be interpreted in the following diagram.

![Figure 9](image-url)

The above results can also be presented based on detailed results on each theme so that it can be known the percentage of conceptions that occur in each of these themes. The results are presented in Table 7.

<table>
<thead>
<tr>
<th>Thema</th>
<th>Percentage (%) of conception</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PK</td>
</tr>
<tr>
<td>1.</td>
<td>16%</td>
</tr>
<tr>
<td>2.</td>
<td>32%</td>
</tr>
<tr>
<td>3.</td>
<td>20%</td>
</tr>
<tr>
<td>4.</td>
<td>6%</td>
</tr>
<tr>
<td>5.</td>
<td>4%</td>
</tr>
<tr>
<td>6.</td>
<td>6%</td>
</tr>
<tr>
<td>7.</td>
<td>15%</td>
</tr>
<tr>
<td>8.</td>
<td>44%</td>
</tr>
<tr>
<td>9.</td>
<td>6%</td>
</tr>
</tbody>
</table>

From Figure 9, it is known that the most significant percentage of MCGF conceptions are misconceptions, where almost half of the total respondents tested. It turned out to be in line with Table 7, where the most significant percentage of conception that occurs in almost all themes are misconceptions. The biggest misconceptions occurred on six themes. Based on the answers given, actually, MCGF already understand the concept being tested but MCGF difficult to change their understanding in the form of questions that have representation in the form of map graphics and motion.

Correspondingly, it was found that the principal cause of misconception in most of the questions was the MCGF confidence level that exceeded 2.5 (CRI > 2.5) in the second tier and the fourth tier indicating that respondents had high confidence related to the correctness of the answers to the first-tier and third tier. The answer to the first tier or third tier indicated incorrectly. There are also respondents' answers that indicated as correct in the first tier but incorrect in the third tier.

This description, indicating that MCGF does not fully understand some of the concepts, Respondents only partially understand the concept without deepening it but so that respondents confused in choosing an answer or find it difficult to give a reason. It is then triggered many misconceptions of respondents labeled according to the response assessment criteria in Table 2. Thus it can be seen that the causes of the misconceptions come from his own self MCGF namely associative thinking, reasoning incomplete/incorrect, and intuition is wrong.

From the analysis above, alternative solutions to solving misconceptions can be done with several tips to overcome misconceptions, including; confronted with reality, anomalous events, and rationality, as well as for incomplete/wrong reasoning can be completed[12].
IV. CONCLUSION

Based on the results of the study, it can be concluded that the developed test instrument answers both categories based on the results of the assessment by material experts, media experts, and MCGF responses on limited trials so that it is fit to be used as a test instrument and has the potential to measure the level of conception of prospective physics teacher candidates on the concept of force.

ACKNOWLEDGMENT

The author would like thank to the Department of Master in Physics Education and Department of Physic Education Universitas Ahmad Dahlan for all assist and support so that the study can be completed.

REFERENCES


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Controlling Water Pollution in Batu Merah Village Ambon City

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ABSTRACT: The main problem in this study is the management of water quality on the Batu Merah River Pollution Level. Declining water quality will reduce the usability, usufruct, productivity, carrying capacity, and carrying capacity of water sources which in turn will reduce the wealth of natural resources. The research method used was a Field Research study conducted at the Ambon City Environmental Agency and Ambon Batu village residents. Using primary and secondary data, the method of data collection is by observing, documenting and interviewing. By using descriptive analysis and by using a qualitative method that is to find a concrete picture of water quality management of the Batu Merah River Pollution Level.

The research method used was a Field Research study conducted at the Ambon City Environmental Agency and Ambon Batu village residents. Using primary and secondary data, the method of data collection is by observing, documenting and interviewing. By using descriptive analysis and by using a qualitative method that is to find a concrete picture of water quality management of the Batu Merah River Pollution Level. Based on the results of the study, it can be concluded that the efforts to control the Ambon Batu Merah river water pollution carried out by the Ambon City Environment and Waste Management Office are to increase inventory and identification of water pollutant sources, improve waste management, determine the capacity of pollution loads, increase knowledge and community participation in waste management, improve supervision of wastewater disposal, improve monitoring of river water quality.

Keywords: Control, Water Pollution, River

I. INTRODUCTION

Water is a natural resource that is very necessary for the survival of organisms. Humans use water to meet various needs such as household, agricultural, industrial and others. The role of water for human life is very important, so that great attention is needed so that the quality of the water source is maintained. Water as a component of the environment will affect and be influenced by other components. Poor quality water will result in bad environmental conditions that will affect the health and safety conditions of humans and other living things. Declining water quality will reduce the usability, usufruct, productivity, carrying capacity, and carrying capacity of water sources which in turn will reduce the wealth of natural resources. The river is the most important water provider for humans. With this being the most important water provider, it has a negative impact on rivers. The negative impact that occurs in rivers is in the form of water pollution caused by human activities. Activities commonly carried out by humans include disposing of trash and disposing of industrial waste directly into the river that can have an impact on aquatic organisms. Water pollution is indicated by a decrease in quality to a certain level that causes water not to be able to function in accordance with its purpose. What is meant by a certain level above is the water quality standard that is set and serves as a benchmark to determine the occurrence of water pollution, it is also a directive about the level of water quality that will be achieved or maintained by each water pollution control work program.

The efforts to control water pollution in Indonesia, carried out by strengthening sanctions and expanding the range of regulations on environmental pollution with the enforcement of Law No. 32 of 2009 concerning Environmental Protection and Management, Government Regulation Number 82 of 2001 concerning Management of Water Quality and Water Pollution, Government Regulation Number 27 of 2012 concerning Environmental Permits, Government Regulation Number 101 of 2014 concerning Management of Hazardous and Toxic Waste, as well as other regulations concerning the control of environmental pollution.

Water pollution is controlled to control water pollution are regulated in PP RI No. 82 of 2001 concerning Management of Water Quality and control of water pollution, in Article 1 paragraph 9 PP No. 82 of 2001 is a measure of the limit levels of living things, energy, or components that exist or must be present and / or pollutant elements that exist in water. Water quality criteria for each class are listed in appendix PP RI No.81 of 2001. Water pollution is regulated in Article 1 point 11 PP RI No.82 of 2001 formulates the definition of water pollution, or the inclusion of living things, substances, energy, or components in water and / or components and energy in water that cause the quality of water to not function according to its purpose. Article 1 point 12 PP RI No. 82 of 2001 formulates the definition of pollution load, namely: the amount of a pollutant element contained in water or wastewater. Article 1 point 13 formulates the definition of the capacity of the pollution load, namely: The ability of water in a water source to receive input from the pollution load without causing water to become polluted.

According to Government Regulation of the Republic of Indonesia Number 82 Year 2001 regarding water quality management and water pollution control, it is stated in Article 8 that the classification and criteria for water quality are applied into 4 (four) classes, namely: a) First Class: Water intended for use can be used for raw water drink and or other purposes that require water quality that is the same as those uses, b) Class Two: Water intended can be used for water recreation facilities, freshwater fish farming, animal husbandry, water for irrigating crops and or other purposes which are the same as the uses c) Class Three: Water intended for use can be used for culturing freshwater, water husbandry to irrigate planting and or other purposes similar to these uses, d) Class Four: Water intended can be used to irrigate other crops and or other uses with these uses.

Water pollution and forms of activities carried out by humans such as disposing of waste that can mention environmental stress can have a harmful effect on individuals, populations, communities and ecosystems. Over time the community will be dominated by species that can survive, can live superior, stable and independent in it. This whole process is called succession, while communities that have achieved stability are called communities that have reached a peak or climax. There are six levels of water pollution effects in accordance with the level of danger they cause: a) Class 1: aesthetic disturbances (smell, taste, scenery), b) Class 2: disruption or damage to property, c) Class 3: disruption of animal life and plants, d) Class 4: disturbance to human health, e) Class 5: disturbance to the human reproductive system and genetics, f) Class 6: Major ecosystem damage. To prevent diseases from arising from water pollution, the quality of water bodies must be maintained in accordance with water quality standards. The water quality of the Batu Merah river can be determined by carried out certain tests of the water. The usual tests are carried out by several parameters namely physical parameters (temperature, turbidity, dissolved solids and so on), chemical parameters (PH, BOD, COD, DO).

According to Effendi Waters that have BOD values of more than 10 mg / L liter have experienced pollution.8 The increase in BOD value in river water from upstream to downstream shows that the Batu Merah River in Ambon has experienced pollution, especially in the downstream area. The level of water pollution in the Batu Merah river in Ambon downstream is classified as high and is classified as a bad water category. According to Effendi Effendi Waters that have BOD values of more than 10 mg / L liter have experienced pollution.8 The increase in BOD value in river water from upstream to downstream shows that the Batu Merah River in Ambon has experienced pollution, especially in the downstream area. The level of water pollution in the Batu Merah river in Ambon downstream is classified as high and is classified as a bad water category. This is referred to Salim's opinion that a water with a low level of pollution and can be categorized as good water, the biochemical oxygen content (BOD) ranges from 0-10 ppm.9 Furthermore it is said that the presence of organic material in water can come from nature or household and industrial activities. COD values in uncontaminated waters are usually less than 20 mg / L liter, and waters that have high COD are undesirable for fisheries and agriculture.10 Pollution does not only depend on the form of pollutants, but also depends on the intended use of the water. The entry of pollutants into the river in Batu Merah can change the physical and chemical conditions of the environment, thereby changing the diversity of river water communities. Because the species that exist in the environment are not all tolerant of the stresses of the environmental conditions, but rather have their own tolerance limits and industrial waste discharged into the river without regard to the Environmental Impact Analysis (AMDAL).

Some industries that dispose of industrial waste in places that are still used by the community such as land surface and river flow. Though the river has a vital function in relation to ecology, the river and its banks are usually a habitat that is very rich in flora and fauna as well as a barometer of the ecological conditions of the area. An unplowed river can function as a natural place that will increase or maintain the oxygen content of water in a river. The source of water pollution is mainly caused by human activities and is triggered by population growth. Water pollution is increasing along with industrial growth. The government has determined that industrial waste cannot be released into the waters if it does not meet a standard. That is, the industry must build and operate the WWTP. But in reality, it is often violated and ignored.

II. RESEARCH METHODS

8 Agoes Soegianto, Freshwater Ecology, (Surabaya: Publishing and Printing Center (AUP), 2010), p.44
9 RI Regulation No. 82 of 2001 concerning Management of Water Quality and Water Pollution Control
10 Takdir Rahmadi, Environmental Law, (PT Raja Grafindo Persada: Jakarta), p.125
11 Ibid, 126
12 PP RI No. 82 of 2001
13 Ibid, p.49
14 Agoes Soegianto, Freshwater Ecology, (Surabaya: Aup Publishing and Printing Center, 2010), p.48
15 Effendi, H. Quality Study for Water Resources and Environmental Management, Fifth Printing (Yogyakarta: Kanisius), h. 20
16 Salim, Dimensi Oxygen (Do) and Biological Oxygen Demand (BOD) as one indicator to determine the quality of the waters. ISSN 01216-1877, Osema, Volume XXX, Number 3, 2005, h. 21
18 Ibid, h. 39

http://dx.doi.org/10.29322/IJSRP.10.01.2020.p9770
www.ijsrp.org
The method used in this study is empirical legal research with the nature of descriptive research that uses primary and secondary data sources with library research techniques using primary legal materials, secondary legal materials and tertiary legal materials. Primary legal materials are legal materials whose contents are related to government regulations or other institutions that have authority. Secondary legal sources are materials in the form of books and other printed materials, as well as software, which are the needs of this research.

III. RESULTS AND DISCUSSION

1. The Role of the Ambon City Environmental and Waste Management Office

The Office of Environment and Waste of Ambon City is an element of implementing regional autonomy in the environmental field. The Ambon City Environment and Waste Management Agency was formed based on Ambon City Regulation Number 38 of 2016 concerning the Organization and Work Procedure of the Ambon City Service. Regarding the role related to the main tasks and functions that must be carried out by regional apparatus organizations as public organizations of the Ambon City waste and environmental agency that have the following tasks and functions:

1) The main duties of the Ambon City Environmental and Waste Management Agency are carried out under the supervision of the Mayor of Ambon City and reporting to the Mayor of Ambon City. The Ambon City Solid Waste Office has the function: a) Formulation of technical policies on government affairs in the field of environment and waste; b) Formulation of regulations and zoning in the field of environment and solid waste, the implementation of Administrative Services; and the implementation of other functions provided by the Mayor in relation to his duties and functions.

Based on Ambon Mayor Regulation No. 38 of 2016 concerning the Organization and Work Procedure of the Ambon City Office consisting of: 16) The Main Duties of the Ambon City Environmental and Waste Management Agency include; a) Environmental monitoring and packaging that can be broken down by natural processes; Carry out guidance on recycling of waste; Provide waste recycling facilities; Carry out supervision of the recipient of environmental permits; b) Formulate waste reduction policies; Carry out fostering restrictions on landfilling; c) The Head of the Waste Management Division has the task of carrying out part of the secretariat of the environmental and waste service department in preparing staff and general policy materials in the environment and waste service department.

c) The Head of the Sub-Division has the task of carrying out part of the duties of the secretariat of the environmental and waste department in preparing fiscal, technical, and operational policies related to their duties and functions.

d) The Head of the Planning and Division carries out part of the duties of the secretariat of the environmental and waste department in preparing planning policy materials, preparation of programs and activities as well as evaluation in the environment and waste service department.

The Head of the Environmental Management Division has the task of carrying out the preparation of policy materials and the coordination of sub-governments in the field of environmental planning, the Head of the Environmental Impact Assessment Section has the following tasks: 1) Coordinating the preparation of environmental pollution and / or damage prevention instruments (Amda UKL / UPL, environmental permit, environmental audit and environmental risk analysis); 2) Assessing environmental documents (Amdal, UKL / UPL); 3) Arranging a transparent environmental document review team (appraisal commission, expert team and consultant); and 4) Carry out other tasks given by the Head of the Division related to their duties and functions.

The Section Head of environmental maintenance and parks has the following tasks: 1) Implement protection of natural resources; 2) Carry out preservation of natural resources; 3) Carry out sustainable use of natural resources; 4) Carry out the reserve of natural resources; 5) Implement mitigation and adaptation measures for climate change; 6) Carry out an inventory of Greenhouse Gases (GHG) and compile profiles of GHG emissions; 7) Carry out biodiversity conservation, establish policies and implement conservation, sustainable use and control of biodiversity damage; 9) Carry out monitoring and supervision of the implementation of biodiversity conservation; and 10) Carry out other tasks given by the Head of Environmental Planning related to their duties and functions.

The Head of the Environmental Impact Assessment Section has the following tasks: 1) Coordinating the preparation of environmental pollution and / or damage prevention instruments (Amda UKL / UPL, environmental permit, environmental audit and environmental risk analysis); 2) Assessing environmental documents (Amdal, UKL / UPL); 3) Arranging a transparent environmental document review team (appraisal commission, expert team and consultant); and 4) Carry out other tasks given by the Head of the Division related to their duties and functions.

The Section Head of environmental monitoring has the following tasks: 1) Formulate technical policies for the control of spatial use of cities; 2) Carry out the formulation of a policy for the temporary storage of B3 waste in a district of the city, and carry out other tasks given by the Head of Waste Management in relation to their duties and functions.

The Head of the Transportation and Waste Management Office has the following tasks: 1) Implement the implementation of the RPLPH in the field of waste; 2) Monitor and control the implementation of the RPLPH in the field of waste; 3) Determine the criteria for environmental damage; Carry out environmental damage monitoring; 4) Carry out the monitoring of water quality; 5) Carry out the air monitoring; 6) Carry out the soil monitoring; 7) Carry out the monitoring of pyrogenic waste; 8) Carry out the monitoring of chemical waste; 9) Carry out the monitoring of electronic waste; 10) Carry out the environmental monitoring workshop (e. g. water, air and soil); and Carry out other tasks given by the Head of Environmental Planning related to their duties and functions.

The Head of the Environmental Management Division has the following tasks: 1) The task of the Ambon city environmental office has the main task of carrying out the formulation and implementation of policies in the field of environment and solid waste, its function is to carry out the tasks as mentioned above, then the Ambon City environmental and waste service has functions: Formulation of technical policies on government affairs in the field of environment and waste, implementation of policies in the field of environment and waste, implementation of evaluation and reporting of the results of follow up recommendations on the evaluation results of the recipient of environmental permits and environmental protection and management permits; Carry out follow up supervision of recommendations on the evaluation results of the recipient of environmental permits and environmental protection and management permits; Carry out supervision and guidance of environmental supervisory officers; and Carry out enforcement

12 Ambon Mayor Regulation Number 38 of 2016 concerning the Organization and Work Procedures of the Ambon City Service.

http://dx.doi.org/10.3923/ijrpr.2010.970.977
of individuals for violations of environmental protection and management; Carry out investigations on cases of environmental violations; and Carry out other tasks given by the Head of the Division of Environmental Management and Capacity Building related to their duties and functions.

The head of the environmental legal capacity building section has the following tasks: To formulate policies on the recognition of the existence of indigenous and tribal peoples; Establish customary land (MHA) and rights of the MHA related to environmental protection and management; Carry out the identification, verification and validation and determination of recognition of the existence of indigenous peoples, local wisdom or traditional knowledge and the right of local wisdom or traditional knowledge and the MHA related to environmental protection and management; Establish customary land which is the existence of the MHA, local wisdom or traditional knowledge and rights of the MHA related to environmental protection and management; Carry out dialogical communication with the MHA; Form a committee for the recognition of indigenous and tribal peoples; Compile data and information about the MHA profile, local wisdom or traditional knowledge related to environmental protection and management; and Carry out other tasks given by the Head of the Division of Environmental Management and Capacity Building related to their duties and functions.

Referring to the duties and principal of the Ambon City Environmental and Waste Department as explained above, as a part of the public organization it is expected to be able to carry out its role by carrying out its main tasks and functions in the environmental field as stipulated in the legislation so that it can meet community expectations of the role of the environmental service in preventing and overcoming environmental problems.

2. Efforts to Control Water Pollution in the Batu Merah river in Ambon

a) Water Pollution Control

Control of environmental pollution is an effort made to prevent, overcome and restore damage to the quality of the environment caused by pollution. The high density of population in the Batu Merah river basin, the presence of livestock slaughtering places, industrial waste and waste from small and medium enterprises that are discharged into the river will effectively create domestic pollution and industrial waste being discharged directly into water bodies without treatment of WWTP / septic tank, which needs to be a major concern in pollution control programs. Communities around the Batu Merah river need to change their behavior regarding the use of the river so that the river is no longer used as a landfill, awareness of compliance with applicable regulations, natural knowledge of waste management. Implementation of industrial waste disposal regulations should be monitored for implementation and violators sentenced. Industrial waste should be processed first with sewage treatment techniques and after meeting the quality standards for wastewater, it can be channeled into gutters or rivers. Thus a river will be created that is clean and has ecological functions.

As a result of local residents, DA provincial stated that “the government had actually issued a ban not to throw garbage into the river, but the ban was not accompanied by strict sanctions, those who lived or boarding around the riverbanks were still determined to throw garbage in the river.” The same thing was also conveyed by residents around the Batu Merah river with provincial R. There should be strict sanctions from the state and city governments, there must be a strict warning to boaters to prohibit their residents from throwing garbage in the river, home industries around the village office. Mardika must be warned and given strict sanctions if he is still determined to dump garbage into the river.15

As a result of the bad behavior of the Batu Merah community which turned the Batu Merah river into a garbage bin. Garbage is dumped into the red rock river various types of plastic waste from the community such as crakle, packaging items made of plastic and household and industrial waste. Interview with B3 Waste Pollution Control Staff, Ir Margaretha Tomasoa, that said river pollution occurs in the red stone because the community still uses the river as a landfill and there is direct disposal of industrial waste into the river.16

b) Industrial Waste Pollution Control

The Ambon City Environment and Waste Management Office are authorized to:

1. Carry out dialogical communication with the MHA; Form a committee for the identification, verification and validation and determination of recognition of the existence of indigenous peoples, local wisdom or traditional knowledge and the right of local wisdom or traditional knowledge and the MHA related to environmental protection and management; Establish customary land which is the existence of the MHA, local wisdom or traditional knowledge and rights of the MHA related to environmental protection and management; Carry out dialogical communication with the MHA; Form a committee for the recognition of indigenous and tribal peoples; Compile data and information about the MHA profile, local wisdom or traditional knowledge related to environmental protection and management; and Carry out other tasks given by the Head of the Division of Environmental Management and Capacity Building related to their duties and functions.

2. Non-permanent sources (non-point sources), non-permanent sources include waste originating from land runoff, from the atmosphere and sources that are difficult to identify and difficult to control. These pollution materials include: a) sediment waste on land both naturally caused by human activity, b) runoff of chemicals such as fertilizers, pesticides from agricultural areas, c) sedimentation due to mining, d) oil spills and other hazardous materials.

Based on government regulation No. 80 of 2001 concerning water quality management and water pollution control, water quality management and water pollution control activities are carried out in an integrated manner using an ecosystem approach. The integration is carried out through the stages of planning, implementation, observation and evaluation. The scope of water pollution control According to the Regulation of the Minister of Environment No. 01 of 2010 includes the inventory and identification of water

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15 Interview, resident of Batu Merah Village on 8 August 2019
16 Interview, Batu villagers on 9 August 2019
17 Interview, Margaretha Tomasoa, 10 August 2019, B3 Waste Pollution Control staff
18 Interview, Margaretha Tomasoa, 10 August 2019, B3 Waste Pollution Control staff
19 Interview, N. Ch. Risakota, S.Pt Head of Control and Pollution and Environmental Damage in Ambon City, August 6, 2019
20 Interview, N. Ch. Risakota, S.Pt Head of Control and Pollution and Environmental Damage in Ambon City, August 6, 2019
21 Regulation No 80 of 2001 concerning Management of water quality and control of water pollution
22 http://dx.doi.org/10.29322/IJSRP.10.01.2020.p9770
pollutant sources, determination of the capacity of water pollution loads, determination of wastewater quality standards, stipulation of water pollution control policies, licensing, monitoring of water quality, guidance and supervision and provision of information.

Strategy is a tool to achieve the goal, efforts to control water pollution require strategic planning which includes the process of analysis, formulation and evaluation of strategies. One strategic planning model is the SWOT analysis (strengths, weaknesses, opportunities and threats). According to the strategy summary generated from the SWOT analysis can be grouped into 4 (four) categories consisting of: 20

1. SO Strategy: This strategy is carried out by using strengths (Strategy) to take advantage of opportunities (Opportunity) which consists of: Increase the enforcement of Environmental Law No. 32 of 2009, Increase leadership commitment to the availability of environmental information in order to increase the role of the Ambon City Environment Office to increase the role of the community in the protection / conservation of natural resources.

2. WO Strategy: This strategy is a step to minimize weaknesses to take advantage of existing opportunities. Increase the number of environmental quality monitoring tools and infrastructure and the funds available to implement environmental MSS in the city of Ambon.

3. WT Strategy: This strategy is implemented with the intention of minimizing weaknesses to reduce threats. This strategy consists of: Increasing the number of environmental law enforcement so that it can handle the business world that violates environmental laws can be optimized, Increase infrastructure and funds available to control environmental pollution / destruction of forest and land fires.

In this SWOT analysis of pollution control indicators are used as a basis for assessing the strengths, weaknesses, opportunities and threats in the current effort to control water pollution. These indicators are determined based on the elements that influence the level of river pollution and the principles of pollution control. The elements used in this analysis are: 1) The physical condition of the river, an element that explains the current environmental condition of the river with the problems faced and the potential that exists physically, this element includes the level of water pollution. Perennial pollution, efforts to control water pollution, is an element that explains the efforts to control water pollution that have been carried out by the government and the community, to reduce the level of water pollution; a) Monitoring water quality, b) Determination of the capacity of water pollution load, c) Determination of wastewater quality standards, d) Preparation of WWTP, e) Inventory and identification of sources of water pollution. The attitude and behavior of the community, is an element that explains the attitudes and behavior of the local community in efforts to control water pollution, both of which are both supportive and hindering the success of water pollution control including; a) Disposal of industrial waste, b) Disposal of residential waste, c) Disposal of livestock waste, d) Awareness of compliance with applicable regulations, e) Knowledge in waste treatment.

The role of the Government in efforts to control water pollution, is an element that explains the policies of the central government, provincial governments, district governments and related agencies regarding water pollution control, both supporting and inhibiting, including: a) Licensing for disposal of wastewater from water sources, b) Provision of information, c) Determination of water pollution control policies, d) Guidance and supervision, e) Coordination between agencies concerned in controlling water pollution, d) Application of the concept of community participation in the implementation of water pollution control activities. Now the condition of the Batu Merah River water is very alarming. This can be seen from the development of community activities along the Batu Merah river area and the large number of residents living along the Batu Merah river. Pollution that occurs in the Batu Merah River Basin (DAS) due to the large number of factories dumping river water is the main cause of the decline in the quality of the Siak river water, not to mention household rubbish which more or less influences the destruction of the Batu Merah river ecosystem.

Management of water quality to the Batu Merah River Pollution Level that from the highest Batu Merah river water temperature was obtained in 2017 and the lowest in 2015. The highest pH was found in 2016 and the lowest in 2018; Highest TSS in 2015 and lowest in 2016; DO is highest in 2017 and lowest is 2018; Highest BOD in 2016 and lowest in 2015; and the highest COD in 2016 and the lowest in 2018. The water quality of the Batu Merah Ambon River from 2015 to 2018 shows a significant difference. Each environmental parameter has a difference from year to year. This is because natural activities and people experience significant changes every year.

Water quality reflects water status based on physical and chemical aspects through a periodic set of measurements. Batu Merah River is a type of periodic river that flows through the middle of Ambon city. The high activity of the people who live around the river flow causes the river to become polluted and not suitable for the community to function. In managing water quality and controlling water pollution, there are three possibilities for the intersection of authoring of authority, namely: (a) between agencies that have different main tasks and functions (topkasi); (b) between administrative regions; and (c) between Environmental Permit giver and PPLH Permit. An important point of these three possibilities is the mechanism of coordination with agencies authorized to oversee other instruments. 21

(a) Interaction between agencies with different main functions

Although it is not directly related to monitoring activities, it is important to understand the duties of various agencies related to water pollution control. In addition to environmental agencies under Law No. 32 of 2009, here are some agencies that have the task of influencing the control of water pollution.

<table>
<thead>
<tr>
<th>Mandate</th>
<th>Relevant Principal Tasks</th>
<th>Agencies</th>
</tr>
</thead>
<tbody>
<tr>
<td>LU no. 11 of 1974 concerning Irrigation (“Law 11/1974”)</td>
<td>Management of water resources (water use rights) • Drinking water supply system • Waste water and environmental drainage management systems (including sanitation) • Solid Waste • Construction of related infrastructure with water; and • Coordination of all arrangements for planning, technical planning, supervision, business, maintenance, and protection and use of water and / or water sources</td>
<td>Public Works</td>
</tr>
<tr>
<td>LU no. 41 of 1999 concerning Forestry (“Law 41/1999”)</td>
<td>• Land use management • Management of conservation areas • Watershed rehabilitation</td>
<td>Living environment 4 (Now the Ministry of Environment and Forestry)</td>
</tr>
<tr>
<td>LU no. 5 of 1990 concerning Conservation of Biological Natural Resources and their Ecosystems (“Law 5/1990”)</td>
<td>Protection of species in territorial waters • Protection of habitat in</td>
<td>Environmental and forestry 5 (Now the Ministry of Environment and Forestry)</td>
</tr>
<tr>
<td>LU no. 26 of 2007 concerning Spatial Planning (Law 26/2007)</td>
<td>• Arrangement and supervision of spatial planning • Implementation of spatial planning • Coordination of spatial planning across sectors, across regions and across stakeholders</td>
<td>Spatial</td>
</tr>
<tr>
<td>LU no. 25 of 2004 concerning Development Planning Systems (Law 25/2004)</td>
<td>• Coordination between development actors • Guaranteed integration, synchronization, and policy synergy between regions, between spaces and between times • Consistency of planning, budgeting, implementation and supervision • Monitoring and evaluation of the implementation of development plans</td>
<td>Development and Financial Planning Agency</td>
</tr>
<tr>
<td>LU no. 18 of 2008 concerning Waste Management (“Law 18/2008”)</td>
<td>• Development and increase public awareness in waste management • Technology research and development (including local specific technology), waste reduction and handling • Facilitating, developing and implementing waste reduction, handling and utilization efforts • Provision of waste management facilities and infrastructure • Coordination between government agencies, communities and the business sector so that there is solid waste management</td>
<td>Environmental and Public Works</td>
</tr>
</tbody>
</table>

Source: Guidebook for Supervision and Law Enforcement in Water Pollution

In addition to the above agencies, there are also several other relevant agencies in the field of natural resource management, but their authority still refers to the authority above. Related sectors include: mineral and coal mining, plantations, agriculture, public infrastructure, and industry / manufacturing.

(b) Interaction between administrative regions

20 Bangkuti, F. SWOT Analysis (Jakarta: Gramedia Pustaka Utama, 2006), p.20

http://dx.doi.org/10.29322/IJSRP.10.01.2020.p9770
www.ijsrp.org
In principle, the supervisory authority is inherent in the authority of the permit. However, related to planning, recovery and mitigation, authority depends on the flow of the river. The division of authority is as follows:

<table>
<thead>
<tr>
<th>Mandate</th>
<th>In the Regency / City</th>
<th>Inter-Regency / City</th>
<th>Cross-Province</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inventory and identification of water pollutant sources (Article 20 PP No. 82 of 2001)</td>
<td>Regent / Mayor</td>
<td>Governor</td>
<td>Minister</td>
</tr>
<tr>
<td>Water quality monitoring (Article 13 PP No. 82 of 2001)</td>
<td>Regent / Mayor</td>
<td>Governor</td>
<td>Minister</td>
</tr>
<tr>
<td>Determination of water class (Article 9 PP No. 82 of 2001)</td>
<td>Regent / Mayor</td>
<td>Governor</td>
<td>Minister</td>
</tr>
<tr>
<td>Determination of Water Quality Standards (Articles 10-12 PP No. 82 of 2001)</td>
<td>Regent / Mayor</td>
<td>Regent / Mayor</td>
<td>Regent / Mayor</td>
</tr>
<tr>
<td>Establishment of DTBPA (Article 20 PP No. 82 of 2001)</td>
<td>Regent / Mayor</td>
<td>Governor</td>
<td>Minister</td>
</tr>
<tr>
<td>Determination of BMAL (Article 21 PP No. 82 of 2001)</td>
<td>Minister / Governor</td>
<td>Minister / Governor</td>
<td>Minister / Governor</td>
</tr>
<tr>
<td>Determination of water pollution control policies</td>
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</tr>
</tbody>
</table>

(c) Interaction between the authority granting Environmental Permit and PPLH Permit

There is a difference regarding the basis for determining authority between Environmental Permits and the three types of PPLH Permits related to water pollution control (Ivalerina, 2016) that affect their supervisory authority. What is meant by these three types of PPLH permits are IPLC, Wastewater Utilization Permit, and Injection Permit.

<table>
<thead>
<tr>
<th>Mandate</th>
<th>Authority to grant Environmental Permit and PPLH Permit, Procedure, Period and Reporting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Environmental Permit (PP No. 27 of 2012)</td>
<td>The authority to grant licenses is based on the authority to evaluate AMDAL, UKL-UPL, and SKKLH, that is based on the type of business plan or activity and its scale / magnitude.</td>
</tr>
<tr>
<td>IPLC and Waste Water Utilization Permit (PP No. 82 of 2001)</td>
<td>The authority is determined based on legislation, that is, by the Regent / Mayor.</td>
</tr>
<tr>
<td>Injection permission (LH Regulation No. 13 of 2007)</td>
<td>The authority is determined based on legislation, namely by the Minister.</td>
</tr>
</tbody>
</table>

For supervisory officials, the distribution of governmental authority in the context of controlling water pollution becomes important in terms of: 1) The impact of pollution is felt in a different administrative area (for example: in the downstream) with an administrative area that grants a waste water discharge permit and / or an Environmental Permit (for example: in the upstream); and, 2) Governmental performance in the upstream administrative region will greatly influence pollution control in the downstream (for example: related to the cumulation of pollutant sources or water discharge). In both cases, there is a possibility that complaints will be received by environmental agencies that do not have the authority to monitor polluters / sources of impact. In the event that a complaint is received by an environmental agency that does not have the authority to supervise polluters / sources of impact, the agency submits follow-up recommendations to other work units or related agencies authorized to follow up on the complaint (see Article 25 paragraph (2) Regulation of the Minister of the Environment No P22 / MenLHK / Setjen / Set. 1 / 3/2017 concerning Procedures for Managing Complaints over Suspected Pollution and / or Environmental Damage and / or Forest Damage).

1. Enforcement of Environmental Law

Law enforcement is an effort to uphold the norms / rules and legal values that are behind the norm. The value of law is the achievement of the condition of preservation of environmental capabilities. Enforcement of environmental law is an effort to achieve compliance with regulations and requirements in legal provisions that apply generally and individually, through supervision and determination (or threat) of administrative, criminal and civil facilities. In general, environmental law enforcement officers are categorized as: Police, prosecutors, judges, legal advisors, officials / agencies that have the authority to give permits (Ministry of Environment and Provincial, Regency and

** TABLE 2 **

Agencies That Have Principal Tasks In Water Pollution Control

<table>
<thead>
<tr>
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<td>Establishment of DTBPA (Article 20 PP No. 82 of 2001)</td>
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</tbody>
</table>

** TABLE 3 **

Authority to grant Environmental Permit and PPLH Permit, Procedure, Period and Reporting

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</tr>
</tbody>
</table>

In accordance with Article 72 of RI Law No. 32 of 2009, supervision is carried out on the compliance of those responsible for the business and / or activity with respect to Environmental Permits. This shows that the Environmental Permit is the object of supervision. The relationship between supervision and licensing is also regulated in RI Law No. 30 of 2014 concerning Government Administration ("Law No. 30 of 2014"). Article 39 Paragraph (2) Letter b of Law no. 30 of 2014 states that the decision of a Government Agency and / or Officer is in the form of a permit if the activities to be carried out are activities that require special attention and / or comply with statutory provisions. The purpose of requiring special attention to the letter b is that every effort or activity carried out or carried out by the Citizens, individually, through supervision and determination (or threat) of administrative, criminal and civil facilities. In general, environmental law enforcement officers are categorized as: Police, prosecutors, judges, legal advisors, officials / agencies that have the authority to give permits (Ministry of Environment and Provincial, Regency and
City Government Agencies responsible for the environment. As well as parties related to environmental management such as Non-Governmental Organizations (NGOs), communities, entrepreneurs and the journalism. Law enforcement as a concrete form of the application of law greatly affects the feeling of law, legal satisfaction, legal benefits, legal needs or justice individually and socially. Law enforcement cannot be separated from the rule of law, legal actors and the environment in which the law enforcement process occurs, it is not possible to solve the problem of law enforcement if only glance at the law enforcement process, moreover it is more limited to the administration of justice. Regarding environmental law enforcement Ninik Suparni (a member of the Indonesian prosecutors association) emphasized that environmental law enforcement is an effort to achieve compliance with regulations and requirements in general and individual legal provisions, through supervision and application in administrative, civil, criminal matters. For this reason, law enforcement can be carried out preventively, namely law enforcement efforts to prevent environmental pollution. And can also be done in a repressive manner, namely law enforcement efforts to take legal action to anyone who violates the applicable provisions. Enforcement of environmental law is closely related to the ability of the apparatus and the community's compliance with applicable regulations. In Indonesia the regulations governing environmental protection are regulated in Law No. 32 of 2009 concerning Environmental Protection and Management. In the regulation, there are 3 ways in which law enforcement can be done in an effort to protect the environment. include: Administrative law enforcement, criminal law enforcement, and civil law enforcement.

2. Law Enforcement on Environmental Administration

Administrative law enforcement through 2 ways, namely the way of supervision and administrative sanctions. Supervision if we see in Article 71 of Law No. 32 Year 2009, namely supervision is carried out by 2 parties, namely the government and the community. The role of government oversight in Article 71 of Law No. 32 Year 2009 is to be stated by the Governor, Mayor or Regent. In Article 71 number 2 of Law No. 32 of 2009 Stating that role can be delegated to the authorities. The role of the authorized official is: a) Conducting monitoring, b) Requesting information, c) Making copies of documents, d) Making notes needed, e) Entering a certain place, f) Taking photos, g) Making audio-visual recordings, h) Taking samples, i) Checking equipment, j) Checking installation, k) Stopping certain violations. While the role of the community according to Article 70 of Law No. 32 of 2009 concerning the role of the community are: a) Social oversight, b) Providing suggestions, opinions, proposals, objections, complaints, c) Submission of information and reports. The administrative sanctions according to Government Regulation No. 27 of 2012 concerning Environmental Permits, namely the Regional Head (Governor, Mayor and Regent) can impose administrative sanctions to those who commit violations. Sanctions given under Article 71 PP No. 27 of 2012 concerning environmental permits are: a) Written warning, b) Government coercion, c) Suspension of environmental permit, d) Revocation of environmental permit.

3. Environmental Criminal Law Enforcement

Criminal regulation which can be the basis of law enforcement for environmental law is Law No. 32 of 2009 concerning Environmental Protection and Management. According to the regulation, there are acts that can be criminalized by law enforcement officers. The intended legal acts are in the form of violations of the provisions stipulated in the UU/PLH. There are at least 7 provisions that can be convicted if the provisions are violated by the parties concerned. The provisions in question are: a) Provisions on quality standards, b) Provisions on genetic engineering, c) Provisions on Waste, d) Provisions on Land, e) Provisions on Environmental Permits, f) Provisions on Environmental Information, g) Provisions on Environmental Information, h) Provisions on water pollution. For water pollution, quality, supervision has the following important functions. 1) Ensuring the control of pollutants entering the water source and is used as a basis for environmental permit. 2) Providing information and reports to the authorities. 3) Stopping certain violations. While in the supervision and application in environmental documents. In relation to water quality, supervision has the following important values: 1) Ensuring the control of pollutants entering the water sources of certain pollutants (point sources) runs according to the permit, by complying with the required conditions; and 2) Verifying the accuracy of the monitoring, monitoring and monitoring information provided by the activity and / or business in the report. Water pollution control itself is only one part of the overall water quality management framework, including efforts to prevent and control water pollution and restore water quality to ensure water quality in accordance with water quality standards. As part of the law enforcement mechanism, supervision is downstream.

IV. CONCLUSION

From the discussion that has been presented, it is seen from the implementation of control activities carried out by the Ambon City Environment and Solid Waste Department on liquid waste in the Batu Merah watershed that is already good but not yet optimal. The community is also less aware of the awareness of preserving the environment, especially in the Batu Merah River watershed. So the strategy undertaken by the Ambon City Environmental and Waste Management Office in dealing with water pollution and water quality degradation so that river water can be utilized in accordance with its purpose and is sustainable as follows:

1. Increase inventory and identification of water pollutant sources

Inventory of sources of pollution is needed to determine the cause of the decline in water quality. This is because the source of water pollutants that will be identified will always develop from time to time depending on the dynamics of development, economic, social and cultural growth of the local community. Inventory is carried out with the aim to characterize pollutant streams in the environment, while identification is carried out to identify and classify types of pollutants, sources and locations and the effects of impacts on the environment.

2. Improving waste management

Efforts to reduce pollution of liquid waste in rivers is by managing waste before being discharged into the river. Waste management can be done by making WWTPs.

3. Determine the capacity of the pollution load

Determination of pollution capacity can be used as a material for consideration and policy in determining spatial planning, giving business licenses / activities that affect water quality both directly and indirectly. Give an environmental permit for wastewater from a water source and is used as a basis for allocating the burden obtained into water sources from various pollutant sources so that appropriate control measures can be implemented so that the specified water quality standards can be met or the target water quality can be achieved.

4. Increase community knowledge and participation in waste management

27 Syahrul Mahmud, Indonesian Environmental Law Enforcement, p. 20
http://dx.doi.org/10.29322/IJSRP.10.01.2020.p9770
www.ijrsp.org
Increasing community knowledge in waste management is done by conducting socialization and training. Public awareness to maintain cleanliness and health also needs to be improved. This is necessary to prevent the community from carrying out garbage disposal in the river or using river banks as a place for garbage disposal.

5. Improve supervision of waste water disposal

Water pollution can be minimized by monitoring the disposal of river wastewater. Supervision is carried out to ensure the implementation of the requirements stated in the environmental permit for the disposal of river waste water and the technical requirements for water pollution control that are listed in the AMDAL or UKL / UPL documents. The results of the implementation of supervision can be used as a reference in developing structuring or law enforcement.

6. Improve monitoring of river water quality

Efforts to monitor river water quality can be done routinely measuring river water quality parameters and checking waste generated from industrial activities that dispose of Batu Merah river waste.

The things that can be done in conducting coaching can be in the form of: providing socialization or campaigns related to the application of legislation related to water pollution control, providing information on technical guidelines and licensing procedures related to water pollution control; or provide information regarding the application of clean technology to prevent water pollution.

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24) PP No. 82 of 2003 concerning Management of Water Quality and Water Pollution Control
25) Minister of Environment Regulation No. 19 of 2008 concerning Minimum Service Standards (SPM) for the Provincial and Regency / City Environmental Areas
26) Minister of Environment Regulation No. 20 of 2008 concerning Technical Guidelines for Implementing District / City SPM
27) Decree of the State Minister for the Environment No. 115 of 2003 concerning Determination of Water Quality Status
28) Minister of Public Works Regulation No. 04 / PRT / M / 2015 concerning Criteria and Determination of River Basin Areas
Modern Reflection In Shakespeare’s Plays

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Abstract- William Shakespeare, the pioneer of English literary world, is a universally famous dramatist whose creations and literary contributions became more in the Elizabethan period than in Jacobean age. This is why; he is identified as an Elizabethan dramatist in English literature although he is a Renaissance and modern thinker. Modernism is reflected in his plays to a great extent. Shakespeare has written thirty-seven plays in his life time. Out of them, only twenty-five plays were written in the Elizabethan Age (1558-1603). He wrote his twelve important plays in the Jacobean Age (1603-1625). Yet he is an Elizabethan and not the Jacobean. However, whether he is Elizabethan or Jacobean, he is above all modern writers. Besides, Dr. Johnson says about the features of Shakespeare’s plays in his Preface to Shakespeare, “Just representation in general nature” which indicates evergreen prestige of his dramas in all literary ages including modern age like today. So, from his life time up to the present the atmosphere-language and theme, characters and construction of every age is depicted in his plays and especially the modern elements are merged with his plays. A touch of feminism, realistic aspects, newness in plot-construction, horror elements, treatment of depression and indecision, mental turbulence, use of foil and vulgarism, display of domination all are drawn like almost a modern piece of literature. In fact, the use of above features has made Shakespeare universal and appealable for all ages.

Index Terms- Modern, Reflection, Shakespeare, plays.

I. INTRODUCTION

“T
to be or not to be?” That is the question that has passed over the lips of countless actors playing Hamlet in the last four centuries on stage and screen. It’s also a question that people in almost every country and in any language know quite well. We can thank playwright William Shakespeare whose reach is ever extensive. So, Shakespeare’s works continue to resonate with each generation. Bruce Smith in his The Cambridge Guide to the Worlds of Shakespeare explained, “Shakespeare reveals a different face to different cultures and different people at different times.” When the First Folio of Shakespeare’s work was published in 1623, seven years after his death, Ben Johnson, who was a fellow writer, noted that “Shakespeare was ‘not of an age, but for all time.’ That statement can be taken two ways: that the meaning of Shakespeare’s work is always the same or that it is always different. The second interpretation is the one that has been borne out.” A prominent Russian critic says, “Shakespeare has created more after God.” As a playwright, he is versatile and contemporary and his plays have immortalized him. Shakespeare’s dramas can be divided into three sections.

First Section: The dramas of this section were written in 1590-1600. They are 22 in number. They are Henry VI (1st part), Henry VI (2nd part), Henry VI (3rd part), Richard III, The Comedy of Errors, Titus Andronicus, The Taming of the Shrew, Love’s Labour’s Lost, Romeo and Juliet, A Midsummer Night’s Dream, The Two Gentlemen Of Verona, King John, Richard-II, The Merchant of Venice, Henry-IV (1st Part), Henry-IV (2nd Part), Much Ado About Nothing, Henry-V, Julius Caesar, The Merry Wives of Windsor, As You Like It and Twelfth Night.

Second Section: The dramas of this section were written in 1601-1608. They are 11 in number. They are Hamlet (1601), Troilus and Cressida (1602), All’s Well that Ends Well (1602), Measure for Measure (1604), Othello (1604), Macbeth (1605), King Lear (1605), Antony and Cleopatra (1606), Coriolanus (1606), Timon of Athens (unfinished-1608), Pericles (in part-1608).

Third Section: The dramas of this section were written in 1608-1613. They are Cymbeline (1609), The Winter’s Tale (1610), The Tempest (1611) and Henry VIII (in part-1613).

Among the above sections some plays have the issue of recurrent elements. A deep study of Hamlet, Othello, King Lear, As You Like, The Merchant of Venice, The Tempest, Twelfth Night, A Midsummer Night’s Dream etc. possesses such aspects which ensure modernity.

II. WHO WAS WILLIAM SHAKESPEARE?

William Shakespeare is widely regarded as one of the greatest writers in the English language. He was born on or around 23 April 1564 in Stratford-upon-Avon, the eldest son of John Shakespeare, a prosperous glover and local dignitary, and Mary Arden, the daughter of a wealthy farmer. There are no records of William’s education, but he probably went to King’s New School – a reputable Stratford grammar school where he would have learned Latin, Greek, theology and rhetoric – and may have had a Catholic upbringing. He may also have seen plays by the travelling theatre groups touring Stratford in the 1560s and 70s. At 18, William married Anne Hathaway, and the couple had three children over the next few years.

What is Modernism: Modernism is a comprehensive but vague term for a movement. It reveals a breaking away from established rules, traditions and conventions, fresh ways of looking at man’s position and function in the universe and many experiments in form and style. The term, “Modern” is not absolute. There is no suggestion in this word with which we
evaluate a piece of literature. Even we cannot call writing modern easily unless we point out its date of composition. So by the term “modern”, we mean the contemporary writing of a writer or a reader. For this reason, the meaning of the term is changeable. While discussing the poetry and drama of ancient Athens, Aristotle regards that literature as modern. Similarly, the English poet and dramatist wants to consider his age as modern. In this way, contemporary literature has been regarded as modern.

We know that Geoffrey Chaucer is a famous poet of the Middle Age in the history of English literature. Matthew Arnold in his The Study of Poetry says, “Chaucer is the father of modern English poetry.” He considers his own age, the Victorian Period, as a modern age. William Shakespeare is the Elizabethan poet and dramatist. Dr. Samuel Johnson in his Preface to Shakespeare says, “Shakespeare is, above all writers at least above all modern writers....” So we can vigorously say what is modern today will be old tomorrow.

However, Modernist literature is characterized chiefly by a rejection of 19th-century traditions and of their consensus between author and reader. Specifically, Modernists deliberately tried to break away from the conventions of the Victorian era. This separation from 19th century literary and artistic principles is a major part of a broader goal. Modernists wished to distinguish themselves from virtually the entire history of art and literature. Ezra Pound captured the essence of Modernism with his famous dictum, “Make it new!” It is believed that modernism in English poetry has been started with the publication Prokof and Other Observations by T.S. Eliot in 1917. Eliot was the disciple of Ezra Pound who led many other imagists. W.B. Yeats, W.H. Auden, Joseph Conrad, D.H. Lawrence and Virginia Woolf led modern literature. Features of modernism are not yet set and fixed but frustration, inner conflict, boredom, treatment of sex and recent technology are generally common in a recent writing.

Use of Language: Shakespeare’s language runs deeply extensive and modern. Although English language mostly came from the Greek and the Roman, it was subsequently changed from the anonymous up to the old, the middle and the modern literary persons. But in his literary works, Shakespeare invented 1700 words and many phrases which are still in modern literature. For instance, if we search the Oxford English Dictionary (OED) and the definitive record of the English language, “Shakespeare is often identified as the sole user or first user of a word or phrase,” according to Charlotte Brewer who authored the guide’s chapter on “Shakespeare and the OED.” Shakespeare is the most famous of all Englishmen. One of the things he is famous for is the effect he had on the development of the early modern English language. For example, without even realizing it, our everyday speech is full of words and phrases invented by Shakespeare. He was able to do that because English was changing as people modernized it in their normal work a day speech.

In Modern English we use the word “you” as both the singular and the plural form. In Old English, thou was used for addressing one person; ye for more than one. You was used then, and while thou and ye were used as a subject of a clause, you was used as the object. By the time of Early Modern English, the distinction between subject and object uses of ye and you had virtually disappeared, and you become the norm in all grammatical functions and social situations. Ye had become old-fashioned and so, when we see it in the Authorised Bible (‘Oh ye of little faith’) we are seeing that, in spite of the fact that you may think you understand the language in the Bible better than you do Shakespeare, Shakespeare is more modern! Brewer also said, “The more of Shakespeare’s words we look up, the more we discover that, time after time, he turns out to have used language in wholly individual ways or [more often] to have originated usages that subsequently became established in the language.” Thus, William Shakespeare is undoubtedly modern in using language in the sixteenth century. He is modern in both theme and language in his plays – tragedy, comedy and tragi-comedy.

Feminism: Feminism is a burning issue in the present world. According to the Cambridge Advanced Learner’s Dictionary, “Feminism is the belief that women should be allowed the same rights, power and opportunities as men and be treated in the same way, or the set of activities intended to achieve this state.” From this definition, we can say that feminism is a modern term. It tells about the belief that women should have the same rights and chances as men. The feminist awareness emerged in the 19th century. But it took the shape of a movement in the 20th century. Virginia Woolf was one of the prominent writers who tried to say in favour of women.

Shakespeare, an Elizabethan dramatist, picks out the most powerful female characters across all of his plays. Social and political power was entirely in the hands of the men in Elizabethan England and particularly, well-born men. Both women and men in the lower classes were powerless but women in the upper classes were in a particularly unenviable position as their value was generally reckoned to be a rich or powerful man’s path to more riches or more power.

Cordelia in the play King Lear is the central character who is banished by the king, her vain and foolish father for her original love for father and truthfulness. Later, when the two older daughters, Goneril and Regan have cruelly rejected Lear and he lies defeated and imprisoned in a dungeon, Cordelia comforts him and raises him up. She has helped him to learn what the bond between a father and daughter is. She has shown great strength throughout, and when her sisters have her hanged.

Portia in The Merchant of Venice, having no brother, had to perform the role of a man and manage the very wealthy estate after her father’s death. To save the life of Antonio, Portia comes disguised as a famous young judge and shows extraordinary qualities in delivering her judgment. Her power lies in her wisdom, recognised by all those who do not know that she is a woman. In a real sense she exercises power over everyone present.

Lady Macbeth in the play Macbeth is thought of as a very strong woman. She certainly exercises power over her husband, Macbeth, in the first half of the play, as she encourages him to murder Duncan. She uses her sexuality; she taunts him and mocks his lack of courage. She appeals to his sense of obligation towards her.

Rosalind is the central character in the play, As You Like It. She is disguised as a man throughout, until the end, and is able to manage everyone to fit with her needs and desires. Her aim is to turn the man she wants to marry into someone who can match her qualities and be as strong as she is.

A touch of feminism in male dominance is peeked in his A Midsummer Night’s Dream. In this play, we find Egeus obstinately insisting on her daughter to marry Demetrius. He also
comes to Theseus to complain against Hermia. The duke also talks in favour of Egeus. Thus Hermia has to face an adverse situation to settle her own decision. Her love for Lysander does not go on smoothly. As a woman, she feels helpless. She feels that she has no power to decide as her own. But, like other strong female characters in Shakespeare, Hermia stands up to her father. She does this with logical argument and remains calm while doing it. She then courageously runs away with her lover. Her strength lies in her calm assertiveness and her determination to control her own destiny rather than hand it to the men around her. In this sense, we can say that feminism becomes one of the most important themes in this play.

Besides, Viola in Twelfth Night, Beatrice in Much Ado About Nothing, Juliet in Romeo and Juliet, Desdemona in Othello, Margaret of Anjou in four history plays, all expect to practice woman rights in their own world. They also surpass their male counterparts with works and deeds.

Realism: The plays of Shakespeare show the course of the real world. Here in this world, the loss of a man is the gain of another. The reveller is hurrying to his wine and the mourner to a funeral. The malice of one is sometimes exceeded by the gaiety of another. In this world, many good and bad actions are done and prevented without design. The ancient poets had made a selection among the serious and light human activities. Some of them chose the crimes and absurdities of men. Some of them chose the lighter incidents for composing dramas.

Parallelism and contrast is the very basis of As You Like It. In order to compare and contrast, the playwright has dealt with realistic elements in this play. At the outset of the play, we get a taste of the atmosphere of the court and the city. The atmosphere here is visited by jealousies, rivalries and antagonisms. Early in the play, we see that Duke Frederick has usurped the dominions of his elder brother, Duke Senior. He banishes him to the Forest of Arden. Orlando has to come to the Forest of Arden along with old Adam. Duke Frederick passes an order of banishment against Rosalind, his niece. Though his daughter, Celia is deeply attached to her, he does not hesitate to do so. Later on, he takes a stern step against Oliver. As a result, Oliver has to flee from the city to save him to the same forest. Such is the sordid and depressing atmosphere of the court and the city. All those are found here are artificial, pompous and eye-catching. No touch of nature and its impact on man is found in the court life. We may find conspiracy, corruption, jealousy, artificiality, villainy and pomposity in the court life.

The Tempest is full of supernatural elements. But it is realistic at the core. Prospero’s island is an enchanted island. And yet the play is essentially realistic. The realistic quality of the play finds expression in the manner in which the various characters have been portrayed. In other words, Shakespeare’s portrayal of the various persons in this play shows his realistic approach to his art of drama-writing. Most of the events in the play are manipulated by Prospero by the use of his supernatural powers. But human nature in the play has been depicted in a perfectly realistic manner. The mutual attraction of Ferdinand and Miranda, and their falling in love with each other, are perfectly true to life. In real life also we have the common situation of the young people falling in love with each other at first sight. Then the villainy of Antonio and Sebastian is also true to life.

Construction: Dr. Samuel Johnson says that Shakespeare has borrowed the plots of his dramas from his contemporary popular stories. His plots are also loose. In this respect, Johnson says: “The plots are often so loosely formed that a very slight consideration may improve them, and so carelessly pursued that he seems not fully to comprehend his own design.”

Shakespeare violates chronology. He shows no regard to distinction of time or place. He does not set the historical incidents chronologically. He puts one character in the place of another. He attributes a certain nation or a period of history to another. We find that Hector quotes Aristotle in Troilus and Cressida. We also find the love of Theseus and Hippolyta combined with the Gothic mythology of fairies in A Midsummer Night’s Dream. This type of chronological violation not only destroys likelihood but also affects possibility. Loose plot-construction is found in As You Like It. The play has a main plot, three major sub-plots and two minor sub-plots. Sub-plots are the plots by which the main plot is nourished. They are introduced to brighten the main plot of a play. Violation of the unities of time and place is noticeable here. Many critics opine that Shakespeare has no plot. Actually, Shakespeare is the greatest borrower. He has borrowed his plots from different sources. The main plot of As You Like It has been derived from Thomas Lodge’s Rosalynde.

Horror Elements: Horror elements are annexed in the revenge plays of Shakespeare. Revenge tragedy is a kind of tragedy in which revenge, horror, murder, and other supernatural horrors, quests for revenge urged on by ghosts, suicides, and feigned or real insanity etc. are take place. The Elizabethan Age saw the introduction of a kind of tragedy called revenge tragedies. The features of the revenge tragedy are horror, revenge, blood-shedding, supernatural elements and murders. Hamlet is a revenge tragedy of William Shakespeare. It was Shakespeare who introduced the elements of horror in the tragedy. In his tragedies we find the piling up of crude, physical horror upon horror, which assume sensational and melodramatic quality. In the tragedy entitled Hamlet, horror is an integral part of the drama. Sensationalism is another characteristic of a revenge tragedy, which we find in Hamlet. In revenge tragedy, supernaturalism plays an important role. The appearance of ghost is a common phenomenon in the revenge tragedies of Shakespeare. Murder is generally at the centre of a revenge tragedy. In a Shakespeare’s revenge play it is the murder of somebody that puts the main action of the play in motion. The language in the conventional Revenge tragedy is highly rhetorical. But in Hamlet, the language is refined and not so sensational as we find in The Spanish Tragedy. Matthew Arnold calls the style of Shakespeare’s soliloquies as grand-style but it is not melodramatic like Kyd. Melodramatic elements like sensationalism violence, murder, horror and horrific details, gruesome scenes, intrigue etc. abound in Hamlet, Macbeth, Othello, King Lear and Julius Caesar. In these plays, one can easily notice the abundant use of imagery of violence and horror.

Suffering from Indecision: Lady Macbeth is able to influence her husband to a great extent. Her instigation leads him to kill the innocent King Duncan. She knows that Macbeth is not devoid of ambition too. But she is conscious of the want of his spirit. She takes the vital decision to murder Duncan without waiting to consult her husband. This establishes her dominance over her husband. Her domination helps the main action of the
play in a decisive way. Macbeth is almost determined not to assassinate the King. But he is defeated by Lady Macbeth’s strength of will and singleness of purpose. His determination is no match for her dominating influence. Lady Macbeth scolds and reproves him. So she brings him easily back to his original decision. Thus her influence upon her husband plays a crucial role in developing the main action of the play, *Macbeth*. It is true that the thought of murdering Duncan initially comes to Macbeth’s mind from his meeting with the Witches. But without Lady Macbeth’s instigations, the thought might probably never have been transformed into action.

Macbeth has primarily overcome intention to assassinate the King. But the initial victory of conscience in his mind is only too short-lived. Lady Macbeth accuses him of cowardice and infirmity. She asks him to screw his courage to the sticking-place. She then proceeds to underline the apparently fool-proof plan of murder. Her forceful arguments revive his ambition to a great extent. So Macbeth is now forced to ignore conscience and agree to his wife’s plan. With the decision to assassinate Duncan, his tragedy has begun to take shape. But his conscience has not yet given up. It continues to fight against ambition. The situation thus helps in making his self-damnation more intense. Even moments before the murder, his conscience appears in full force. But his imagination tries to dampen his ambition. He finds a visionary dagger dripping with blood symbolizing the horror of the proposed crime.

Macbeth feels heart-sickness and agony of restlessness. Yet he continues to proceed steadily along the path to self-damnation. Love of power and the will to live are so powerful in him. He now possesses sickness of heart, weariness and ennui. On the one hand, he is a mood of all-defying fury and ruthlessness. Both of these contrary feelings are frustrated ambition and tortured conscience. He has undiminished resolution. His impulse inspires him to go for a second meeting with the Witches. It forces him to stride from crime to crime. He diagnoses his chronic unrest as a thing caused by fear of retaliation and considers Banquo to be the potential source of this fear. But he takes the steps to dispose of this fear. This proves futile and leads to his further undoing. He sees Banquo’s ghost at the banquet. Fleance escapes and Macbeth’s crime is exposed. Macbeth cannot rest and his agony is not abated. He starts shedding blood through the assassination of Duncan. Now his retreat from the path is impossible. So he plans the purposeless slaughter of Macduff and his family. He degenerates into a butcher. He has lost conscience and his capacity for feeling. The tragedy of Macbeth lies precisely in this degeneration.

Procrastination is a striking feature in the character of Hamlet. It makes him almost a coward. Hamlet always suffers from indecision. He fails to decide whether he will take revenge upon the killer of his father or not. He discloses it in his famous soliloquy:

“To be or not to be, that is the question:
Whether ‘tis nobler in the mind to suffer
The slings and arrows of outrageous fortune,
Or to take arms against a sea of troubles
And by opposing end them.”

Hamlet raises the question whether it is good to submit to all kinds of misfortunes of life and bear them cheerful, or to oppose them and fight with them and finally to conquer them. If he could conquer all his misfortunes, he would have never complained against fate or against his own luck which is mostly bad and very rarely good. Here Hamlet raises this question because he has been fed up with his own life after having seen so much of wickedness, immortality and treachery in this world, and particularly because he has come to know that his own uncle has murdered his father and afterwards married his mother. If this be the human character or if this be human life, what is the good of living at all? This is the significance of Hamlet’s question.

Indeed, among a large number of soliloquies, this is a famous one. It is very significant too. Confusion and indecision of Hamlet is clearly expressed through this famous soliloquy.

*Mental Unrest*: This conflict between his imagination and his ambition results in heart rending spiritual anguish. His soul gradually falls to pieces. It is the real tragedy. Whenever his imagination is stirring, we feel suspense and pity. But as soon these feelings vanish, he becomes a brutal and pitiless murderer. This is so because the will to live is mighty in him. He is not prepared to lose the glittering prize and the worldly power and pelf. He fails to understand his own true nature. He interprets his sleepless torture as resulting from a sense of insecurity and the fear of retaliations. Hence his ruthless career of crime and gradual descent into hell is insured. It is an engrossing spectacle. Psychologically, it is perhaps the most remarkable exhibition of the development of a character to be found in Shakespeare’s tragedies. We admire and pity the man while we condemn and abhor the murderer. Macbeth is never completely dehumanized despite his manifold crimes. Conscience unnerves a man turning him into a moral coward unfit for action. Hamlet appears as a typical melancholic personality. He wants to cover his cowardice in the name of conscience. He says in *Hamlet*:

*Thus conscience does make cowards of us all, And thus the native hue of resolution Is sicklied o’er with the pale cast of thought.*

Hamlet is shocked between the thoughts of ‘miserable life’ and ‘evil death’ and concludes his soliloquy by saying that his conscience is responsible for his cowardice and inaction. He says that the fear of the would be life after death makes us cowards and so the original colour of strong determination is made pale by the sickness of unhealthy reflection. Thus the enormous task of great importance which he has undertaken to accomplish has lost its hold on him on account of this fear of conscience and thus he is rendered incapable of prompt action.

Hamlet pretends to be mad. His insanity is a major turning point in the field of taking revenge upon the killers of his father. Ophelia regrets the madness of Hamlet in the following way:

*O, what a noble mind is o’erthrown; The courtier’s soldier’s scholar’s eye, tongue, sword, The expectancy and rose of the fair state.*

Placed in a hostile world, Hamlet intentionally takes a pose of madness. He behaves and talks like a mad person. in his meeting with Ophelia, Hamlet throws insult at her. He suggests that Ophelia is a loose woman and should go to a convent to rectify her. Ophelia interprets Hamlet’s speech the words of a madman. Then she laments the loss of Hamlet’s reason. Hamlet’s character embodies an ideal Renaissance prince. He is a polished and well-mannered prince. Besides, he has the courage of a soldier. He is also a scholar with an extraordinary gift of speech. Thus any citizen would like to love him and expect him as the king.

According to Ophelia, all these virtues of Hamlet’s character have

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been destroyed because of the attack of madness. On the one hand, Ophelia’s speech is ironic in the sense that she does not know the actual condition of Hamlet, that he is not mad. However, it is true that Hamlet is really disturbed at the current state of affairs.

Characterization: Shakespeare is able to hold up to his readers a faithful mirror of manners and of life. His characters have got universal appeal. In Samuel Johnson’s preface to The Plays of Shakespeare (1765), he wrote, “His characters … are the genuine progeny of common humanity, such as the world will always supply, and observation will always find.” For example, Shylock of The Merchant of Venice is still present in the modern society. Johnson appreciates Shakespeare’s dramas as a forest. But he compares the dramas of other dramatists to a garden. Some critics compare Addison’s Cato to Othello. But Johnson disagrees with their view in this respect. He argues that Othello is the progeny of Shakespeare’s vigorous genius accompanied with subtle observation of human nature. Cato fails to familiarize us with human sentiments.

His art of characterization is unsurpassable. It will also remain incomparable even in future. His characters are life-like and vivified. They have a universal appeal. The dialogue in the plays of Shakespeare is the dialogue of common man. It is level with life. His language is refined and praiseworthy. But we cannot deny that Shakespeare has some faults and defects in his art of characterization and use of language. He is different from other dramatists in characterization. His characters express human sentiments in human language derived from real life. He does not disguise the natural passions and the natural incidents. His dialogue is thoroughly realistic. It is pursued with much ease and simplicity. It seems to have been taken from the common conversation of human beings. Even where the agency is supernatural, the dialogue accords with real life. Johnson says—“Even where the agency is supernatural, the dialogue is level with life.”

In fact, there is no blurring of characters. No character shades off into another. The dialogue in his plays is based on the actual conversation of people. Shakespeare’s characterization is modern and realistic. He violates three unities, absent in modern plays, in his plays except his last play, The Tempest.

Use of Foil: In modern literature, we find the use of foil. In Julius Caesar, Brutus is recognized by everybody in Rome as a noble-minded man. Casca says that Brutus stands high in all the people’s hearts. Brutus’ participation in the conspiracy against Caesar would make the assassination of Caesar appear to be a noble deed. In a soliloquy, Cassius himself says that Brutus is a man of a noble character though he can be misled and lured into a wrong path. At the end of the play, Antony pays a high tribute to Brutus by saying that Brutus was the noblest of all the Romans who joined the conspiracy against Caesar. No such praise is given by any person in the play to Cassius.

In fact, it is only Caesar who makes an elaborate comment upon Cassius’s character and this comment is most adverse. Caesar speaks of him as a dangerous man whom he would like to avoid. Now we will bring out the contrast between the characters of Brutus and Cassius. The main difference between Brutus and Cassius is that Cassius is a selfish man while Brutus is an unselfish man. Brutus joins the conspiracy against Caesar because of his profound and real love of freedom and republicanism. On the other hand, Cassius initiates the conspiracy because of his personal motives. Cassius conceives a plan to assassinate Caesar because he has been feeling jealous of Caesar’s growing power.

Brutus is a very close to Caesar. He feels a deep affection for Caesar. On the other hand, Cassius is not very close to Caesar. He does not feel any affection for Caesar. He conspires to murder Caesar. Caesar seems to Brutus to be well on the way to become a dictator and a tyrant. Brutus’s motives in joining the conspiracy are therefore totally unselfish. Cassius himself bears testimony to this contrast between Brutus and himself. In a soliloquy early in the play, Cassius says that, if he had been Brutus and if Brutus had been Cassius, he (Cassius) would not have joined the conspiracy. There is another point of contrast between Brutus and Cassius too and this is a major contrast. Brutus is a philosopher and an idealistic philosopher. On the contrary, Cassius is a man of action and he is a man who possesses an exceptional practical sense. Brutus lives in the world of ideas and ideals, while Cassius lives in the world of realities and the world of hard facts. Brutus proves a failure both as a conspirator and as a military leader, while Cassius shows himself to be most competent to start the conspiracy.

Modern Hero, Hamlet: Hamlet suffers from conflicts, both external and internal. His conflict is obvious in the following soliloquy—“To be or not to be”. The tragic hero is influenced by a supernatural agent. Supernatural element plays a very vital role in his life. He is influenced profusely by it. With the information of the Ghost, Hamlet wants to kill his father’s murderer. The Ghost of motivates the action of the play. Every tragic hero has some tragic flaw. Similarly, Hamlet has some tragic flaws. People have spoken about his inability to seek revenge, his irresolute nature, his moral idealism, his mental suffering, and the conflict in his mind. His most serious flaw is perhaps the genuinely loving and exquisitely beautiful Ophelia. The tragic hero must arouse pity and fear in the mind of the audience. He is able to arouse pity and fear in our minds. Thus almost all the characteristics of a tragic hero are present in Hamlet. He is a tragic hero. But he is not traditional as Aristotle terms. He is a modern tragic hero.

Vulgarism: Measure for Measure is regarded as a dark comedy which believes that morality and ethics, as well as intellectual values are meaningless, and that life is a tragic farce. A dark comedy is gloomy. It does have a happy ending. It also has amusing scenes as well as wit and humour. It is an undecurrent of gloom and despair which never leaves us. The comic elements in such play are pushed into the background by the tone and atmosphere of seriousness and gravity. The play is also called ‘problem play’ because it with a particular social or moral problem. It displays the most detested of human emotions or of sexual promiscuity. The gloom in the play is attributed to three different and distinct reasons. There is no doubt that the world of the play is a world of brothels and pimps, senseless copulation, mindless pregnancies and a total reversal of Christian value of marital sex. It has a weak Duke. It has a deputy Duke, Angelo. His learning makes him harsh and cruel. It is a world where a brother asks a sister to compromise her virginity to save his life. Vulgarism is also responsible for making it a dark play.

Vulgar languages are used openly in Othello. Desdemona is generally regarded as a simple foolish young girl. She falls in love with a man older than herself. She is thought of as a weak-willed creature deceived by the dazzling brilliance of Othello’s romantic stories, almost as if she were like Bathsheba. She is extremely
Caliban preserves burning flame in his mind. His hatred for the tyranny of Prospero remains silent in his heart like a volcano. But he could not give it out without language. After learning it, he starts abusing Prospero first. He curses and abuses him being benefited by him. In a word, he who gives eyes is dishonoured. This is the utmost reality in the world. Thus the theme of usurpation and colonization is another significant theme of the play.

Interest seeking: It is one of the most important phenomenon in our modern world

III. Conclusion

Modern literature enjoys frustration, inner conflict, boredom, feminism, display of muscle power, war, treatment of sex and recent technology. Almost all these traits are found in the plays of William Shakespea. Moreover, we see some exceptional features in them. Therefore, William Shakespeare can be regarded as a modern dramatist, not historically but as a displayer of recurrent elements in his dramas. In fact, he has occupied a remarkable place in the world literature. He was incomparable and matchless. He is still so and will remain in future. The empire he has built will never meet its downfall. The sun never goes down in the kingdom of Shakespeare. He is an institution. His merits and contribution are never to be ended and cannot reach the last point to express.

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Behavior of Mothers for Malaria in Children Under Five Years of Age in Fobur, JOS East LG, Plateau State.

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Abstract- Malaria fever appears to be one of the leading causes of infant mortality in Nigeria. Improper health seeking behavior for effective treatment is still a great concern for health practitioners especially in rural areas. A sample of 200 mothers between ages 15-49 years with children ages 1-5 years in the community participated. The study examined the treatment seeking behavior of mothers for malaria in children under five years of age in Fobur, Jos East LGA, Plateau state, Nigeria.

Index Terms- Malaria, Public health, Infant mortality, Diagnosis, Morbidity, utilization, treatment,

I. INTRODUCTION

Background to the study.

Malaria remains one of the greatest public health challenges of our time. The disease is a major health issue in several tropical and sub-tropical countries (Haque, et al., 2012). World Health Organization (WHO, 2013), reported that in 2012, there were an estimated 207 million malaria cases and 627,000 malaria deaths, of which, 77% of deaths were children under age five. However, malaria mortality has decreased by more than 25% since 2000 due to extensive prevention and control measures (WHO, 2012). Appropriate malaria treatment administered within 24 hours after the onset of fever can help lower it further (WHO, 2014).

Federal Ministry of Health (2010), reported that malaria is the leading cause of mortality and morbidity in children aged less than 5 years. It is estimated that over 300,000 people, mainly pregnant women and children die of the disease each year in the country. Childhood mortality due to malaria has been attributed to poor health service delivery and ignorance associated with cultural beliefs.

It has been suggested that social and cultural determinants of behavior may account for the gap between awareness of modern health measures and health seeking behavior (Okeke and Okafor, 2008). While some children are treated with malaria medications from biomedical facilities as the World Health Organization recommends, others receive treatment at home or from traditional healers. Investigating social and cultural issues regarding malaria treatment is integral in the development of effective public health responses to the disease.

Although malaria is typically treated at health facilities, diagnosis and treatment at community level is effective when access to such facilities is not limited. The effectiveness of community-level malaria control measures is influenced by early recognition of symptoms and subsequent treatment-seeking behaviors (Das, et al., 2010). It is therefore important to obtain region-specific information on treatment seeking behavior for malaria.

Malaria treatment seeking behaviors are also associated with socio-economic, demographic and personal factors. Other important factors are proximity to health facilities, availability of transportation, knowledge of malaria, a history of malaria, cultural beliefs regarding traditional and herbal medicines, satisfaction with health services, and attitude towards health care providers (Haque, et al., 2012; Yadav, et al., 2005).

Nigeria setting, being in the tropical region Most early treatments for fever and uncomplicated malaria occur through self-treatment at home with anti-malaria bought from patent medicine sellers (Okeke, et al., 2006). Treatments are rarely sought at health facilities and are most often inappropriate or delayed (Muller, et al., 2003; Guyatt and Snow, 2004; Kofoed, et al., 2004). Only less than 15 per cent of the malaria episodes treated at home is treated correctly. Most fevers in children (>60%) are treated with simple fever drugs, such as paracetamol and aspirin, but not with anti-malaria. Even when anti-malaria are purchased, they are commonly (<80% of cases) administered inappropriate doses (WHO, 2004).

Various existing development assistance programmes have funded nation-wide integrated malaria control projects in Nigeria, with the aim of accelerating scale-up of intervention and assessing the impact and sustainability of an integrated package of malaria control interventions on malaria-related morbidity and mortality among children under five and pregnant women. This included distribution and use of Insecticide Treated Nets (ITNs), improved management of sick children at the household level, improved management of malaria and anaemia in health facilities, and prevention of malaria in pregnant women (WHO, 2012).

Success in controlling malaria depends on understanding the pattern of malaria in the communities including factors that influence healthcare decision-making at household level, which has implications for policy on the promotion of healthcare services and utilization.

A number of studies highlighting behavior of mother’s control of malaria have been carried out in Nigeria (Agu and Nwoji, 2005; Marcus, 2014). It has been observed that healthcare
decisions are determined by, among others, individual, household and community factors. These include parental decisions, socioeconomic status, both at individual and household level, and availability of a health facility and drugs.

This study investigates mother’s behavior towards malaria in children less than five years in Fobur, a district in Jos East Local Government Area of Plateau.

II. METHODOLOGY

Study Area

Fobur is one of the districts in Jos East Local Government Area of Plateau State. Fobur is a rural area comprised of eight villages, which includes; laminta, Sabon gari, Bisiki, Kerker, Furaka, Wada, Fobur Central, Fada Fobur Border area and Hardo Fulani. The major tribe is Afizere. However, the community has different settlers such as the Ibos, Yorubas, fulanis and other indigenous citizens and their major tribe is the Afizere. The physical environment is a serene environment. The area has not been affected by any crisis.

Population and Socio-Economic activities

The 2006 census figure gave the population of Jos East local government area as 85, 602 people. It has a Land mass of 2,540sq km. The natives of the community are the AFizere even though it is a heterogeneous community with other tribes.

Agriculture is the major occupation of the inhabitants with only a few civil servants and many traders. The major crops produced are millet, sweet potatoes, tomatoes, maize, soya beans, cocoyam, cassava and carrots.

Social Amenities

Fobur has two private health facilities and a government secondary healthcare centre facility which are being used by the community. There are a few Nursery and primary schools. It also has a government secondary school and a private secondary school. It also has a police station.

Climate

The climate characteristics of the study area reflects the climate feature of Jos Plateau, which varies from North-South as presented in the work of Tuley and Alfred (1975). The study area is marked by alternating wet and dry seasons. Rainfall is both orographic and convectional and last between April to October. The mean rainfall is about 1400mm annually. Temperature is warmer during the rainy season (April - October) which encourages the breeding of mosquitoes, and much colder during the harmattan period (December – February).

Vegetation

The vegetation of the area is associated with the soil type. The vegetation of the area is the northern guinea savannah which consists mainly of short trees and grasses and there is presence of gallery forest along the river valleys. The practice of irrigation farming during the dry season which dampens some areas is also a contributory factor to epidemics of malaria.

Sources and types of data required

Published data on social aspects of malaria in the state are not readily available. Thus, the study relied mainly on primary data gathered from mothers with at least a child less than five years old. Data was also sourced from secondary sources which included; Published books, internet materials and scientific journals on malaria.

Sample selection and Sampling technique

The study population was contacted through a systematic sampling procedure. The study was first, stratified into four residential zones. Sampling in each zone proceeded with the counting of all the buildings in the zone. The next stage was the selection in each zone at specified intervals of either every second or third building from a starting number (determined randomly) depending on the length of the street or on the total number of houses on zone. In each of the selected household, an eligible respondent for selection was a mother, aged 15 - 49 years with at least a child less than five years within the period of data collection. About 50 questionnaires were administered to the identified eligible respondents in each zone; totaling 200 mothers participated in the questionnaire aspect of the study. The sample size is considered adequate because research statisticians would generally recommend at the minimum having between 150-200 participants per unit of analysis for a small scale study of this nature (Palumbo, 1969). Thus, the sampling strategy captured this sample size and provided adequate power and precision to determine differences in the behaviors of interest.

Data Analysis

The data management and analysis was purely descriptive analysis and Chi-square statistical was used to enter the data from the study questionnaire and to construct a data base. The quantitative data was summarized using tables and graphs for quick comparisons of values.

All the data generated at the end of every FGD and IDI were transcribed on return from the field. Verbatim transcriptions were made for all tape-recorded FGDs and in-depth interviews. The actual analysis was divided into two stages: analysis of the individual transcripts and all the group discussions. After that, all the transcripts were coded. The edited reports of each of the interviews were prepared by themes and the key findings were noted and sorted. This enabled the pooling of similar ideas and statements under a particular code across variables which was used to support the quantitative findings and where appropriate, quotes that best explained the knowledge and practices of the mothers about malaria were identified and used in parallel with the quantitative findings to elaborate more on the insights of the perceptions and practices of the community.

Results and discussions
III. KNOWLEDGE OF MALARIA

Table 2 contains information on respondent’s awareness of malaria. The table shows that all the respondents (100%) have heard about malaria. This is an indication the study population is aware of malaria and the disease is a common ailment in the study area. Respondents source of information about malaria varied; 34.5% heard about the disease from a health facility, 2.5% from Radio/TV/Newspaper, 58% from community health workers, 2% from family/relatives/friends, 0.5% through community meetings and 2.5% from other sources. Majority (95%) of the respondents had knowledge of the vulnerability of children under five to malaria attack. All discussants during the Focus Group Discussions and In-depth Interviews acknowledge malaria as one of the most important and commonest ailments among children in their locality. They perceived malaria as one of serious disease in the area that imposes different spectra of bad consequences and believed that malaria could cause death unless proper treatment is sought. They reported that malaria affects children, adults and the elderly but differently. Infants were considered the most vulnerable group, as was explained, “Adults have stronger blood while children are weak”. The seriousness and prevalence of malaria in the study community is explained by these quotes from the respondents:

Malaria is the number one disease in this community. It is like a natural illness worrying children and it is killing them.

In this village, we sell malaria drugs more than any other drug.

In this clinic, we attend to malaria cases in children more than any other childhood illnesses.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Variable</th>
<th>No of Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ever heard of malaria</td>
<td>Yes</td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>00</td>
<td>00</td>
</tr>
<tr>
<td>Source of Information about malaria</td>
<td>Health facility</td>
<td>69</td>
<td>34.5</td>
</tr>
<tr>
<td></td>
<td>Radio/TV/Newspaper</td>
<td>5</td>
<td>2.5</td>
</tr>
<tr>
<td></td>
<td>Community health workers</td>
<td>116</td>
<td>58</td>
</tr>
<tr>
<td></td>
<td>Family/Relatives/Friends</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Community meetings</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>5</td>
<td>2.5</td>
</tr>
<tr>
<td>Vulnerability of children under 5 to malaria</td>
<td>Yes</td>
<td>190</td>
<td>95</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>10</td>
<td>5</td>
</tr>
</tbody>
</table>

Source: Author’s Field survey, 2019

Knowledge of signs and symptoms of malaria

The care a child less than five years receives when suffering from malaria is influenced by the caregivers understanding and recognition of the symptoms of the illness. It also depends on how the caregiver connects the signs with malaria. Figure 1 shows respondents knowledge of malaria signs and symptoms in under five children. The Figure show 92.2% of the respondents considered high body temperature as a common symptom of malaria in children. This was followed by fever (85.2%), headache (89.7%), vomiting (63.4), convulsion (35.8%). A high percentage of mothers indicating high body temperatures as symptoms of malaria is an indication that the study respondents have a good knowledge of signs and symptoms of malaria in children. This is because a high body temperature of a child is clinically sensitive in diagnosing the disease.

Some of the responses on the signs and symptoms of malaria as explained by some mothers in the FGDs are noted below:

You will know that a child has malaria when the body is very hot.

Malaria is accompanied by vomiting and loss of appetite.

Anytime my child vomits frequently, I know that he/she has fever.

The child will have headache. This sign or symptom signals the approach of malaria attack.

Malaria in children is accompanied by changes in the child’s body; the body will be hot, he/she will vomit.

The views expressed suggest that mothers in the study area could accurately diagnose malaria. However, some incorrect views on signs and symptoms of malaria in children emerged during FGDs. Some discussants think that sneezing mark the onset of malaria in children. Other cited non-biomedical symptoms were the appearance of blood in the stool of children and running nose. Discussants also expressed malaria as dangerous, if the signs and symptoms are not identified on time and cured, it leads to further complications in the body and ultimately death.
Knowledge of causes of malaria

Regarding, knowledge of causes of malaria transmission (Table 4), 169(84.5%) of the study participants correctly associated the disease with bite of mosquitoes. This correct knowledge is not surprising because the presence of health facility in the study area and is expected to be exposed to intensive health information, and should be well aware of the malaria-mosquito link. Others felt that cold/climate change (0.5%), contaminated water (2.5%), malnutrition (4%), hot sun (0.5%), witchcraft (3.5%), nature (2%) and other factors (2.5%) were the main cause of malaria. The identification of mosquito bite as the main cause of malaria is a positive attitude of the knowledge of the cause of malaria which invariably will determine their treatment seeking behavior for malaria in children under five.

Table 4: Main cause of malaria reported by respondents

<table>
<thead>
<tr>
<th>Causes of malaria</th>
<th>No of Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mosquito bite</td>
<td>169</td>
<td>84.5</td>
</tr>
<tr>
<td>Cold/climate change</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Contaminated water</td>
<td>5</td>
<td>2.5</td>
</tr>
<tr>
<td>Malnutrition</td>
<td>8</td>
<td>4.0</td>
</tr>
<tr>
<td>Hot sun</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Witchcraft</td>
<td>7</td>
<td>3.5</td>
</tr>
<tr>
<td>Natural</td>
<td>4</td>
<td>2.0</td>
</tr>
<tr>
<td>Others</td>
<td>5</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Source: Author’s Field survey, 2019

IV. PERCEPTIONS AND BELIEFS ABOUT MALARIA

Understanding mother’s beliefs of the causes of malaria in children in the study community is important because it helps to identify the probable areas of intervention for the control of malaria in the under-fives. Table 5 show respondents perception and beliefs about malaria. Majority of the respondents (73.5%) had the correct perception and believe that it is not possible to contact malaria where there are no mosquitoes while 26.5% believed that it is possible to contact malaria where there are no mosquitoes. This indicates that some of the study participants harbour some misconceptions about the diseases. This misconception by a few will definitely have an effect on prevention of malaria in children in the study area.

A greater number of the respondents 185(93.5%) had the belief that malaria in under five children is preventable while only 6.5% believe that it is not preventable. The belief that malaria can be preventable was further strengthened in the FGD, where mothers agreed that it was the knowledge they had of malaria that made them to use bed-nets for the family members, especially for the under five children that were more vulnerable to malaria attack and some of them also had mosquito nets on their windows and doors as preventive measure against malaria.

Majority (93.5%) of the respondents also believed that malaria in children less than five years is treatable while only 6.5% believed that it is not treatable. Mothers in the FGD validated the belief that malaria was treatable in children and mentioned the different drugs they use when their children are attacked by the disease. The most common mentioned drugs were arthemeter,
chloroquine, Lokmal, maldox. This was confirmed by a patent medicine store owner who had high patronage by community members. The in-depth interviews with health care practitioners revealed similar patterns of treatment seeking behavior for malaria.

Respondent’s belief about malaria was further assessed by asking them whether a child suffering from malaria will die if the disease is not treated (table 5). According to the table 95.5% of the respondents believed that a child can die if malaria is not treated. This suggests that some people in the study area (4.5%) still believe that malaria does not kill children. It also indicates some level of ignorance about the disease. This ignorance (even though a small percentage) is not expected because people are supposed to be more enlightened about the disease. This is also in spite of the fact as reported earlier that malaria awareness was high and children experience malaria attack severally in a year, yet some believed it does not kill. Discussants during FGD and informal conversation with community members reveal that they have some contradictory views. Respondents that claim that malaria does not kill indicated that it makes one sad and unable to carry out one’s duties and attribute the distress to the fact that it may kill. Thus, they attribute the main distress of malaria to mortality due to it. A mother who perceived the disease to result in death of children reported during FGD that:

Malaria is a big problem to us because many of our children are dying due to the disease.

Table 5: Beliefs about malaria

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Variable</th>
<th>No of Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contacting malaria where there are no mosquitoes</td>
<td>Yes</td>
<td>53</td>
<td>26.5</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>147</td>
<td>73.5</td>
</tr>
<tr>
<td>Is malaria in children preventable</td>
<td>Yes</td>
<td>187</td>
<td>93.5</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>13</td>
<td>6.5</td>
</tr>
<tr>
<td>Is malaria treatable</td>
<td>Yes</td>
<td>187</td>
<td>93.5</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>13</td>
<td>6.5</td>
</tr>
<tr>
<td>Death of a child If malaria is not treated</td>
<td>Yes</td>
<td>191</td>
<td>95.5</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>9</td>
<td>4.5</td>
</tr>
</tbody>
</table>

Source: Author’s Field survey, 2019

PREVENTIVE PRACTICES

Mothers perception of the cause of malaria determines their protective behaviour and the type of protective measures adopted. The major malaria preventive measures used at home and at community level by respondents are shown Table 6. Majority (78%) indicated using bed-nets which some of the respondents said they got from the community health centre when they went for immunization, 3.0% make use of environmental manipulation, 3.5% indicated indoor residual spraying as a means of reducing mosquitoes. Respondents that use repellants and coils were 8.5%, 2.5% keep house clean. Others use traditional medicine (0.5%) which was reported in the FGD as leaves called Kurga which they believed repels mosquitoes. About 2% indicated that they cover the Child body with cloth and 2% also believe in good nutrition as a preventive measure. The finding reveals that the major form of protection for children from mosquito bites was the use of bed-nets.

Table 6: Respondents Major Preventive Measures

<table>
<thead>
<tr>
<th>Preventive measures</th>
<th>No of Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of Bed-nets</td>
<td>156</td>
<td>78.0</td>
</tr>
<tr>
<td>Environmental manipulation</td>
<td>6</td>
<td>3.0</td>
</tr>
<tr>
<td>Indoor residual spraying</td>
<td>7</td>
<td>3.5</td>
</tr>
<tr>
<td>Use of repellants and coils</td>
<td>17</td>
<td>8.5</td>
</tr>
<tr>
<td>Keep house clean</td>
<td>5</td>
<td>2.5</td>
</tr>
<tr>
<td>Traditional medicine</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Cover body with clothes</td>
<td>4</td>
<td>2.0</td>
</tr>
<tr>
<td>Good nutrition</td>
<td>4</td>
<td>2.0</td>
</tr>
</tbody>
</table>

Source: Author’s Field survey, 2019

Respondents use of preventive measures were also assessed (Table 7). Table 7 indicate the percentage of respondents who made use of bed-nets as at the time of the study. Majority (89%) of the respondents reported the making use of bed-nets to protect children less than five years from mosquito bite. This is a positive attitude in the use of preventive measures against malaria attack in children while 11% did not use bed-nets. The use of bed-nets was also confirmed by respondents in the discussion groups where mothers attested to using bed-nets that were given to them at the community health centre and some of the women made mention
of buying extra for the family. The high rate of ownership may be due to increased health promotion by the government. It can also be attributed to the state government massive distribution of Insecticide Treated Nets (ITNs) in all communities in the state. It could also possibly imply that the campaign of the Ministry of health to reach all communities in the state was being successfully implemented. This has also increased mosquito net availability and use in communities in the study community. The high rate of ownership of bed-nets is also an indication that the respondents associate mosquitoes with malaria. It was noted that bed-nets were generally appreciated in the study community.

Table 7 also shows the category of people that use mosquito nets most often. The table shows that children (73%) more than adults (3.5%) often use bed-nets in their homes. This shows that majority of the existing mosquito nets are used by people who are at greatest risk of severe malaria-the children. This finding is confirmatory to the findings in the FGDs where discussants who mentioned the use of bed-nets in their homes also indicated that children mostly use them. About 12.5% of the respondents reported that both adults and children making use of the bed-nets. Table 7 further shows that majority (76%) of the respondents reported that all their children under five years sleep under bed-nets while 13% reported that not all their children sleep under bed-nets.

Respondents were also asked whether they had mosquito proofs on their doors and windows as a strategy for preventing children from mosquito bites (table 7). Majority (78%) of the respondents do not have mosquito proofs on their doors and windows while 22% had. This is surprising because community members are expected to be exposed to the mosquito preventive benefits associated with having mosquito proofs on doors and windows. There is the need for more advocacies about the disease in the study area.

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Variable</th>
<th>No of Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Use of Bed-nets</td>
<td>Yes</td>
<td>178</td>
<td>89</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>22</td>
<td>11</td>
</tr>
<tr>
<td>Users of bed-nets</td>
<td>Adults</td>
<td>7</td>
<td>3.5</td>
</tr>
<tr>
<td></td>
<td>Children</td>
<td>146</td>
<td>73.0</td>
</tr>
<tr>
<td></td>
<td>Both</td>
<td>25</td>
<td>12.5</td>
</tr>
<tr>
<td>All children sleep under bed-nets</td>
<td>Yes</td>
<td>152</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>26</td>
<td>13</td>
</tr>
<tr>
<td>Mosquito proofs on doors and windows</td>
<td>Yes</td>
<td>44</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>156</td>
<td>78</td>
</tr>
</tbody>
</table>

Source: Author’s Field survey, 2019

4.6. TREATMENT SEEKING BEHAVIOR

Malaria morbidity and mortality can be substantially reduced with prompt and appropriate treatment, while the roles of parents in illness are an essential factor in deciding where and when professional help is sought for children. Table 8 presents information on treatment choice for childhood malaria. The table shows that majority (87.5%) of mothers treat their children for malaria at the dispensary or hospital. Mothers appeared to be well aware that proper malaria treatment at health clinics is critical to their children getting well. This was expressed by statements such as, ”if I take my child to the hospital for malaria treatment, I will get something good to stop the symptom”. Several mothers noted that although the “persistence of symptoms” was one of the main reasons for taking their children to the clinic, “it was better to take the child so that the health worker will tell me why my child is ill,” and “prescribe drugs that will make my child better”.

Although the dispensary and hospital was the reported first treatment choice, discussant during the FGDs narrated that most of the mothers normally give some form of treatment to their children at home at the onset of malaria. Those that sought for help from traditional medicine accounted for 3.5%, from family 0.5%, some respondents went to chemist(7.5%), and a combination of traditional and modern medicine(1%).

This findings, is an indication that the respondents view medication at the hospital as the most reliable and effective. This also indicates that medication at the chemist and local shops is not considered very effective by the respondents. Respondents who reported traditional health care as their source of help when their child had malaria were asked during FGD, after attending the traditional healer and the child did not get relief what they did. All reported that they took the child to a clinic or hospital. This suggests that the usual pattern for those that consult traditional health providers is the use of herbal treatment as a starter and then a follow up with modern medicine when that failed.

<table>
<thead>
<tr>
<th>First treatment choice</th>
<th>No of Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dispensary or hospital</td>
<td>175</td>
<td>87.5</td>
</tr>
</tbody>
</table>
4.6.1. Treatment of children with malaria at home.

Table 9 contains information on whether respondents start treatment of malaria in children at home. The table shows that more than half (61.5%) of the respondents start treatment at home when their children have malaria while 38.5% often do not start treatment at home when their children have what they perceived as malaria.

Some of the respondents perceived malaria not as a serious disease but as an illness that has a simple and known treatment regime that can be effectively applied at home. Since malaria is often viewed as an "ordinary illness", they mostly believe that a child has to be taken to a health centre only if it becomes severe.

Table 9: Treatment of malaria at home

<table>
<thead>
<tr>
<th>Treatment of malaria at home</th>
<th>No of Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>123</td>
<td>61.5</td>
</tr>
<tr>
<td>No</td>
<td>77</td>
<td>38.5</td>
</tr>
</tbody>
</table>

Source: Author’s Field survey, 2019

4.6.2. Sources of Drugs for the Treatment of Malaria

Table 10 shows that most respondents (43.5%) got their drugs from government health centre, 35% went to the chemist to buy drugs, 0.5% bought it from drug vendors, 12.5% of the respondents patronized private health facilities where they obtained drugs, 4% were given by health workers and from family members (4.5%) who had malaria drugs at home.

It was difficult to elicit information from respondents from the study questionnaire on the type of anti-malarial drugs used at home. The study respondents generally could not be categorical about the anti-malarial drugs used at home. Most of them reported during FGD that when children have malaria, they normally go to the chemist and asked for any anti-malaria drug. They were not too certain about the names of drugs used. However, the most frequently mentioned drugs were chloroquine, fansidar, paracetamol and some elderly mothers mentioned quinine.

Discussants in FGDs were asked whether they were aware of Artemisinin-based combination therapies (ACTs). Uninterestingly, not even a discussants reported that they have heard about ACT implying a very poor use of artemisinin combination therapy. This is not encouraging because child ACTs are the recommended first-line treatment for uncomplicated malaria in most malaria-affected regions of Africa and are extremely effective against malaria parasites and have few or no side effects.

Table 10: Sources of Drugs for treatment of childhood malaria

<table>
<thead>
<tr>
<th>Sources</th>
<th>No of Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemist</td>
<td>70</td>
<td>35</td>
</tr>
<tr>
<td>Government hospital/clinic</td>
<td>87</td>
<td>43.5</td>
</tr>
<tr>
<td>From vendor</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Private health facility</td>
<td>25</td>
<td>12.5</td>
</tr>
<tr>
<td>Health workers</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Family members</td>
<td>9</td>
<td>4.5</td>
</tr>
</tbody>
</table>

Source: Author’s Field survey, 2019

**Duration between when symptoms of malaria are noticed in children and consultation at the treatment centre.**

The type of health care provider and time when treatment is sought may depend on how the individual perceives the severity of the disease and his or her faith in and experience of various treatments. Delay in seeking help often results in complications, increased cost of treatment and death. Table 11 presents information on duration between noticing of symptoms of malaria in children and consultation at treatment centre within and after 24 hours. Majority (69.5%) of the respondents take their children suffering from malaria to a treatment centre within 24 hours.
while 30.5% take their children for treatment later than this. Mothers who consult a health care provider after 24 hours in the FGD reported that they normally wait till home treatment fails. They wait for between 2-3 days to see whether the child will be healed without treatment or wait for more than 3 days to observe the illness or until when the illness becomes severe. The implication of this finding is that since mothers are likely to delay seeking for help, it may be necessary to educate them on how to recognize and treat uncomplicated malaria in children at home. This will help in restricting consultation to treatment centres only for complicated malaria cases. This strategy, which is home friendly, may considerably reduce problems of delay in treating malaria in children.

### Table 11: Duration of Seeking for Treatment for Malaria For Under Five Children

<table>
<thead>
<tr>
<th>Duration</th>
<th>Within 24 hours</th>
<th>After 24 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No of respondents</td>
<td>Percentage</td>
</tr>
<tr>
<td></td>
<td>139</td>
<td>69.5</td>
</tr>
</tbody>
</table>

Source: Author’s Field survey, 2019

### 4.7 PARENTS ROLES IN MALARIA CARE FOR CHILDREN

Growing evidence suggests that behaviour related to health is influenced by gender. This is because gender roles and responsibilities influence treatment-seeking behaviour for child illness. Table 12 contains information on the role of parents in decision-making and responsibilities for help-seeking/treatment for malaria in their children. The ability of parents to clearly diagnose that a child has malaria affects treatment choice while early treatment depends upon prompt recognition of symptoms and signs of malaria in the household. Table 11 shows which of the parent’s advice is most important when a child has malaria. Majority (46%) of the respondents reported that it is the father’s advice that is most important while 16.5% reported that it is the mother’s advice that is important when children have malaria. About 31.5% reported that the advice of both parents is important when seeking for treatment for childhood malaria.

Majority (62.5%) of the respondents reported that it is both parents that decide treatment centre for a child suffering from malaria-indicating that only 8% of the fathers and 27% of mothers that take decision about the treatment of malaria in their children. It is glaring from the table that it is both parents that decide where treatment should be sought.

Cost is an important factor in treatment-seeking behavior of parents for malaria in children. This is because it affects the promptness and quality of the treatment sought. Respondents were asked who pays for the monetary cost of treating children with malaria. More fathers (65.5%) than mothers (9%) and both parents (24) pay for the cost of treating malaria in their children. About 1.5% of the respondents reported that other family members bear the cost of treating children with malaria. However, generally determining which of the parents often bears the cost of treating illness and malaria in children in particular is very complex. This is because even where fathers are considered to pay the cost of treatment (as found in this study), it is mostly only considered as direct cost which includes money for transportation to the health centre, medication, cost of consultation and feeding. This assumption undermines the role of mothers who often bear indirect cost like nursing the child at a treatment centre or home, administering the drugs and absence from work.

### Table 12: Roles and responsibilities of parents in treatment-seeking for childhood malaria

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Variable</th>
<th>No of Respondents</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Most important advice</td>
<td>Father</td>
<td>92</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>Mother</td>
<td>33</td>
<td>16.5</td>
</tr>
<tr>
<td></td>
<td>Both parents</td>
<td>63</td>
<td>31.5</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>12</td>
<td>6.0</td>
</tr>
<tr>
<td>Decides treatment centre</td>
<td>Father</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Mother</td>
<td>54</td>
<td>27</td>
</tr>
<tr>
<td></td>
<td>Both parents</td>
<td>125</td>
<td>62.5</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>5</td>
<td>2.5</td>
</tr>
<tr>
<td>Payment of treatment</td>
<td>Father</td>
<td>131</td>
<td>65.5</td>
</tr>
<tr>
<td></td>
<td>Mother</td>
<td>18</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Both parents</td>
<td>48</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>3</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Source: Author’s Field survey, 2019

### 4.8 DISCUSSION OF FINDINGS

The aim of the study was to investigate the behavior of mothers for malaria in children under five in Fobur, Jos East Local Government Area of Plateau state, Nigeria. There were more Christians (69%), Afizere and mothers that were into business (59%) in the sampled population. The educational status of the respondents shows that majority (77.7%) had some form of formal education. This implies that the study captured a significant number of mothers who could be reached with health education.
about malaria. This supports a similar study reported by Okeke and Okafor (2008) findings where 73% of the care givers had at least attained primary education. The findings was consistent with the study done in Nasarawa state of Nigeria (Marcus, 2014) where majority of the respondents had formal education and were significantly associated with high score of malaria knowledge than those who had no formal education. It is however, higher than findings reported by Chukwuocha, et.al (2009) where 58.3% of the mothers interviewed were illiterates. The literacy level of the mothers may affect their timely decision about treatment of malaria in children as reported by Osagbemi (1998) that literate mothers were significantly associated with early treatment of malaria.

All the study participants have heard of malaria. This is an indication of the prevalence of the diseases in the study community. It is probably because the study area is not too far from the urban centre (Jos-Plateau state capital) where there have been a lot of campaign on malaria. The major source of information about malaria was community health workers.

Most of the respondent’s identified the correct clinical symptoms of malaria. For example, the high percentage (992.2%) of mothers indicating high body temperature (fever) as symptoms of malaria is an indication that the study respondents had a good knowledge of signs and symptoms of malaria and could accurately diagnose malaria in children. Similar results were found in other studies (Chukwuocha, et.al, 2009; Okeke and Okafor, 2008; Marcus, 2014).

The study participants noted the role of mosquito bite in malaria transmission. The participants elaborated their ideas of the cause of malaria and most of them (84.5%) associated the disease with mosquito bites. Although mosquitoes were recognized to be the main agents in transmission of malaria in this study, misconceptions such as cold/climate change, contaminated water, malnutrition, hot sun, witchcraft, natural and others were also perceived as a cause of malaria by some of the participants. People’s perception and understanding about the perceived cause and transmission of malaria have strong implications on the preventive measures such as ITNS implementation (Ahorlu, 1997, Agyepong et al. 1999).

The second hypothesis stated that treatment seeking behavior of mothers is a function of age. The hypothesis was confirmed. This finding showed that the age of mothers determined treatment seeking behavior of mothers in Fobur. In other words, the treatment seeking behavior of mothers in this community is a function of age to some extent, using the variable ‘In how many hours of the onset of malaria signs and symptoms do you seek treatment? Cross tab with mothers age. (t =19.705; df =6; p =0.003). The older women within the age of 45-49 years had a higher percentage of those who sought for treatment after 24 hours.

Most participants in the study believed that malaria can only be contacted through mosquito bite while 93.5% each believed that malaria is preventable and treatable. Majority (95.5%) of the respondents believe that a child will die if malaria is not treated. This suggests that some people both in the study area still believe that malaria does not kill children and it is not treatable and preventable. This incorrect belief indicates the level of ignorance about the disease. It could also be attributed to ignorance of malaria prevention methods among community members and lack of sensitization on the part of health workers to communities on the appropriate malaria preventive measures. However, it is surprising that despite the several years of contact with and exposure to modern health education on the mosquito as the vector that transmit malaria parasite to human beings, such information is still not convincingly accepted by some mothers who have heard it.

Greater awareness about malaria and undertaking a broader range of preventive actions for malaria influence appropriate treatment-seeking behavior. The commonest form of protection used by respondents for children in the study area was a mosquito net (78%) which is interestingly high. This is an indication of a positive attitude towards malaria control. A similar finding was reported by Chukwuocha, et.al, 2009; Okeke and Okafor, 2008 and Marcus, 2014. Respondents associated bed-nets with a control programme of the government. Since identification of malaria as a serious and potentially deadly disease is already high in the study area, only little effort is needed in educating the respondents on this.

Although environmental manipulation (draining of mosquito breeding sites cleaning the environment), indoor residual spraying were reported as some of the practices of some households, the practice was said not to observed completely as reported in the FGD, the quantitative report might have been influenced by social desirability bias in which the respondents replied to conform to the expectations of the field workers. The practice of malaria prevention by households is related to perception of the risk, their knowledge of the causes of malaria and its preventive measures (Agyepong, et.al, 1999).

Mothers reported in this study that their major reason for protecting their children against mosquitoes is that they cause malaria. Since majority use bed-nets, it can be inferred that the study respondents consider mosquito nets as an effective strategy in reducing malaria in this group of children as reported by WHO (2003). About 89% reported ownership and use of at least a bed-net in their houses. The mosquito net ownership findings in this study is higher than the results reported by Oyewole and Ibidade (2007) and Humphrey, et.al (2010). The high rate of ownership may be attributed to the state government’s massive distribution of Insecticide Treated Nets (ITNs) in all communities in the state. This has increased mosquito net availability and use in communities.

The study shows that majority (73%) of existing mosquito nets in the households were used by children. This demonstrates that the existing mosquito nets were used by people who are at greatest risk for severe malaria. This support James et.al.(2011) findings in northern Uganda where children were more frequently protected with mosquito nets than older children and adults. The practice of putting mosquito proofs on doors and windows as a form of protection against malaria was not too common in the study community. More than half (78%) of the respondents had no mosquito proofs on their doors and windows. This is even though that, the study respondents believed the introduction of bed-nets and mosquito nets on doors and windows had helped to reduce malaria. (2011). Also, despite the fact that the study participants had high knowledge of malaria, their low educational level implies the need for intensifying the expansion of training programmes to raise the level of women’s education. Evidences show that educational attainment is associated with better malaria
knowledge. For example, in some parts of Nigeria, higher levels of education were associated with improved knowledge and practice about the appropriate malaria prevention and control intervention (Dike, et al; 2006). Education also increases the probability that household would purchase bed-nets (Dike, et al; 2006). This suggests that higher level of education may be required to impact upon the intake of malaria prevention and control interventions.

In this study, mothers seek for help from a variety of sources. Mother’s first choice of treatment outside the home was mainly from Dispensary or Hospital about (87.5%), within this percentage most of them went to private health facilities. The reason given in FGD was the availability of health personnel anytime of the day and drugs unlike the government health centres where they only operate during the day, long waiting and non-availability of some of the drugs. However, traditional remedies were found to be very low in this study. The findings is an indication that malaria illness is considered best treated by modern health services by most respondents while a few considered it best treated by traditional methods, and often a mixture of both is sought.

The delay in seeking treatment within 24 hours of onset of malaria is a great concern in the right attitude in treatment seeking behavior as 30.5% of the respondents did not seek treatment within 24 hours at the onset of malaria signs. This leads to seeking treatment at home. However, the findings in this study like in most African countries are far below the Roll Back Malaria (RBM) partnership target of ensuring that 80 percent of those suffering from malaria have prompt access to, and are able to correctly use, affordable and appropriate treatment within 24 hours from year 2010. Perhaps the proportion of those that delay in consultation with a health care provider should be educated on how to recognize and treat uncomplicated malaria in children at home.

Treatment at home (61.5% to 70%) to cure malaria among the children less than 5 year of age was commonly practiced by parents before going to the health facility. Similar findings were reported by Jane, et al. (2010). Mothers usually start treatment for children at home with the belief and hope to cure malaria in children. Mothers are more likely to begin with self-medication at home to minimize expenditure at health facility; this was also emphasized in the FGDs where the mothers reported delay in seeking treatment outside the home, due to financial constraints which was due to the absence of the husbands in some cases from the house who were responsible for the payment of their children’s treatment.

Gender roles and responsibilities influence treatment-seeking behaviour for child illness. Majority (46%) of the respondents reported that it is the father’s advice that is most important. Dominating and decision making by fathers was also reported by James, et al. (2011) in their study of northern Ghana. Patent medicine store owners in the community also confirmed that the mother often come to purchase drugs with insufficient money. This means husbands have important role in health of children because financing care largely depends on them. While some women can advice (16.5%), both parents advice is also important (31.5%) seeking for treatment for childhood malaria. Majority (62.5%) of the respondents reported that it is both parents that decide treatment centre for a child suffering from malaria-indicating that only 8% of the fathers and 27% of mothers that take decision about the treatment of malaria in their children. This suggests that in the study community, it is both parents. In this study, more fathers (65.5%) than mothers (9%) and both parents (24) pay for the cost of treating malaria in their children. This finding means that husbands have important roles in health of children because financing care largely depends on them (D’Alessandro, et al, 2005).

V. CONCLUSION

This study has contributed to the existing knowledge about malaria and the findings are also very informative in the area of increasing peoples knowledge on the behaviors of mothers for malaria in children under age five. The study has revealed reasonable knowledge of the symptoms of malaria, however there is a need for community intervention programmes directed towards correcting misconceptions about the cause of malaria, the recognition of danger signs which will require prompt referral to health facilities and improving treatment seeking practices. Appropriate home management with effective drugs given in correct dosages should also be promoted since majority resort to self treatment before seeking treatment outside. Childhood malaria is common in rural Nigeria. Mothers are at home more than are the fathers, and so they are often the first to recognize when a child is sick with malaria fever. In many instances, therefore, mothers take the first step in finding treatment for the child, so mothers should be enhanced financially.

VI. RECOMMENDATIONS

The following recommendations are proffered in this study to improve knowledge, belief and treatment seeking behavior for childhood malaria.

1. Identify target groups, such as children and youth for malaria prevention and control and bring down the observed disease burden in this particular community.

2. There is a need to strengthen community education. Also introduce integrated malaria vector control strategy, since most of the respondents use only bed-nets as the most common preventive measure.

3. The community should have access to any f a health institution within less than one hours walking distance and get health education because lack of education is associated with delay to seek health.

4. There is a need for subsequent health education regarding malaria and promote general education of the community to suit the economic circumstances of women in the study area.

5. Greater awareness and health education for mothers, particularly on early treatment-seeking and appropriate use of health care options for malaria. A regular workshop on malaria prevention should be held regularly with the women, thereby raising their awareness and understanding, and involving them in malaria prevention.

6. A more concerted effort is needed for scaling up the distribution of bed-nets (ITNs), improving the knowledge of the community about the link between malaria and mosquitoes, causation of malaria and its preventive methods particularly on the proper utilization of bed-nets.
7. Effective antimalarial drugs should also be available in the community and malaria drugs should be free or affordable for children under five to encourage mothers utilize the public health facilities.

8. Women should be given opportunity for higher education in order to develop more positive attitudes towards treatment seeking for malaria.

9. There should be an intensive and extensive media enlightenment campaign on accessibility to treatment, dangers of mosquitoes, prevention and control, both by the electronic and print media in English and local languages.

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Comparative Scrotal Ultrasound Findings in Fertile and Infertile Males in Jos, North Central Nigeria


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Abstract: Introduction: Infertility remains a threat to successful reproduction by couples desirous of pregnancy. Since the seminiferous tubules make up 70%–80% of the testicular mass, the testicular volume reflects spermatogenesis. The testicular volume demonstrates a relationship with the semen profiles in fertile men, and its measurement has been used to estimate spermatogenesis.

Materials and Methods: This was a cross-sectional comparative study where 85 infertile and 85 fertile male subjects were recruited and examined in Jos University Teaching Hospital. All the subjects had their seminal fluids analyzed and their testes were measured in the supine position using a high frequency linear transducer of an ultrasound scanner. The results were expressed as percentages and tests of significance were done using the chi-square and Student’s t-test. A P-value of <0.05 was considered statistically significant.

Results: The common abnormal scrotal ultrasound findings were hydroceles (32.7%), bilateral small volume testes (24.7%) and varicocele (22.9%). There were statistically significant difference between fertile and infertile men (p<0.05). The average testicular volume for fertile and infertile groups were 14.07 ± 3.08 ml and 9.37 ± 3.57 ml respectively (p<0.05). There was positive strong linear association between testicular volume and sperm count (coefficient of correlation r’ =0.481, p<0.05).

Conclusion: This study found a strong positive correlation between ultrasound measured testicular volume and total sperm count. It was also observed that the critical mean testicular volume of less than 10.3ml is associated with sub-fertility.

Index Terms: Male infertility, Seminal fluid analysis, mean testicular volume, scrotal ultrasound

I. Introduction

Parenthood is undeniably one of the most universally desired goals in adulthood, and most people have life plans that include children. However, not all couples who desire a pregnancy will achieve one spontaneously and a proportion of couples will need medical help to resolve underlying fertility problems.

Infertility is defined as inability of couples to achieve conception despite regular unprotected sexual intercourse for one year.1 Infertility in the male refers to the inability of a man to impregnate a woman after 12 months of regular and unprotected sexual intercourse that is if the woman has no gynecological problems.1

About 8–12% of couples worldwide experienced some form of infertility during their reproductive lives, thus affecting 50–80 million couples with 20–35 million in Africa. It was therefore extrapolated that 3–4 million Nigerian couples are affected.2

The prevalence of infertility in Sub-Saharan Africa ranges from 20% to 40%. Fertility problems are shared by both male and females. Sub-fertile men are investigated to find a cause for their infertility.3

The aetiology of male infertility is multifactorial. The major causes of male factor infertility in Nigeria are infection and hormonal abnormalities.4

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Male factor contributes significantly to the infertility burden in our environment and play a role in approximately 40-50% of all infertility cases.¹

Seminal fluid evaluation is the primary investigative tool in the assessment of male fertility. However, this does not state the cause of the structural anatomical abnormality associated with the impaired or deranged spermogram.

Ultrasound is non-invasive and adequately demonstrates all the essential parts of the scrotum that may be missed by clinical examination. It is a modality of choice for examination of the scrotum.

The role of ultrasonography in the evaluation of male infertility has expanded with advancements in technology with scrotal ultrasonography (scrotal US) serving multiple purposes in the sub-fertile man. Ultrasonography can measure the testicular volume which correlates with the level of spermatogenesis. There is positive strong linear association (r= 0.499, p=0.0001) between testicular volume and sperm count.² Small testicular volume is a crude indicator of severity of infertility with a statistically significant relationship between the testicular volume and the sperm density.

Therefore, unlike seminal fluid analysis, scrotal sonography can depict scrotal abnormalities and also give an insight into aetiology/pathogenesis of the problem.

The objective of the study was to compare scrotal ultrasound findings in fertile and infertile males in Jos, Nigeria

II. MATERIALS AND METHODS

The study was conducted over a period of 9 months at the Jos University Teaching Hospital, a tertiary medical institution located in an urban and cosmopolitan area in Nigeria in which 85 patients diagnosed with male infertility were studied. The inclusion criteria for the subjects were history of infertility of at least 12 months duration, seminal fluid analysis (SFA) showing sperm density less than 20 million/ml of semen and age 18-60 years. Eighty-five (85) subjects who had normal seminal fluid analysis results were recruited from among the patients in the clinic for comparison. The main inclusion criteria for the fertile subjects were normal SFA and age 18-60 years.

A non-probability convenience sampling method was used in recruiting eligible participants consecutively from the infertility clinic until the sample size of 170 was reached.

Ethical approval was obtained from the Ethical and Research Review Committee of the Jos University Teaching Hospital and the informed consent was taken from all subjects.

Evaluation of the scrotum

Scrotal ultrasound examination was performed using GE LOGIQ V3 series ultrasound machine fitted with 10 MHz linear transducer in supine position and erect postures when needed with the help of Valsalva manoeuvre. Grayscale ultrasound was first conducted to determine the size and echogenicity of the testes. Colour Doppler interrogation was done to assess blood flow, spectral waveform pattern and velocity of flow and indices in the testes and epididymis.

The scrotal sac was further examined to detect other scrotal abnormalities such as Varicocele, hydrocele, epididymitis, epididymal cyst, Microlithiasis, and testicular tumours.

Data Analysis

A structured questionnaire was used to obtain relevant data and the results of the seminal analysis were documented from the case file.

The data was collated, entered into a computer and processed by the use of Statistical Package for Social Sciences (SPSS) version 23 to determine frequencies; means ± standard deviations; statistical associations of dependent and independent variables. Chi square test was used to test these associations. T-test was also used to determine the difference in the means of continuous variables between fertile and infertile males. All tests were 2-tailed, a 95% confidence interval was used and P-values of less than 0.05 (P <0.05) was considered statistically significant.

III. RESULTS.

The mean age for infertile and fertile groups were 38.69 ±7.2 years and 37.94±6.1 years respectively. There was no statistically significant difference between the age distributions of the two groups (p>0.05).

Scrotal ultrasound findings in infertile and fertile respondents

Normal scrotal sonograms were seen in 56 respondents constituting 24.7% of the scrotal findings comprising 10 (17.9%) in infertile patients and 46 (82.1%) in fertile group respectively. There was statistically significant difference in this findings in infertile and fertile group (Table 1, P<0.05).

Scrotal ultrasonography detects numerous scrotal abnormalities constituting 70.8% and 29.2% for infertile and fertile groups respectively (Table 2).

Hydrocele was the most common abnormal scrotal ultrasound findings seen in 56 (32.7%) respondents, constituting 57.1% and 42.9% for infertile and fertile respondents respectively.

This was closely followed by bilateral small volume testes and varicocele seen in 42 (24.7%) and 39 (22.9%) respondents respectively comprising 39 (92.9%) infertile and 3 (7.1%) fertile group for bilateral small volume testicles respectively while varicocele has 25 (64.1%) and 14 (35.9%) infertile and fertile group respectively. This was statistically significant in infertile males (P<0.05, Table 2).

Testicular microlithiasis and testicular tumour were seen in 6 (3.5%) patients and 2 (1.2 %) respondents respectively in the infertile group (Table 2).

Similarly, testicular atrophy and epididymal cysts were seen in 9 subjects each for infertile and control groups with the infertile category having higher incidences of 55.6% and 77.8% for epididymal cyst and testicular atrophy respectively (Table 2).

Relationship between testicular volumes in infertile and fertile males.

The average testicular volumes for fertile and infertile groups were 14.07 ± 3.08 and 9.37 ± 3.57 respectively. The mean right testicular volumes for fertile and infertile were 14.30 ± 3.13 and 9.55 ± 3.66 while the mean left testicular volumes were 13.85 ± 3.08 and 9.19 ± 3.84 for fertile and infertile groups respectively. These were statistically significant (Table 3).

Thirty nine (92.9%) infertile and 3 (7.1%) fertile respondents had small testicular volume (<10.3ml) while 46 (35.9%) infertile and 82 (64.1%) fertile had normal testicular
volume (>10.3ml). This was statistically significant (Table 4, p<0.05).

**Association between testicular volume with sperm count, Age, Height, Weight and BMI**

There is a positive strong linear association between testicular volume and sperm count with a coefficient of correlation (‘r’) of 0.481. This was statistically significant (p<0.05, Table 5). A positive weak linear association is noted between testicular volume with BMI and weight with coefficient of correlation (‘r’) of 0.029 and 0.011 respectively. These were statistically not significant (p>0.05).

A very weak negative association is seen between testicular volume with age and height with coefficient of correlation of -0.050 and -0.070 respectively these were however, statistically not significant (p>0.05).

**Table 1: Relationship between scrotal ultrasound findings and fertility status**

<table>
<thead>
<tr>
<th>Scrotal finding</th>
<th>Infertile(%)</th>
<th>Fertile(%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>10(17.9)</td>
<td>46(82.1)</td>
<td>56(24.7)</td>
</tr>
<tr>
<td>Abnormal findings</td>
<td>121(70.8)</td>
<td>50(29.2)</td>
<td>171(75.3)</td>
</tr>
<tr>
<td>Total</td>
<td>131(57.7)</td>
<td>96(42.3)</td>
<td>227(100.0)**</td>
</tr>
</tbody>
</table>

$X^2=48.376$ df-1 $P=0.001$

**Some respondents had multiple scrotal findings**

**Table 2: Relationship between abnormal scrotal ultrasound findings and fertility status**

<table>
<thead>
<tr>
<th>Scrotal finding</th>
<th>Infertile(%)</th>
<th>Fertile(%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bilateral Epididymo-orchitis</td>
<td>3(3.5)</td>
<td>3(3.5)</td>
<td>6(3.5)</td>
</tr>
<tr>
<td>Unilateral Epididymo-orchitis</td>
<td>2(2.4)</td>
<td>0(0.0)</td>
<td>2(1.2)</td>
</tr>
<tr>
<td>Epididymal cyst</td>
<td>5(5.9)</td>
<td>4(4.7)</td>
<td>9(5.3)</td>
</tr>
<tr>
<td>Atrophy</td>
<td>7(8.2)</td>
<td>2(2.4)</td>
<td>9(5.3)</td>
</tr>
<tr>
<td>Small volume testes</td>
<td>39(45.9)</td>
<td>3(3.5)</td>
<td>42(24.6)</td>
</tr>
<tr>
<td>Testicular microlithiasis</td>
<td>6(7.1)</td>
<td>0(0.0)</td>
<td>6(3.5)</td>
</tr>
<tr>
<td>Testicular mass</td>
<td>2(2.4)</td>
<td>0(0.0)</td>
<td>2(1.2)</td>
</tr>
<tr>
<td>Hydrocele</td>
<td>32(37.6)</td>
<td>24(28.2)</td>
<td>56(32.7)</td>
</tr>
<tr>
<td>Varicocele</td>
<td>25(29.4)</td>
<td>14(16.5)</td>
<td>39(22.8)</td>
</tr>
<tr>
<td>Total</td>
<td>121(70.8)</td>
<td>50(29.2)</td>
<td>171(100.0)**</td>
</tr>
</tbody>
</table>

$X^2=67.339$ df-9 $P=0.001$

**Some respondents had multiple scrotal findings**

**Table 3: Relationship between Average numerical parameters of respondents and fertility status**

<table>
<thead>
<tr>
<th>Fertility status</th>
<th>N</th>
<th>Mean</th>
<th>Std deviation</th>
<th>Std Error mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rt. testicular vol.</td>
<td>Infertile</td>
<td>85</td>
<td>9.5482</td>
<td>3.6602</td>
</tr>
<tr>
<td></td>
<td>Fertile</td>
<td>85</td>
<td>14.2953</td>
<td>3.1269</td>
</tr>
<tr>
<td>Lt. testicular vol.</td>
<td>Infertile</td>
<td>85</td>
<td>9.1941</td>
<td>3.8417</td>
</tr>
<tr>
<td></td>
<td>Fertile</td>
<td>85</td>
<td>13.8494</td>
<td>3.0755</td>
</tr>
<tr>
<td>Ave. testicular vol.</td>
<td>Infertile</td>
<td>85</td>
<td>9.3712</td>
<td>3.5679</td>
</tr>
<tr>
<td></td>
<td>Fertile</td>
<td>85</td>
<td>14.0724</td>
<td>3.0830</td>
</tr>
</tbody>
</table>
In the study comprising 17.9% of infertile patients and 32.0% in fertile males, the percentage of normal scrotal sonogram was 55.8%. This was similar to the finding of Tijani et al. who documented a mean age of 36.5 ± 7.3 years. This was at variance with the findings of Qublan et al. who detected much lower value of 10.4% as normal scrotal sonogram.

The effect of hydrocele on spermatogenesis, testicular size, testicular geometry, scrotal temperature and testicular spectral wave pattern has been studied. Dandapat et al. assessed the pressure effect of hydroceles in 120 men with unilateral idiopathic normal sonogram in their study is most likely due to the fact that those with small testicular volumes were also categorized as normal while in this study they were grouped under abnormal finding. Ibrahim et al. in Zaria, North West Nigeria recorded a much lower value of 10.4% as normal scrotal sonogram.

The prevalence of scrotal abnormalities in this study was 75.3% constituting 70.8% in infertile and control groups respectively. This was similar to the findings of a study in Jordan that recorded 85.3% in infertile and 32.0% in control group.

Similarly, Pierik et al. and Sakamoto et al. reported scrotal abnormalities in 38-65% of infertile men following their ultrasound evaluations.

Scrotal hydrocele is frequently identified in infertile men by clinical examination and scrotal ultrasonography. Hydrocele was the most common abnormal scrotal ultrasound finding in this study seen in 32.7% comprising 28.2% in fertile and 37.6% in infertile men respectively. This was at variance with the findings of Qublan et al. who detected hydrocele in 16.7% of infertile men, compared to 8.7% of men in a control group of fertile men. Tijani et al. and Dandapat et al. reported a similar trend. Pierik et al. noted much lower incidence of hydrocele in infertile men.

The mean age for the infertile respondents was 38.69 ± 7.2 years with over half of the respondents being in the age range of 30–39 years. This was similar to the finding of Tijani et al. in Lagos who documented a mean age of 36.5 ± 7.3 years. This actually coincides with the active reproductive age group.

Normal scrotal ultrasound findings constituted 24.7% of the total findings in the study comprising 17.9% in infertile patients and 82.1% in the control group. This was at variance with the findings of scholars in Sri Lanka who found a much higher percentage of normal scrotal sonogram in 55.8%. The higher percentage of normal scrotal sonogram in their study is most likely due to the fact that those with small testicular volumes were also categorized as normal while in this study they were grouped under abnormal finding. Ibrahim et al. in Zaria, North West Nigeria recorded a much lower value of 10.4% as normal scrotal sonogram.

Undeniably, parenthood is a universally desired goal in adulthood. However, this does not occur spontaneously in some couples with a proportion needing medical help to resolve underlying fertility problems.

Male infertility refers to the inability of a male to achieve a pregnancy in a fertile female. This is commonly due to deficiencies in the semen quality. The male factor infertility play a role in approximately 50% of infertility cases and the testes are the central organs for male fertility.

Seminal fluid evaluation is the primary investigative tool in the assessment of male fertility. Over the last few decades, there have been reports to suggest decreased human semen quality (defined as sperm density) in the general population while scrotal ultrasound has also become the primary imaging modality in the evaluation of testicular function.

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The effect of hydrocele on spermatogenesis, testicular size, testicular geometry, scrotal temperature and testicular spectral wave pattern has been studied. Dandapat et al. assessed the pressure effect of hydroceles in 120 men with unilateral idiopathic

**Table 4: Relationship between testicular volume and fertility status**

<table>
<thead>
<tr>
<th>Testicular volume(group)</th>
<th>Infertile(%)</th>
<th>Fertile(%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low(&lt;10.3)</td>
<td>39(29.2)</td>
<td>3(7.1)</td>
<td>42(24.7)</td>
</tr>
<tr>
<td>Normal(10.3-20.9)</td>
<td>46(35.9)</td>
<td>82(64.1)</td>
<td>128(75.3)</td>
</tr>
<tr>
<td>Total</td>
<td>85(50.0)</td>
<td>85(50.0)</td>
<td>170(100.0)</td>
</tr>
</tbody>
</table>

X² = 40.982 , p=0.001

**Table 5: Correlation between testicular volume and sperm count and BMI group**

<table>
<thead>
<tr>
<th>Testicular volume (group)</th>
<th>Correlation coefficient</th>
<th>Sperm count</th>
<th>BMI group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>.481**</td>
<td>.029</td>
</tr>
<tr>
<td>Sig.(2-tailed)</td>
<td>.001</td>
<td>.018</td>
<td>.704</td>
</tr>
<tr>
<td>N</td>
<td>170</td>
<td>170</td>
<td>170</td>
</tr>
</tbody>
</table>

| Sperm count              | Correlation coefficient | .029        | .814      |
| Sig.(2-tailed)           | .704                    | .100        | .018      |
| N                        | 170                     | 170         | 170       |

| BMI Group                | Correlation coefficient | .018        | 1.000     |
| Sig.(2-tailed)           | .814                    | .100        | 1.000     |
| N                        | 170                     | 170         | 170       |

**. Correlation is significant at the 0.01 level (2-tailed).**

IV. DISCUSSION

Undeniably, parenthood is a universally desired goal in adulthood. However, this does not occur spontaneously in some couples with a proportion needing medical help to resolve underlying fertility problems.

Male infertility refers to the inability of a male to achieve a pregnancy in a fertile female. This is commonly due to deficiencies in the semen quality. The male factor infertility play a role in approximately 50% of infertility cases and the testes are the central organs for male fertility.

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The effect of hydrocele on spermatogenesis, testicular size, testicular geometry, scrotal temperature and testicular spectral wave pattern has been studied. Dandapat et al. assessed the pressure effect of hydroceles in 120 men with unilateral idiopathic

http://dx.doi.org/10.29322/IJSRP.10.01.2020.p9773
hydrocele and found no pressure effect in 70% of men, testicular flattening in 22% of the cohort and pressure-induced testicular atrophy in 8% of patients. Turgut et al.14 noted time-related testicular size declines in patients with hydrocele and described a rounding rather than flattening effect of hydrocele on testicular shape.15

Some investigators have shown that hydrocele can affect spermatogenesis, which may be partially or totally absent.19 The possible mechanisms that underlie impaired spermatogenesis include the pressure effect of the hydrocele on the testis,14 the reaction of testicular cells to the highly proteinaceous fluid, and raised intrascrotal temperature.15 The hydrostatic pressure of a hydrocele exceeds the pressure in blood vessels within the scrotum,16 which interferes with arterial blood flow and might have an ischemic effect on the testicle.

In this study bilateral small volume testes and varicocele also showed similar trend of higher prevalence in infertile group compared to the control with prevalence of 92.9% versus 7.1% and 64.1% versus 35.9% for bilateral small testes and varicocele respectively.

Epididymal cysts were found in 5.3% of the participants evaluated sonographically. This is consistent with finding of Sakamoto et al in Japan who found epididymal cysts in 3.9% of the patients.11 They may cause infertility by either partial or complete obstruction of the vas deferens.

Testicular microlithiasis was identified in 3.5% of the participants. It is thought to impair testicular function via immunological mechanism.9 Various studies have reported incidence of between 0.6-9.0% in the healthy population, and an incidence of 0.8-20% in sub-fertile population.11 Testicular microlithiasis is associated with pathological conditions such as Klinefelter’s syndrome, infertility, epididymal cysts, cryptorchidism, atrophy and torsion.11 However, in this study there was no associated abnormality seen in patients with microlithiasis. In this study, the mean testicular volume (MTV) in the control group was 14.30 ± 3.13 ml and 13.85 ± 3.08 ml for right and left respectively. This study agrees with previous study of scholars who reported mean volume of 15.38 ± 3.29 ml and 15.29 ± 3.89 ml for right and left respectively.11 This was however at variance with the mean testicular volumes of 18.13 ± 3.85 ml and 18.37 ± 3.62 ml for right and left respectively obtained by scholars in Seoul, Korea.19 This was most likely due to the fact that the sample size was restricted to normal young men aged 19-27 years, unlike this study where control group were between 18 years to 60 years. Testicular volume rapidly increases during puberty and reaches its peak at age 30 years and thus an advancing age is a risk factor for decrease testicular volume.

The mean testicular volume in this study for the control group was significantly higher than the mean testicular volume of 9.55 ± 3.66 ml and 9.37 ± 3.56 ml for right and left respectively in the infertile group. This was consistent with the findings of other authors who documented the mean testicular volumes of 7.66 ml and 7.43 ml for the right testis respectively and low testicular volumes in men with infertility and oligospermia, as the seminiferous tubules responsible for spermatogenesis constitute about 80% of testicular volume. This was, however, at variance with the finding of a higher mean testicular volume of 18.3 ml and 16.9 ml for right and left respectively by Schiff et al. in New York, USA using 159 sub fertile men.20 This value for MTV in infertile men was also at variance with that reported by a study carried out by Kiridi et al. which was 13.3 ml.17

In this study, a testicular volume below 10.3 ml had statistically significant effect on the fertility status of the individual (p<0.05).

Similarly, scholars in Tokyo, Japan documented a critical total testicular volume of 20 ml (MTV of 10 ml) using ultrasonography indicating normal or nearly normal testicular function.11 However, a study in Tirana, Albania using 500 subfertile males, found that testicular volume has a direct correlation with semen parameters and the critical mean testicular volume indicating normal testicular function is 13.3 ml. The study also concluded that measurement of testicular volume can be helpful for assessing fertility at the initial physical examination.5,20

There was a positive strong linear association between testicular volume and sperm count (r=0.481, p<0.05) in this study. The study by Kristo et al. in Albania also showed positive correlation between testicular volume and sperm count (r=0.499, p<0.0001).5

Another study carried out in India by Sharath et al. also showed a significant positive correlation between mean testicular volume and sperm count (r=0.501 p <0.0001) as well as a higher mean testicular volume for the fertile men compared to the infertile population.21

The mean testicular volume for the control population in the study by Sharath et al. in India was 11.45±2.65 ml while that for the infertile patients was 7.31±3.6 ml.21

Testicular volume is a measure of the level of spermatogenesis as there is relationship between the testicular volume and sperm count per ejaculate.22 Small testicular volume is a crude indicator of severity of infertility with a statistically significant relationship between the testicular volume and the sperm density.

The minimum testicular volume necessary for adequate spermatogenesis is also yet to be determined. However, using the punched-out orchidometer, others have reported a critical mean testicular volume of 14 ml as the minimum for adequate spermatogenesis and a critical total testicular volume of 30 ml as the minimum for normal testicular function. However, orchidometers are known to overestimate testicular size especially the smaller testes.7

Condorelli et al. also found reduced semen parameters in patients with mean testicular volume of less than 12 ml.22

In this study, there is positive weak linear association (r²=0.029, p>0.05) between testicular volume with BMI and weight of the participants. This was in agreement with the findings of Kiridi et al that demonstrated a positive correlation between testicular volume and BMI.17

A very weak negative association is seen between testicular volume with age and height.

This was at variance with the findings of Sobowale et al.23 who reported a weak positive linear relationship between testicular volume and height.23

V. CONCLUSION

This study found a strong positive correlation between ultrasound measured testicular volume and total sperm count. It
was also observed that the critical mean testicular volumes of less than 10.3 mL is associated with sub-fertility. Ultrasound scan of the scrotum and its content is safe, reliable and indispensable modality in the evaluation of the scrotum and its contents especially in sub-fertile subjects as this may aid early diagnosis and prompt management of treatable causes of infertility.

VI. RECOMMENDATION

Scrotal ultrasound should be done routinely in the evaluation of male infertility as it has been shown to give an insight to the possible outcome of the seminal fluid analysis and detect abnormalities that may not be clinically visible following clinical examination alone.

REFERENCES


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Abstract

The study was undertaken to explore the efficacy of audio-visual teaching materials in EFL Classes in two elementary schools in Addis Ababa, Ethiopia. The target population comprised 55 boys and 59 girls in the elementary schools. Data was collected from selected pupils, teachers and principals of the two elementary schools. The study sought to identify the common materials, methodologies and expertise used in teaching EFL Classes as well as to establish their effectiveness in using and promoting teaching aids. A survey research design was employed with a purposefully selected sample of one hundred fourteen (114) respondents. Interview, questionnaires and observation were used to collect data from principals and teachers on one hand, and pupils on the other hand. The data from the questionnaires was analyzed using frequency distribution tables and percentages while first-hand information from the interviews was recorded according to emerging themes. The findings of the study showed that materials and methodologies used to disseminate audio-visual teaching materials were not very effective. The schools did not run the mill with relevant literature on audio-visual teaching materials. They commonly used teaching methodology in EFL Classes with limitations of language and audio-visual teaching materials. The findings further revealed that the context for audio-visual teaching materials was limited in the schools. It was also revealed that audio-visual teaching materials lacked the required expertise to conduct it as most of the officers involved had no pedagogical experience. The study concluded that the audio visual teaching materials in EFL Classes were not effective. It was recommended that stakeholders should use suitable media, resources, methodologies and personnel to advance audio-visual teaching materials in EFL Classes.

Keywords: Efficacy, Audio-Visual Teaching Materials, Language, Methodologies, Textbook.

1. Introduction

Visual aids have a great role in language teaching and learning. They make pupils involved, expand pedagogical implementation, and create access to information and teaching resources. A visual aid facilitates a new method of teaching language in the classroom. It also develops modern communicative teaching methods, especially, a new audiovisual serves as a warning and a signal on pedagogical quality of teachers teaching strategies and their interaction with pupils. It is important to get concrete wide information within a short time. In addition to this, the relevant visuals develop individual learning styles, teaching skills and comprehensive educational syllabus. They also enhance the competence and performance of pupils, and finally strengthen the systematic application of scientific knowledge in finding practical solution to specific problems of teaching language.

Audio-visual aids help teachers to bring a significant change in the class environment as well as in the teaching process. By using audio-visual aids in the class, teachers can present a topic both verbally and visually which is very helpful for the learners to pay more attention in the lesson. They can make a correlation between the verbal and non-verbal as well as abstract and concrete issues. There are some abstract things in language which are difficult to explain verbally (Abdullah, 2014). However, teachers in elementary schools are not interested to use visual aids in language classes. The fact beyond the curtain is lack of experience, exposure, interest, motivation and facilities. Consequently, the pupils do not
get much knowhow on visual aids. Krashen (1987) points out the importance of motivation and self-confidence. He holds that these factors are more involved not only in supplying comprehensible input but also in creating a situation that encourages a low filter. Thus, the effective language teacher is someone who can provide input and make it more comprehensible in low anxiety situation. Therefore, motivated pupils will learn better than those who are not.

Teachers have their own role in communicative approach. According to Larsen Freeman (1986) teachers in communicative classroom will find themselves talking less and listening more becoming active facilitator of their students learning. Similarly, to encourage visuals in the classroom and to integrate visuals with their uses, it is necessary to create some interesting situations in the classroom in which learners can use various visual items. If the verbal and visual things are presented together, learners can get the information quickly. Mayer (2001) approved that, if the instruction is given in the class using both words and visuals, learning becomes faster (cited in Dolati, 2011). Furthermore, a resourceful teacher can create different types of situations in the classroom. Although a few types of situations are created by the teacher, a competent teacher can create situations spontaneously depending on the level of students, the items and the topic s/he is teaching.

Teachers’ main target is to foster Learners’ interest toward the foreign language by taking advantage of the various resources available for this purpose. The schools under investigation used audio visual aids as one of the strategies in conducting the teaching and learning process. True audio visual aids are the significant resources utilized when it comes to having learners exposed to the target language. There are pedagogical centers in both schools where audiovisual materials are prepared as strategies to enhance the use of audio visual aids in EFL classes. However, the effectiveness of such strategies was not known as there was no known study to measure their efficacy, the researcher of this study was interested to see the real challenges while using audiovisual aids. Therefore, the study sought to explore the efficacy of audio-visual teaching materials in EFL Classes: in the case of two elementary schools in Addis Ababa, Ethiopia.

1.2 Purpose of the Study

The purpose of the study was to assess the efficacy of audio-visual teaching materials in EFL Classes: in the case of two elementary schools in Addis Ababa, Ethiopia.

1.3 Major Objectives of the Study

The major objective of the study was to assess the efficacy of audio-visual teaching materials in EFL Classes: the case of two elementary schools in Addis Ababa, Ethiopia.

Specific Objectives of the Study

The specific objectives of the study were to:

- identify the factors that affect the use of audio-visual teaching materials in EFL Classes find out the effectiveness of audio-visual teaching materials in EFL Classes
- identify the common methodologies used in EFL classes; and find out to what extent audio-visual aids use in EFL classes.

1.4 Research Questions

What are the factors that affect the use of audio-visual teaching materials in EFL Classes?
What are the audio-visual aids used in EFL Classes?
What are the common methodologies used in EFL classes?
How effective are the methodologies used in EFL classes?

1.5 Significance of the Study

The study was very important because it intended to benefit all stakeholders such as the Ministry of Education, education officers, supervisors, school principals, teachers and pupils. The results would help school principals, teachers and pupils to
work together and produce relevant materials for preparing audio-visual teaching materials in EFL Classes to the pupils.

2. Review of Related Literature

In Ethiopia, English is taught as a subject starting from grade one up to tertiary education. It is also a medium of instruction in secondary and tertiary levels. Even though students are exposed to English language, their level of performance in using the language is very low. Moreover, students cannot understand the target language as they understand their mother-tongue. Therefore, learning of English becomes difficult for them. In the teaching of language, the main purpose of the use of audio-visual aids is to enable the teacher to make his/her lessons effective and interesting. In the teaching of English the teacher uses the lecture method. Therefore, it is for the teacher to give a clear idea to the students through audio-visual aids as such type of teaching make the idea permanent in the pupils mind.

According to Adrian Doff (1990:81-82), the use of audiovisual aids is important to teachers as well as to pupils. It focuses attention on meaning, helps to make the language used in the class more interesting. In addition, visuals can be used at any level of the lesson, to help out in interpreting new language or introducing a topic, as part of language practice, and when reviewing language that has been presented earlier. Good visual aids are not just used once, but again and again and can be shared by different teachers. Mattew etal (2013) state that an effective integration of teaching aids methodology elevates the learning environment. Koc (2005) cited in Mattew says that the integration of technology into curriculum means using it as a tool to teach academic subject and to promote higher order thinking skills of the students. It is generally said that students like the language class when teachers use different audio-visual materials because it motivates them to pay more attention in the class and they can relate their learning with their real life (Çakir, 2006, pp.67). As a result, the use of audio-visual aids seems to benefit both the teachers and the learners.

Use of audio-visual materials makes the learning more long-lasting than the use of traditional textbooks (Craig & Amernic, 2006:152-153). A resourceful English language teacher create smart audiovisual aids as a motivational tool in enhancing students attention in language teaching and learning. Thus, audiovisual aids are significant and the best tool for making teaching effective and the best dissemination of knowledge. Moreover, it arouses the interest of pupils and helps out the teachers to explain concepts easily. According to Burton cited in Shabiralyani (2015) “Visual aids are those sensory objects or images which initiate or stimulate and support learning”. Kinder, S. James; describe visual aids as “Visual aids are any devices which can be used to make the learning experience more real, more accurate and more active”. Hence, Saricoban (1999) proposes the incorporation of a sort of visual backup to enhance comprehension as well as the importance of awareness on environmental clues such as gestures, tones of voice, or expressions that may contribute in their comprehension.

Eliane etal (2007) state that visuals such as tables, charts and graphs provide clarity. Effective visuals are used for specific purpose, not for decoration, and each type of visual illustrates some kind of materials better than others. Moreover, effective visuals are simple and clear. If a chart is overloaded with information, separate it into charts instead. In fact, the experience of elementary teachers in using visual aids is poor. Thus, the essence of using various visual aids in line with the target lesson is mandatory, especially in EFL classes. Therefore, the study sought to explore the Efficacy of audio-visual teaching materials in EFL Classes: the case of two elementary schools in Addis Ababa, Ethiopia. In short, the researcher focuses on identifying the factors that hinder the use of effective audiovisuals in ELT classes.

Photographs, pictures, drawings, diagrams, and maps provide visual support to various subject matters like history, English and other languages as well as to philosophy, music, theater, and other performing arts Elaine P. and etal (2007:235). Most of the times students learn through visuals make the teaching learning process easier. It helps to integrate with various language skills such as reading, listening, speaking and writing. According to Abdullah (2014), using different relevant visuals in classrooms makes the class interesting and interactive. It helps the teachers to visualize the content of the classroom. Also, it makes the learners more attentive and engaged in tasks. When visuals are used to introduce any topic to the learners, it becomes more real and contextualized. Learners get an overview of the lesson and can generate ideas better. It improves the
learner comprehension ability.

About Visual Aids in Language teaching, B. M. Bowen (1991) states: They vary the pace of the lesson:

☐ They encourage the learners to lift their eyes from their books, which makes it easier and more natural for one to speak to another;
☐ They allow the teacher to talk less by diminishing the importance of the verbal stimuli provided by the teacher’s voice, and allow the students to talk more;
☐ They enrich the classroom by bringing in topics from the outside world which are made real and immediate by the pictures;
☐ They spotlight issues, providing a new dimension of dramatic realism and clarifying facts;
☐ A student with a creative imagination will often learn a new language easily and enjoyably through the use of pictures while he finds it difficult to learn just from a textbook and dictionary;
☐ They make a communicative approach to language learning easier and more natural;
☐ They help to teach listening, speaking, reading, and writing and allow the teacher to integrate these skills constructively;
☐ They inspire imaginativeness in both the teacher and students;
☐ They provide variety at all levels of proficiency (Bowen, 1991)

Wright A., Hallem S. also state that pictures have a major role to play in the development of students skills. There are two reasons in particular for listening and reading: meanings we derive from words are affected by the context they are in; pictures can represent or contribute much to the creation of contexts in the classroom; it is often helpful if the students can respond to a text non – verbally: pictures provide an opportunity for non – verbal response (Wright & Hallem, 2001).

3. Methodology

3.1 Research Design

The researcher used both quantitative and qualitative research designs. The researcher also investigated the efficacy of audio-visual teaching materials in EFL Classes in two elementary schools in Addis Ababa, Ethiopia. Descriptive research design was employed to conduct the study.

3.2 Population

The population of the study included 450 pupils, teachers, and principals in two elementary schools in Addis Ababa, Ethiopia.

3.3 Sample Population

The sample size of the population comprised one hundred fourteen (114) pupils and four teachers from the two schools and two (2) principals from the two elementary schools (Tsehay Chora and Dil Betigil) in Addis Ababa, Ethiopia.

3.4 Sampling Procedure

Purposeful sampling for the two schools, principals, pupils and teachers was used with the purpose of including all key elements in the sample. The two schools were purposely selected based on information from the Gulele sub-city education office that these schools were among those where pupils have been exposed to various teaching methods. Random sampling method was used for the selection of the 114 respondents.

3.5 Data Collection Techniques

To get valid and reliable data, the researcher used questionnaire, interview and observation. Structured interviews were used for all the three categories of respondents in order to get firsthand information on the effectiveness of audiovisual aids. Structured interviews allowed direct interaction and also permitted assessment of non-verbal communication which could have been missed if other techniques were employed. Structured interviews also encouraged mutual exchange of information.
yet allowing data to be easily coded and analyzed.

3.6 Data Analysis

The data was analyzed both quantitatively and qualitatively. Quantitative data was used to analyse the effectiveness of methods and materials used. In this case tables and frequencies were used. Qualitative data was coded and analysed in the form of explanations as given by the respondents.

4. Findings and Discussion of Findings

The findings of the study revealed that there were several types of audio visual materials used in distributing information to pupils namely brochures, textbooks and electronic media. Similarly, the government had developed a more effective medium for educating the pupils through the publication of pictures, maps, diagrams, etc with various texts on the usefulness of audio visual materials.

The interview, questionnaire and observation results describe the suggestions of teachers, students and principals concerning the features of ELT audio-visual aids for elementary school students. The participants were asked about their primacies while selecting audio visual materials. The participant teachers focused on the possible features of a model ELT audio-visual aids designed for the elementary school students. In every stage of their suggestions, the participants focus on the importance of reflecting both the written and spoken aspect of communication in the classroom. The importance of the choice of a working methodology, the presentation of language skills with a focus on integration, importance of language functions, the appropriateness of the audio-visual aids/materials in terms of students’ age, needs, levels, and interests are among teachers’ priorities while evaluating the audio-visual aids. Most of the participants of the study also focused on the necessity of presenting authentic materials or the ones reflecting real-life situations and cultures in the audio-visual aids in terms of transferring knowledge into students’ personal and social life endeavor. In addition, other participants of the study insist that the audio-visual aids should include materials relevant with the objectives of the curriculum that is consistent with the students’ ages and needs.

As another component of the audio-visual aids, teachers also focused on the features of illustrations. A group of participants made a distinction between the use of drawings and the photographs in regards to the students’ needs and suggested the use of real photographs for the elementary school students. Another group of teachers recommended the presentation of different kinds of illustrations as a mixture.

The majority of the participants considered that a communicative methodology following a content- based approach is ideal for the elementary school students and such kind of a methodology should be based on four main language skills, namely reading, listening, speaking and writing. Additionally, the organization of the audio-visual aids would manipulate students in order to give prompt answers to the questions that they are likely experience in their daily lives. Moreover, the teachers evaluated a successful audio-visual aids as long as it provides sufficient number of activities for enhancing interaction in the classroom. Furthermore, an effective audio-visual aids should manipulate students to use the language for different purposes under different circumstances and create as a basis in terms of providing discussions in the classroom.

According to the participants, the materials in audio-visual aids should evoke both the spoken and written communication in the classroom in terms of students’ needs. An audio-visual aid can be regarded as successful, as long as it improves students’ productivity in all skills and provides an assorted organization over a monotonous one.

Considering the presentation of cultural issues in the audio-visual aids and textbooks, it is essential to reflect the target language culture overwhelmingly into the audio-visual aids/materials. The participants also suggested the presentation of Ethiopian culture in terms of making comparisons and the representations of multicultural aspects. Additionally, they indicated that it would be inappropriate to disregard the cultural aspects of first language and teaching the language via the representations of the Ethiopian culture.

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The participant teachers also indicated their thoughts concerning the four main language skills. The suitability of the skill exercises in terms of the students’ needs and levels and the importance of a varied selection of the activities are indicated by the teachers. Specifically for the speaking skill, the importance of guidance and authenticity is stated. According to the teachers, the speaking activities should create a reason for students to talk and discuss and such activities should require pair or group work discussions. While focusing on the writing exercises, the participants indicated a number of aspects such as the guidance, integration of writing activities with other skills (speaking and reading) and activating students’ creative and cognitive thinking skills. Moreover, the writing samples should be selected from the ones since students are able to write in their daily lives. Visual aids are also necessary for the students to experience writing different kinds of essays and writing samples such as short stories, poems, letters postcards, and e-mails. Regarding the reading skill, interesting, attractive and motivating reading passages associated with various audio-visual aids are indicated to be effective in students’ language learning process. Another aim should be to achieve appropriate audio-visual aids content consistent with students’ ages, preferences and expectations.

The teachers suggested a number of aspects concerning the presentation of vocabulary in ELT audio-visual aids. The teachers considered that the selection of vocabulary should be consistent with the students’ needs and levels. A great majority of the teachers suggested the use of meaningful and contextual grammar exercises. The teachers also focused on the efficacy of audio-visual aids and situation-based instruction with the aim of teaching different language skills. In addition, the participants pointed out the superiority of the audio-visual aids instruction of language issues and the importance of presenting situations and tasks in which students have to use the specific skills interactively. Shortly, audiovisual aids have positive effects on pupils, teachers and schools.

Moreover, it is possible to observe that teachers share common opinions by indicating their disagreement considering several features of the audio-visual aids in the textbook. In other words the participant teachers do not consider that a number of features or aspects are successfully presented in the textbook. According to the majority of the participants, the cover of the audio-visual aids are unattractive (83.3 %), the audio-visual aids do not reflect representations of L 2 (80.3 %), the topics are uninteresting for the students (88.3 %) and the exercises are not designed according to the students’ interest (80 %).

Moreover, most of the participants (81.7 %) did not consider that the vocabulary items are controlled to ensure the systematic gradation from simple to complex. One fourth of the participants (25 %) strongly disagree with the statement ‘The teacher’s guide provides practical activities/ideas for the teacher to use visual aids in the classes’.

More than half of the teachers and principals (75 %) indicated that the audio visual aids help students to comprehend the reading passages, on the other hand, the rest of the participants (25 %) considered that the audio visual aids are ineffective for manipulating the students to understand the reading texts. In the open-ended questionnaire, a great majority of the teachers reflected that the audio visual aids, especially, the drawings are poor in quality. For this reason, they are ineffective in terms of reflecting the real scene of the reading passages.

While focusing on the language skills in the audio-visual aids, the majority of the participant teachers and principals (86%) indicated that the reading exercises are appropriate for improving students’ reading abilities. In addition, listening exercises presented in the audio-visual aids are found to be effective in terms of improving students’ listening skills (80%). Furthermore, most of the participants agree on the efficacy of the listening materials or audio-visual aids (pictures, diagrams, photographs, charts, videos, CDs) in terms of improving students listening in particular and language skills and fluency in general.

However, considering the speaking skill, most of the teachers (76%) pointed out the inefficacy of speaking exercises in terms of enhancing students’ speaking abilities. Especially for the writing skill, although a significant number (65 %) of the teachers agree on the efficacy of the writing exercises, the rest of the participants (35%) did not evaluate the writing exercises as
The last section of the questionnaire was designed to find out the aspects that the teachers would like to see in the audio-visual aids regarding the four-language skills. The results indicated that a great majority of the teachers would like to see more speaking (95 %) and writing exercises (88.3 %). On the other hand, teachers’ responses show diversity whether or not they would like see more reading, grammar, and listening exercises. At this point, it is possible to state that there is a significant correspondence between the teachers’ assessments of the four-skills in the audio-visual aids and teachers’ following comments regarding the language exercises that they would like see more in the textbook.

Furthermore, the analysis of interview and observation results revealed that half of the teachers indicated that the organization of some of the main headings is problematic in terms of not presenting the actual sequence of the visual aids. Moreover, focusing on the visual aspects, the subheadings are presented with small typeset in the textbook. This aspect is disparaged by a number of the teachers and they suggested that these headings can be redesigned by using big typeset and various colors in order not to present a rhythmic organization.

The participant teachers and principals tended to be negative concerning the efficacy of the instructions in explaining the purpose of the relevant activities. However, the analysis conducted by the researcher did not match with the teachers’ statements since the language of the instructions is simple, consistent and addresses the purpose of the practices at different levels. Focusing on the topics and exercises, the majority of the teachers (82 %) consider that the topics are not interesting for the students and in the interviews teachers regarded the interestingness of the topics as a priority issue. Concerning certain topics in the audio-visual aids, teachers indicated that their students were not eager to participate in the activities in a number of topics because of finding the visuals uninteresting. Although creative activities and tasks are displayed, they are limited and none of the activities are based on authentic situations. Thus, most of the teachers and principals considered that audio-visual aids are not successful in terms of initiating communication.

5. Conclusion and Recommendations

5.1 Conclusion

From the findings, it was concluded that audiovisual aids are not as effective as they should be because of a number of reasons. The inadequate availability of teaching materials and limited methodology hinders effective dissemination of the lesson/ needed information. To achieve desired goals, all the stakeholders concerned must ensure availability of required resources, employment of a variety of methodologies to arouse interest in the learners and also train all personnel involved to disseminate information. It was understood that audiovisual aids have positive effects on pupils, teachers and schools. The failure to recognize the importance of audiovisual aids will always lead pupils into misunderstanding the text/message. Audiovisual aids, if accorded the importance they deserve, will help to avoid excessive, empty and meaningless verbalization in teaching English. Moreover, using audiovisual aids make teaching and learning effective, provide interest and inspiration, and help students to form clear and accurate concepts in English. Thus audio-visual aids help out our students in their language articulation. However, most of the teachers do not use these aids which have great educative value. These are not the ordinary materials, rather these are teaching materials. Audio-visual aids give direct sensory experience to the students.

In addition to the above points, the findings revealed facts regarding the evaluation of EFL audio-visual aids. First, since the audio-visual aids were designed for the elementary school students, the topics can be rearranged or chosen by taking into consideration their ages, expectations, and needs. Second, the illustrations may be restructured to meet the expectations of elementary school students by providing high-quality standards similar to the ones in commercial publications. Third, from the teachers’ perspectives, the teacher’s guide can be revised in order to provide practical ideas for the teachers to use in the classroom. Fourth, the results are considered to be informative considering the audio-visual aids elements which do not require revision regarding teachers’ audio-visual aids evaluation results such as the presentation of grammar and the relevant exercises, the presentation of listening and the relevant exercises, and the activities.

5.2 Recommendations

The researcher made the following recommendations:

1. The audiovisual aids need to be transformed into policy so that it is included in the school curriculum and be incorporated in the entire school subject both at primary and secondary school. Only then will it receive maximum attention it deserves.

2. The audiovisual aids must be given adequate funding so that the school officials can provide quality training to those given the mandate to disseminate information to the teachers. Adequate funds will allow all stakeholders to attend frequent workshops in order to keep abreast and avoid misinforming the pupils mind.

3. The principals, department heads, supervisors must make it a mandate to visit all schools at least once a week by utilizing supervisors in all schools, so that pupils and teachers in schools can perceive the importance of the audio visuals unlike the situation where the officers visit the schools at the most once per year or not at all.

4. There must be involvement of stakeholders in decision making, planning, implementation and evaluating of programs designed to make sure that the audiovisual aids education succeeds.

5. Addis Ababa and Gulele sub-city education office should give continuous training on the use of effective visual aids in ELT classes in order to cultivate students’ cognitive as well as social bondage.

6. The principals, department heads, supervisors must consider the audio-visual aids elements which require adjustments such as the presentation of grammar and the relevant exercises, the presentation of listening and relevant exercises, and the activities.

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Communal Riots and Plight of Women

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Abstract- In this paper I am going to explore the topic of communal violence in general and violence against women in particular and the violation of women’s basic rights. The time span, which I am going to look at, is phase of partition 1947 and riots of 2002 Gujarat. Then I will also look upon the Communal violence Bill 2011.

Index Terms- Communal, Gender, Gujarat, Hindu, Muslim, Nation, Partition, Violence, Women, Riots.

I. INTRODUCTION

Starting with Communal violence, it is a form of violence that is perpetrated across ethnic or communal lines, the violent parties feel solidarity for their respective groups, and victims are chosen based upon group membership. The term includes conflicts, riots and other forms of violence between communities of different religious faith or ethnic origins. The Indian law defines communal violence as, “any act or series of acts, whether spontaneous or planned, resulting in injury or harm to the person and or property, knowingly directed against any person by virtue of his or her membership of any religious or linguistic minority, in any State in the Union of India, or Scheduled Castes and Scheduled Tribes within the meaning of clauses (24) and (25) of Article 366 of the Constitution of India”. (Constitution of India)

Now coming to conflict’s gendered perspective, women were the worst and most sufferers of these kinds of violence. Due to the reason of the difference between gender and sex, the oldest known difference embodied into language, is seen as basic, unquestionable and unproblematic- a condition of life. Difference “in itself” is historically determined as the hierarchy/domination/injustice/ social inequality that are “theoretically” based on patriarchy/gender/sex. In conflict’s time women were not seen as individual, rather they were seen as reproductive unit and property or pride of “other” community which is meant to be distorted so as to destroy the pride of community.

I am tracing communal violence and the experiences of women, to re-write her history. It has been experienced by many that the history we read is male biased i.e. written from men’s perspective. I’m not denying the fact that there were considerable women figures who worked on partition but that too were male centered. Their contribution in freedom struggle was seen as the supplement of male. When feminists began their study of partition violence against women, they used first-hand accounts of social workers and memoirs and the testimonies of women in rehabilitation camps. And if we talk about government records, women were considered as mere objects only shown in numbers. No subjectification was provided as to what had happened? What were the causes and consequences of violence against women? What were the steps taken by government?

Talking about the partition of 1947 India, the practice of nation building employed social constructions of masculinity and femininity that supports a division of labor in which women reproduce the nation physically and symbolically and men protect, defend, and avenge the nation. National mythologies draw on traditional gender roles and the nationalist narratives is filled with images of the nation as mother, wife, and maiden. At that point of time and till now women’s bodies become symbolic and spatial boundaries of the nation. Women’s were seen as the property of the nation and at times property of the community. Partition: a metaphor for irreparable loss. (Menon & Bhasin, 2000)

II. PARTITION VIOLENCE 1947

The violence which immediately followed the partition of British India into India and Pakistan resulted in the death of nearly 2.5 million people across both the regions. As the partition was announced Minorities from both the sides tried to migrate to the other country. Perhaps some of the historians peg the figure of migration at about 15million. There were a large no of incidents of mass violence. Sikh villages were burnt in West Punjab, male members killed and female were subjected to physical violence and mass rapes. Similarly in Eastern Punjab and other parts of India the migrating minority community faced a similar fate. The worst suffer of the violence were women. Both Hindus and Muslims were affected on both sides of borders during the partition riots. The main cause of partition was division of the nation on religious grounds and the unbending attitude of the political parties. The communal award announced by Ramsay Mcdonald in 1932 was the beginning point of the conflict between the different religious groups. The award provided for separate electorates along religious lines. It resulted in compartmentalization further the policy of divide and rule of the Britishers and their sudden withdrawal lead to a bloody aftermath.

III. 2002 GUJARAT VIOLENCE

Since partition, there have been a number of incidents of mass brutality against Muslims in Gujarat. In 2002, in an occurrence depicted as a demonstration of “fascistic state terror”, Hindu radicals completed acts of extraordinary savagery against the Muslim minority population. The beginning stage for the episode was the burning of a train, which was blamed on Muslims. Later in the riots, young ladies were sexually assaulted or hacked to death. These assaults were virtually approved by the decision of
The incident of Sheikhpura is quite shaking. The Sheikhpura district in Western Punjab was a Sikh minority district. During the partition riots Sheikhpura became a byword for murder, arson, loot and rape. A person named Dr. Virsia Singh claimed that he had shot 50 women personally even his wife, daughter and mother because he said that Muslims came to get them. The most disturbing element is that the women themselves came and said “Viran, pehle mannu maar”. Despite being highly educated Dr. Virsia did not regret killing them. Rather he said that this was necessary in order to protect the honour of the community, because he considered the women as the honour of the community.

The trauma of Partition violence was very difficult to tell for both men and women. The gendered nature of experience of violence has given rise the different narrations of the events of violence. As Veena Das and Ashish Nandy have pointed out that the difference in narrations of women and men was different because the women have “retained the memory of loot, rape and plunder” in their bodies as well. But the memories were more formal and organized as in case of Iqbal or Dr. Virsia Singh.

An article from the Caravan: Journal of politics and culture, titled “how Hindu mobs used rape as weapon against women like Bilk Bano during Gujarat riots” by Prita Jha. “The struggles of Gujarat’s rape survivors were not, and still are not, limited to the courts of law,” Jha writes. “These women had to also fight for their dignity in their own communities.”

The heavily pregnant Kauser Bano’s stomach had been ripped open with a sword, her foetus removed and thrown into fire. This clearly shows the patriarchal mentality of the mob.

Another case from Gujarat, was from the rehabilitation camp where the Muslim survivors were kept for their safety and security. Girl named Jamila stated that the Maulana there has asked for sexual favor from her mother and sister, in return she will get proper benefits of the camp. This shows the hypocrisy and patriarchal nature of their community.

Kumkum Sangari’s response to this viewpoint is very important. For her there is no abstract disembodied patriarchy. Rather, there is a multiplicity of patriarchies located in a variety of institutions in the civil society, apart from the state.

State’s Role from recovering from the pain of partition and Gujarat riots.

Apart from setting up rehabilitation camps for refugees in 1947, the governments of the two countries came to an agreement that abducted persons should be recovered. India’s Abducted Persons Act of 1949 stated that “Abducted person’ means a male child of under the age of 16 years or a female of whatever age who is, or immediately before the first day of March, 1947, was a Muslim (Pakistan’s Law stated Hindu or Sikh) and who on or after that day or before the first day of January, 1949, was separated from his or her family and is found to be living with or in control of any other individual or family, and in the latter case includes a child born to any such female after the said date.” This law in itself is very good, which allowed women and children from other side to come to their respective countries. But the question here is of honor of the family. Question was of acceptance of those women who were coming from other side and after long time. The issues of Abducted women were taken into account, resistance was coming from within India, the question of children born from these

ruling BJP, whose refusal to intercede prompted the relocation of 200,000 Muslims. Loss of life figures extend from the official gauge of 790 Muslims and 254 Hindus murdered, to 2,000 Muslims slaughtered. Then Gujarat CM Narendra Modi has too been blamed for starting and overlooking the brutality, as have the police and government authorities who remained silent and virtually participated, as they literally coordinated the agitators and gave addresses of Muslim-possessed properties to the radicals. Women in both these cases faced the most brutality and the most heinous crimes were committed on women of both the religious communities.

As I had mentioned earlier women during the partition and even before the partition also didn’t constitute a separate or individual identity. Their identity was clubbed with the community so as the honour. The nature of violence which occurred was very ghastly ranging from:

1. Disfigurement,  
2. Mutilation,  
3. Disembowelment,  
4. Castration,  
5. Branding or tattooing the breasts and genitalia with triumphal slogans,  
6. Raping and killing the foetuses,  
7. Abduction,  
8. Honour killing,  
9. Stripping and parading naked

These are the parts of its pathology and must be recognized for their symbolic meaning. As Veena Das had noted “There is no contradiction between the fact that, on the one hand mob violence may be highly organized and crowds provided with such instruments as voters list or combustible powders and on the other hand that crowds draw upon repositories of unconscious images.” This phenomenon of violence is described most aptly by the language of feud. As in, feuds may be defined as “a pact of violence” between social groups in such a way that definition of self and other emerges through the exchange of violence i.e. the exchange of violence is an integral part which is directed towards the others. In such an exchange the “victims are simply the bearer of status of their group”. The other group thinks by directing their violence towards the victims they can crush the prestige of their opponents. Similar was the case of women who faced the violence in 1947 and 2002 Gujarat. The groups targeted the women (victims) for the above mentioned reasons. The brutal violence that women faced during the communal riots can also be seen in the context of the place the women’s sexuality occupies in an all-male, patriarchal arrangement of gender relations between and within religious or ethnic communities. Most of the violence experienced by women is when women are sexually assaulted by men of other community in an assertion of their identity and in order to humiliate the other by hurting their honour. The violence, rape faced by Sikh, Hindu and Muslim women were a result of similar action-reaction, retaliation and the fake honour concept.

There were a range of testimonies or case studies from 1947 violence riots and 2002 Gujarat riots, from the women who personally experienced it or by the family members or by the fact finding teams.

“Puttar, aurat da ki ai, aur tan varti jaandi ai Hamesha, bhanve apne hon, bhanve paraye”
women, they were considered illegitimate in the eyes of law said by one of member of Hindu society. Those children were needed to send back to Pakistan. This also created trauma of separation from the child to women. Homes for widows and children were also setup.

Earlier known as ‘Prevention of Communal and Targeted Violence (Access to Justice and Reparations) Bill, 2011’ is brought to curb the riots taking place between majority and minority communities. After the alleged post-godhra riots in Gujarat, The former UPA government proposed for the need of the bill. The controversial Communal Violence Bill (later name changed from “Prevention of Communal and Targeted Violence bill”) has raised the brows of one and all. While some believe it is UPA’s strategy to win minority vote banks, others believe that it is a tool to strengthen the integrity and harmony of the country. At first glance, it does seem to be a peacemaker, but on second thoughts it brings out the darker side of democracy. When the government should be emphasizing on equal rights for all, it is promoting the minority community as the underprivileged and the deprived. Recent amendments- drawing the wrath of various parties, starting BJP, the two major points of contentions may be amended. The words "majority" and "minority" have been removed from the Bill. With this, communal violence law becomes applicable against any particular community and not against a minority or a majority. To emphasize its point, the UPA further proposed to change the name of the Bill to “Communal Violence Prevention Bill”. However, another clause that allows the Centre to send paramilitary force to a state, without its consent, when a communal tension threatening the harmony of the society arises.

From all this I only want to say that, women is not a heterogeneous group. Each woman has her individual human rights. In the time of riots women was the first whose human right is violated. Her dignity was outraged. She was considered as the mere reproductive machine for the community. Her honor was honor of community but she is not part of community. Her motherly nature was praised until she was under the set boundaries of patriarchal society. She doesn’t have any control on her life and death. When needed set on fire, and that too very proudly. The concept of “Ghar Wapsi” is only applicable to men folk and many more constraints in women’s emancipation.

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Quality Management in Theory

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Abstract- The quality management in any organization undoubtedly has a direct impact on the performance of that organization. Thus, the quality of educational institutions has a direct impact on the economy of a country, since higher quality faculties emerge from higher quality students who have higher and better knowledge that will be applied in practice, in a bank, an enterprise, a public institution, or in a school. Increased application of quality knowledge, acquired through education in the enterprise, for example, leads to an increase in the economic position of companies in the market, to a greater profit of the company, which again affects the economy of the whole country. Intellectual capital is considered one of the most important factors in explaining economic growth and is considered one of its sources. Any increase in the quality of education can have an impact on economic growth by improving the productivity or quality of workers.

Index Terms- quality management.school.company.institution

I. INTRODUCTION

In modern theory we distinguish a large number of different definitions of the quality concepts. Within this paper, quality will be explained in detail as a term, and its connections to quality management concept.

Term quality has numerous and different definitions, which can be accepted as precise. Different definitions of quality concept are result of numerous changes in life style in the last hundred years, as well as technological development.

As the organization's success always shows the profit and market share achieved, users have an important role in the functioning of the organization, and their assessment of the quality of the output of the business system by looking at the level of fulfillment of their requirements for these outputs is an important factor of success. Therefore, the business systems that have been implemented and the quality management system should have greater likelihood of achieving good business results. Thus, the quality of educational institutions has a direct impact on the economy of a country, since higher quality faculties emerge from higher quality students who have higher and better knowledge that will be applied in practice, in a bank, an enterprise, a public institution, or in a school. Increased application of quality knowledge, acquired through education in the enterprise, for example, leads to an increase in the economic position of companies in the market, to a greater profit of the company, which again affects the economy of the whole country.

II. QUALITY AS A TERM

In its broadest sense, this term means the quality characteristics of certain products related to reliability during use, the periods in which the product can be used, the characteristics of the product, the level of customer satisfaction in consumption of a product or usage of a service.

Quality can be viewed from several aspects, and some of observation aspects are:

- Requirements specified by regulations;
- Meeting the relevance criteria;
- Satisfaction of the criteria in terms of reliability;
- Absence of defects;
- Supremacy over competitors;
- Satisfaction of the consumer's request.

Regarding prescribed requirements for a particular product or service, they need to be met. This aspect of of observing a product quality or service is a minimum in terms of conditions that has to be met when it comes to quality. An example of prescribed requirements, that a product must satisfy, is level of safety that a particular device or machine must satisfy. Then, the next is safety of children's and people's food products, and so on.

In relation to meeting the criteria in terms of relevance, products and services that are marketed, must be in line with the basic idea that the product or service was created. In other words, the product or service is expected to provide for the satisfaction of the purposes for which they were designed. Regarding this aspect, it should be noted that the product or service must also be functional, that is, for example, if the means of transport is concerned, users expect from it, to provide transport from one point to another, and if this function was performed without difficulty, such a means of transport may be considered to be of high quality.

Regarding satisfaction of reliability criteria, products or services are expected to provide consumers with the assurance that the product or service will be functional at any time, regardless of when it is used, and then the product or service can be said to be of high quality.

When it comes to the absence of defects, consumers expect that the product does not contain any anomalies and that there is no need for additional product-related activities, such as finishing or repairing.

When comes to question of superiority over competitor's product, it means comparison of quality of a particular product or service with a product or service that is similar in functionality. This aspect is based on the principle that higher quality products
or services meet more demands or provide more in relation to products or services of the competition, according to consumers.

The Industrial Revolution has contributed to an increase in the number of products used over a longer period of time. For such products, the concept of suitability for use places a factor of time in the first place. In order for the product to be effective, it is necessary to achieve the role assigned to it and to be available for use as long as the user wants it. This availability depends on whether the product has reliability, that is, it is free of defects, along with its sustainability, or the ability to easily service and repair it.

The basic aspects of quality are:
- A marketing aspect, which includes a technical aspect that relates to the performance of a product or service,
- a Business Aspect, which includes the economic and organizational aspect of quality,
- and the Social Aspect, which includes the moral and ethical aspect of quality.

Marketing aspect of quality:
It refers to the quality of the product that must be such that:
- It meets the requirements of users,
- Ensures the convenience of the product for use throughout its lifetime,
- It enables the win of competition and achieves customer loyalty,
- and it is achieved by constant improvement and innovation of products and / or services.

Business aspect of quality
It relates to the quality of business processes that are being realized:
- Increasing the effectiveness and efficiency of business processes by fully defining and eliminating delays,
- Increasing productivity,
- Lower operating costs,
- Increase in profit and long-term survival of the company on the market.

III. SOCIAL ASPECT OF QUALITY

It relates to human quality or quality of life, and relates to the future, and is based on a broad social understanding of quality, the culture of the company's quality and the human aspect of quality.

The creator of modern quality theory is Deming, an American scientist who laid the foundations and helped significantly to the development of quality practices throughout the world, primarily in Japan. After the Second World War, Deming was transferred to the Ministry of War as a consultant, where he was tasked to, in addition to statistics, analyze the quality of the work of the company's production that produced for the army. During the war, while performing the basic work, he also held a series of lectures from statistics across the US and Canada. Thanks to these lectures and efforts of General McCarthy, Deming came to Japan in 1947 for the first time.

Deming's contribution to the development of Japanese philosophy of quality, the renewal of the Japanese economy after the Second World War, and the formation of scientific methods of control and quality improvement is enormous. The fact that the biggest Japanese quality award is named after him: The Deming Award for Quality speaks enough of the merit of creating Japanese business success, and the American Quality Control Association in 1980 established the Deming Medal for achievements in statistical techniques and quality improvement.

Deming's fourteen points are its guidelines to management when it comes to creating relationships and practical measures to raise the quality system level in their own company. The application of these principle does not depend on the size of the company, type of production or services. They can also apply to sectors within companies.

In the abbreviated version, the principles listed are:
1. Adopt continuous goals (create and publish an enterprise mission and implement it),
2. Adopt a new philosophy,
3. Discontinue the practice of cheapest procurement,
4. Institutionalize leadership,
5. Eliminate empty slogans,
6. Eliminate numerical goals,
7. Introduce education at work,
8. Eliminate fear (and create trust),
9. Breaking barriers between organizational units (within companies),
10. Conduct activities in accordance with changes (transformations),
11. Improve continuous processes in production and service,
12. Reducing dependence on mass quality control,
13. Remove barriers that prevent people from being proud of their work,

Interpretation of quality, ie interpretation of the path for achieving quality, the goal defined within each organization, changed over time and depended on the achieved level of development and the volume of production or services, as well as the level of maturity of the social community. Efforts to determine the concept of quality are characterized by the presence of a subjective moment, which additionally influences an objective approach in its expression. Some of the approaches are based on assumptions that quality is a reflection of living standards at a higher level.

There are also approaches according to which the quality of the phenomena is reflected in the so-called petty attitudes that are not common. According to some interpretations, quality can be viewed through the level of convenience for use or compliance with the needs of users.

“To determine meaning and essence of services quality, is far more complex than defining the quality of goods. Without going into more detail in the analysis of individual specificities, it is shown that the basic difference between products and services stems from the nature of service intolerance.

From this characteristics of service, there are also other differences between products and services. Services cannot be seen, touched, possessed or displayed before purchase, and
customers can not test or evaluate quality before their use. Because of this, service is very difficult to explain to potential buyers, and the quality of the information provided depends on the ability of those who sell those services.”

A sufficient number of comprehension of the concept of quality is understandable, and the answers that have been obtained lead to the conclusion that quality is not uniquely determined. Quality is a set of different attributes and properties that the product or service has and the impressions it leaves for each user individually.

According to Kotler, quality can be defined as the degree of ability of a particular brand to perform its functions. Quality is a set of all properties of products, processes, services for the consumer, from a range of market elements, business, quality of life, protection of the environment, health correctness of foodstuffs and others.

We distinguish different quality approaches according to the lifetimes of a product or service that underlie key activities that have an impact on the quality of products and services. In a given context, in relation to the life-span of a product or service, the following concepts can be stated:

- Quality in the design phase of a product or service,
- Quality in the stage of production of a product or service,
- Quality in the phase of delivery of a product or service,
- Quality in a phase that involves relationships with users of products or services.

A set of activities related to the realization of quality objectives is necessary to be implemented in an organized and systematic manner. The starting point for this is the attitude of the organization, that is, the management of the organization in terms of quality, which is an organization's quality policy. The quality of the organization's quality within itself contains the general goals and intentions of the organization in relation to the quality prescribed by the management of the organization. Quality policy is one of the most important segments of the overall policy of the organization.

IV. QUALITY MANAGEMENT

Quality management represents all the activities of the overall management function that determine the quality policy, goals and responsibilities and is introduced as quality planning, quality assurance, quality control and quality improvement within the quality system. Quality management means that control over the characteristics that make up the quality of a product or service is established.

This practically implies the definition and implementation of the procedures necessary for creating products that will have the desired characteristics, or manage the activities and their results. Quality management actually represents methodical actions and procedures that are applied throughout the duration of all processes in order to increase the level of their efficiency. Procedures and methods of quality management can be divided into three groups:

- Inclusion of quality as one of the parameters of the management of creative activities,
- Application of general procedures and methods to quality as a parameter.
- Introduction and application of special methods and tools.

Quality management at the same time represents the technique and methodology, that is, it is not a separate and separate activity that is an upgrade to the activities of the company and its products and services. It is implementation of these activities in a way that they take place efficiently, in a way to master the activities of creating products and services and the results of these activities.

Quality management is responsible for all levels of management, with the highest responsibility of top management, which is also responsible for managing the quality management system within the organization.

“Implementing and applying the concept of a quality management system requires careful planning. It is also necessary to create real technical and organizational conditions. Successful examples show that the highest potential lies in the expertise of employees and their motivation.” Since quality is embedded in a product or service, it is defined and constructed together with it.

Quality management, as part of the overall management of the company (management system), is aimed at realizing the general goals of company, first of all, to quality, resource allocation, growth and development of the company, market position, profitability, environmental protection, safety of tourists and employees, food safety, etc. It is a continuous process based on compliance with established standards, which serve as a basis for establishing a quality management system, their continuous improvement and continuous improvement of products. Organizational standards are used as a framework for organizing the organization in order to improve the performance, ie, successful conduct and successful business. For the purpose of more efficient operation, ie satisfying the requirements of all participants in the business process, the trend is to integrate individual standardized management systems (quality, environment, health and safety of employees, food safety, finance, ethical standards, etc.). Such integrated systems as a whole are oriented towards the continuous achievement of the goals of the organization that meet the expectations of all stakeholders.

V. TOTAL QUALITY MANAGEMENT

Contemporary understanding of quality management implies the so-called total quality management, which includes the functions within the organization that contribute to the creation, definition of products, its realization, maintenance and use, which are realized through the quality system.

Creating a product consists of a particular process that represents a sequence of activities and work, carried out in a way to provide the previously determined desired result. The management of these activities is carried out through procedures that have a preventive character and whose goal is to do a good job from the first time. In order to ensure a higher level of product quality, the most important factor of the quality leverage system lies in the development area (100: 1), then in the area of process planning (10: 1) and, ultimately, in the production itself (1: 1). Carrying out a particular job in an appropriate way is not a primary goal that is placed before a manager. The goal should be defined in the direction that the job must be done in an even better way the
next time. In this way, the set goal ensures that the job process can be viewed as a process of continuous improvement.

Quality management services rely on identical mechanisms of prevention and correction, as well as product quality management. The design of the service involves the conversion of complex information about the service into the specification of services, its performance and congresses. The service specification defines the service that is performed, while the specification of the service performance defines the means and methods used to perform the service. The quality control specification defines the procedure for assessing and controlling the service and characteristics of the provision of the service. Designing service specifications, service performance and quality control are independent, but with interaction during the design process. The service specification needs to have a complete and accurate display of the service. It should be planned as an integral part of the service process. It should be provided in such a way as to enable effective control of each service process and ensure that the service fully meets the specifications of the service and users.

Improving quality is becoming a priority task not only of management, but also of state bodies, educational and scientific institutions, business professional and professional associations. Comprehensive introduction and improvement of quality should contribute to achieving overall improvement of people's quality of life, which implies improvement of living standards, protection of the environment, health and safety. The quality management system is by no means a formality that needs to be fulfilled to meet the requirements of the international market, but a kind of social technology that affects the way and organization of the business of the company.

REFERENCES


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Rules Of Engagement: A Case Of Employees In Jubilee Insurance

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ABSTRACT

Organizations are striving to find better ways of engaging their employees since many organizations have realised that workers are the most imperative resource for achieving their goals. The objective of the study was to find out the factors affecting employee engagement at jubilee insurance. Descriptive survey was used as a research design and questionnaires distributed to the 175 respondents from a population of 580. Factor analysis was employed used for analysing data. Results indicated that four major factors influence employee engagement. It is recommended that managers should ensure they have a good relationship with employee and encourage teamwork in the organization.

Keywords

Employee Engagement, Disengagement

INTRODUCTION

Employee engagement is an inner state of being that gathers earlier models of work effort, organizational commitment, work satisfaction and optimal experience (Armstrong, 2006). Engagement is a fulfilling, work related experience characterized by dynamism, devotion and captivation (schaufeli et al 2002). According to Gallup (2010) engaged personnel are those that work with dedication and who feel connected to their organization. Alfes et al (2010) posited that engaged workers are more productive, more innovative and are likely to be retained with the employer, are healthier and enjoy their work more than others. Employee engagement focus in bringing out an intrinsic desire to work for the company. Guest (2009) argues that employee involvement is demonstrated in employees’ positive attitudes and behaviour and indication of trust, equity and commitment are fulfilled.

Gallup (2005) noted that there are three types of employees; engaged employees. They consistently endeavour to give quality within their roles. They are devoted to their role, unlikely to quit, more industrious, hence brings in greater profits in organization. The second category according to Gallup (2005) is the not engaged personnel. They emphasis on the tasks spelt rather than the goals of the organization. They do what is in their job description are “checked out” and “sleepwalking” through their day with less interest, or any personal investment. They are usually neither positive nor negative about their company. The third types are the actively disengaged employees. Gallup (2005) noted that these are employees who not only don’t do well, but demotivate others as well. They are always complaining and criticizing and undermining colleagues’ efforts to promote a negative attitude and environment.

LITERATURE REVIEW

Several research studies have been published that on factors that drive employee engagement. A study done by Robinson (2007) on what drives employee engagement, found that employee engagement is brought about by opportunities for upward feedback, operative consultation and communication systems and a manager who is fair-minded and evidently committed to the
He noted the unlikability of a ‘one size fits’ approach is effective, as the levels of engagement and its drivers differ from one organization to the other, employees and the job itself. Kahn (1990) did a study on establishing the psychological conditions that influence employee to either engage or disengage themselves with work. The study found out that meaningfulness, safety and availability were the major influences.

A conference board embarked on a study of determining the factors that lead to employees’ engagement and the results indicated that career growth opportunities, trust and integrity, the meeting point between individual and company performance, pride in the company, the nature of the job, relationships with co-workers/team members, employee development and the personal relationship with one’s manager are some of the factors that brings about employee engagement. The factors discussed in the paper consist of key drivers given from a combination of both the conference board (2006) and DDI (2007). These factors include; nature of the job, individual performance and the company performance, development opportunities, pride about the company, recognition and reward, quality communications, team members, Personal relationship with one’s manager and inspiring leadership.

The study was underpinned on three-component model of engagement which was advanced by Schaufeli and Bakker in 2006. They posited that work is a satisfying state of the mind comprised of vigour, dedication and absorption. They noted that employees who are engaged take greater initiative and generate self-positive feedback. They found a positive relationship between three job resources (performance feedback, social support and supervisory coaching and work engagement (vigour, dedication and absorption) in four different samples of Dutch employees. Structural equation model was used to analyse the data and job resources predicted employee engagement as well as employee engagement being a mediator on the relationship between job resources and turnover intentions. Schaufeli and Bakker (2006) came up with their own tool for measuring work engagement and the items measured included vigour, dedication and absorption. They developed the Utrecht Work Engagement Scale (UWES) and analysed the relationship between employee engagement and job performance of Dutch employees.

The study is underpinned to the self-Determination Theory (SDT) which is a need fulfilment-based theory that provides a theoretical framework for employee engagement. The fulfilment of the three key psychological needs; autonomy, competence and relatedness at a work situation could lead to improved levels of employee engagement as suggested by self-Determination Theory.

**RESEARCH METHODOLOGY**

The study used census survey where all members of the population were included. The population comprised all the managers, employees and supervisors in various branches of the insurance company which is a total number of five hundred and eighty employees in the stations. The study used a sample size of 175 respondents. Stratified random sampling was used to get the number of respondents from the different cadres of the organization. Table 1 below shows the sampling frame from the different divisions of the organization.

<table>
<thead>
<tr>
<th>Division</th>
<th>Population</th>
<th>Sampling Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human Resources</td>
<td>110</td>
<td>30</td>
</tr>
<tr>
<td>Finance</td>
<td>15</td>
<td>14</td>
</tr>
<tr>
<td>Operations</td>
<td>150</td>
<td>42</td>
</tr>
<tr>
<td>Business Development</td>
<td>100</td>
<td>28</td>
</tr>
<tr>
<td>Corporate Planning</td>
<td>30</td>
<td>9</td>
</tr>
<tr>
<td>Procurement</td>
<td>50</td>
<td>16</td>
</tr>
<tr>
<td>Technical Services</td>
<td>90</td>
<td>26</td>
</tr>
</tbody>
</table>
Structured questionnaires were used to collect primary data comprising of closed ended 5-point Likert scale statements. Questionnaires were preferred in this study because of the large number of respondents involved. The questionnaire comprised of two sections; where section one covered the biodata of the respondents, section two covered questions on the level of employee engagement. The questionnaires were administered through drop and pick later method. Data analysis was done by descriptive and inferential methods of data analysis. Factor analysis was used to establish the factors that affect employee engagement at Jubilee insurance company.

DATA ANALYSIS
Preliminary data was analysed by descriptive statistics; mean, standard deviation and coefficient of variation were used.

Table 2: Gender Distribution

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>96</td>
<td>54.86</td>
</tr>
<tr>
<td>Female</td>
<td>79</td>
<td>45.14</td>
</tr>
<tr>
<td>Total</td>
<td>175</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 2 above showed the results for the gender distribution of the company. Male respondents had a 54.86% distribution while female employees (79) had a percentage of 45.14%. This indicated that there were more male respondents in the company than there were female.

Table 3: Departments of the Respondents

<table>
<thead>
<tr>
<th>Department</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human Resource Department</td>
<td>30</td>
<td>17.1</td>
</tr>
<tr>
<td>Operations</td>
<td>42</td>
<td>24</td>
</tr>
<tr>
<td>Business Development</td>
<td>28</td>
<td>16</td>
</tr>
<tr>
<td>Finance</td>
<td>14</td>
<td>8</td>
</tr>
<tr>
<td>Technical Services</td>
<td>36</td>
<td>20.57</td>
</tr>
<tr>
<td>Procurement Department</td>
<td>16</td>
<td>9.14</td>
</tr>
<tr>
<td>Corporate Planning</td>
<td>9</td>
<td>5.14</td>
</tr>
<tr>
<td>Total</td>
<td>175</td>
<td>100</td>
</tr>
</tbody>
</table>

The results shown in table 3 above indicates that the department with the highest respondents in the study are from the operations department with a percentage distribution of 24%, followed by technical services with a percentage distribution of 20.57%, Human resource department 17.1%, Business development department with 16%, Procurement department 9.14%, Finance department 5.8% and Corporate Planning with a percentage distribution of 5.14%.

Table 4: Age Distribution of the Respondents

<table>
<thead>
<tr>
<th>Age</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>24-29</td>
<td>10</td>
<td>5.74</td>
</tr>
<tr>
<td>30-35</td>
<td>44</td>
<td>25.14</td>
</tr>
<tr>
<td>36-41</td>
<td>69</td>
<td>39.43</td>
</tr>
</tbody>
</table>
Table 4 indicated the respondents’ age and majority of them lies between the age of 36-40, followed by age 30-35 and the least number of respondents were aged over 53 years of age.

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>42-47</td>
<td>31</td>
<td>17.71</td>
</tr>
<tr>
<td>48-53</td>
<td>19</td>
<td>10.86</td>
</tr>
<tr>
<td>Over 53</td>
<td>2</td>
<td>1.14</td>
</tr>
<tr>
<td>Total</td>
<td>175</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 5: Results for Length of Service

<table>
<thead>
<tr>
<th>Length of Service</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-5</td>
<td>52</td>
<td>29.71</td>
</tr>
<tr>
<td>6-10</td>
<td>67</td>
<td>38.29</td>
</tr>
<tr>
<td>11-15</td>
<td>54</td>
<td>30.86</td>
</tr>
<tr>
<td>16-20</td>
<td>2</td>
<td>1.14</td>
</tr>
<tr>
<td>Total</td>
<td>175</td>
<td>100</td>
</tr>
</tbody>
</table>

Majority of the respondents have worked for company for between 6-10 years, followed by 11-15 years. This indicates that employee at the organization stay for long periods working for the organization.

Table 6: A Table showing the results for Academic Qualifications

<table>
<thead>
<tr>
<th>Academic Qualifications</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A level</td>
<td>15</td>
<td>8.57</td>
</tr>
<tr>
<td>Diploma</td>
<td>69</td>
<td>39.43</td>
</tr>
<tr>
<td>Degree</td>
<td>65</td>
<td>37.14</td>
</tr>
<tr>
<td>Master Degree</td>
<td>26</td>
<td>14.86</td>
</tr>
<tr>
<td>Total</td>
<td>175</td>
<td>100</td>
</tr>
</tbody>
</table>

Results in table 6 above indicated that employees with A level qualification were 15, those with diploma certificates were 69, degree holders were 65 and those with master degree were 26. This shows that the employees in the organization are literate and can make informed decisions.
Table 7: A Table showing Mean, Standard Deviation and Coefficients of Variation of the Data Collected

<table>
<thead>
<tr>
<th>Statements</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Coefficient of Variation</th>
</tr>
</thead>
<tbody>
<tr>
<td>I understand what the management asks of me</td>
<td>175</td>
<td>3.41</td>
<td>0.49</td>
<td>0.14</td>
</tr>
<tr>
<td>I am free to give commentaries and opinions</td>
<td>175</td>
<td>3.61</td>
<td>0.65</td>
<td>0.18</td>
</tr>
<tr>
<td>My ideas are taken seriously</td>
<td>175</td>
<td>3.57</td>
<td>0.57</td>
<td>0.16</td>
</tr>
<tr>
<td>My manager cares about me as a person</td>
<td>175</td>
<td>3.57</td>
<td>0.50</td>
<td>0.14</td>
</tr>
<tr>
<td>I approach my manager with my problems</td>
<td>175</td>
<td>3.25</td>
<td>0.43</td>
<td>0.13</td>
</tr>
<tr>
<td>My immediate supervisor treats me impartially</td>
<td>175</td>
<td>3.22</td>
<td>0.42</td>
<td>0.13</td>
</tr>
<tr>
<td>My manager handles my work-related concerns satisfactorily</td>
<td>175</td>
<td>3.14</td>
<td>0.35</td>
<td>0.11</td>
</tr>
<tr>
<td>I recognize what is anticipated of my work</td>
<td>175</td>
<td>3.43</td>
<td>0.50</td>
<td>0.14</td>
</tr>
<tr>
<td>Assignments are equally spread throughout our company</td>
<td>175</td>
<td>3.48</td>
<td>0.50</td>
<td>0.14</td>
</tr>
<tr>
<td>I am competent and have the ability to grip my job</td>
<td>175</td>
<td>3.47</td>
<td>0.50</td>
<td>0.14</td>
</tr>
<tr>
<td>I have a well-established career path</td>
<td>175</td>
<td>3.38</td>
<td>0.49</td>
<td>0.14</td>
</tr>
<tr>
<td>Promotions are handled fairly in my organization</td>
<td>175</td>
<td>1.53</td>
<td>0.50</td>
<td>0.33</td>
</tr>
<tr>
<td>I know the promotion opportunities in jubilee insurance</td>
<td>175</td>
<td>1.52</td>
<td>0.50</td>
<td>0.33</td>
</tr>
<tr>
<td>There is a good communication between my supervisor and myself</td>
<td>175</td>
<td>1.51</td>
<td>0.50</td>
<td>0.33</td>
</tr>
<tr>
<td>Management pays attention to all its employees at all levels</td>
<td>175</td>
<td>2.74</td>
<td>0.44</td>
<td>0.16</td>
</tr>
<tr>
<td>The company provides the relevant equipment’s to do my job effectively</td>
<td>175</td>
<td>2.65</td>
<td>0.48</td>
<td>0.18</td>
</tr>
<tr>
<td>I have assurance in the leadership of Jubilee Insurance</td>
<td>175</td>
<td>2.71</td>
<td>0.46</td>
<td>0.17</td>
</tr>
<tr>
<td>I have an opportunity to learn and grow in jubilee</td>
<td>175</td>
<td>4.15</td>
<td>0.42</td>
<td>0.1</td>
</tr>
<tr>
<td>Management exercises fair and honesty in all judgements</td>
<td>175</td>
<td>4.20</td>
<td>0.64</td>
<td>0.15</td>
</tr>
<tr>
<td>Statement</td>
<td>N</td>
<td>Mean</td>
<td>Std Dev</td>
<td>Total</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>---</td>
<td>------</td>
<td>---------</td>
<td>-------</td>
</tr>
<tr>
<td>I clearly understand my company goals</td>
<td>175</td>
<td>4.09</td>
<td>0.68</td>
<td>0.17</td>
</tr>
<tr>
<td>My individual goals are connected directly to the company's goals</td>
<td>175</td>
<td>1.37</td>
<td>0.48</td>
<td>0.35</td>
</tr>
<tr>
<td>My job contributes to the organizational performance</td>
<td>175</td>
<td>1.40</td>
<td>0.51</td>
<td>0.37</td>
</tr>
<tr>
<td>I am rewarded whenever I achieve my targets</td>
<td>175</td>
<td>1.45</td>
<td>0.50</td>
<td>0.34</td>
</tr>
<tr>
<td>The benefits offered to me are sufficient</td>
<td>175</td>
<td>3.72</td>
<td>0.63</td>
<td>0.17</td>
</tr>
<tr>
<td>I am recognized and praised for a good job</td>
<td>175</td>
<td>3.74</td>
<td>0.57</td>
<td>0.15</td>
</tr>
<tr>
<td>I am proud to be identified with Jubilee Insurance</td>
<td>175</td>
<td>3.66</td>
<td>0.50</td>
<td>0.14</td>
</tr>
<tr>
<td>I can recommend customers and employees to this company</td>
<td>175</td>
<td>3.74</td>
<td>0.44</td>
<td>0.12</td>
</tr>
<tr>
<td>I wish to remain in this company</td>
<td>175</td>
<td>3.42</td>
<td>0.50</td>
<td>0.14</td>
</tr>
<tr>
<td>Teamwork is encouraged in this company</td>
<td>175</td>
<td>3.43</td>
<td>0.50</td>
<td>0.14</td>
</tr>
<tr>
<td>I share information and new ideas with my workmates freely</td>
<td>175</td>
<td>3.40</td>
<td>0.49</td>
<td>0.14</td>
</tr>
<tr>
<td>There is great teamwork in this company</td>
<td>175</td>
<td>3.37</td>
<td>0.48</td>
<td>0.14</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>3.07</strong></td>
<td><strong>0.50</strong></td>
<td><strong>0.16</strong></td>
</tr>
</tbody>
</table>
Table 7 above shows the results of the means, standard deviation and coefficient of variation of the statements that were responded to in the questionnaires. The statement with the highest mean is “Management exercise fairness and honesty in all judgements” with a mean of 4.20, standard deviation of 0.64 and a coefficient of variation of 0.15. This indicates that majority of the respondents agree to a great extent that the management exercise fairness in their judgements. On the other hand, the statement with the lowest mean is “My individual goals are connected directly to the company’s goals” with a mean score of 1.37, standard deviation of 0.48 and a coefficient of variation of 0.35. This indicates that majority of the respondents agree to a very less extent that their goals are connected directly to the company’s goals. The average mean score is 3.07 with a standard deviation of 0.50 and a coefficient of variation of 0.16. The overall mean score indicates that the respondents agreed to a moderate extent with the statements provided on the factors that affect employees’ engagement.

The correlation coefficients matrix of the factors ranged from -0.01 to 0.5. This indicated a low correlation between the factors. It therefore allows for using the orthogonal type of factor analysis since the factors are not highly correlated.

**Table 8: Table of Diagnostic Tests**

<table>
<thead>
<tr>
<th>KMO and Bartlett’s Test</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaiser-Meyer-Olkin Measure</td>
<td>.487</td>
</tr>
<tr>
<td>of Sampling Adequacy.</td>
<td></td>
</tr>
<tr>
<td>Approx. Chi-Square</td>
<td>944.428</td>
</tr>
<tr>
<td>Bartlett’s Test of Sphericity</td>
<td>.465</td>
</tr>
<tr>
<td>Df</td>
<td></td>
</tr>
<tr>
<td>Sig.</td>
<td>.000</td>
</tr>
</tbody>
</table>

Table 8 above shows the KMO measure of sampling adequacy as 0.487 which is considered adequate by experts as it has a significance level of less than 0.05. Bartlett’s test of Sphericity had an approximated chi-square of 944.428 with a degree of freedom 465.

**Table 9: Showing the communalities and extractions of the variables**

<table>
<thead>
<tr>
<th>Communalities</th>
<th>Initial</th>
<th>Extraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>I understand what the management asks</td>
<td>1.000</td>
<td>.594</td>
</tr>
<tr>
<td>of me</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am free to give commentaries and</td>
<td>1.000</td>
<td>.588</td>
</tr>
<tr>
<td>opinions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>My ideas are taken seriously</td>
<td>1.000</td>
<td>.620</td>
</tr>
<tr>
<td>My manager cares about me as a person</td>
<td>1.000</td>
<td>.622</td>
</tr>
<tr>
<td>I approach my manager with my problems</td>
<td>1.000</td>
<td>.487</td>
</tr>
<tr>
<td>My immediate manager treats me fairly</td>
<td>1.000</td>
<td>.613</td>
</tr>
<tr>
<td>I recognize what is anticipated of my</td>
<td>1.000</td>
<td>.667</td>
</tr>
<tr>
<td>work</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assignments are equally spread</td>
<td>1.000</td>
<td>.653</td>
</tr>
<tr>
<td>throughout our company</td>
<td></td>
<td></td>
</tr>
<tr>
<td>My manager handles my work-related</td>
<td>1.000</td>
<td>.680</td>
</tr>
<tr>
<td>concerns satisfactorily</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I am competent and have the ability to</td>
<td>1.000</td>
<td>.719</td>
</tr>
<tr>
<td>grip my job</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I have a well-established career path</td>
<td>1.000</td>
<td>.750</td>
</tr>
<tr>
<td>Promotions are handled fairly in my</td>
<td>1.000</td>
<td>.707</td>
</tr>
<tr>
<td>organization</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
I am aware of the promotion opportunities in Jubilee insurance 1.000 .752
There is a good communication between staff and managers 1.000 .694
Management care for all its employees at all levels 1.000 .738
I have the materials and equipment I need to do my job effectively 1.000 .578
I have confidence in the leadership of Jubilee Insurance 1.000 .700
I have an opportunity to learn and grow 1.000 .600
Management exercises fair and honesty in all judgments 1.000 .691
I clearly understand my company goals 1.000 .730
My individual goals are connected directly to the company’s goals 1.000 .634
I understand how my job contributes to the organizational performance 1.000 .696
If I do good, am rewarded 1.000 .766
I am happy with the benefits offered to me 1.000 .707
I am recognized and praised for a good job 1.000 .645
I am proud to be identified with Jubilee Insurance 1.000 .619
I can recommend customers and employees to this company 1.000 .616
I wish to remain in this company 1.000 .652
I enjoy working with my workmates 1.000 .669
My workmates and I share information and new ideas 1.000 .770
There is great teamwork in this company 1.000 .715

Extraction Method: Principal Component Analysis.

The results in table 10 above indicated the extraction coefficient of the factors using the principal component analysis method. The factor with the highest coefficient is “My co-workers and I share information and new ideas,” (0.849) while the factor with the lowest coefficient is “I can freely approach my supervisor with problems”, (0.487).

<table>
<thead>
<tr>
<th>Total Variance Explained</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Component</strong></td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>1</td>
</tr>
</tbody>
</table>

Table 10: Showing Results for Total Variance
Table 1 above indicates the results for the variance of the factors arranged from the highest initial eigen values to the lowest initial eigen values with their percentage of variance and cumulative percentage of variance. Out of the thirty-one statements, the statements with eigen values of over 1 were extracted and they were thirteen. Their percentage of variance and cumulative percentage was also displayed in table 10. The last column shows the rotation of the sums of squared loadings and their percentage of variance and cumulative percentage. The statements which had less than one (1) eigen value were dropped hence not extracted and not rotated.

Extraction Method: Principal Component Analysis.

Figure 1: Showing the Scree Plot for the factors affecting Employee Engagement
As shown in figure one above, the scree plot is showing the eigen values of the factors. After eigen value of one the scree plot starts flowing down as if it has similar points. Eigen value of one marks the cut off points for the factors to be extracted and rotated. It shows thirteen statements.

Table 11: Showing the Rotated Component Matrix of the factors affecting Employee Engagement

<table>
<thead>
<tr>
<th>Component Matrix^a</th>
<th>Component</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>I understand what the management asks of me</td>
<td>0.364</td>
</tr>
<tr>
<td>I am free to give commentaries and opinions</td>
<td>0.502</td>
</tr>
<tr>
<td>My ideas are taken seriously</td>
<td>-0.076</td>
</tr>
<tr>
<td>My manager cares about me as a person</td>
<td>0.636</td>
</tr>
<tr>
<td>I can freely approach my manager with problems</td>
<td>0.349</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------------------------------------------------------</td>
<td>--</td>
</tr>
<tr>
<td>My immediate manager treats me fairly</td>
<td>-1.20</td>
</tr>
<tr>
<td>I know what is expected of my job</td>
<td>-1.156</td>
</tr>
<tr>
<td>Assignments are equally distributed in our department</td>
<td>-0.005</td>
</tr>
<tr>
<td>My manager handles my work related issues satisfactorily</td>
<td>0.002</td>
</tr>
<tr>
<td>I am competent and have the ability to handle my job</td>
<td>-0.212</td>
</tr>
<tr>
<td>I have clearly established career path</td>
<td>0.342</td>
</tr>
<tr>
<td>Promotions are handled fairly in my organization</td>
<td>-0.392</td>
</tr>
<tr>
<td>I am aware of the promotion opportunities in jubilee insurance</td>
<td>0.391</td>
</tr>
<tr>
<td>There is a good communication between my supervisor and myself</td>
<td><strong>0.594</strong></td>
</tr>
<tr>
<td>Management care for all its employees at all levels</td>
<td>-1.182</td>
</tr>
<tr>
<td>I have the materials and equipment I need to do my job effectively</td>
<td>-1.194</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>I have confidence in the leadership of Jubilee Insurance</th>
<th>-0.235</th>
<th>0.254</th>
<th>-0.164</th>
<th>-0.355</th>
<th>-0.089</th>
<th>-0.083</th>
<th>0.370</th>
<th>0.362</th>
<th>0.071</th>
<th>-0.006</th>
<th>-0.339</th>
<th>0.104</th>
<th>0.120</th>
</tr>
</thead>
<tbody>
<tr>
<td>I have an opportunity to learn and grow</td>
<td>-0.231</td>
<td>-0.085</td>
<td>-0.152</td>
<td>0.122</td>
<td>0.068</td>
<td>-0.132</td>
<td>0.131</td>
<td>0.191</td>
<td>0.077</td>
<td>0.324</td>
<td>0.471</td>
<td>0.284</td>
<td>-0.109</td>
</tr>
<tr>
<td>Management exercises fair and honesty in all judgments</td>
<td>0.157</td>
<td>0.239</td>
<td>-0.010</td>
<td>0.073</td>
<td>0.089</td>
<td>-0.050</td>
<td>-0.540</td>
<td>0.092</td>
<td>0.313</td>
<td>-0.164</td>
<td>-0.166</td>
<td>-0.042</td>
<td>0.372</td>
</tr>
<tr>
<td>I clearly understand my company goals</td>
<td>0.036</td>
<td>0.065</td>
<td>0.380</td>
<td>-0.049</td>
<td>0.128</td>
<td>-0.474</td>
<td>0.268</td>
<td>0.090</td>
<td>-0.023</td>
<td>-0.029</td>
<td>-0.253</td>
<td>0.435</td>
<td>-0.048</td>
</tr>
<tr>
<td>My individual goals are connected directly to the company's goals</td>
<td>0.007</td>
<td>0.181</td>
<td>0.469</td>
<td>-0.129</td>
<td>0.099</td>
<td>0.186</td>
<td>-0.150</td>
<td>0.016</td>
<td>-0.262</td>
<td>-0.174</td>
<td>0.258</td>
<td>0.226</td>
<td>0.284</td>
</tr>
<tr>
<td>I understand how my job contributes to the organizational performance</td>
<td>0.163</td>
<td>0.406</td>
<td>0.027</td>
<td>-0.135</td>
<td>-0.177</td>
<td>-0.287</td>
<td>-0.027</td>
<td>0.212</td>
<td>0.056</td>
<td>0.001</td>
<td>-0.082</td>
<td>-0.474</td>
<td>-0.304</td>
</tr>
<tr>
<td>If I do good I can be rewarded</td>
<td>0.043</td>
<td>0.122</td>
<td>-0.185</td>
<td>-0.187</td>
<td>-0.351</td>
<td>-0.102</td>
<td>-0.076</td>
<td>-0.455</td>
<td>0.183</td>
<td>0.430</td>
<td>0.198</td>
<td>-0.026</td>
<td>0.277</td>
</tr>
<tr>
<td>I am happy with the benefits offered to me</td>
<td>0.042</td>
<td>0.446</td>
<td>0.203</td>
<td>0.168</td>
<td>-0.295</td>
<td>0.236</td>
<td>0.200</td>
<td>-0.149</td>
<td>-0.197</td>
<td>0.290</td>
<td>0.024</td>
<td>-0.289</td>
<td>0.155</td>
</tr>
<tr>
<td>I am recognized and praised for a good job</td>
<td>0.355</td>
<td>0.412</td>
<td>0.171</td>
<td>-0.262</td>
<td>0.061</td>
<td>-0.183</td>
<td>0.267</td>
<td>0.213</td>
<td>0.104</td>
<td>-0.114</td>
<td>0.234</td>
<td>-0.139</td>
<td>-0.006</td>
</tr>
<tr>
<td>I am proud to be identified with Jubilee Insurance</td>
<td>-0.534</td>
<td>0.159</td>
<td>0.194</td>
<td>0.064</td>
<td>-0.181</td>
<td>0.099</td>
<td>-0.015</td>
<td>-0.015</td>
<td>-0.227</td>
<td>0.302</td>
<td>-0.262</td>
<td>0.092</td>
<td>0.060</td>
</tr>
<tr>
<td>I can recommend customers and employees to this company</td>
<td>0.150</td>
<td>-0.266</td>
<td>0.254</td>
<td>-0.305</td>
<td>0.190</td>
<td>0.089</td>
<td>0.193</td>
<td>-0.419</td>
<td>-0.006</td>
<td>0.145</td>
<td>-0.248</td>
<td>0.155</td>
<td>-0.052</td>
</tr>
<tr>
<td>I wish to remain in this company</td>
<td>0.007</td>
<td>-0.041</td>
<td>-0.213</td>
<td>0.433</td>
<td>0.178</td>
<td>0.257</td>
<td>0.491</td>
<td>-0.031</td>
<td>0.074</td>
<td>0.076</td>
<td>-0.156</td>
<td>-0.190</td>
<td>-0.078</td>
</tr>
<tr>
<td>I enjoy working with my co-workers</td>
<td>0.214</td>
<td>-0.448</td>
<td>0.323</td>
<td>0.084</td>
<td>-0.172</td>
<td>0.098</td>
<td>0.353</td>
<td>0.004</td>
<td>0.281</td>
<td>0.024</td>
<td>-0.240</td>
<td>-0.090</td>
<td>0.044</td>
</tr>
</tbody>
</table>
My co-workers and I share information and new ideas.  

<table>
<thead>
<tr>
<th></th>
<th>-0.258</th>
<th>0.176</th>
<th>0.427</th>
<th>0.491</th>
<th>-0.143</th>
<th>0.059</th>
<th>-0.170</th>
<th>0.325</th>
<th>0.177</th>
<th>0.157</th>
<th>0.114</th>
<th>0.141</th>
<th>-0.045</th>
</tr>
</thead>
<tbody>
<tr>
<td>The people I work with help each other when needed</td>
<td>0.032</td>
<td>0.195</td>
<td>0.028</td>
<td>-0.162</td>
<td>-0.205</td>
<td>0.464</td>
<td>-0.107</td>
<td>0.220</td>
<td>-0.453</td>
<td>0.012</td>
<td>-0.046</td>
<td>-0.001</td>
<td>-0.352</td>
</tr>
</tbody>
</table>

Extraction Method: Principal Component Analysis.

a. 13 components extracted.

Table 11 above shows the results of the Rotated Component Matrix of the statements affecting Employee Engagement. The statements with coefficients of above 0.5 falling under one factor will be put together and taken as a factor affecting employee engagement. Four factors were therefore developed. Based on this study, the following factors are deemed to affect employee engagement: Relationship with manager, Nature of the job, Teamwork and Employee Performance.

**DISCUSSION OF FINDINGS**

The primary objective of the study was to find out the factors that influence employee engagement. Descriptive statistics presented in this study indicated that there is a minimal difference between the genders, which means that the company recognizes the importance of both genders in the organization. Age distribution showed that majority of the respondents is at the age bracket of between 30-41 years (64.57%). This is the age where majority of the employees are actively involved in developing the organization. In terms of length of service, majority of the respondents have worked for the organization between 6-10 years (38.29%). This is an indication that employees in the organization stay for longer periods before quitting in the organisation.

Results of the factor analysis indicated that four factors affect employee engagement. Relationship with the manager is one of the factors that have been proved by this study to influence employee engagement. The statements that confirmed this factor has also been proved by descriptive statistics where “I feel free to offer comments and suggestions,” My supervisor cares about me as a person had mean scores of 3.61 and 3.57 respectively. This is in tandem with a study done by Guest (2009) where he found that employee engagement is manifested in positive attitudes and a positive exchange within a psychological contract where two way promises and commitment are fulfilled.

Nature of job is another factor that has been found by this study to influence employee engagement. This has been supported by descriptive statistics done earlier in this study where the statement “workload is distributed equally,” and “I know what is expected of my job,” had a mean score of 3.48 and 3.43 respectively. This is an indication that majority of the respondents agree largely that nature of job is a factor that influences employee engagement. This has been supported by a study done by Alfes et al (2010) who found that employees perceive their workload to be more sustainable than others do.

Another factor that influences employee engagement found by this study is employee performance. Descriptive statistics that support this factor include the mean scores of the statements, “I feel competent and fully able to handle my job,” and “My supervisors handle my work related issues satisfactory,” with mean scores of 3.47 and 3.14 respectively. A study done by Alfes et al (2010), supports this study. They found that engaged employees work better and are more innovative and likely to stay in the company. Further, Gallup (2005) noted that more productive and give better customer service.
Teamwork is also one of the factors that influence employee engagement found by this study. This has also been proved by descriptive statistics in that the statements “Workload is distributed equally throughout our department,” and “My co-workers and I share information and ideas,” with mean scores of 3.48 and 3.40 respectively.

SUMMARY, CONCLUSION AND RECOMMENDATIONS
In summary, the study found sufficient data from the respondents with majority of the employees aged between 30-41 years, majority of the employees have worked for the organization between 6-10 years and are of good academic qualifications. The study found out that relationship with managers, nature of the job, teamwork and employee performance are the factors that influence employee engagement in Jubilee insurance company.

In conclusion therefore, employers need to understand these four factors and make full use of them to ensure employees are engaged hence achieve their objective. The study recommends that employers should encourage teamwork in their organizations; they should ensure that the managers and lower employees have a good relationship. They should develop a policy that ensures employees are given the necessary tools in order to improve their performance which will then ensure that employees feel engaged in the organization. This way organization will benefit from the diverse ideas that will come from their employees for the development of the organization.

REFERENCES


Medina Halako Twalib is a lecturer at the University of Nairobi, School of Business lecturing Human Resource Management Courses.
Media Framing of Human Papillomavirus (HPV) Health Issues and HPV Vaccine-Related Sentiment in English Language News Media in India (2015-2018)

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Abstract- India records a high incidence of Human Papillomavirus (HPV)-related infections and cancers, with cervical cancer being the second biggest cause of mortality among women with cancer in the country. Immunization against the high-risk HPV serotypes can efficiently prevent related diseases. The HPV vaccine was recommended to be added in the Universal Immunization Program (UIP) of India by the National Technical Advisory Group on Immunization (NTAGI) in 2017. However, following a controversial vaccine trial in 2009 and a pending decision on a related legal case, the Government of India has refrained from including the vaccine in the UIP. This study is an analysis of the media coverage of HPV-related issues and HPV vaccine-related sentiment in English language news media in India from 2015 to 2018. The sampled news media for the study include four national daily newspapers, The Hindu, The Times of India, The Indian Express and Hindustan Times; and two Indian news websites, The Wire and Scroll.in. Results based on the sentiment analysis of the media coverage reveal a predominantly positive sentiment towards the HPV vaccine with a marginal presence of thematically framed negative and contested opinion against the vaccine. The analysis of media framing of the issue reveals a prevalence of authoritative frames devoid of exemplification, and an extensive use of behavioral determinants of health to establish responsibility in HPV-related health status.

Index Terms- health behavior, health journalism, Human Papillomavirus, HPV vaccine, vaccine uptake, Indian media, media framing

I. INTRODUCTION

HPV incidence and HPV vaccine policy in India

Human Papillomavirus (HPV) is a common virus that is present abundantly in the environment and is among the most common sexually transmitted infections (STI). Scientific research has established that certain types of high-risk HPV strains, specifically the HPV serotypes 16 and 18, are responsible for cancers of cervix uteri, penis, vulva, vagina, anus and oropharynx in women as well as men. The incidence of HPV related cancers, especially cervical cancer among women, is very high in India. Approximately, 453.02 million women aged 15 and older are at the risk of developing cervical cancer in India. Every year, 96922 women are diagnosed with cervical cancer, while 60078 succumb to the disease (ICO/IARC HPV Information Centre, 2018). Cervical cancer is the second most common cause of cancer-related deaths among women in India. As a result of long-term tobacco use and concurrent HPV infections among the population, the rate of head and neck cancers associated with HPV infections is also expected to rise in India (Gupta, Johnson, & Kumar, 2016).

The probability of acquiring HPV infections and the severity of HPV-related diseases are determined by several medical and non-medical factors. The non-medical factors include environmental factors, such as, polluted environment, poor sanitation, and lack of clean water for cleaning and consumption; behavioral factors, such as, having unprotected sex, having multiple sex partners, tobacco use and poor maintenance of health and hygiene. Socio-economic and political factors like income, social status, gender, social rituals and norms, access to healthcare and other amenities, political institutions, nature and ideology of government and bureaucracy, corruption, and public policy, among others are also significant determinants of HPV-related health status. Several structural factors within the field of medicine, such as, research, knowledge and training, health infrastructure, administration, services, etc, and biological/physiological factors, such as, gender, age, genetics, prevailing diseases, among others, also determine an individual’s HPV-related health status. An overall poor health, arising from a combination of certain specific factors or several medical and non-medical determinants of health puts an individual at a high risk of contracting HPV infections and HPV-related diseases.

Timely immunization with the HPV prophylactic vaccine, along with regular HPV screening, can help prevent HPV infections and HPV-related cancers (Schiffman, Wentzensen, Wachold, Kinney, Gage, & Castle, 2011; Ronco, et al., 2014; Petrosky, et al., 2015; Zhai & Tumban, 2016). The safety and the efficacy of the HPV vaccine have been confirmed by the results of large
trials across the different countries and health contexts. Currently, there are three types of approved prophylactic HPV vaccines available for use: the bivalent (against HPVs 16/18), the quadrivalent (against HPVs 6/11/16/18) and the 9-valent vaccines (against HPV 6/11/16/18/31/33/45/52/58).

In 2017, the National Technical Advisory Group on Immunization (NTAGI) recommended introducing the HPV vaccine in the Universal Immunization Programme (UIP) of India (NTAGI, 2017). In 2009, a feasibility study of the HPV vaccine conducted by an American non-profit organization, Program for Appropriate Technology in Health (PATH), in partnership with the provincial governments of the Indian states of Andhra Pradesh and Gujarat, hit a roadblock following the deaths of eight pre-adolescent girls, who were among the 24,000 girls who had been administered the vaccine during the study. The Parliamentary Standing Committee of the Ministry of Health and Family Welfare (MHFW), India, highlighted ethical violations committed during the trial conducted jointly by PATH and Indian Council of Medical Research (ICMR), which was one of PATH’s technical partners for the study in India. The study was abruptly stopped, even though it was found that the deaths of the adolescent girls were not related to immunization with the HPV vaccine (Larson, Brocard, & Garnett, 2010). In 2012, a writ petition filed in the Supreme Court of India called for revoking the licenses of the two HPV vaccine manufacturers, Merck Sharp & Dohme (MSD) and GlaxoSmithKline (GSK), citing that the then Drug Controller General of India (DCGI) had allegedly approved the vaccine by the manufacturers without conducting proper clinical trials and without any evidence of the vaccine’s efficacy and safety. What with the decision still pending with the apex court of India, the Government of India has suspended its decision on introducing the vaccine by the two manufacturers in the UIP. However, the Indian states of Delhi and Punjab have introduced the vaccine for adolescent girls in their immunization program as an optional vaccine (Narayanan, 2018). An Indian pharmaceutical company is currently in its final stage of clinical testing of a quadrivalent HPV vaccine. It remains to be seen whether the HPV vaccine made by the Indian manufacturer, after completing trials and its market launch, will be adopted in the UIP or not.

**HPV and media coverage**

Health behavior associated with the causes of HPV infections, and vaccine uptake in a population are influenced by the public perception of the risks of HPV infections and beliefs related to the efficacy of HPV vaccine. The news media plays a crucial role in forming a public perception of risks and health beliefs by disseminating information about health issues and policies. Finding its theoretical base in the concept of media influence and the ecological model of health behavior (Sallis & Owen, 2015), this study involves an analysis of news coverage related to HPV and HPV vaccine in English language news media in India from 2015 to 2018. Since public perception of an issue is based on its interpretation by the public using personal and social frames, including those presented by the media (Goffman, 1974), the prime focus of this study is to analyze the frames assigned to the HPV and HPV vaccine issue by the media. The World Health Organization (WHO) Commission on Social Determinants of Health recommends including information about social determinants of health in public policy and awareness messages (Commission on Social Determinants of Health, 2008). The study also screens the news items to identify and analyze the presence of medical and non-medical determinants of HPV-related health status.

In India, awareness about HPV-related diseases and HPV vaccination is low (Hussain, et al., 2014; Rashid, Labani, & Das, 2016; Chawla, Chawla, & Chaudhary, 2016). Recent studies have also shown resistance to the HPV vaccine, citing fears about post-vaccination complications and the prohibitively high cost of vaccine (Singh, et al., 2018). However, there’s evidence that attitude towards the HPV vaccine, and associated risk-benefit beliefs among parents of adolescents can be modified through strategic messages which focus on highlighting the risks of HPV infections and the efficacy of the vaccine against HPV-related diseases (Degarege, et al., 2019).

While research on HPV and HPV vaccine-related messages in Indian media is lacking, significant presence of negative information regarding vaccines and immunization has been found on Indian online and web-based media. The negative information found is primarily coverage of adverse events reporting – from minor allergic reactions to rare deaths – without any proof of causality, or is about shortage of vaccine and social resistance to immunization (Das & Singh, 2018). Research shows that negative news coverage can generate a negative information loop, beginning with a negative media report about a vaccine and leading to a spike in adverse events reporting post-vaccination. Consequently, there is a drop in vaccine uptake, inviting more negative media coverage. A Denmark-based study (Suppli, Hansen, Rasmussen, Valentiner-Branth, Krause, & Mølbak, 2018) found a significant negative correlation between negative media coverage of vaccines and vaccine uptake, coinciding with a spike in Google search activity related to the side effects of the HPV vaccine, Gardasil, manufactured by MSD.

**II. METHODS AND INSTRUMENTS**

A sample of HPV and HPV vaccine-related news coverage was drawn from four leading national daily English language newspapers: The Hindu, The Times of India, Hindustan Times and The Indian Express; and two independent news website: The Wire and Scroll.in, for the period 2015-2018. The English language press in India was purposively selected to study the HPV-related media messages disseminated among the urban upper/middle class and educated population, which constitutes the main readership group of the English language media in India (Parameswaran, 1997). The sample of new items was selected through keyword search in the headline and/or the body text of news items using four terms: HPV, Human Papillomavirus, HPV vaccine and cervical cancer. A keyword search on the online and print versions of the selected news media filtered a sample of 138 news items for the study. All news items were studied and manually coded using content analysis as the prime method for textual analysis. Qualitative and quantitative findings of the
textual enquiry measures listed below were used to find the frames employed by the media in its coverage of HPV and related issues.

1. **Health Issue**: Each news item was categorized on the basis of its prime focus on the HPV-related health issue under the following categories: HPV; HPV vaccine/immunization; HPV-related cancers, HPV/HPV-related cancers screening, and HPV/HPV-related cancer treatment.

2. **News type**: Each news item was categorized as either news; feature/article; editorial/opinion; or others.

3. **News source**: The attributed source of each news item was recorded and coded.

4. **Attribution**: Attribution of quotes and other information within each news item was recorded and coded. The two broad categories of attribution were: authoritative sources, such as, governments, health organizations and institutes, research and publication, health professionals, health care and other industry, and public figure; and non-authoritative source, such as, patients or the public.

5. **Place**: Each news item was categorized on the basis of its framing of HPV-related issues using geographical location as global; national; international; regional or local.

6. **Sentiment towards HPV vaccine**: sentiment towards the HPV vaccine in each item was recorded and categorized as follows:

   1. **Positive towards HPV vaccine**: News items containing information or references that support immunization against HPV; cite efficacy and safety of the vaccine.
   2. **Negative towards HPV vaccine**: News items that carry only negative HPV vaccine information, including ineffectiveness, dangers, side-effects and high cost.
   3. **Neutral or having no opinion**: News items that do not present a stance on the HPV vaccine, or only mention the vaccine without recommending or opposing it.
   4. **Contested position on the HPV vaccine**: News items that pit the positive and negative information related to the vaccine against each other, establishing a conflict, however, without a resolution that favors any one side.

7. **Health approach**: Each news item was categorized on the basis of its prime public health approach, which coded as prevention; awareness; screening/testing, or control.

8. **Determinants of health**: Using a directed content analysis approach (Hsieh & Shannon, 2005), each new item was categorized on the basis of medical and non-medical determinants of health (DOH). The DOH categories were constructed on the basis of the determinants of health listed by the Commission on Social Determinants of Health (CSDH) by World Health Organization (WHO). The categories include structural factors like the social and economic environment, the physical environment, and individual characteristics and behaviors, among the non-medical determinants of behavior (WHO, 2019).

Each news items is categorized within a particular DOH if it includes references to that DOH and carried statements claiming the influence of the said DOH on the HPV-related health status of an individual or group. The sampled news items that were found to be containing more than one DOH were assigned to every category that was applicable in the analysis. The DOH categories were:

1. **Health behavior**: defined as statements claiming the impact of personal hygiene, nutrition, sexual behavior and individual attitude on HPV health status.
2. **Economic**: defined as statements claiming impact of livelihood, low-income, cost of vaccine and health services, the cost of medical interventions, economic independence and affordability of health and livelihood amenities on HPV health status.
3. **Social**: defined as statements containing reference to social factors, like gender, marital status, social norms, social hierarchy, race, ethnicity, social support, education, culture, customs and beliefs, as influences of HPV health status.
4. **Environmental**: defined as statements claiming influence of the physical environment, such as, the natural environment, climate, resources; living and work environment; and infrastructure on HPV health status.
5. **Political**: defined as containing references to government policies, political environment, bureaucracy and ideology as an influence on the HPV health status.
6. **Biological/Physiological**: defined as containing references to age, sex, prevailing health status, illness history or other bodily factors as a factor in deciding HPV health status.
7. **Medical**: defined as containing references to professional expertise, medical practice, infrastructure, research, knowledge and other aspects of medical field as a factor influencing HPV health status.
An association between the news framed according to each DOH, HPV health issue and sentiment towards the health issue was conducted using cross tabulation of coded data followed by association testing using the Fisher’s exact test of independence.

III. RESULTS

Health issue: In the sample of 138 stories, 61 (44.2%) news items focused on HPV vaccine, 44 (31.8%) were about HPV-related cancers, primarily cervical cancer among women, 17 (12.3%) were about HPV-related scientific and medical information, 12 (8.7%) were about screening and 4 (2.9%) were about treatment and related interventions.

News type: 77 (55.7%) were news stories, 44 (31.9%) were articles or features, and 17 (12.3%) were either opinion or editorials.

News source: The data reveals that 86 (62.3%) stories were written by a newspaper staffer, 32 (23.2%) stories were sourced from a news agency and 20 (14.5%) were written by guest writers from the field of medicine, public health and science, either expressing personal opinion or representing an organizational perspective.

Sentiment towards the vaccine: Figure 1 shows the distribution of HPV-related coverage across six media outlets from 2015 to 2018 using a box plot with quartile-wise distribution. An overlay of the sentiment towards the HPV vaccine represented by each news item is included in the graph. The studied data reveals presence of an overall positive sentiment represented in the news items. In the data, 78 news items (56.5%) mentioned the efficacy and importance of HPV vaccine as a potent prophylactic against HPV-related diseases; 44 news items (31.8%) represented neutral or no opinion about the HPV vaccine; 12 news items (8.7%) contained contested sentiment; and 4 news items (2.9%) contained a negative sentiment towards the vaccine.

Attributions: Medical professionals were also amongst the most attributed sources within news items (26%), followed by Government and government agencies (19%); Scientific research or journal articles (17.3%); international health organizations (13.7%); national health institutes (10.1%); Indian health organizations (2.8%) and others that included governments of other countries, pharmaceutical industry, celebrity or a public figure (13.7%).

Place: In the data set, 108 stories (78.2%) covered the HPV and HPV vaccine issues within a national context; 94 news items (68.1%) discussed the issue within a global context; 48 stories (34.7%) had a regional context; 36 stories (26%) frames the issue within an international context; and only 1 news item (0.7%) contained a local context.

Determinants of health: Health behavior was the most frequently used non-medical DOH of HPV-related health status (47.1%), followed by economic (26%), social (24.6%), environmental (8.7%) and political (6.5%). In the sample, 129 news items (93.4%) also contained references to medical and biological/physiological determinants of health, while 14 news items (10.1%) made no reference to any DOH, leaving out any information regarding HPV and related illnesses causal factors.

Health approach: Prevention against HPV infections and related diseases as a health approach was the focus of 81 news items (58.7%); 27 news items (19.5%) were based on the awareness approach of public health; 14 news items (10.1%) were based on screening for HPV infections, cervical cancer and other HPV-related diseases; 8 news items (5.7%) focused on HPV-related treatment, while another 8 news items (5.7%) focused on control at the public health level.
In the subset of news items focusing on prevention, 50 items (61.7%) were about the HPV vaccine, while only 1 item (1.2%) was about HPV-related screening and diagnostics. About 21 stories (25.9%) focused on general messages to prevent HPV-related cancers, and about 9 (11.1%) were preventing HPV infections. In the prevention subset, 66 news items (81.4%) carried a positive sentiment towards the HPV vaccine, 2 items (2.4%) carried a negative sentiment (total negative were 4 in the data set), 8 items (9.8%) were neutral or had no opinion and 5 items (6.1%) presented a contested position.

In the subset of news items based on the awareness approach, 11 news items (40.7%) were about HPV-related cancers, 10 news items (37%) carried awareness messages about the HPV vaccine and 6 news items (22.2%) carried awareness messages about HPV.

Association between HPV health issues, sentiment towards HPV vaccine and determinants of health

The studied data reveals a significant association between the type of HPV health issue and the sentiment towards HPV vaccine present in the news items (p-value = 0.004998). The association between the HPV health issue and sentiment towards the vaccine was calculated using Fisher’s exact test of independence for count data with simulated p-value (based on 2000 replicates). In the data categorized per HPV health issue, among the 61 news items that focused on the HPV vaccine, 41 news items (67.2%) carried a positive sentiment towards the vaccine; 11 (18%) contained contested sentiment news items; 6 news items (9%) were neutral as they only mentioned the HPV vaccine, and 3 news items (5%) carried a negative sentiment story. News items about HPV-related cancers were most likely to have a neutral sentiment, or no opinion, about the HPV vaccine (22 stories, as well as a positive sentiment towards the HPV vaccine (21 stories). Similarly, news items about HPV and related illness screening and diagnostics, and HPV/cervical cancer treatment, contained either a positive sentiment (7 news item and 2 news items, respectively) or contained neutral or no opinion about the HPV vaccine (5 items and 2 items, respectively).

Tables 1-6 provide a summary of HPV-related news items categorized on the basis of determinants of health frame, HPV health issue and sentiment towards HPV vaccine.

### Table 1

<table>
<thead>
<tr>
<th>Determinant of Health</th>
<th>HPV related issue</th>
<th>Sentiment towards vaccine</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Positive towards vaccine</td>
<td>Negative towards vaccine</td>
</tr>
<tr>
<td>Health Behavior</td>
<td></td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>HPV</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>HPV vaccine</td>
<td>16</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Cervical Cancer/ HPV related Cancers</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>HPV /Cervical Cancer Screening Treatment</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>34</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>65</td>
<td></td>
</tr>
</tbody>
</table>

Table 1 (above) summarizes the results of analysis of sentiment towards HPV vaccine in news items focusing on different HPV-related health issues within the data subset of news items framed using the health behavioral determinants of health. There is a significant association between HPV health issue and sentiment towards HPV vaccine (p= 0. 003498) based on Fisher’s exact test of independence using replicates (2000)

### Table 2

<table>
<thead>
<tr>
<th>Determinant of Health</th>
<th>HPV related issue</th>
<th>Sentiment towards vaccine</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Positive towards vaccine</td>
<td>Negative towards vaccine</td>
</tr>
<tr>
<td>Economics</td>
<td>HPV</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>HPV vaccine</td>
<td>14</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Cervical Cancer/ HPV related Cancers</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>HPV /Cervical Cancer Screening Treatment</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>22</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>36</td>
<td></td>
</tr>
</tbody>
</table>
Table 2 (above) summarizes the results of analysis of sentiment towards HPV vaccine in news items focusing on HPV-related health issues within the data subset of news items framed using the economic determinants of health. There is an insignificant association between HPV health issue and sentiment towards HPV vaccine (p = 0.1579) based on Fisher’s exact test of independence using replicates (2000).

<table>
<thead>
<tr>
<th>Determinant of Health</th>
<th>HPV related issue</th>
<th>Sentiment towards vaccine</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Positive towards vaccine</td>
<td>Negative towards vaccine</td>
</tr>
<tr>
<td>Social</td>
<td>HPV</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>HPV vaccine</td>
<td>12</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Cervical Cancer/ HPV related Cancers</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>HPV /Cervical Cancer Screening</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Treatment</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>17</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 3 (above) summarizes results of analysis of sentiment towards HPV vaccine in news items focusing on HPV-related health issues within the data subset of news items framed using the social determinants of health. There is a significant association between HPV health issue and sentiment towards HPV vaccine (p = 0.0004998) based on Fisher’s exact test of independence using replicates (2000).

<table>
<thead>
<tr>
<th>Determinants of Health</th>
<th>HPV related issue</th>
<th>Sentiment towards vaccine</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Positive towards vaccine</td>
<td>Negative towards vaccine</td>
</tr>
<tr>
<td>Environmental</td>
<td>HPV</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>HPV vaccine</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Cervical Cancer/ HPV related Cancers</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>HPV /Cervical Cancer Screening</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Treatment</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>6</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 4 (above) summarizes results of analysis of sentiment towards HPV vaccine in news items focusing on HPV-related health issues within the data subset of news items framed using the environmental determinants of health. There is an insignificant association between HPV health issue and sentiment towards HPV vaccine (p = 0.7026) based on Fisher’s exact test of independence using replicates (2000).

<table>
<thead>
<tr>
<th>Determinants of Health</th>
<th>HPV related issue</th>
<th>Sentiment towards vaccine</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Positive towards vaccine</td>
<td>Negative towards vaccine</td>
</tr>
<tr>
<td>Political</td>
<td>HPV</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>HPV vaccine</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Cervical Cancer/ HPV related Cancers</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>HPV /Cervical Cancer Screening</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Treatment</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>4</td>
<td>0</td>
</tr>
</tbody>
</table>
Table 5 (above) summarizes results of analysis of sentiment towards HPV vaccine in news items focusing on HPV-related health issues within the data subset of news items framed using the political determinants of health. There is an insignificant association between HPV health issue and sentiment towards HPV vaccine (p=1) based on Fisher’s exact test of independence using replicates (2000).

Table 6

<table>
<thead>
<tr>
<th>Determinants of Health</th>
<th>HPV related issue</th>
<th>Sentiment towards vaccine</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Positive towards vaccine</td>
<td>Neutral/No opinion</td>
</tr>
<tr>
<td>Medical/Biological/Physiological</td>
<td>HPV</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>HPV vaccine</td>
<td>31</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Cervical Cancer/HPV related Cancers</td>
<td>17</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>HPV/Cervical Cancer Screening Treatment</td>
<td>7</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6 (above) summarizes results of analysis of sentiment towards HPV vaccine in news items focusing on HPV-related health issues within the data subset of news items framed using the medical/biological/physiological determinants of health. There is a significant association between HPV health issue and sentiment towards HPV vaccine (p = 0.0004998) based on Fisher’s exact test of independence using replicates (2000).

IV. ANALYSIS AND DISCUSSION

A prevalence of prevention and awareness messages related to HPV-related issues and the HPV prophylactic vaccine in the HPV-related coverage by the English language news media in India was found. Prevention messages focusing on the HPV vaccine largely carried a positive sentiment towards the vaccine, while 2 out of the total 4 news items in the data set with a negative sentiment were also found in this subset. News items carrying awareness messages were among the ones with the most neutral sentiment or no mention of the HPV vaccine, while the remaining 2 out 4 negative sentiment news items were also found in this sub-set. These findings suggest that the risk-benefit messages related to the HPV vaccine are frequently framed within the prevention and awareness health discourse disseminated by the media.

The data reveals coverage of the HPV-related issues and the HPV vaccine to be temporally connected. However, thematic framing was used in news items carrying contested position or negative sentiment towards the HPV vaccine. It was found that 3 out of 4 stories with a negative sentiment towards the HPV vaccine appeared in the news media after officials of an economic affairs-related outfit that is affiliated with a right-wing political organization in India, wrote to the Prime Minister of India’s office in December 2017, against the implementation of the HPV vaccine in the UIP, as a reaction to the NTAGI recommendation to include the vaccine (Mathew & Ghosh, 2017). The remaining one news item with a negative sentiment, written by a guest writer for the news media, was an opinion-based article about ethical issues in clinical trials conducted in India. All the stories with the negative sentiment included references to the 2009 HPV vaccine trial controversy in India, and associated vaccine inefficacy with the alleged ethical violations in the trials. The stories related to the controversial letter to PMO also cited the high cost of the vaccine as a drawback. The deaths of the pre-pubescent girls during the 2009 HPV vaccine trial were mentioned without clearly associating them with HPV immunization and without providing evidence for or against the safety of the vaccine. Almost all news items with the contested sentiment towards the vaccine carried references to the controversial trial by PATH in 2009.

Health behavior was the most frequently referenced determinant of HPV-related health status. News items that framed the HPV-related issues using the health behavior DOH mentioned personal hygiene, sexual behavior, specifically having multiple sex partners and unprotected sex, as a high-risk factor in HPV-related diseases. References to general risk behaviors associated with cancer incidence, such as, smoking, tobacco use and unhealthy lifestyle, etc, were also present. Studies about coverage of the HPV vaccine in the US and British news media reveal mediation of links between sexual behavior and immunization with the HPV vaccine by the media. The news media coverage primarily argued against any causal relationship between HPV vaccination and sexual behavior that might lead to rise in promiscuity following immunization. (Forster, Wardle, Stephenson, & Waller, 2010; Casciotti, Smith, Tsui, & Klassen, 2014). However, no such mediation of links between the HPV vaccine and sexual promiscuity was present in the news items sampled for this study.

An absence of non-authoritative sourcing and attributions, and the dominating presence of authoritative sources of news items and attributions within the news items reveal the media’s use of authoritative frames in its coverage of the HPV issues. The public, the patient or the individual opinion and voice was absent. Exemplification, which has shown to influence public...
opinion about issues related to health and society (Zillmann, Gibson, Sundar, & Perkins, 1996), was absent in the authoritative framing of the HPV issue.

The HPV vaccine-related news items were mostly framed within the economic DOH, followed by the health behavior DOH. This suggests that the media’s perception of economic factors, such as the cost of the vaccine, affordability of health services and interventions in a low-income country like India, and its perception of behavioral factors, such as, sexual activity, hygiene and lifestyle, etc, influences its coverage of the HPV vaccine issue. News items related to cervical cancer and other HPV-related cancers were mostly framed within the health behavior DOH, and almost never within the environmental DOH frame. The implication of this framing can be studied in future research.

DOH, and almost never within the environmental DOH frame. The implication of this framing can be studied in future research related to HPV-related media coverage. It was also found that the HPV-related issues were routinely covered in a national or global context, while regional and local perspectives were sparse.

V. CONCLUSION

The study revealed a predominantly positive sentiment towards the HPV vaccine in the media coverage of the issue. The news items with the negative or the contested sentiment towards the vaccine were thematically framed by the media. References to previous adverse events’ reportage, the vaccine trial controversy, the cost of vaccine and negative perception related to the vaccine, appeared as the most significant discursive elements in the thematic framing of the HPV vaccine issue. All news items maintained authoritative sourcing and attribution pattern. The association between the presence of positive attitude towards the HPV vaccine and authoritative framing using authoritative sources and attribution can be further investigated.

Becker (1986) stated that the media usually leveled responsibility on the individual for his health and wellbeing, while placating the role of society, state, etc, in preventing and curing a disease. The prevalence of an authoritative framing of the HPV-related issues using behavioral determinants of health by media, as seen in the studied sample, necessitates a critical examination of attribution of responsibility and its effect on public policy, public perception and health behavior. Since the results of this study are based on a selected sample of the English language news media in India, it is recommended that the results be used as probes for studying HPV-related coverage in the vernacular press, online media and social media as well.

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Status of Education for Sustainable Development in teacher training institutions in Botswana

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Abstract: This paper reports on a qualitative study which evaluated the extent to which the ideals of ESD are incorporated into teacher training curricula. The study was conducted at 3 teacher training colleges of education and the University of Botswana. Participants of the study were lecturers. Questionnaire and observation were used to collect data. Findings reveal that in Botswana information on ESD has been fairly disseminated at teacher training institutions. This has resulted in the infusion of ESD in the training curriculum in some subjects. However, not much addressed the actual set of MDG and Sustainable Development Goals. To cover this deficit, the Ministry of Education came up with a strategy of change projects to sensitize institutions on EE and ESD. These projects range from infusion of ESD in the curricular, proper disposal of used oil and water and rain water harvesting. Results disclose that most lecturers were aware of the concept of ESD but have not taken much attention to have the concept aligned to courses they offer. As such amongst the recommendations made are, that there is immediate need to capacitate college lecturers on ESD.

Key words: curriculum, Education for Sustainable Development (ESD), environmental education, Teacher Training, qualitative research

INTRODUCTION

The paper evaluated Botswana’s response to Education for Sustainable Development (ESD) and the extent to which the ideals of ESD are reflected or incorporated into teacher training curricula. In the face of changing climatic and environmental conditions (such as global warming and depletion of natural resources), education system must infuse into schools and academic oriented institutions’ relevant subject matter to ensure a collective effort towards mitigation of fast changing environmental and living conditions. Education for Sustainable Development (ESD) does not only advocates for aspects of Environmental Education and sustainability but for holistic sustainability which is depicted by the five (5) priority areas as outlined in the United Nations Educational, Scientific and Cultural Organization (UNESCO) Road Map for Global Action Programme (GAP) on ESD (UNESCO, 2014). The holistic approaches include amongst others biophysical, social, cultural, political and economic approaches (Ketlhoilwe, 2010; UNEP, 2005). The interrelationships among these approaches include provision of focal point for advocacy and promotion of environmental education and training, supporting the development of high quality education learning
support materials, undertaking ongoing research into environmental education and training and the promotion of Information and Communication Technology (ICT) with respect to integration of sustainable development principles across all levels of education (UNEP, 2005).

The United Nations declaration of a Decade of Education for Sustainable Development (DESD) stated that there is need to integrate sustainable development into education systems at all levels so as to make education a key instrument for change (UNEP, 2005). This was affirmed at the Johannesburg Summit in 2005 (UNEP, 2005). At the summit, it was made clear that ESD addresses a wide area of themes that include the following: (which do not necessarily focus on the environment), poverty alleviation, citizenship, peace, ethics, democracy and governance, justice, human rights, gender equality, corporate responsibility, natural resource management and biological diversity. All these being the Millennium Development Goals (MDG) set in Rio 24th summit (UNEP, 2005).

Success of ESD lies mostly on reflecting the equal importance of the learning process and outcomes of the education process (UN Decade of Education for Sustainable Development (DESD) (UNESCO, 2006) through:

a. Imbedding ESD in curriculum in an interdisciplinary and holistic manner

b. Sharing values and principles that underpin Sustainable Development

c. Developing confidence in addressing the challenges of Sustainable Development

d. Employing variety of educational methods (literature, art, drama, animation, ICT etc.

e. Allowing learners to participate in decision making and designing of educational programs

f. Addressing local and global issues on Sustainable Development

g. Ensuring long-term planning for Sustainable Development

**STATEMENT OF THE PROBLEM**

Although the concept of ESD has long been deliberated worldwide, Botswana’s education system has since been lagging behind in the infusion and/or integration of ESD in the curricula at all levels of learning. This may be linked to the fact that the education Policies of Botswana have not included or adhered to the call for nations to address the MDGs and/or SDGs to integrate ESD in educational curricular. As a matter of fact, this condition has seen institutions putting very little to no effort in sensitising its trainees or learners on issues of sustainability. The implication of this state of affairs is that graduates from some training institutions are more likely to graduate without a concrete foundation on issues of sustainability and ESD.

**OBJECTIVES OF THE STUDY**

The objectives of the study are to:

- To investigate the extent to which the ideals of ESD are reflected or incorporated into higher education curriculum

- To find out response to Education for Sustainable Development by teacher training institutions

**PURPOSE OF STUDY**

The purpose of this paper is to examine Botswana’s response to Education for Sustainable Development (ESD) and the extent to which the ideals of ESD are reflected or incorporated into teacher training curricula.
CONCEPTUAL FRAMEWORK

This study is compatible with the transformative learning theory from the perspective of Jack Mezirow (1978, 1997) which offers learning that is uniquely adult, is abstract, idealised, and grounded in the nature of human communication. The theory is partly a developmental process, but more as “learning is understood as the process of using a prior interpretation to construct a new or revised interpretation of the meaning of one’s experience in order to guide future action” (Mezirow, 1996:162). Education for sustainable development requires change in the way education and training is offered and as such this theory is relevant by reason that it offers an explanation for change in meaning structures that evolves in the domains of instrumental and communicative learning. The instrumental domain focuses on learning through task-oriented problem solving and determination of cause and effect relationships—learning to do, based on empirical-analytic discovery while the communicative learning domain involves understanding the meaning of what others “communicate concerning values, ideals, feelings, moral decisions, and such concepts as freedom, justice, love, labour, autonomy, commitment and democracy” (Mezirow, 1991:8). The relevance of this theory for education for sustainable development at college level is that projects done by student-teachers and staff have potential to encourage exploration of the environmental and sustainability concepts and ideas to influence transformative learning among staff and students’ at various teacher training institutions in Botswana.

LITERATURE REVIEW

The concept of Education for Sustainable Development

Since the time sustainable development was first sanctioned at the UN General Assembly in 1987, the parallel concept of education to support sustainable development has also been explored. From 1987 to 1992, the concept of sustainable development matured as committees discussed, negotiated, and wrote the 40 chapters of Agenda 21. Consequently, Initial thoughts concerning ESD were captured in Chapter 36 of Agenda 21, Promoting Education, Public Awareness, and Training (Rosalyn McKeown, 2002).

Education for Sustainable Development is the focus or projection of education that seeks to equip people towards creating a sustainable future. As such to achieve education for sustainable development can only be fully achieved through a united force by various stakeholders comprising government, private sector educational institutions, and media. Together these bodies can achieve expressive efforts towards achieving sustainable development goals. According to UNESCO (2000) the way each nation, and stakeholder be it private sector, individual, media or cultural group view sustainable development will depend on its own values. This is so primarily because each of these stakeholders have a different visualization of sustainable development and education for sustainable development. For instance some are interested in environmental preservation and protection; some have economic development interests while others may be more interested in social development. These variance in interests and visualisations deserve to be harmonised to effect mutual benefit of our nation states.

Like revealed above, stakeholders may differ in their interests and visualisations of ESD, but there is need for all to work within the scope of ESD as outlined by UNESCO (2002). In 2002 UNESCO indicated that ESD shall have the following four major thrust:

- Promotion and improvement of basic education
- Reorienting existing education at all levels to address sustainable development
- Enhancing public awareness and understanding of sustainability
- Training and skills development for the world of work.
For the purpose of this paper, two (2) thrust above are considered most relevant. These are: Reorienting existing education at all levels to address sustainable development and Training and skills development for the world of work. Reorienting existing education at all levels to address sustainable development Education for Sustainable Development requires the reorientation of many existing education policies, programmes and practices to address the social, environmental and economic knowledge, skills, perspectives and values inherent to sustainability (UNESCO, 2014). This goal is a challenge to nations to consider rethinking and revisioning education at all levels with a view to inclusion of a clear focus on the development of the knowledge, skills, perspectives and values related to sustainability issues relevant to current life status and going forward. This implies a review of existing curricula in terms of their objectives and content to develop transdisciplinary understandings of social, economic and environmental sustainability (UNESCO, 2002).

In Botswana’s conditions, this may also bring a challenge and a need to consider a holistic review of approaches to teaching, learning and assessment to foster lifelong learning skills. Lifelong learning skills are the means by which students master academic content and translate knowledge into action (McGarrah, 2015). These include skills for creative and critical thinking, oral and written communication, collaboration and cooperation, conflict management, decision-making, problem-solving and planning, using appropriate ICTs, and practical citizenship.

The other major thrust relevant for this study is - training and skills development for the world of work. Sustainable development depends on the provision of specialized training programmes to ensure that all sectors of society have the skills necessary to perform their work in a sustainable manner (UNESCO, 2002). It implies that all sectors of the workforce can only contribute meaningfully to sustainability issues provided they have requisite enlightenment and skills. A challenge of teacher training institutions therefore is to conduct on-going training with a hands-on approach so that all their graduates have the knowledge and skills necessary to make decisions and perform their work in a sustainable manner.

**Concept and development of Education for Sustainable Development in Botswana**

At independence in September 1966, Botswana was young, poor and had a fragile democracy. The education system at independence was inherited from the British who had colonised and ruled Botswana from 1885 to 1966 (Jotia, 2006). The inherited education system had several features which were not applicable and therefore not beneficial to Batswana (Oats, 2014). It was therefore because of colonial influence that after independence immediate efforts were undertaken through various education policies (Republic of Botswana, 1977; Republic of Botswana, 1994; Presidential Task Group for a Long-Term Vision for Botswana, 1997) for the building of a politically, socially, economically and educationally strong nation envisaged by the then government. This shows that since the attainment of self-rule in 1966, the government of Botswana has deemed education as an essential tool for achievement of economic development and sustainability. The government has always recognized that current economic development trends are not sustainable and that public awareness, education, and training are keys to moving the society of Botswana towards sustainability.

According to Ketlhoiwe and Jeremiah (2013), Environmental and sustainability discourses are integral parts of education and national development plans and policies in Botswana. The authors reveal that sustainable development and education for sustainable development discourses have been introduced through curriculum documents such as the different subjects’ syllabi and the Environment Education Guidelines (Ministry of Education, 2002). The Government of Botswana has also exposed awareness on sustainability issues by making sustainable development a emphasis for National Development Plans as can been seen from various national development plans such as Botswana Government (1991/7), (1997/2002), (2003/09) and (2010/16). The other instrumental policy document is the National Environmental Education Strategy and Action Plans 1 and 2 (Botswana Government, 1996 and 2007). The strategy and action plan emphasize both environmental education and education for sustainable development. Also, the objective in the National Environmental Education Strategy and Action Plan (NEESAP) are

all encompassing, making it the appropriate document to implement the post ESD activities (Magosi, 2015). These are the policies and initiatives that gave a drive to change projects in various learning institutions in Botswana.

Among others, the RNPE of 1994 was more direct and robust in authorising EE. Thus environmental education has been recommended by the 1994 Revised National Policy on Education (Botswana Government, 1994). Recommendation 44 of the policy indicated the need for defined national goals for environmental education and that EE should be incorporated into all subjects. Mostly importantly, the recommendation indicated that educational institutions starting with teacher training institutions and the University of Botswana should develop an environmental ethos and set an example to the rest of the community (Government of Botswana, 1994). This was indeed a milestone in terms of policy support for environmental and sustainability issues in education. However, the yields of this policy support are not satisfactory hence studies such as this one are conducted to find out the impact teacher training institutions are making in fostering the sustainability aspirations of the country. This is because from interpretation of the policy recommendations, it is clear that teacher training institutions have been called upon to in-service and pre-service teachers on environmental education and to be exemplary to the rest of the community through environmental ethos (Botswana Government, 1994).

**METHODOLOGY**

This qualitative study undertaken through the case study design targeted colleges of education in Botswana and the University of Botswana. A case study can be used in diverse forms, hence for this study multiple case study approach was used. In this approach a number of cases are studied to investigate some general phenomenon. It is for this reason that in this study multiple case study approach was chosen to fit the phenomenon being studied and to gain the information-rich and thick descriptions of data portrayed by Patton (2002) and Rubin and Rubin (2005). In this study the use of multiple case studies helped to select sites and participants with varied backgrounds and experiences on ESD and tertiary education in Botswana and this venture has added validity to the study.

Lecturers at colleges of education and University of Botswana lecturers were the target population. This study used probability sampling in particular simple random sampling approach to select two colleges to form the sample. Simple random sampling was preferred because it allowed each unit in the sample identified to have an equal chance of being selected. Further, simple random sampling was favoured because it permitted the selection of each unit independent of the selection of every other unit and increases validity in the study. The same approach to selection was used to identify 5 lecturers at each college selected to form participants for the study. The lecturers all held master’s degree qualification and were from social studies education, science and practical subjects. On the side of the University of Botswana lecturers, purposeful sampling was used to select lecturers who offer environmental education courses. The University of Botswana lecturers all held PhD and were from the faculty of education with environmental education specialisation.

Questionnaire with semi-structured items was used to collect data. A questionnaire was selected based on the fact that it allowed collection of large amounts of information can be collected from a large number of people in a short period of time and in a relatively cost effective way with limited effect to its validity and reliability. Data analysis followed stages of intensive reading to familiarise with data before coding for patterns and themes, category formation and triangulating between colleges and types of interviews.

**RESULTS AND DISCUSSION**

As open ended questions were used for data collection, the researchers analysed the collected data by searching for the statements that replicate commonalities or aspects of particular relevance to the study. Data from each college was first exposed to within case analysis, where data from each college is analysed separately. Then cross-case analysis was done by compiling the

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findings to come up with the final data that was coded into themes. Merriam (2009) stated that in multiple-case study, within case analysis of each study is first done as a comprehensive case, and then analysed. After that, cross-case analysis was done after within-case is completed. There three (3) major themes which emerged from the study were that participant’s conceptualisation of ESD differed, the need for teacher training on ESD and Botswana’s response to the ESD call.

**Participant’s comprehension of ESD**

It has emerged from findings that people view ESD in diverse ways. As a result, defining of the concepts, ESD, EE and Sustainable development seem to be problematic as many view the concepts differently. It is in this light that there it was found necessary to gather educators views on these concepts since the way they understand and practice them has implications for this study. Lecturers were asked to differential the concepts, ESD and EE, one lecturer, (C1SP2) said: ‘To me ESD is a holistic approach in that it requires the wellbeing of the society, while EE only focus on the environment’. Another one closer to above opined that ‘EE focuses on the environment while ESD is holistic in approach because it caters for both the environment and the society they live in as well as the economy of the country’.

A more elaborate view was from one UB lecturer who indicated that, ESD is a cross cutting interdisciplinary approach to learning that covers the integrated social, economic and environmental dimensions of the formal and informal curriculum. She further indicated that ESD is a pedagogical approach that should develop skills, knowledge and experience to contribute to an environmentally and ethically responsible society that reflects those values in their day to day. On the contrary, a thought-provoking response was from two (2) college lectures who pointed out that they cannot differentiate the concepts. Along the same vein, to a closer question, which wanted to find out how much information participants know about ESD, the same respondents gave answers such as- ‘Nothing’, ‘very little’, ‘am not sure’. To this question in fact, majority of respondents from colleges of education indicated that they know little about the depth and breadth of ESD. This is a serious challenge to Botswana aspirations of achieving UNESCO goals on ESD. The challenge facing Botswana is that if educators are unaware of the critical components of ESD and sustainable development reorienting education to address sustainable development will not happen.

On the contrary, the results obtained from Colleges of Education indicated that most lecturers were aware of the concept of Education for Sustainable Development but have not taken much attention to have the concept aligned to courses offered in these colleges. The implication of this state of affairs is that graduates from these colleges are more likely to graduate without a concrete foundation on issues of sustainability despite the fact that the colleges are engaged with change projects. This has seen some of the colleges making effort to sensitize the teacher trainees and other members of staff while other colleges are still lagging behind. Those colleges that have taken a step to sensitise their trainees are still skewed in their sensitisation as they mostly emphasise on sustainability with relation to the environment only. One college has taken a different route in their sensitization though, by including in their ongoing curriculum issues of sustainability in subjects such as the sciences, Art and design, and English. This has been seen as a great move towards achieving the goals of Education for Sustainable Development as stipulated by United Nations declaration of Decade of Education for Sustainable Development (DESD) (UNESCO, 2005; UNEP, 2006).

**ESD and teacher training curricular**

Academic staff members at colleges of education and the University of Botswana were asked questions regarding the curriculum offered in respect to ESD. On the question of the subjects/courses offered in line with ESD, all participants except two (2) indicated the yes options meaning that their institutions have courses/subjects with ESD components. When asked to explain their responses, most of them indicated that “there is infusion of sustainable development issues in lessons, projects and lesson material”. They also pointed out that at colleges of education subjects like agriculture, home economics, social studies, music and art are offered which have components on ESD and/or environmental education. As such participants believe that graduates can
continue using the knowledge and skills learnt from these subjects to sustain themselves. Although this seems to be embraced by most lecturers at colleges of Education, it was observed and noted during visits to the colleges whose main aim was to carry out needs analysis with regard to ESD, that most lecturers were either not aware of issues of ESD or they did not really understand what the whole concept on ESD. This led to some resistance by some lecturers in to join working teams on college change projects not develop any interest in wanting to get to find out what and how those projects would benefit them individually, their learners and the college as a whole.

While on overall, majority of college lecturers talked of infusion of ESD components across various subjects, the University lecturers mentioned a number of courses offered in her department which are in line with ESD. One lecturer further indicated that she has gone to the extent of developing a new course for anticipated pre-service programme which will be an introductory course in education for sustainable development.

The findings further show an indication that in Botswana information towards ESD has been fairly disseminated in teacher training institutions. Although certain subjects had topics which indirectly taught on some aspects of sustainability and ecological balance such as Biology, Chemistry and social studies like mentioned before, not much addressed the actual set of MDGs, which is what ESD and EE have been striving towards achieving. Due to this condition, the Ministry of Education and Skills Development came up with some ways of sensitizing some training institutions such as colleges of education on the issues of EE and ESD through change projects. These projects are in varied areas ranging from infusion of ESD in the curricular, proper disposal of used oil from the institutions kitchen, rain water harvesting and proper disposal of wastewater for purposes of safe re-use. All these projects are in a quest by colleges of Education in Botswana to address matters of sustainability and environmental protection.

The integration of ESD into curricular by Molepolole College of Education is a move that strives towards empowering teacher trainees as to how in their view Botswana has embraced the concept of ESD. Results show that this was a challenging question for most college lecturers. Expressively, it was noted with a surprise that a huge majority of college lecturers were not aware of any innovations or strategies in place to address the ESD call. That is, for the question, how has Botswana embraced the concept of ESD, majority gave answers such as-no idea, I do not know, and, yes (without further explanation). It is therefore imperative for the Ministry of Education, through the department of training as the producer of teachers to take a deliberate initiative of internalizing the ESD concepts in order to impart it to the teachers who in turn must engrave it in the minds of the young ones (Tsayang & Bose, 2013). If government officials or school district administrators are unaware of the critical linkages between education sectors and sustainable development, reorienting education to address sustainable development will not occur (UNESCO, 2013).
The University of Botswana lecturers on the other hand were well informed on ESD issues. From their responses, it emerged that Botswana Government had availed a lot of opportunities to address the ESD call. Participant pointed out that a number of innovations through collaboration between different stakeholders like University of Botswana, NEEC, Department of Curriculum, and Department of Training & Development are being made and initiated to attempt to respond to agenda 21. Participants however decried the fact that there is neither clear national policy nor strategy on ESD. They suggested the need for the Government of Botswana to give greater attention to develop a policy at national level where ESD should be clearly articulated and it would be mandatory that it is mainstreamed in all aspects of education.

CONCLUSION

The findings of this study show an overall agreement among the academic staff at colleges of education and the University of Botswana particularly with respect to curriculum offered to teacher-trainees and ESD components. That is there is a positive picture that the Government of Botswana through the ministry of education and skills development is attempting to address ESD related issues. However, a contradiction was noted particularly at colleges of education in instances where lecturers would indicated that college curriculum has ESD components but fail to show deeper understanding on ESD issues. It is also clear that college lecturers do not have self-willingness to take part in ESD related initiatives of the country. Simply put, it appears ESD issues in most colleges are left the subjects which have topics related to ESD. These arguably show the lack of expertise on such lecturers with the perspective ideals of ESD.

This study maintains that it is imperative to capacitate college lecturers so that they pass requisite knowledge and skills to their students. If children are raised in good ESD ways, they will not lose these good ways when they are older and there will be no need to discipline or fight with them as they will be in good understanding of sustainable development (Tsayang & Bose, 2013). Education for Sustainable Development if incorporated and emphasised in the curriculum in teacher training institutions will enable trainees to understand themselves and others. This will make them understand their links with the wider natural and social environment. It also enables trainees to highlight the importance of respect and care for life in all its diverse forms that involve protection and restoration of the earth’s ecosystems, respect for the dignity and human rights of people, respect for the rights of future generations and respect for cultural diversity.

RECOMMENDATIONS

Bearing in mind the findings, the researchers would advise policy makers in the form of teacher training officers to update curriculum developers and colleges of education, in particular lecturers on EE and ESD issues. Expressly, college curricula, both academic and ‘methods course’ material should be reviewed to add more content on EE & ESD. There is also need for the Government of Botswana to develop an ESD policy at national level to guide all operations and practice with respect to sustainability. There is also a dire need to develop capacity building programmes specifically for college lecturers on issues of Education for Sustainable Development.

References


Effectiveness of Integrated Watershed Management Intervention for Sustainable Development in Meskan District, Southern Ethiopia

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Abstract

The core drive of this study was to measure the effectiveness of integrated watershed management implementation in Meskan district. Systematic sampling technique and random sampling method were used to select sample micro-watersheds and specific households from the two selected intervention and less/ non-intervention areas, respectively.

Data were collected through household questionnaire review, focused group discussion, key informant interview, and field observation. Moreover, physical soil and water conservation structures’ arrangement measurement was piloted. To analyze the data, SPSS version -20 software descriptive statistics, chi-square test, independent t-test, and participation index were used. The study discovered that the intervention has effective progresses in enhancing the attitude of society towards integrated watershed management practices, protecting soil erosion, improving ground and sub- surface water availability, increasing vegetation cover and expanding household income source. However, low public involvement, nonexistence of the structures design arrangement with criteria, and lack of differentiated soil water conservation procedures, lack of regular maintenance time, and unable to use suitable structures for each micro- watersheds were some of the main drawbacks of the implementation. Therefore, this study commends that the stakeholders should make appropriate adjustment measures for practical failures and additional interdisciplinary revision should be heading for discover the difficulties.

Keywords: Meskan district, Integrated, Effectiveness, Intervention, Watershed Management

1. Introduction

The concept of integrated watershed management has established to ensure effective use of social, environmental, and economic capitals. It has been critical in a country like Ethiopia where more than 80% of the population depends on agriculture. A large part of the high land in Ethiopia is categorized by low level of technological change, low productivity, high risk of uncertainty and vulnerability to natural resources degradation [1]. Deforestation, soil erosion, and nutrient depletion are the major social, ecological, and economical problem in Ethiopia [2]. Sustainable development and increased food production in agricultural based developing countries requires availability of sufficient water and fertile land. Water especially affects greatly the prosperity of people and their development potential and health [3].

The recent methodology which should be done critically for effectiveness is integrated watershed management through ‘community based participatory approach’, which requires participation of local people. The government of Ethiopian recognizes the spirit of this methodology as evidences from effectively implemented model schemes appear encouraging. Substantial effort is occurring to replicate ‘community based participatory integrated watershed management’ activities in districts of most regions. As an element of this effort, in the last ten years, a nationwide 30 -40 days watershed management through public work campaign has occurred [4]. But many problems were also recognized that threaten the effectiveness of watershed management. Lack of information and technical advice to support the identification of interventions appropriate for the local context; the uneven distribution of the water management costs and benefits, and uncoordinated interventions of actors and institutions within a watershed weet the main challenges. To solve these challenges and support, best practices scaling up was very important[5]. Moreover, for the last many years, different social activities, such as improvements in monitoring and diverting superficial waters, overgrazing, discovering ground water, and in excess

use of natural resources for a diversity of drives have been accepted without attention. Unable to keeping the natural resource, mishandling of the watershed, and absence of maintaining the quality of environment have greatly affect the sustainable development of the country.

In order to improve the aforementioned problems, the role of participatory integrated effective watershed management is essential. It can prevent the community from flooding and erosion, poor water quality, and water shortage. Subsequently, the rivers, streams, and wetlands of a certain watershed area can provide ecological facilities that maintain the health safety, social, and economy prosperity by developing and distributing cleaned drinking water; maintaining ecological diversity, providing opportunities of recreation that attract tourists; providing opportunities of spawning for commercially valuable fish; raising property values; supporting agriculture, and protecting people and property from risk of flooding [6].

The Government of the country (Ethiopia) is undertaking community based watershed management practices all over the country mainly during the last 10 years [7]. According to Meskan district office of Agriculture, there are exhaustive watershed management activities in the local areas following the program launched by the government and almost all kebeles of the district practicing in different SWC activities, containing biological and physical measures. However, until now, Effectiveness of those conservation activities for the local condition was not continually evaluated throughout the country. The monitoring system of those interventions is fragmentary, and there is weak maintenance of physical structures [8]. As it is also the Governmental approach to solve natural resources degradation and enhance productivity for future sustainable development, the issue should have to get more attention. This being a general scenario, no much research is yet done to evaluate the successfullness of IWSM interventions in relations to its biological and physical impact in the study area. This study is, therefore, intended to evaluate the effectiveness of IWSM interventions in Meskan district through identifying the main watershed management interventions implemented, evaluating the outlook of the local society towards the intervention, identification of supporting institutions, evaluating selected intervention measures in terms of their scientific standard and investigating the environmental contribution of watershed management activities.

2. Materials and Methods

2.1. Study Area Description

The research was conducted in Southern Nation Nationalities and Peoples Regional State, Gurage Zone, Meskan District, Ethiopia, which lies between 7°50'0'' N and 38°20'0'' E respectively and 130 km far away from the capital city of Addis Ababa, 155 km from regional capital city of Hawasa, and 100 km from zonal capital city of Wolkite. The district has 42 kebeles totally, among these, 40 of them are rural kebeles while the rest 2 are urban kebeles.

According to (Meskan district finance and economic development office, 2018) and (CSA), the estimated total population of the Woreda is 222,602 (109,549 men and 113,060 women). The total household number is 46,570 of this 29,398 are men headed households and 17,172 are women headed households. The district is located at an altitude range of 1501-3500 masl. The mean annual rainfall of the area is 1001-1200 mm. The topography of the district is 55% leveled land, 35% sloppy and 10% high land. From 50,177 ha, total area coverage of the district the land which used for cultivation is 13,579. Total land covered with perennial and annual crop is 9.9,31.3 ha,respectively. 25.22 ha shrubs land,grazing, and forest, and 26.73 ha is covered with others. The lower watershed part of Zebidar mountain (the highest mountain in the region) with high risk area to soil erosion by runoff; land slide and changing the river direction causing social &economic crisis in the woreda and the administration center of the study area (Butajira city) with a population of around 100000 the impact watershed has direct impact also on the city administration as well.
2.2. Primary and Secondary Data Collection and Analysis

The study was conducted on four sub-watersheds, which are selected systematically: this systematic selection has been done in order to use best matched watersheds for comparison; two have watershed management intervention, while the others have less/no intervention. The historical similarity before watershed management intervention, to collect the data, 200 households were survived; 12 key informant’s interview was conducted (key informants were carried out with 3 elders, 3 local administrators, 3 youth leaders, and 3 experts), and 8 focus group discussions were conducted (the focused group discussion includes 12 to 15 people in each group and community elders, youth and females was included in the focused group discussion).

For secondary data, I have collected reports from district to regional level; the police documents of the country have been reviewed; tried to collect image documented in different years, and physical observations were done to found the actual condition of the study area in different aspect of the study.

The survey was conducted by using both open and closed ended structured questions. In addition focused group discussions were conducted based on checklists and semi-structured questionnaires, and in-depth. During this session, respondents permitted to express their opinions, views, feelings, and perspectives about the research process and outcomes. Soil and water conservation structures layout measurement was conducted on sample households’ catchments and numerical symbols (coding) was done, and then the collected data entered into Statistical Package for Social Science. Finally, descriptive statistics, t-test, chi-square test, participation index and logistic regression model were used for analysis.

3. Results and Discussion

3.1 Level of knowledge, participation, and perceptions of the society about IWSM

The concept integrated watershed development program with participatory approach was emphasized since the last 25 years. This approach has been focused on soil and water conservation measures to improve crop productivity and livelihood in watersheds [9]. To achieve this goals the first priority should be changing the attitude and knowledge of the society instead of thinking for day today problems, such as fuel wood, food consumption, and extracting construction materials; it is better to keep integrated and sustainability of natural resources by soil and water conservation. As shown in Table-1, 90% from intervention category and 85% from nonintervention category respondents rated first that water and soil conservation is as means to get integrated economic, social

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an environmental benefits; and it is the same to result with key informants and group discussions, Indicating that the attitude of the society in the study area is positively changed and they accept the integrated approach of the program.

Table 1. The reason to participate on watershed management

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<tr>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>200</td>
</tr>
</tbody>
</table>

Source SPSS Analysis

As shown from the Table-2a, the level of knowledge as assessed from the respondents rated 0.5% very low, 7 % low, 17.5 % medium, 47 % high, 28 % very high, suggesting that 75% of the respondent the level of knowledge is high and fromTable-2b, the chi-square test the p value <0.05 shows that have significant difference between intervention and non-intervention area, this result is consistent to the previously published literature .[9]

Table-2a. Level of knowledge about IWSM

<table>
<thead>
<tr>
<th>Level of knowledge about IWSM</th>
<th>Intervention category</th>
<th>Total</th>
<th>Level in %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very low</td>
<td>With intervention</td>
<td>1</td>
<td>0.5</td>
</tr>
<tr>
<td>Very low</td>
<td>Less intervention</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>With intervention</td>
<td>3</td>
<td>7</td>
</tr>
<tr>
<td>Low</td>
<td>Less intervention</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Medium</td>
<td>With intervention</td>
<td>15</td>
<td>17.5</td>
</tr>
<tr>
<td>Medium</td>
<td>Less intervention</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>With intervention</td>
<td>53</td>
<td>47</td>
</tr>
<tr>
<td>High</td>
<td>Less intervention</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>Very high</td>
<td>With intervention</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td>Very high</td>
<td>Less intervention</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Table2b Chi-Square Tests

The reason to participate at IWSM * Intervention category

One of the means to check the attitude (perception) of the society towards integrated watershed management practices is on the participation during the practical implementation of the program and the driving force to participate on the program. As shown in the Figure 2, eventhough men have the highest rate, the participation of the society with intervention area and non intervention area is almost the same that means (men, women, and youth,) all participate with out gender and age defference. From this, we can conclude that the participation of the society is good and shared as best practicies between the intervention areas.

**Source SPSS Analyses**

As observed from the Figure 3, the respondents replied that the reason to participate at IWSM 96% and 81% understanding the value, 2%and 12% fearing of isolation, 2% and 2%fearing of punishment,0% and 5% political enforcement, with intervention and non intervention respectively, this shows that the perception of the society is very good and the society participate in the program by understanding the vale of the program from (Table-3a) the chi-square test p value (0.004) is less than 0.05 which means is has significant deference between the catagories. In addition to this, the perception of the society more than 80% is high and very high 17.5 % is medium and 2.5%is low as shown in the table below (Table- 3 b)

**Figure- 2. The most participant in the society**

**Figure- 3 The reason to participate at IWSM**
Table-3a Chi-Square Tests

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>13.414*</td>
<td>3</td>
<td>.004</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>16.129</td>
<td>3</td>
<td>.001</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>9.124</td>
<td>1</td>
<td>.003</td>
</tr>
</tbody>
</table>

N of Valid Cases 200

a. 4 cells (50.0%) have expected count less than 5. The minimum expected count is 2.00.

Table-3b Perceptions of the society about IWSM

<table>
<thead>
<tr>
<th>Perceptions of the society about IWSM</th>
<th>Intervention category</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>With intervention</td>
<td>Less intervention</td>
</tr>
<tr>
<td>very low</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>low</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>medium</td>
<td>10</td>
<td>25</td>
</tr>
<tr>
<td>high</td>
<td>45</td>
<td>62</td>
</tr>
<tr>
<td>very high</td>
<td>40</td>
<td>13</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

3.2 Effectiveness of the training

Building the capacity of local communities and extension workers are an important component in watershed management. Different people have different roles and responsibilities in watershed projects implementation and there is a need to train people involved in the watershed development program. The purpose of training is to achieve sustainable village/community-based development with
integrated watershed management serving as a tool. Training can enhance knowledge, attitude, skills, and relationship [7]. Thus, to empower the attitude of the society to wards the program increasing the knowledge of IWSM its social economic, environmental value and sustainable development in the study area different trainings were given by stake holders like the government officials, development agents, NGOs, and community leaders its impact have significant change in the community in conserving natural resources by preventing soil erosion increasing soil fertility and moisture conservation but the effectiveness is different from place to place and between the two intervention category as show in the Figure 4 below the training effectiveness is very high in the intervention area while it is low in the non intervention area [10] from this result we can conclude that means and aprouch of the training should be taken as best practice from intervention area. Moreover, this result is also similar with the China Watershed Management Project (CWMP), is contributing to the improved management of the Yellow River, and other basins, by developing best practice models for watershed management[11].

Figure -4  Effectiveness of the training

3.3 Types and reliability of SWC structure
Each soil and water conservation structure has specific standards according to the slope, soil type, amount of rain fall. Research findings suggest that structures constructed under these standards are less effective in controlling erosion. Improper construction of structures leads to a series soil erosion by collecting the surface runoff and increasing collective high volume flow. Thus, keeping the construction minimum standards is not optional it is mandatory. As shown in the Table 4, 68% of the respondents agreed that all type of soil and water conservation, 16% stone bunds, 4.5% stone bunds, 3.5% fanyaju, and 8% planting tree seedling, indicating that most of the society agreed that all types of soil and water conservation structures are implemented on their locality; and the reliability of the structures are also 1% low, 36.5% medium, 62% high, 0.5% very high. And also from key informant and focus group discussion have the same conclusion. From field observation and some of key informant realized that fanyaju is not appropriate some parts of the study area this similar to the founding of [10]. From this, we can conclude that all structures implementation is not appropriate to all the study area.

Table -4 a Type of conservation practice

<table>
<thead>
<tr>
<th>Type of conservation practice</th>
<th>With intervention</th>
<th>Less intervention</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stone bund</td>
<td>17</td>
<td>15</td>
<td>32</td>
</tr>
<tr>
<td>Soil bund</td>
<td>1</td>
<td>8</td>
<td>9</td>
</tr>
</tbody>
</table>

water Fanyaju
conservation planting tree seedling
all

total

<table>
<thead>
<tr>
<th></th>
<th>3</th>
<th>4</th>
<th>7</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6</td>
<td>10</td>
<td>16</td>
</tr>
<tr>
<td></td>
<td>73</td>
<td>63</td>
<td>136</td>
</tr>
<tr>
<td></td>
<td>100</td>
<td>100</td>
<td>200</td>
</tr>
</tbody>
</table>

### Table- 4 b Reliability the structure * Intervention category

<table>
<thead>
<tr>
<th>Reliability the structure</th>
<th>With intervention</th>
<th>Less intervention</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>low</td>
<td>0</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>medium</td>
<td>36</td>
<td>37</td>
<td>73</td>
</tr>
<tr>
<td>high</td>
<td>63</td>
<td>61</td>
<td>124</td>
</tr>
<tr>
<td>very high</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>200</td>
</tr>
</tbody>
</table>

### 3.4 Maintenance responsibility, timing, and management of the structure

As shown in the figure 5 and Table 5a, the sustainability of SWC depends on who takes the responsibility to maintain the structures at a regular time. From the household survey, 83.6% household leaders, 8% development agents, 8% NGOs, and 0.4% others agreed that the responsibility is taken by households. However, when we analyze the maintenance time 80.4% of the respondents replied that the maintaining time is occasional 10.6% regular and 9% replied as unknown, this shows that the society accept the responsibility to maintain and manage the soil and water conservation by themselves but there is series problem on maintain the structures regularly, this is the same conclusion with focus group discussions and key informant interviews. This is towing to the problem that the district agricultural office mainly focus on the expansion of the SWC rather than maintaining the structures at regular time, which is the same to [12] found poor structure maintenance in Campaign works watershed Management

### Table- 5 a Who takes maintenance responsibility * Intervention category

<table>
<thead>
<tr>
<th>Who takes maintenance responsibility</th>
<th>With intervention</th>
<th>Less intervention</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>household leaders</td>
<td>99</td>
<td>59</td>
<td>158</td>
</tr>
<tr>
<td>development agent</td>
<td>1</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>NGOs</td>
<td>0</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>others</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>89</td>
<td>189</td>
</tr>
</tbody>
</table>

Figure -5 Who take maintenance responsibility
Table 5c Chi-Square Tests

<table>
<thead>
<tr>
<th>Test</th>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>8.744a</td>
<td>2</td>
<td>.013</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>8.987</td>
<td>2</td>
<td>.011</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>.629</td>
<td>1</td>
<td>.428</td>
</tr>
</tbody>
</table>

N of Valid Cases 189

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 8.01.

3.5 The effect on improving income source of the society
The socioeconomic impacts of integrated watershed management for sustainable development were assessed based on income, assets owned by farm households, income diversification, employment opportunities, food security, health and education. Most of the key informants interviewed suggested that their socioeconomic conditions improved since integrated watershed management activities began in their communities. The study clearly reveals that the problem of watershed management problems could not be solved without addressing the socio-economic problems of the area. Development organizations need to take income generation and farmer market participation more into account as powerful mechanisms positively or negatively influencing watershed management. More farmers need cash income for their households [13]. To solve the problem, the program should be linked with incomes generating mechanisms” to the society in general and youth, poor and landless in particular (i.e. improving the livelihood of inhabitants) in addition to the improvement of crop and livestock production to keep the sustainability of the program; it should be related with daily life of the community as shown in the table below the program is one source of income like selling fodder crops, Bee farming, seedling preparation, environmental protection, and Daily labor listed in priority as source of income in the watershed area, this result shows that from independent sample T-test 95% confidence interval of the difference (table -6) selling of fodder crops is the main source of income in the study area.[3]

<table>
<thead>
<tr>
<th>Value on</th>
<th>Levine’s Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>Sig.</td>
<td>t</td>
</tr>
<tr>
<td>Selling fodder crops</td>
<td>0.039</td>
<td>0.845</td>
<td>0.399</td>
</tr>
<tr>
<td>Bee farming</td>
<td>9.043</td>
<td>0.003</td>
<td>-1.642</td>
</tr>
<tr>
<td>Seedling preparation</td>
<td>1.41</td>
<td>0.236</td>
<td>1.6</td>
</tr>
<tr>
<td>Environmental protection</td>
<td>26.248</td>
<td>0</td>
<td>-1.977</td>
</tr>
<tr>
<td>Daily labor</td>
<td>8.826</td>
<td>0.003</td>
<td>-1.251</td>
</tr>
</tbody>
</table>
3.6 Its effect on surface water availability and expansion of irrigation

The implementation of IWSM in the study area has great impact on the availability of surface and ground water and it leads to the expansion of irrigation. The local communities categorized the availability of water into four classes: namely, very low, low, medium, and high.

The presence of water sources, the volume of water sources, its nearness to the settlement and constant flow rate of the water sources were the main criteria locally used to categorize the availability of water resources in the study area. According to respondents, the area which has several water sources with continuous flow rate and nearest to the settlement is characterized as high. On the other hand, if the area has no several water sources, fluctuated flow rate and far away from the settlement, the water availability is considered as low. Moreover, if the case is in between the above two category the water availability is termed as medium if it is series problem they termed as very low.

Most of respondent in the intervention area rated water availability as high, while non-intervention site as medium. The result observed indicates statistically significant variation between the two intervention categories of areas in water availability. The availability of water in the less/non intervention area is less than the intervention one. Moreover, from group discussion and all key informants from the intervention micro watershed also expressed that the soil and water conservation structures constructed on farmland have contributed to the water from rainfall to be enter in the soil rather than being runoff, and it increased the soil moisture content. These indicate that the intervention has positive contribution for the improvement of water availability in the area. This result is similar with findings of [14] in India. The impact of watershed management on subsurface water availability developed springs, shallow and hand-dug wells, hand-dug wells and water harvesting pond although the level of changes varies from watershed to watershed. From the respondents, focus group discussion, key informant, and field observation founded that groundwater can be found at depths of less than 8-12 m, as compared to depths of more than 25-50 m prior to watershed management interventions. This leads the farmers to expand the irrigation system in the study area and have significant change in food security. The impact is more visible on groundwater recharge than surface runoff this result is similar to [15].

3.7 The effect on improving soil fertility and crop production

Agriculture is the main income source of the community in the study area. Mixed farming which involves crop production and animal husbandry is adopted by all farmers. Crop production in the area includes the production of staple food crops, cash crops and cereal crops. The survey result depicted that majority of the respondents in both sites categorized their land soil fertility is improved time to time due to the fact that replied as great change in crop production in general [16]. Empowering farmers to have how to alleviate degradation and how to maintain sustainability of natural resources through training has a great contribution in conserving watershed resources. The survey result indicated that most of the respondents agreed the advantage of soil and water conservation structure on their watershed catchments. Out of the selected respondents more than 99% of them address that soil and water conservation structures have positive impact by improving their land through preventing erosion, increase soil depth, enhancing land productivity, and moisture conservation. The study conducted in Amhara Region by [17] also indicated that the participants had evaluated the soil and water conservation works as good. Similarly, 95% have believed there were differences between conserved and none conserved areas in terms of soil erosion problems and productivity. Farmers emphasized that their conserved farm catchments are more fertile than the non-conserved ones since the latter are more disposed to soil erosion than the former. In similar study conducted Gunano watershed of Wolaita southern Ethiopia farmers perceive that soil bunds improve the fertility of the soil and then increase yield [18].

3.8 Impact on Sustainable development

Sustainable development is a development that meets the desires of the present without compromising the capability of next-generation to meet their own need. It is not so easy to realize and answering the key components of IWSM interventions for the future generation, therefore, it is the time to create the actual research basis and do act depending on it for the future generation of IWSM for sustainable development issues[19]. Improving the lives of a few hundreds or even thousands of farmers does not necessarily amount to generating sustainable development. Likewise, conserving the soil in thousands of plots does not automatically amount to managing and rehabilitating the whole watershed. The only hope of achieving a lasting impact with relatively modest funds is to foster development which starts something that will continue to grow and spread on its own. This contrasts with many current projects that continue to provide inputs but do not aim for self-perpetuating growth. Projects need to limit themselves to practices that are of such benefit to the farmer that s/he will continue them on his/her own and his/her neighbors will emulate, and will continue to change the landscape, even long after the project itself or other assistance promoting the practice has ended [13] to achieve this goal the attitude of the society for future generation has great impact on the other hand, as shown in the table -7 below the sustainability issues of the watershed plans and technologies implementation in both intervention and non-intervention is almost the same 46.4% very high, 44% high, 9% medium, 0.5% low, and 0.5% very low. This result show that 90% of the respondents replied that participating

in integrated watershed management program highly increased the attitude of the society to work for future generation in sustainable way this is the same conclusion with key informants and focus group discussions. From this we can concluded that the implementation of IWSM has significant contributes for the sustainable development of the study area. This is the same result found [20]

<table>
<thead>
<tr>
<th>Intervention category</th>
<th>With intervention</th>
<th>Less intervention</th>
<th>Total % share</th>
</tr>
</thead>
<tbody>
<tr>
<td>The value of thinking for sustainability</td>
<td>very low</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>low</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>medium</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>high</td>
<td>49</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>very high</td>
<td>39</td>
<td>52</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
<td>200</td>
</tr>
</tbody>
</table>

4. Conclusions

The watershed management intervention in Meskan district was effective in several aspects; mean while it has also the components in which the implementation has unsatisfactory achievements. The findings indicated that the watershed management intervention brought decreasing soil erosion, enhance soil fertility, increasing of crop and livestock production, improvement of surface and ground water availability, and development of vegetation cover and improve income source of the society specially for youth and landless and create positive attitudinal change on the society about sustainable development in its intervention area.

The participation status of communities in watershed management was good. The structural arrangement of the institution was participatory; most of community leaders at lower level is committed to take their responsibility. But, some administrative bodies of the local area instead of dedicating their effort for the community development through sustainable IWSM they have their own motives and concerns like securing authority for long period of time.

Most of introduced physical soil and water conservation structures are appropriate for the area. that means in most micro-watersheds, structure selection, design, construction, and spacing were appropriate. However, in some micro-watersheds errors need correcting, such as; too long bunds without space for land users to move across farmland, bunds with narrow berms, poor stone bund foundations, and shallow channel depth. Moreover, the effort that exerted to repair the broken/sediment filled/structures is poor in some area and needs attention, which affect the long term fate of these structures. However, the implemented structures layouts were not related with the standards. Besides to the limitation on layouts of the structures, the diversity of implemented structure was also having some problems. And also, the management of implemented SWC structures with regular maintenance was not practiced in the area. In spite of having the limitations due to many reasons, the overall evaluation showed that IWSM intervention for sustainable development has effective achievements in the area.

5. Recommendations

- The local communities are expected to devote themselves for the success of IWSM interventions for sustainable development.
- The government of the district is expected to develop the knowledge, skill, and capacity of the society, community leaders, community facilitators, in relation to IWSM for sustainable development through capacity building.
- The soil and water conservation structures should be maintained with a regular time and the implementation should be related with the standard.
- The current watershed management approaches mostly focuses on physical part of the implementation/soil and water conservation, rather than integrating the biological part, but effective watershed management requires multidisciplinary and innovative approaches based on the local situation.
- Comprehensive baseline survey of the IWSM is needed before onset of the watershed activities at watershed level to expand best practices of the impact of the intervention.
- Furthermore, interdisciplinary study for related to sustainable development is recommended to be done in the same study area or elsewhere in the region to provide empirical evidences for the country situation.
• In addition to increasing the vegetation cover by expanding the plantation approach, should be one source income focusing on edible fruit, and select tree seedling

Acknowledgements

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And also, I would like to extend my thanks to SNNPR Youth and Sport Bureau for transport and stationary support and Meskan district agriculture office, development agents, and kebele leaders who take the full responsibility and commitment to facilitate informants for data collection. Finally, I would also like to thank my advisor for his unfailing guidance and his kind support.

References


Abbreviations

IWSM  Integrated watershed management
CSA - central statistics agency
KEBELE- Lower administrative structure of the country

SWC-Soil and Water Conservation

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Assessing Barriers To Household Waste Recycling: A Case Study Of Coventry University Postgraduate Students

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Abstract- Household waste recycling requires the participation of all individuals which include student’s population who are transient in nature but contribute largely to waste generation. A case study of Coventry University Postgraduate (CUPG) students, with the objective to identify the barriers facing these group of students. To give every student an equal opportunity of selection, simple random sampling was used for data collection. To get at least 100 responses, a number of 150 CUPG students were sampled, using questionnaires as a tool for data collection. Out of 150 questionnaires administered, 128 questionnaires were retrieved. SPSS was used for data analysis to identify the various barriers that CUPG students face in recycling household waste. Findings obtained show that behaviour and attitude barrier are interdependent on knowledge barrier as results reveal that although 67% are in the habit of recycling, 82% are too busy to sort out their recyclables (Behaviour Barrier) and 85% are of the opinion that they will recycle more if they understand the benefit of recycling (Attitude Barrier); majority of the students (93%) were in need of bigger bins and more storage space for their bins (Situational barrier). Emphasis was made on knowledge barrier being a major challenge therefore, this study recommends the need for more awareness for students to understand the need and benefit of recycling.

Index Terms- Household Wastes, Recycling barriers, Transient Students, Awareness level, Recycling habits, Postgraduate Students

I. INTRODUCTION

House of Commons (2014) report on waste management in England reported that approximately 177 million tonnes of waste is discarded yearly in England. 22.6million tonnes of the total waste discarded are household waste, which weighs averagely 423kg waste per person. Discarding this amount of waste shows poor waste consumption which has negative impact on the environment. House of Commons (2014) identified household waste recycling to be a top priority in recovering back lost resources.

Increased recycling is a vital way of mitigating waste generation as it reduces dependency on landfill which is detrimental to the environment and leads to air pollution, groundwater contamination, methane emissions and increase in resource loss Hershkowitz, (1997) and WRAP (2010a). According to WRAP (2008) effective recycling has a link with individual participation. Four basic barriers were identified that are likely to hinder public participation in recycling: Knowledge, Behavioural, Attitude and Situational barrier. Perrin and Barton (2001) pointed out the key barrier as knowledge barrier. Their survey on two kerbsides identified the main reason given by respondents before scheme implementation were lack of time and inconvenience, of which after implementing the scheme, the participation level of individuals increased by half the population compared to the previous scheme. According to WRAP (2008) knowledge barrier could be seen as a challenge, as there could be poor understanding on why people should recycle. This was further agreed by (Mori 2002) survey which identified that people are unaware of recycling and its importance. Furthermore, DEFRA (2002); Mee et al. (2004) and Zen et al. (2014) also agree that storage space and insufficient facilities are possible factors that limit household waste recycling. In addition, Hernandez et al. (1999) in Ecuador ascertained that economic incentives to sell recyclables are a motivating factor to individuals especially to those who earn a low income thus enhancing their attitude towards recycling.

The University population is a large, transient group which significantly contributes to the environment. Assessing their behaviour and attitude towards the environment is imperative in enhancing recycling rate and similarly reducing waste generation. Adomssent (2013), Corcoran and Wals (2004) opined that higher institutions have key roles to play towards effective recycling rate. Based on previous studies, to enhance the recycling rate and reduce waste generation. Students are special group of the public that their recycling behaviour need to be explored. Studies by Robertson and Wallington (2009) discovered that recycling participation is centred on other populations with little or no attention given to the younger population such as the University Students. This propelled a study to investigate Oxford University student’s behaviour on recycling.

Timlett and Williams (2009) studied the impact of transient or temporary students on recycling using a survey of 1300 households. 40% of the households surveyed, lived in houses for over three years which he termed as long-term residents and about 48% lived in houses for about a year or less. Based on the results obtained from these two groups, the study concluded that the longer the students live in a particular house the better their recycling participation. It was further discovered that 21% out of the 1300 households surveyed were students who live in rented...
houses of which 92% of the students’ population live in a house a maximum of one year. He then concluded that because of student’s short-term residency, they tend to recycle less as they are not attached to a particular location as shown in figure 1, where long term residents recycle more than short term residents.

Figure 1 Residence duration of stay and their recycling rate. Source: (Williams and Timlett 2009)

Therefore, using CUPG students as a case study, this study aims at assessing the various barriers that impedes the recycling rate of this group of the public. Thereby suggesting ways through which their recycling behaviour could be improved.

II. MATERIALS AND METHODS

Study Area

Coventry University is situated in Coventry City on coordinate 52°24’29” N 1°30’38” W. Coventry City is 31km east-southwest of Birmingham, 39km southwest of Leicester, 18km north of Warwick and 151km Northwest of London. Coventry is an urban area in the West Midlands of England in the central part of the British Islands with an approximate population of over 300,000 people.

2.1 Method of Data Collection

This study employed the use of questionnaire using the 5 point likert-scale from strongly agree, agree, strongly disagree, disagree and I do not know. Using simple random sampling technique, the questionnaires were distributed at random giving every respondent equal opportunity to respond to the questionnaire administered.

2.2 Population and Sample Size

CUPG students were used for this study which were students from Engineering, Arts and Social Science department. The CUPG students are a typical example of transient students, as most of the student’s duration of study was for a period of one year.

To determine the sample size from an unknown population size, this study used the formula suggested by Saunders et al. (2012) which is:

\[ N^A = \frac{n \times 100}{r_e \%} \]

Where, \( N^A \) = actual sample size, \( r_e \% \) = estimated response rate 100 = Constant Value

Using the formula above the sample size required for this survey is:

\[ N^A = \frac{100 \times 100}{95 \%} \]

\[ N^A = 105 \text{ questionnaires, the actual sample size for this study} \]

According to (Moore 2000), for a population, a sample size of at least 100 should be used for a survey. To obtain at least a 100, this study administered about 150 questionnaires at random to the CUPG students mainly in the Engineering, Arts, Social sciences and Humanities department. A number of 128 questionnaires were retrieved for analysis. This study observed ethical consideration and approval before administering the questionnaires.

2.3 Method of Data Analysis

This study used Statistical Package for Social Sciences (SPSS) to analyse the data obtained from the CUPG students and to derive descriptive statistics. Figures in form of graphs were drawn out for better discussion and clarification of the data obtained. Each column of the figures represents a question and responses of the 128 CUPG students.

III. RESULTS AND DISCUSSIONS

A sample size of 128 students was used for the study. The data obtained was analysed and represented in a descriptive format with frequency tables and graphs. To achieve the objectives,
graphs were used to summarise the responses of CU students to identify the different barriers that could be a challenge to students recycling efficiently, using the 4 identified barriers; knowledge, behaviour, attitude and situational barrier as key indices to understand the students level of recycling participation. The following questions were used to describe the knowledge barrier:

3.1 KNOWLEDGE BARRIER

Table 1 summarises CUPG student’s responses to the behavioural pattern;

<table>
<thead>
<tr>
<th>s/no</th>
<th>Variables</th>
<th>Scores</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I am aware of recycling</td>
<td>25</td>
<td>98</td>
</tr>
<tr>
<td>2</td>
<td>I agree that recycling is good</td>
<td>121</td>
<td>99</td>
</tr>
<tr>
<td>3</td>
<td>I do not think recycling is important</td>
<td>4</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>I am aware of the collection days</td>
<td>68</td>
<td>54</td>
</tr>
<tr>
<td>5</td>
<td>I am of the opinion that there should be more collection days</td>
<td>76</td>
<td>59</td>
</tr>
</tbody>
</table>

Table 1 showing the frequency table of CUPG students responses to recycling

Figures 2 and 3 describes the knowledge barrier:

![Knowledge Barrier](image)

Figure 2 identifying the knowledge barrier of students recycling habit

Table 1 and Figure 2 summarises that 98% of students are aware of recycling, 95% agree that household recycling is a good waste reduction strategy although 2% do not think recycling is important, 54% are aware of their collection days, 84% are aware of their local councils being responsible for taking away their waste and 59% are of the opinion that there should be more collection days.

The results obtained indicates that CUPG students are familiar with the practise of recycling and agree that recycling is important this is in accordance with Thang (2011) survey on students are being aware of recycling and agreeing that recycling is important. CUPG students see the importance of recycling but only 54% of the students actually know when their recyclables are being collected by the local council. This shows that it is one thing to be aware of recycling and it is another thing to participate fully this is in line with Aini et al. (2007) whose study reveals that students are generally aware of recycling but a lesser number actually participate in recycling.

To further understand the actual waste that CU postgraduate students recycle, Fig 2 and table summarises their responses and awareness of the recyclables they should recycle.

<table>
<thead>
<tr>
<th>S/No</th>
<th>Variables</th>
<th>Score</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I recycle glass</td>
<td>24</td>
<td>19</td>
</tr>
<tr>
<td>2</td>
<td>I recycle green waste</td>
<td>32</td>
<td>25</td>
</tr>
<tr>
<td>3</td>
<td>I recycle paper</td>
<td>51</td>
<td>40</td>
</tr>
<tr>
<td>4</td>
<td>I recycle plastics</td>
<td>39</td>
<td>30</td>
</tr>
<tr>
<td>5</td>
<td>I do not know</td>
<td>17</td>
<td>13</td>
</tr>
</tbody>
</table>

Table 2 showing the frequency table of the recyclables CUPG recycle
Students understanding of what to recycle is imperative as it was discovered that 19% of the CUPG students recycle glass, 25% recycle green waste, 40% recycle paper, 36% recycle plastics and 13% do not know what to recycle. From results shown, students recycle more of paper and plastics, this is similar to Wilcox (2014) research study in Wartburg College, 100% of students in the study recycle paper, 91% plastics, 15% glass and only 6% recycle organic materials, Wilcox concluded that students find it easy to recycle paper and plastics as they are more aware of recycling paper and plastics. This makes it a challenge when students do not know what to recycle, this is in line with previous studies such as Foltz (1999); Barr et al. (2003), Mc Donald and Oates (2003). Furthermore, study carried out by Tonglet et al. (2004) pointed out that availability of kerbside scheme is not enough to increase recycling rate as in-depth knowledge on what and how to recycle needs to be clearly communicated to postgraduate students as it is to the general public. Similarly, Miranda and Blanco (2010) investigation on high paper recovery in European countries came to a conclusion that awareness is the major factor influencing high recycling rate.

This indicates that CUPG students recycle more of paper and plastics probably because they are more aware of recycling paper and plastics. Enlightening CUPG students frequently on what to recycle as well as making it easier for them to recycle will probably enhance them to recycle more items. This is in line with the study carried out by Kelly et al. (2006). However, the reason 13% of the CUPG students do not recycle, may include not being bothered or having time to recycle as this cannot be considered as a knowledge barrier but a mindset towards recycling. Nevertheless, if these 13% of residents are more knowledgeable about the benefits of recycling they might have a positive perspective towards recycling.

3.2 BEHAVIOUR BARRIER

To understand the behaviour of the students, Table 3 and Fig. 4 shows that 23% of students are not in the habit of recycling, 8% have no idea why they should recycle and 32% forget to recycle. Most of the students (82%) are too busy to sort out their waste which is in line with Perrin and Barton (2001) on kerbside survey in Leeds which identified that individuals find it difficult to sort out waste, (95%) have a challenge of identifying recyclables and therefore finding recycling complicated. Mori (2002) identified that individuals have no time to sort and store recyclable waste which affects the recycling behavior of individuals. It is therefore suggested that a simplified separation and collection system could result to an increased recycling rate. Provision of a wide range of collection bins will make it easier for the CUPG students to recycle more. On the overall, analysis of behavioral barriers shows that 77% are of the habit of recycling but only 33% take extra effort to separate their waste.

<table>
<thead>
<tr>
<th>S/No</th>
<th>Variables</th>
<th>Score</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I am not in the habit of recycling</td>
<td>29</td>
<td>23</td>
</tr>
<tr>
<td>2</td>
<td>I have no reason why I should recycle</td>
<td>10</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>I forget to recycle</td>
<td>41</td>
<td>32</td>
</tr>
<tr>
<td>4</td>
<td>I have better things to worry about than to recycle</td>
<td>69</td>
<td>54</td>
</tr>
<tr>
<td>5</td>
<td>I am too busy to sort out waste or recycle</td>
<td>105</td>
<td>82</td>
</tr>
<tr>
<td>6</td>
<td>Identifying recyclables can be complicated</td>
<td>121</td>
<td>95</td>
</tr>
<tr>
<td>7</td>
<td>I have an extra bin to help me recycle more</td>
<td>40</td>
<td>33</td>
</tr>
</tbody>
</table>

Table 3 showing the frequency table of CUPG students behavior to recycling.
Further analysis of behavioral barrier shows that more than half of the population (54%) agreed that they had better things to worry about than to recycle, this is in line with Knuseen et al. (2004) study, they discovered that young people tend to be not concerned about recycling as student’s transient and time pressured lifestyles tend to shift their interest from recycling thereby influencing their recycling behavior negatively. Furthermore, Busteed et al. (2009) opined that students do not feel a sense of belonging to a community and therefore see themselves as temporary residents this might suggest a global attitude to the environment as they do feel responsible for a particular environment Thus, CUPG students could be enlightened more on the importance of recycling. There is therefore a need for short term residents to be aware and understand the need to be responsible to their environment wherever they reside regardless of their duration of stay.

### 3.3 SITUATIONAL BARRIER

To understand the situational barrier of the students towards recycling as revealed by WRAP (2015) and Coggins (1994), unavailable space and limited bin size could be a limiting factor of recycling. When students were asked how they would react to damage/loss of recycling bins, 37% said they would report to their city council, 27% said they would report to their landlord, 32% have no idea of who they would report to. This shows that knowing who to report to plays a key role in the recycling habits of the students. Figure 4 shows how effective the students recycling bins have efficiently influenced the students recycling habit. And as seen in figure 5, majority of the population (93%) agreed that there is a need for larger sized bins while 15% were satisfied with the size of the bin, 7% were neutral of the bin size. Studies such as, Coggins (1994), DEFRA (2002) and Zen et al. (2014) opined that insufficient recycling bins and space are limiting factors to recycling.
3.4 ATTITUDE BARRIER

Figure 6 illustrates the barrier and motivating factor that influences CUPG student’s attitude towards recycling. 85% of the CUPG students indicated that they will recycle more if they are aware of the benefits of recycling. Lee (2008) study on environmental attitude of American African College, explains that students with positive environmental attitude tend to recycle more. Blake (1999) identified that the main barrier to environmental issues is lack of information as information provides knowledge which shapes attitude therefore leading to a behavioral pattern. However, Sammer and Wustenhagen (2006) indicated that people may be aware of environmental issues yet it does not motivate them to participate in recycling as attitude is built on awareness. Retallack et al. (2007), attitude transformation towards recycling depends largely on incentives and regulations as indicated in figure 6 where 85% of the students indicated the need of incentives to recycle more. Furthermore, findings show that increased fine affects recycling as shown in fig 6 where 43% agree that penalty increases recycling rate. According to Amini et al. (2014) fine penalty is one major factor which enhances recycling rate although Timlett and Williams (2011) argued that students of low financial status might not be able to cope with the payment of fines. Results show that 73% of the students see themselves as temporary residence they do not see a need to recycle as seen in the study of Timlett and William (2011) where transient residents do not feel obligated to recycle. Transient students feel that they do not need to recycle but as seen in previous studies and this study awareness on the need to recycle, provision of incentives as a motivation factor and implementation of regulations by demanding fines moderately in convenience with students of low financial class will motivate students and other transient group to recycle more no matter their duration of stay.

In summary, this paper identified and agreed with WRAP (2015) that there are 4 major barriers that impede household waste recycling; these are knowledge, behaviour, attitude and situational barrier. In order of importance table 6 summarises the 4 barriers that impedes the CUPG students from recycling household waste regardless of the fact that they are seen as a transient group among the population at large.

<table>
<thead>
<tr>
<th>Barriers identified</th>
<th>Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Knowledge</td>
<td>Difficulty in identifying waste that should be recycled</td>
</tr>
<tr>
<td></td>
<td>Unaware of the collection days</td>
</tr>
<tr>
<td>2. Attitude</td>
<td>No incentive to motivate students to recycle more</td>
</tr>
<tr>
<td></td>
<td>No understanding to why students should recycle</td>
</tr>
<tr>
<td></td>
<td>Students being a transient group have no sense of belonging to the environment</td>
</tr>
<tr>
<td>3. Behavioural</td>
<td>Students are too busy to sort out their waste</td>
</tr>
<tr>
<td></td>
<td>Students have better things to worry than recycling</td>
</tr>
<tr>
<td>4. Situational</td>
<td>Inadequate recycling bins</td>
</tr>
<tr>
<td></td>
<td>Dissatisfaction with council’s collection days</td>
</tr>
</tbody>
</table>

Table 3 showing a summary of barriers facing CUPG students recycling habit

Figure 6 showing attitude of students towards recycling
From table 3, knowledge barrier is seen as the main barrier to CUPG students that impeded that recycling habit as they do not know what to recycle, how to recycle, and the benefits of recycling. To encourage them to recycle more, they need to understand the benefits of recycling and have a sense of belonging to the environment they live in (attitude Barrier). According to Byrne and O'Regan (2014), Parsons et al. (2012) factors influencing behavior are knowledge, attitude and practice. Furthermore, Oskamp et al. (1999) concurs that knowledge is related to attitude and behavior comes in when people are interested in what they know and understand. This can further be enhanced by setting up the right infrastructures i.e. situational barrier. In summary the four barriers are inextricably interlinked.

IV. CONCLUSION

In conclusion, this paper using the WRAP 2015 barriers to recycling household waste model, aimed at identifying the four barriers facing CUPG household waste recycling which are Knowledge, Attitude, Behavior and Situation barrier. CUPG students were used as case study to see if this identified barriers are applicable to this set of population. This paper identified the four barriers according to importance Knowledge, Attitude, Behavior and Situational. With Knowledge barrier being the top most barrier to recycling habit of these group of students. It is therefore important that in every community no group should be overlooked and every group should feel a sense of belonging to a particular environment no matter their duration of stay.

V. RECOMMENDATIONS

Since knowledge is a key barrier, students need to be more aware of what and how to recycle as well know the benefits of recycling this can be achieved by creating awareness and campaigns to create awareness on the need for recycling as well as its benefits to the environment. Incentives can be given to students for example vouchers so as to encourage them to recycle more. Furthermore, the council need to provide larger bins as well as clearly identify the bin meant for a particular waste or wastes.

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AUTHORS

First Author – Jatau Sarah, Geography and Planning Department, University of Jos, Nigeria

Second Author – Binbol N.L, Geography and Planning Department, University of Jos, Nigeria
Association of Programmed Death Ligand1(PDL1)Immuonoexpression with Histopathology Grade of Rhabdomyosarcoma At The Unit Anatomical Pathology of Adam Malik Hospital In 2016-2018

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Abstract- Rhabdomyosarcoma (RMS) is a malignancy in the mesenchyme that shows differentiation of skeletal muscles, most commonly found in childhood to old age and can occur in any location throughout the body. PDL1 is an inhibiting molecule that causes disruption of the immune response against tumor cells. Revealed expression of PDL1 is associated with a poor prognosis. This study used tissue samples of rhabdomyosarcoma tumors to assess the association between immunohistochemical expressions of PDL1 and histopathology grade among rhabdomyosarcoma patients. Formalin-fixed paraffin-embedded tissue blocks of 29 rhabdomyosarcoma patients were immunohistochemically studied for PDL1 expression. The basic characteristics of the samples were obtained through medical records or pathology archives. The association between PDL1 expression and grade were analyzed using SPSS 22 version. PDL1 was expressed in 17.2% of the rhabdomyosarcoma specimens. PDL1 positive expression was no significantly associated with histopathological grade (p > 0.05). This not can be a prognostic indicator and possible target therapy for these neoplasms.

IndexTerms: PDL1,rhabdomyosarcoma, grade, immunohistochemistry.

I. INTRODUCTION

Rhabdomyosarcoma is a soft tissue sarcoma most commonly found in childhood to old age. The grade of histopathology of rhabdomyosarcoma currently used is based on FNCLCC. Consists of score differentiation, mitotic and necrosis. Depending on subtype histopathology and grade, treatment for rhabdomyosarcoma includes surgery and postoperative radiation therapy. Rhabdomyosarcoma are generally aggressive neoplasm and higher grades, they tend to be progressive and recurrent. New molecular target therapy was tested in the 2010. Recently, the possibility of targeted PD1 and PDL1 pathway therapies has been widely studied in various types of malignancies, and can be used as new prognostic indicators for soft tissue sarcoma. Can also be used as a selection criteria for immunotherapy. Many researchers have significantly related to clinicopathological parameters such as clinical stage, presence of metastasis, poor tumor differentiation and tumor necrosis. Programmed cell death protein 1 (PD1), a receptor expressed on T and B cells, NK cells, and monocytes, is included in the CD28 family that acts as a negative regulator of the immune system. This PD1 binds two ligands namely PDL1 and PDL2. PDL1 acts as an inhibitor of T cell function in peripheral tissues, then PDL2 supressed T cell activation in lymphoid organs. To protect normal tissue by inducing immune tolerance, where the interaction between these two proteins in tumors will affect the anti tumor immune response by causing fatigue (exhaustion) and dysfunction of T cells, so that tumor cells can avoid the immune system, proliferate and metastasize. Where as PDL1 generally experiences an increase in regulation on the surface of tumor cells. And very high expression in the lungs, breast, large intestine and bladder. Tumor cells express PDL1 by increasing T cell apoptosis and to inhibit CD4+ and CD8 T cell activation. Therefore, this study aimed to evaluate the immunohistochemical expression of PDL1 in rhabdomyosarcoma from the tumor tissue and analyze its association with histopathology grade of rhabdomyosarcoma.

II. MATERIAL AND METHODS

Sample selection
This cross sectional study was conducted in Department of Anatomical Pathology, Universitas Sumatera Utara/ H. Adam Malik General Hospital, Medan and includes 29 cases of rhabdomyosarcoma. All samples were obtained through surgical procedure. Inclusion criteria were rhabdomyosarcoma cases with adequate clinical data, available and undamaged formalin-fixed paraffin embedded tissue block with sufficient tumor tissue. Detailed clinical data were obtained from medical records or pathology archives consisting of age, sex, location of the tumor, and histological type were determined independently by researchers through hematoxylin and eosin stained slides examination.

Immunohistochemistry protocol and interpretation

The tissue sections were deparaffinized and rehydrated before pretreatment. Endogenous peroxidase was blocked with hydrogen peroxide followed by antigen retrieval. PDL1 (medaysis) mouse monoclonal antibodies was used as primary antibody. Diagnostic BioSystems (Diagnostic BioSystems, Pleasanton, CA, USA) polymer kit was used for detection. The reaction was visualized with diaminobenzidine and counterstained with Mayer's hematoxylin followed by dehydration, clearing, and mounting. Positive control was plasenta. PDL1 expressions were determined independently by researchers. The expression in cytoplasm and membrane was analyzed. Immunostaining of PDL1 was evaluated in terms of staining intensity of tumor cells. Staining intensity was evaluated as negative score <10%, and as positive staining score > 10%.

Statistical analysis

Statistical analysis was performed using SPSS software package version 22.0 (SPSS Inc., Chicago) with 95% confidence interval and Microsoft Excel 2010. Categorical variables were presented in frequency and percentage. The association between PDL1 expressions with histopathology grade of rhabdomyosarcoma. The p-values < 0.05 were considered significant.

III. RESULT

Patients’ characteristics

The mean age for rhabdomyosarcoma patients was 39.17 (±20.13) years. The most common in >50 years age group. Nineteen patients (65.5%) were males, only 10 patients (34.5%) were females. All the tumors were located in extremity was the predominance. The histological subtypes of rhabdomyosarcoma varied pleomorphic rhabdomyosarcoma was the majority of this case. Clinical basic characteristic of rhabdomyosarcoma patients were summarized in table 1. Representative H&E sections are shown in figure 1.

Table 1. Characteristic of rhabdomyosarcoma patients

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Number of cases</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age, mean ± SD, years</td>
<td>39.17 ± 20.13</td>
<td></td>
</tr>
<tr>
<td>&lt; 20 years</td>
<td>6</td>
<td>20.7</td>
</tr>
<tr>
<td>21-30 years</td>
<td>3</td>
<td>10.3</td>
</tr>
<tr>
<td>31-40 years</td>
<td>6</td>
<td>31.3</td>
</tr>
<tr>
<td>41-50 years</td>
<td>12</td>
<td>20.7</td>
</tr>
<tr>
<td>51-60 years</td>
<td>7</td>
<td>21.4</td>
</tr>
<tr>
<td>61-70 years</td>
<td>4</td>
<td>13.8</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>19</td>
<td>65.5</td>
</tr>
<tr>
<td>Male</td>
<td>10</td>
<td>34.5</td>
</tr>
<tr>
<td>Location</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Extremity</td>
<td>24</td>
<td>82.8</td>
</tr>
<tr>
<td>Head &amp; Neck</td>
<td>2</td>
<td>6.9</td>
</tr>
<tr>
<td>Others</td>
<td>3</td>
<td>10.3</td>
</tr>
<tr>
<td>Subtype</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pleomorphic Rhabdomyosarcoma</td>
<td>14</td>
<td>48.3</td>
</tr>
<tr>
<td>Alveolar Rhabdomyosarcoma</td>
<td>10</td>
<td>34.5</td>
</tr>
</tbody>
</table>

Association between PDL1 expression and grade

The number of cases for positive PDL1 expression was found more in grade 2 rhabdomyosarcoma (10.3%) while negative expression was found more in grade 3 (41.3%) and no expression found in grade 1. This difference was no significant (p=0.076) (table 3).
IV. DISCUSSION

After the discovery of PD1 in 1992, PD1 and PDL1 have been shown to have a function as regulators of the immune system. Anti PD1 therapy has been proven for cases of melanoma, NSCLC, and various other solid tumors. Also in the case of sarcomas, several previous studies have reported that more than 50% of proven efficacy for sarcomas, including leiomyosarcoma, liposarcoma, osteosarcoma and other sarcomas.12

During this period there was a recent development of immunotherapy including immunology checkpoint blockade targeting cytotoxic T- Lymphocyte Protein-4 (CTLA-4) and programmed cell death protein 1 (PD1).13 Research on the development of sarcoma in immunosuppressed patients also support and association with the immune system. In an 8191 study of transplanted patients, of the 8724 malignancies occurring and 7.4% of them were most in Kaposi Sarcoma, 1.7% in other sarcomas including MFH, leiomyosarcoma, fibrosarcoma, rhabdomyosarcoma, hemangiopericytoma with incident 0.5% of cases.13

Activation of PD1 and PDL1 which leads to inhibition of specific antigens and causes the disruption of the immune response against tumor cells. T cell proliferation induces apoptosis. The role of PD1 and PDL1 as physiological immune to T cell responses and prevent autoimmunity. The expressions of PDL1 on soft tissue has the same expressions as other malignancies and is associated with poor prognosis. PD1/PDL1 inhibitors work differently than most cancer immunotherapy strategies in clinical trials, which are usually intended to stimulate T cell response to antigen.6,12

Results clinical trials of pembrolizumab (SARCO28) only 7 of 40 (18%) soft tissue patients and 2 of 40 (%%) bone sarcomas showed clinical response. In SARCO28 patients with undifferentiated pleomorphic sarcoma showed a high response to anti PD1 therapy, 4 out of 10 (40%) responding to pembrolizumab.6

Monoclonal antibodies called “checkpoint inhibitors” are an efficient way to maintain T cell function by inhibiting the interaction of PD1 with PDL1. Clinical research has proven that antibodies that inhibit PD1 and PDL1 have a good effect on various malignancies. PD1 inhibitors are immunotherapy, which works through the immune system. T cells are the body’s natural defense system that can kill cells that have infections and cells that do not function properly as in cancer cells. T cells have two signals that can be activated and deactivated. When the immune system is active, cells called antigens activate two inhibitors on T cells, a small protein derived from T cells and a molecule called PDL1 that binds to tumor cells.12

This study used an immunohistochemical technique PDL1 in rhabdomyosarcoma cases. Kim RJ et al. reported PDL1 expressions based on histopathologicaltype that is obtained with the most cases in alveolar rhabdomyosarcoma and embryonal rhabdomyosarcoma.4

In Paydas et al. is study revealed expression on PD1/PDL1 can be used as a prognostic value. PDL1 Expression can be seen in the majority of cases of dedifferentiated liposarcoma, alveolar rhabdomyosarcoma, and pleomorphic rhabdomyosarcoma. In this study also reported that there was no relationship between PDL1 expression with clinical features and survival rates.5

Zhang C et al. research states that there is a significant association of PDL1 expressions for soft tissue sarcoma with poor survival rates and shows that there is no significant relationship with histopathological subtypes as well as clinicopathologic grade, and location of the tumor. So it was assessed that PDL1 expressions could be useful as a predictive factor for prognosis for soft tissue sarcomas.14

Zhu Z et al. who analyzed the relation ship between PD1L expression with clinicopathological parameters and survival rates in soft tissue sarcoma patients, showed that there was a relationship between PDL1 and survival rates whereas in the clinicopathology parameters showed no significant correlation between age, sex, location and grade of histopathology.15

Kim RJ et al. reported for soft tissue sarcoma that PDL1 expression was also significantly associated with histopathological subtypes, survival rate with p value 0.001 and clinicopathologi parameters such as age, sex, tumor location and histopathological grade with p value 0.002 where at grade 1 the number of cases 22 (63%) and grade 3 the number of cases 39 (81%).4

The expression of PDL1 in soft tissue sarcoma appears to show a tendency towards histopathological type, clinicopathological parameters and survival rates that are useful as prognostic factors.

V. CONCLUSION

There is no significant association between PDL1 expression and histopathology grade of rhabdomyosarcoma.

COMPETING INTERESTS

The authors have no relevant financial interest in the products or companies described in this article.

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ETHICAL APPROVAL

Health Research Ethical Committee, University of Sumatera Utara, Medan, Indonesia approved this study.

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The Relationship Between the Application of Neuromarketing and Competitiveness

AN Applied Study on (Airtel) for Telecom Services in India”

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Abstract- Neuromarketing is one of the effective means to create competitiveness and more excellence. This study aimed to examine the relationship between the application of neuromarketing and competitiveness on Airtel Company. The study based on primary and secondary data, a total of 200 employees who are patronizing marketing and sales processes departments of Airtel Company were surveyed by applying a structured questionnaire. Statistical tools like Cronbach’s alpha coefficient and correlation coefficients, frequencies and percentages, descriptive statistics analysis, correlation analysis are employed to assess the relationship between the application of neuromarketing and competitiveness. The results revealed that there is a significant relationship between the application of neuromarketing and competitiveness. This study contributes invaluable information for both academician and managers for their theoretical and practical purposes.

Index Terms- Competitiveness, Neuromarketing, Neuromarketing activities, Neuromarketing applications.

I. INTRODUCTION

Marketplace is a very competitive and lively in nature. The customers are more aware, their needs are complex, and have an access to diverse channels and choices to get their utilities; therefore, companies are in a severe need to differentiate their marketing strategies as they resist. Managers today are under remarkable pressure to uncover factors driving customers’ attitudes and behaviour. Unfortunately, decades ago traditional methods suffer from recognized limitations and have remained largely unchanged since their introduction. Thus, there is a rising interest in brain-based approaches that may enable managers to directly investigate customers’ essential thoughts, feelings, and intentions. Recently, neuroscience concept has gained increasing popularity in academic literature as well as the practical world to understand the consumer’s behaviour which can positively contribute to enhance competitiveness among companies. Neuroscience has helped the researcher to deeply discuss marketing science in meaningful ways. The interaction between both of these sciences has helped in generating deeper insights into consumer’s behaviour. This has guided to the appearance of a new field of study, termed as neuromarketing or consumer neuroscience. This study introduces the readers to this emerging field in marketing literature and practice. It gives an overview of the relationship of the applications of neuroscience competitiveness. In India, (Bharti Airtel) is one the largest mobile phone companies around India. Within excess of 334, 79 million subscribers. It is a global company operates in 16 countries in Asia and Africa, it is one of the top three global mobile service providers (annual 17- 18, 2019). The organization additionally gives telephone utilities and Web access over DSL. At the same time, they continued their aggressive network transformation program under ‘Project Leap’. With 180,000 mobile sites rolled out in the preceding two years, this is one of the largest network rollouts globally. During the year, we also emerged as the only industry player in India, with both 3G and 4G services in all 22 circles. The total revenue in 2018 for Airtel is 836.87 Billion Rupees.

The telecommunication industry in India is expanding, and the completion among companies is arising; thus, Airtel started to direct the efforts to enrich the lives of customers, win new customers, increase the market share and revenue, and gain competitiveness. In the recent study the researcher attempts to give attention to a new strategy in marketing that will assist companies to understand the potential feelings, thoughts, and emotions of their customers. Thus, companies can assimilate the needs and desires of their customers and directly gain their satisfaction and loyalty.

II. LITERATURE REVIEW

2.1. Neuromarketing:

Neuromarketing is one of the modern and vital concepts in marketing that uses techniques for the measurement of customers’ brain to understand and analyze the customers’ behaviours in line with markets and commercial trade (Lee, Broderick& Chamberlain, 2006). The use of neuromarketing concept emerged in June 2002. Particularly when an advertising company from Atlanta (USA) declared the creation of a department for the use of functional magnetic resonance image (FMRI) to conduct marketing research (Fisher, Chin & Klitzman, 2010). Furthermore, Neuromarketing is the application of neuroscience to marketing (Perrachione & Perrachione, 2008) that includes the direct use of brain imaging, scanning, and other brain activity
measurement technology to measure the responses of customers for specific products, packaging, advertising, or other marketing factors. As a fact, the brain is the black box that conceals customers' emotions and preferences (Marci, 2008; Javor, Koller, Lee, Chamberlain & Ransmayr, 2013; Fugate, 2007 and Green & Holbert, 2012), and neuromarketing is the window that reveals and gives access to these emotions and feelings (Green & Holbert, 2012; Ohme & Matukin, 2012; Fisher, Chin & Klitzman, 2010). When gaining insights from the brain processes of customers, researchers will be able to understand, assess, and predict the customers' behaviours and preferences (Fisher et al., 2010, Hubert & Kenning, 2008; Perrachione & Perrachione, 2008). Some contemporary studies declared that approximately 80% of all new products fail within its first three years in the markets; thus, further associations should be made between newly invented products and actual user requirements (Calvert & Brammer, 2012). Companies started to adopt the concept of neuromarketing after they had assumed that there is an implicit and automatic process which determine the decision making process that will reveal secret information about customers behaviours which is not obtainable by the traditional marketing methods (Ariely & Berns, 2010; Senior, & Lee, 2008). Eye tracking, skin conductance, and brain imaging tools (e.g., FMRI, EEG) are considered as psychological tools of neuromarketing that received increasing attention from specialists because it helps to make brain observations during the execution of certain tasks, which provides marketers with additional secret information about customers (Lieberman, 2007; Dimoka, Banker, Benbasat, Davis, Dennis, Gefen, & Weber, 2012; Calvert, & Brammer, 2012; Ariely & Berns, 2010; Venkatraman et al., 2012). Other researchers assessed neuromarketing as a field resulting from the relationship between two or more sciences. According to Senior & Lee (2008), neuromarketing consists of marketing research domain based on social psychology, econometrics and social sciences, while Garcia & Saad (2008) and Hubert & Kenning (2008) associate neuromarketing with the sciences of consumer behavior and cognitive neuroscience. According to some researchers, the application of consumer neuroscience in marketing and consumer researchers has generated new insights into various facets of branding such as brand perception (Litt and Shiv 2012; Milosavljevic et al., 2012), brand evaluation (Esch et al., 2012; Estes et al., 2012; Saad and Stenstrom, 2012), brand preferences (Venkatraman et al., 2012; Berns and Moore, 2012; Yilmaz et al., 2014), brand relationships (Aggarwal and Larrick, 2012; Reimann et al., 2012), pricing (Plassmann et al., 2007), product packaging (Reimann et al., 2010; Stoll et al., 2008), brand naming (Hillenbrand et al., 2013), green consumption (Lee et al., 2014), advertising (Treleaven-Hassard et al., 2010; Vecchiato, 2011), and new product development (Ariely and Berns, 2010).

2.2. Competitiveness:

Competitiveness is a multidimensional concept. It can be studied from three different levels: country, industry, and firm level. Competitiveness originated from the Latin word, "competer", which means involvement in a business competition for markets. It has become familiar to describe the economic strength of an entity with respect to its competitors in the global market economy in which goods, services, people, skills, and ideas move freely across geographical borders (Saboniene, 2009; Malakauskaitė, Navickas, 2010). That is to say, it is the ability to compete. In the literature the word “competitiveness” conveys a different meaning when applied to an individual firm or an individual sector or economic activity within a country or region. A systematic search of the academic literature revealed that competitiveness is a major issue (Dunning, 1995), it has still not been a well defined concept (Martin, Westgren and Duren, 1991; Conner, 2003). Although, many researchers have tried to determine the concept of competitiveness as a multidimensional and relative concept (Spence and Hazard, 1988). The support of this is that different attributes of competitiveness change with time and context (Ambastha and Momaya, 2004). The dynamic development of competitiveness research requires the more frequent and specific analysis with up to date factors. Cook and Bredahl (1991) stated that competitiveness can be viewed from the perspective of geographic area, product, or time. The competitiveness is defined by enormous amount of factors and determinants depending on the scale, focus, and objectives of the research. Some studies presented many perspectives and frameworks at the country, industry and firm level. While some studies focused on individual firm and its strategies for global operations, some others observed the role of management in competition (Ozal, 1993; Offstein et al., 2007). The US Competitiveness Policy Council (1998) defines competition as the capability of producing goods/services at an international quality that can compete at international markets, resulting continuous increase in the welfare of a nation. From Porter (1990) point of view should be a further emphasis on the productive use of resources in a nation as a good measure for competitiveness. DC (2001) stated that Competitiveness involves “a combination of assets and processes, where assets are inherited (natural resources) or created (infrastructure) and processes transform assets to achieve economic gains from sales to customers. Some authors view competitiveness with the competency approach. They emphasized on the role of internal factors of the firms to enhance competitiveness such as firm strategy, structures, competencies, capabilities to innovate, and other tangible and intangible resources for their competitive success (Bartlett and Ghoshal, 1989; Doz and Prahalad, 1987; Hamel and Prahalad, 1989, 1990). The ability to develop capabilities and talents far more effectively than competitors can help in achieving world-class competitiveness (Smith, 1995). Johnson (1992) declared that for providing greater value and satisfaction for customers than their competitors, companies must be operationally efficient, cost effective, and quality conscious.

2.3. Terminologies:

2.3.1 Neuromarketing:

Many authors have defined Neuromarketing and some definitions are presented below;

Neuromarketing is the process of researching the brain patterns of consumers to reveal their responses to particular advertisements and products before developing new advertising campaigns and branding techniques (Collins Dictionary).

Neuromarketing is the study of the cerebral mechanism to understand the consumer’s behaviour in order to improve the marketing strategies (Smidts, 2002).

applying the methods of the neurology lab to the questions of the advertising world” (Thompson 2003).
Neuromarketing aims to understand how consumers think and why the consumer chooses the products by applying “neuroscientific methods to analyze and understand human behaviour in relation to markets and marketing exchanges” (Lee et al, 2007).

Neuromarketing is the application of findings from neuroscientific consumer research within the scope of managerial practice (Kenning & Hubert, 2008).

Neuromarketing is mostly defined as a new field of marketing research studying consumers’ cognitive and affective responses to different marketing stimuli (Zaltman & Zaltman, 2008; Boricean, 2009; Dooley, 2010).

Neuromarketing is a relatively new and controversial interdisciplinary research field, a component of marketing, by means of which one can properly interpret psychological and neurological knowledge necessary to understand customer behaviour (Constensen, 2011).

Neuromarketing is defined as the obtaining of information useful for marketers by subjecting individuals to functional magnetic resonance imaging (fMRI) and other similar methods of studying automatic responses in the brain to certain stimuli, generally involving products and brands that are part of consumer culture (Berger, 2011).

Neuromarketing is a subset of the study of neuroeconomics, which combines neuroscience, genetics, economics, and psychology to understand how specific neuron activation may lead to larger scale market behaviour, (Levallois et al, 2012).

Neuromarketing is widely defined as the science that uses MRI (magnetic resonance imaging), EEG (electroencephalography), TMS (transcranial magnetic stimulation), fMRI (functional magnetic resonance imaging) and other brain wave tools to view the human brain’s responses to marketing stimuli to figure out what customers’ thoughts are toward a product, service, advertisement, or even packaging to perfectly construct marketing campaigns that are based on the human brain’s response, (Hammou et al, 2013).

Neuromarketing refer to a commercialized market research method for studying brain activity that combines the methodologies of neuroscience and behavioural psychology to generate greater understanding about how consumers respond to products, brands, and advertising stimuli. These insights are then used to inform the development of advertising strategies that are designed primarily to “nudge” particular demographic groups or population segments to take consumptive action. (Nemorin, S., & Gandy, Jr. O.H. 2017)

2.3.2 Neuromarketing Activities:

The marketing actions carried out by the institutions through consumers’ brain researches to identify factors, variables and motivations, whether in demographic, psychological, behavioural, mental or emotional terms that associated with the purchase decision or preferences for certain brands. (Wyer Jr & Xu, 2010)

2.3.3. Neuromarketing Techniques:

The methods and devices used in the field of neuromarketing alongside the marketing activities related to consumer behaviour and variables associated with it. The overall goal of using neuromarketing techniques is to understand the interconnection between marketing activities and the response upon that from consumers. (Kumlehn, 2011)

2.3.4. Competitiveness:

Related to the activities and aspects that enable the telecom company to achieve excellence from competitors by providing service quality, using methods that meet the needs of customers, occupying a market share and increase continuously, distinction prices from competitors, increasing profit and productivity efficiently and effectively. (The researcher)

III. STATEMENT OF PROBLEM

For (Airtel) to keep its maintenance and gain customer satisfaction and loyalty in the complex and competitive market of today they should pay more attention to apply neuromarketing as a new marketing strategy that help in recognizing the thoughts, needs, and feelings of their customers. Thus, it could be easier to meet their needs to achieve customer loyalty and retention, so consequently (Airtel) can save its market share. Accordingly, the statement of the problem can be stated in the following questions:

IV. RESEARCH QUESTIONS

4.1. Main Question:

Is there any relationship between the application of neuromarketing and competitiveness?

4.2. Sub Questions:

a) What are the requirements and factors associated with the marketing activity related to the application of neuromarketing?

b) What are the technical factors that contribute to the application of neuromarketing?

V. RESEARCH OBJECTIVES

The general objective of this study is to explore the relationship between the application of neuromarketing and competitiveness in telecom sector from the perspective of the marketing and sales processes department staff of (Airtel). Particularly the study seeks:

a) To identify the relationship between requirements and factors associated with the marketing activity related to the application of neuromarketing and competitiveness in telecom sector.

b) To identify the relationship between technical factors that contributes to the application of neuromarketing and competitiveness in telecom sector.

VI. DELIMITATION OF THE STUDY

The sample of this study covers the employees of one company (Airtel) that share the market share of telecommunication sector in India with its competitors, so there is a need for another study that takes into consideration the whole telecommunication sector in India.
The responses of the study have been collected from employees from Delhi and Aligarh. The responses of the employees of Airtel in Delhi and Aligarh may vary from those of the rest of India.

The employees of only one Telecom Company were selected for the present study. As a result, the generalization of the findings of the present study should be considered carefully.

The present study has adopted two dimensions of neuromarketing as suggested in previous studies taking in consideration the circumstances of the telecom sector employees in India. For this, a total of 26 parameters belonging to these 2 dimensions were used to measure the responses of the employees about neuromarketing. There may still a possibility of adding some new dimensions or some more parameters to the existing dimensions.

Convenient sampling technique has been used for the collection of data from the respondents; thus, the generalization of the results should be looked carefully.

The current study as all studies that are based on the primary data collected by the predesigned questionnaire suffers from the possibility of dissimilarity between what is recorded and what is the truth of the respondents’ answers.

It was not possible for the respondents to explain certain points related to the questions because the vital source of collecting the primary data was standardized and structured questionnaires with two open questions.

VII. HYPOTHESIS OF THE STUDY

7.1. Main Hypothesis
There is no a significance relationship between the application of neuromarketing and competitiveness in telecom sector in India.

7.2. Sub hypotheses:
   a) There is no significance relationship between the application of neuromarketing activities and competitiveness.
   b) There is no significance relationship between the application of neuromarketing technology and techniques and competitiveness.

VIII. RESEARCH METHODOLOGY

8.1. Research Design
Analytical descriptive method has been used to sustain quantitative measurement and analysis. Data has been collected through different means which include:

Secondary resources: To introduce the conceptual literature of neuromarketing and competitiveness, the researcher has depended on books, periodicals, articles, published papers and referred previous studies in different countries which have been conducted on the same subject, the Internet sites and the available electronic versions.

Primary resources: a questionnaire and interviews have been used as a primary tool for gathering data from the employees of (Airtel) Company in order to analyze the qualitative and quantitative characteristics of the phenomena.

8.2. Study Population/Sample
The population of the study consists of the employees of Airtel Company for telecommunications, which is one of a well-known companies in India.

The sample consists of a total of (200) employees who are patronizing marketing and sales processes departments of Airtel Company. They have been requested to complete questionnaires (self designed with the help of ( Mohammad, E., 2012) that captured all the variables contained measures of the constructs of concern.

Sampling Method/ Sample Size:
The convenient sampling method has been used (200) Questionnaires administered to the respondents. All (200) questionnaires were duly filled and returned.

8.3. Data Collection Instrument:
The study employed a questionnaire as an instrument for data collection. The questionnaire was divided into four sections. Section (1) measures the demographic attributes of the respondents which include: academic qualifications, career level, years of experience in telecom sector, while section (2) measures three variables (neuromarketing activities which contains: items to measure the ability of implementing neuromarketing activities, items to measure the ability of applying marketing research, and items to measure the style of implementing Neuromarketing activities, neuromarketing technology and techniques, and competitiveness). The items were measured on a 5-point Likert Scale ranging from strongly agree (5) to strongly disagree (1). In terms of section 4, 5, they are open questions.

IX. DATA ANALYSIS

9.1. Methods of Data Analysis
The Statistical Package for Social Sciences (SPSS) was used to analyze the data. The following statistical procedures were used:

- Cronbach's alpha coefficient and correlation coefficients were calculated to assure the reliability and validity of study scales.
- Frequencies and percentages were calculated to describe the characteristics of the sample respondents.
- Descriptive statistics analysis was used to summarize the respondents’ answers and to ranking the sub-items of each dimension.
- Correlation analysis was carried out to test the presence, strength and direction of the potential relationships among the variables of the study.

Reliability of the Scale
To check the reliability of the study instruments, cronalh's alpha coefficient was calculated. This coefficient generally varies between zero (for no reliability) and unity (for maximum reliability). Any values equal to or above 0.6 denote that the scale is of acceptable reliability. The closer the value is 1; the more reliable a scale.
Table (1) demonstrates that all reliability coefficient are acceptable, since they all exceed the benchmark of 0.60.

Table (1): Values of cronbach’s alpha coefficient

<table>
<thead>
<tr>
<th>Scale</th>
<th>No. of item</th>
<th>alpha coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neuromarketing Activities</td>
<td>14</td>
<td>0.753</td>
</tr>
<tr>
<td>Neuromarketing Techniques</td>
<td>12</td>
<td>0.842</td>
</tr>
<tr>
<td>Competitiveness</td>
<td>13</td>
<td>0.881</td>
</tr>
</tbody>
</table>

9.3. Validity Analysis of the results

Self-Validity

Table (2) shows values of self-validity coefficient of the study scale. The coefficient is defined as the square root of the reliability coefficient; Cronbach's alpha.

Table (2): Values of self-validity coefficient

<table>
<thead>
<tr>
<th>Scale</th>
<th>No. of item</th>
<th>alpha coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neuromarketing Activities</td>
<td>14</td>
<td>0.713</td>
</tr>
<tr>
<td>Neuromarketing Techniques</td>
<td>12</td>
<td>0.804</td>
</tr>
<tr>
<td>Competitiveness</td>
<td>13</td>
<td>0.829</td>
</tr>
</tbody>
</table>

The results indicate that the self-validity coefficient ranges between 0.713 and 0.829. These values are considered high and acceptable.

Internal consistency validity

To ensure the validity of internal consistency, the correlation coefficient between each item and the dimension to which it belongs was calculated. The results are shown in table (3).

Table (3): Correlation coefficients between each dimension and its items

<table>
<thead>
<tr>
<th>Dimensions and Items</th>
<th>Correlation coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Neuromarketing Activities Items:</strong></td>
<td>Value</td>
</tr>
<tr>
<td>1 Airtel is studying the customers’ behaviors in depth.</td>
<td>.721**</td>
</tr>
<tr>
<td>2 Airtel takes into consideration the mental aspects of its customers and imply them in the marketing activities.</td>
<td>.584**</td>
</tr>
<tr>
<td>3 Airtel has the techniques to recognize the emotional aspects of its customers.</td>
<td>.689**</td>
</tr>
<tr>
<td>4 Airtel is able to identify the psychological factors associated with its customers.</td>
<td>.711**</td>
</tr>
<tr>
<td>5 Airtel is able to identify the demographic attributes for customers.</td>
<td>.715**</td>
</tr>
<tr>
<td>6 Airtel is able to identify the patterns of customers’ buying behaviors.</td>
<td>.731**</td>
</tr>
<tr>
<td>7 Airtel is interested to know the mental motivations of customers.</td>
<td>.585**</td>
</tr>
<tr>
<td>8 Airtel is interested in applying marketing research to identify customers’ behaviors.</td>
<td>.699**</td>
</tr>
<tr>
<td>9 Airtel implements the results of marketing research in its marketing activities.</td>
<td>.851**</td>
</tr>
<tr>
<td>10 Airtel is interested to know the ways of customers’ thinking.</td>
<td>.692**</td>
</tr>
<tr>
<td>11 Airtel is able to determine the customer’s preferences.</td>
<td>.622**</td>
</tr>
<tr>
<td>12 I consider the Neuromarketing strategy is suitable for improving the marketing concepts and capabilities.</td>
<td>.801**</td>
</tr>
<tr>
<td>13 Airtel is able to get help from external specialists to analyze the psychological behaviors of its customers.</td>
<td>.675**</td>
</tr>
<tr>
<td>14 Airtel is able to get help from external specialists to analyze the mental and emotional behaviors of its customers.</td>
<td>.780**</td>
</tr>
</tbody>
</table>

**Technical and technological factors for neuromarketing items:**

<table>
<thead>
<tr>
<th></th>
<th>Correlation coefficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Airtel provides the essential technical equipments for marketing research.</td>
<td>.844**</td>
</tr>
<tr>
<td>2 Airtel develops the techniques used to market its services.</td>
<td>.827**</td>
</tr>
<tr>
<td>3 Airtel can provide sensors that investigate consumers’ behavior.</td>
<td>.713**</td>
</tr>
<tr>
<td>4 Airtel may seek to establish a laboratory for customers’ brain measurements.</td>
<td>.646**</td>
</tr>
<tr>
<td>5 Airtel can attract a sample of volunteer customers to conduct marketing research in its laboratory.</td>
<td>.539**</td>
</tr>
</tbody>
</table>
Airtel has the ability to provide neuromarketing devices and equipments to study customers’ behaviors.

Airtel needs specialists in the field of neuromarketing.

Airtel takes into account the improvement of systems and software in line with the results of customers’ behaviors research.

Airtel has equipments to provide services consistent with the behaviors and needs of its customers.

I believe that if Airtel uses neuromarketing techniques and technology, it will achieve a significant development in customers’ services.

I believe that the use of neuromarketing will enhance the market share.

I believe that neuromarketing techniques and technology can be used to face competition with other telecom companies.

Competitiveness Items

1. Airtel has a specialized staff in providing and developing its services.
2. Airtel develops an appropriate marketing mix to face the competition.
3. Airtel is able to innovate and expand its services.
4. Airtel has the ability to reduce the cost of activities without affecting on its profitability.
5. Airtel has its own pioneer brand in the market
6. There is an annual increase in the market share of Airtel
7. Airtel seeks to target new segments of society.
8. Airtel has a positive brand image.
9. Airtel analyzes competition and competitors then develops its services accordingly.
10. Airtel analyzes the customers’ needs and implies them in the provided services.
11. Airtel has distinctive techniques to serve customers compared to other telecom companies.
12. Airtel provides its services by using distinctive methods and procedures.
13. Airtel works efficiently and effectively in the domestic markets.

**. Correlation is significant at the 0.01 level (2-tailed).

From the above table, it is concluded that:

- The "neuromarketing activities" dimension correlates positively and strongly, with its items. The values of the correlation coefficient range between .584 and 0.851 and all are significant at the 5% level of significant.

- The "Neuromarketing technology and techniques" dimension correlates positively and strongly, with its items. The values of the correlation coefficient range between 0.539 and 0.880 and all are significant at the 5% level of significant.

- The "competitiveness" dimension correlates positively and strongly, with its items. The values of the correlation coefficient range between 0.514 and 0.877 and all are significant at the 5% level of significant.

9.4. Characteristics of respondents:
The following table shows the main characteristics of the sample respondents.

<table>
<thead>
<tr>
<th>Competitiveness Items</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>63</td>
<td>31.5</td>
</tr>
<tr>
<td>2.</td>
<td>63</td>
<td>31.5</td>
</tr>
<tr>
<td>3.</td>
<td>63</td>
<td>31.5</td>
</tr>
<tr>
<td>4.</td>
<td>63</td>
<td>31.5</td>
</tr>
<tr>
<td>5.</td>
<td>63</td>
<td>31.5</td>
</tr>
<tr>
<td>6.</td>
<td>63</td>
<td>31.5</td>
</tr>
<tr>
<td>7.</td>
<td>63</td>
<td>31.5</td>
</tr>
<tr>
<td>8.</td>
<td>63</td>
<td>31.5</td>
</tr>
<tr>
<td>9.</td>
<td>63</td>
<td>31.5</td>
</tr>
<tr>
<td>10.</td>
<td>63</td>
<td>31.5</td>
</tr>
<tr>
<td>11.</td>
<td>63</td>
<td>31.5</td>
</tr>
<tr>
<td>12.</td>
<td>63</td>
<td>31.5</td>
</tr>
<tr>
<td>13.</td>
<td>63</td>
<td>31.5</td>
</tr>
</tbody>
</table>

Table ( 4 ): Characteristics of the sample respondents

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic Qualification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diploma</td>
<td>45</td>
<td>22.5</td>
</tr>
<tr>
<td>Bachelor</td>
<td>102</td>
<td>51</td>
</tr>
<tr>
<td>High Education</td>
<td>53</td>
<td>26.5</td>
</tr>
<tr>
<td>Total</td>
<td>200</td>
<td>100</td>
</tr>
<tr>
<td>Career Level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Top management</td>
<td>15</td>
<td>7.5</td>
</tr>
<tr>
<td>Middle management</td>
<td>57</td>
<td>28.5</td>
</tr>
<tr>
<td>Low management &amp; first line employees</td>
<td>128</td>
<td>64</td>
</tr>
<tr>
<td>Total</td>
<td>200</td>
<td>100</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Years of Experience in telecom sector</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1- 5</td>
<td>63</td>
<td>31.5</td>
</tr>
</tbody>
</table>

From the above table, it is concluded that:

- The "neuromarketing activities" dimension correlates positively and strongly, with its items. The values of the correlation coefficient range between .584 and 0.851 and all are significant at the 5% level of significant.

- The "Neuromarketing technology and techniques" dimension correlates positively and strongly, with its items. The values of the correlation coefficient range between 0.539 and 0.880 and all are significant at the 5% level of significant.

- The "competitiveness" dimension correlates positively and strongly, with its items. The values of the correlation coefficient range between 0.514 and 0.877 and all are significant at the 5% level of significant.
Above 10 | 43  | 21.5  
Total    | 200 | 100

It can be concluded from the table above that:

- The sample consisted of 200 respondents; of whom 45 have diploma (22.5%), 102 have bachelor (51%), and 53 have a high education (26.5%).
- Regarding career level; more than a half of the total sample unites (64%) are in low management and first line employees, while (57%) of the respondents are in middle management, and (15%) are working in top management.
- In terms of years of experience in telecom sector, (31.5%) of the respondents have experience between 1-5 years, (47%) were between 5-10 years, while (21.5%) of the respondents their experience above 10 years.

X. TESTING HYPOTHESES

Testing sub hypothesis (a):

H(a): There is no significance relationship between the application of neuromarketing activities and competitiveness.

To test this hypothesis, simple regression and correlation analysis were used. The dependent variable was competitiveness, and the independent variable was the application of neuromarketing activities. The results of the analysis are shown in table (5).

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>B</th>
<th>T-Test</th>
<th>R</th>
<th>R-Square</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Value</td>
<td>Sig.</td>
</tr>
<tr>
<td>Customer satisfaction</td>
<td>0.601</td>
<td>13.682</td>
<td>0.000</td>
<td>.393</td>
</tr>
</tbody>
</table>

Source: SPSS_ Output (based on Survey data)

Correlation is significant at the 0.05 level (2-tailed).

It can be concluded from the above table:

- There is a significant positive correlation between the application of neuromarketing activities and competitiveness. It is pertinent to mention that all the correlations are significant at 0.05% level of significance.
- The value of the correlation coefficient (R) between the independent variable (the application of neuromarketing activities) and the dependent variable (competitiveness) is 0.623 indicating moderate correlation.
- As evident from the Table (t= 13.682) the application of neuromarketing activities shows significant positive relationship with competitiveness (t > 1.96, p < .05).
- The value of the coefficient of determination (R-square) is 0.393, which means that the application of neuromarketing activities explains 39.3% of the variance in competitiveness.

Thus, the first sub hypothesis is accepted.

This means that the application of neuromarketing activities is positively related to competitiveness and there is a direct relationship between the tested variables above, although only 39% of the change in competitiveness can be attributed to the application of neuromarketing activities. This shows to some extent that the application of neuromarketing activities is a reliable predictor of competitiveness.

Testing sub hypothesis (b):

H(b): There is no significance relationship between the application of neuromarketing technology and techniques and competitiveness.

To test this hypothesis, simple regression and correlation analysis were also used. The dependent variable was competitiveness, and the independent variable was the application of neuromarketing technology and techniques. The results of the analysis are shown in table (6).

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>B</th>
<th>T-Test</th>
<th>R</th>
<th>R-Square</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Value</td>
<td>Sig.</td>
</tr>
<tr>
<td>Customer satisfaction</td>
<td>0.520</td>
<td>16.101</td>
<td>0.000</td>
<td>.598</td>
</tr>
</tbody>
</table>

Source: SPSS_ Output (based on Survey data)

Correlation is significant at the 0.05 level (2-tailed).

It can be concluded from the above table:

- There is a significant positive correlation between the application of neuromarketing technology and techniques and competitiveness. It is important to mention that all the correlations are significant at 0.05% level of significance.
- The value of the correlation coefficient (R) between the independent variable (the application of neuromarketing technology and techniques) and the dependent variable (competitiveness) is 0.598 indicating moderate correlation.
- As evident from the Table (t= 16.101) the application of neuromarketing technology and techniques shows a
significant positive relationship with competitiveness (t > 1.96, p < .05).

- The value of the coefficient of determination (R-square) is 0.413, which means that the application of neuromarketing technology and techniques explains 41.3% of the variance in competitiveness.

Thus, the second sub hypothesis is accepted.

This means that the application of neuromarketing technology and techniques is positively related to competitiveness and there is a direct relationship between the tested variables above, although only 41% of the change in competitiveness can be attributed to the application of neuromarketing technology and techniques. This shows to some extent that the application of neuromarketing technology and techniques is a reliable predictor of competitiveness.

Testing the main hypothesis:

The main hypotheses were conducted to evaluate the existence of a positive relationship between the application of neuromarketing and competitiveness. 

H: There is no significance relationship between the application of neuromarketing and competitiveness in telecom sector in India.

To test this hypothesis, simple regression and correlation analysis were used. The dependent variable was competitiveness, and the independent variable was the application of neuromarketing. The results of the analysis are shown in table (5).

Table (5): Results of simple regression and correlation analysis for testing the first hypothesis

<table>
<thead>
<tr>
<th>Independent variable</th>
<th>B</th>
<th>T-Test</th>
<th>R</th>
<th>R-Square</th>
</tr>
</thead>
<tbody>
<tr>
<td>Customer satisfaction</td>
<td>0.609</td>
<td>18.312</td>
<td>0.000</td>
<td>.766</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: SPSS Output (based on Survey data)

Correlation is significant at the 0.05 level (2-tailed).

It can be concluded from the above table:

- There is a significant positive correlation between the application of neuromarketing competitiveness. It is pertinent to mention that all the correlations are significant at 0.05% level of significance.

- The value of the correlation coefficient (R) between the independent variable (the application of neuromarketing) and the dependent variable (competitiveness) is 0.766 indicating a high correlation.

- As evident from the Table (t= 18.312) the application of neuromarketing shows a significant positive relationship with competitiveness (t > 1.96, p < .05).

- The value of the coefficient of determination (R-square) is 0.673, which means that the application of neuromarketing explains 67.3% of the variance in competitiveness.

Thus, the main hypothesis is accepted.

This means that the application of neuromarketing is positively related to competitiveness and there is a direct relationship between the tested variables above and 67% of the change in competitiveness can be attributed to application of neuromarketing. This shows to some extent that the application of neuromarketing is a reliable predictor of competitiveness.

XI. CONCLUSION

The study examines “relationship between the application of neuromarketing and competitiveness in telecom sector in India.” This study guided by objectives and three research questions, three hypotheses were proposed (one main hypothesis and two sub hypotheses). The dimensions of neuromarketing in telecom sector were identified from extent literature which includes the application of neuromarketing activities and the application of neuromarketing technology and techniques. Furthermore, the application of neuromarketing and competitiveness was investigated. A research framework was developed relating the application of neuromarketing and competitiveness. The application of neuromarketing exerted a significant and a strong relationship with competitiveness.

XII. SUGGESTIONS

- The study has found a positive relationship between the application of neuromarketing and competitiveness in telecom sector in India; thus, telecom companies should make efforts to increase their competitiveness in the market by the application of neuromarketing system as a new and critical strategy to understand the needs and thoughts of the customers then they gain customers’ satisfaction and loyalty.

- Telecom sector companies should introduce new innovative services.

- Telecom sector companies should also focus on competitiveness by enhancing internal competitiveness (i.e., improve the standers of employees selection, development, rewards, and recognition). Consequently, employee satisfaction will lead to external competitiveness.

- Telecom sector companies should also focus on competitiveness by enhancing the application of neuromarketing activities and techniques to ease the access to the customers.

REFERENCES


AUTHORS

First Author – Dr. Fidaa O. D. Safi, Economic and Administrative science, Assistant professor at Al-Azhar University- Gaza

Second Author – Dr. Marwan S. Alagha, Assistant professor at Al-Azhar University- Gaza
Evaluation of knowledge regarding adverse drug reaction and its reporting among dentists in GDC, Hyderabad - A KAP study

Sneha Menga

DOI: 10.29322/IJSRP.10.01.2020.p9784
http://dx.doi.org/10.29322/IJSRP.10.01.2020.p9784

Abstract- Adverse drug reactions was defined by WHO as a response of a drug which is noxious and unintended and which occurs at doses normally used in man for prophylaxis, diagnosis or therapy of a disease or for the modification of physiological function. Detection, recording & reporting of ADR has become vital & health care professionals should be encouraged to execute ADR reporting to ensure safer use of medication Many K A P studies about ADR were conducted among medical professionals & few among dental professionals. Hence current study was conducted to assess K A P of adverse drug reactions and its reporting among dentists.

AIM: The aim of study is to evaluate knowledge and attitude of dentists about ADR & its reporting.

OBJECTIVE: To measure awareness about ADR among dentists & to determine reasons for ADR underreporting.

METHODS & MATERIALS: In present study, a self-administered questionnaire was used to measure the awareness level about ADR & its reporting among dental practitioners in GDC&H. In this study 96 dentists were involved who answered predesigned questionnaire prepared based on previous studies.

RESULT: It was noticed that knowledge & awareness about ADR was moderate & ADR reporting was minimal.

CONCLUSION: we conclude that 96 dentists in our study have satisfactory knowledge about ADR and its reporting. They have good attitude towards practice of reporting ADR, but unable to report ADR due to lack of knowledge and training of ADR reporting but almost every dentist was willing to participate in ADR reporting.

I. INTRODUCTION

Adverse drug reactions was defined by WHO as a response of a drug which is noxious and unintended and which occurs at doses normally used in man for prophylaxis, diagnosis or therapy of a disease or for the modification of physiological function. According to barkar there are 3 possible reactions of drug, they are the one you want, the one you don’t want and the one you don’t know. Adverse reactions vary from mild to moderate severity, sometimes they are very serious. Every year 5-20% of cases hospitalized are due to ADR’S. Around 4% of patients have fatal ADR’S. According to UMC (Uppsala monitoring Centre) only 6-10% of ADR’S are reported, this is because of lack of knowledge & awareness regarding detection, communication & spontaneous monitoring of ADR among healthcare professionals including physicians, surgeons, dentists, and nurses & including pharmacists. It is important for health care professionals to know how to report & where to report on ADR. Dentists use various drugs for treatment of different oral dental & maxillofacial conditions; most commonly used drugs are NSAIDS, analgesics, antibiotics & antacids. Other drugs include steroids, multivitamins & anti epileptics for emergencies are also used. IV drugs like lignocaine, sodium tetradecyl. These drugs have been reported to have ADR like headache, tinnitus & severe anaphylactic shock. Though they are very rare. They were found to be fatal in 3.67% cases. Hence reporting of these unintended ADR’s become very important not only for future references & development of better medicine but also to avoid morbidity (or) mortality of patients. So this study is intended to evaluate knowledge regarding ADR among dentists.

II. MATERIALS AND METHODS:

STUDY DESIGN
This study was conducted at GDCH, a dental hospital in Hyderabad, Telangana, India. The study was questionnaire based study. The study participants consisted of dentists who gave their informed consent and who were working in hospital during the study period. participants include both senior and junior doctors. The questionnaire was designed from previous studies which is as follows:

<table>
<thead>
<tr>
<th>SL. No</th>
<th>K A P Questionnaire</th>
<th>Dentists Response N=96 , n=%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### What is adverse drug reaction?

<table>
<thead>
<tr>
<th>Option</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Unintentional Reactions caused due to Normal dosage of drugs given to a person.</td>
<td>47(48.9%)</td>
</tr>
<tr>
<td>B. Unintentional Reactions caused due to Over dosage of drugs given to a person.</td>
<td>32(33.3%)</td>
</tr>
<tr>
<td>C. Reactions caused due to drug Abuse.</td>
<td>15(15.6%)</td>
</tr>
<tr>
<td>D. None</td>
<td>0</td>
</tr>
</tbody>
</table>

### What is Adverse drug reaction reporting?

<table>
<thead>
<tr>
<th>Option</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Healthcare Professionals Reporting any suspected ADR to Regulatory body or manufacturer</td>
<td>22(22.9%)</td>
</tr>
<tr>
<td>B. Manufacturer Reporting ADR suspected by Healthcare Professional to National Authority</td>
<td>14(14.5%)</td>
</tr>
<tr>
<td>C. Both A&amp;B</td>
<td>60(62.5%)</td>
</tr>
<tr>
<td>D. None</td>
<td>0</td>
</tr>
</tbody>
</table>

### How are Adverse Drug Reactions classified?

<table>
<thead>
<tr>
<th>Option</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Dose related</td>
<td>26(27.08%)</td>
</tr>
<tr>
<td>B. Unpredictable</td>
<td>21(21.8%)</td>
</tr>
<tr>
<td>C. Chronic and Continuous</td>
<td>06(6.25%)</td>
</tr>
<tr>
<td>D. All the above</td>
<td>43(44.7%)</td>
</tr>
</tbody>
</table>

### Do you think Dental Practitioners should be Trained in ADR Reporting?

<table>
<thead>
<tr>
<th>Option</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Yes</td>
<td>96(100%)</td>
</tr>
<tr>
<td>B. No</td>
<td>0</td>
</tr>
</tbody>
</table>

### Do you come across Adverse Drug Reactions frequently?

<table>
<thead>
<tr>
<th>Option</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Yes</td>
<td>21(21.8%)</td>
</tr>
<tr>
<td>B. No</td>
<td>75(78.1%)</td>
</tr>
</tbody>
</table>

### Do you think it’s necessary to include Pharmacovigilance at Undergraduate level?

<table>
<thead>
<tr>
<th>Option</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Yes</td>
<td>96(100%)</td>
</tr>
<tr>
<td>B. No</td>
<td>0</td>
</tr>
</tbody>
</table>

### Regulatory body for ADR Reporting in India?

<table>
<thead>
<tr>
<th>Option</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Central Drug Standard Control Association</td>
<td>45(46.8%)</td>
</tr>
<tr>
<td>B. Adverse Drug Reactions Online Information Tracking System</td>
<td>31(32.2%)</td>
</tr>
<tr>
<td>C. Eudra Vigilance</td>
<td>13(13.5%)</td>
</tr>
<tr>
<td>D. Medwatch</td>
<td>07(7.29%)</td>
</tr>
</tbody>
</table>

### Most common Adverse Drug Reactions seen frequently?

<table>
<thead>
<tr>
<th>Option</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Stomach pain/Heart burn/Vomiting/Diarrhea</td>
<td>43(44.7%)</td>
</tr>
<tr>
<td>B. Headache/Dizziness</td>
<td>14(14.5%)</td>
</tr>
<tr>
<td>C. Skin rashes/Allergic reactions</td>
<td>34(35.4%)</td>
</tr>
</tbody>
</table>
D. Patches on Tongue | 05(5.2%) |
---|---|

9. Do you inform patients regarding Adverse Drug Reactions?

| A. Yes | 96(100%) |
| B. No | 0 |

10. Do you motivate patients to report any Reactions caused after usage of drugs?

| A. Yes | 96(100%) |
| B. No | 0 |

**DATA COLLECTION**

Ninety six questionnaires were collected back from dentists. A time of one day was given for collection of anonymously filled form.

**RESULTS:**

Out of 100 questionnaires given to dentists 96 were returned. Among 96 dentists 47 i.e. 48.9 percent of dentists were aware of adverse drug reactions and 60 i.e. 62.5 percent of dentists were aware of ADR reporting. The results are quite satisfactory compared to other studies conducted in different parts of India.
III. DISCUSSION:

Various factors associated with knowledge and attitude of doctors is reason for underreporting of ADR among dentists. Many studies were conducted previously about ADR and its reporting alone in India. Previous studies stated that knowledge of health care providers regarding ADR and its reporting is very low but surprisingly we noticed that 48.9% of dentists participated were aware of ADR and 62.5% of dentists were aware of ADR reporting which is quite satisfactory compared to other studies conducted in various parts of India.

According to sarfaraaz", 18.9% of dental doctors were of ADR monitoring body whereas according to our study 46.8% of dentists were aware about central drug standard control association, as monitoring body for ADR in India. This is comparatively high. Currently, ADR reporting is not well established in the country, we are still in process of implementing pharmacovigilance programs across the country. In this case variations in the awareness about ADR reporting at different
places can be expected. Both low or high awareness can be due to awareness campaigns run by local monitoring bodies.

Even though there is a high rate of ADR seen in hospitalized patients, Sarfaraz3 observed that 34.4% dentists confirmed that they have never come across ADR, this is similar to our study where 78.1% dentists never came across ADR and remaining 21.9% dentists who came across ADR never thought of reporting. This is a matter to be concerned about and measures should be taken to implement ADR reporting among dentists. Interestingly almost every dentist thinks that dental practitioners should be trained in ADR reporting and suggested that pharmacovigilance programs should be included in undergraduate curriculum to improve knowledge and create awareness among budding doctors regarding ADR and its reporting.

In our study almost every dentist was willing to inform patients regarding unusual reactions caused after ingestion of drug and motivated them to report any reactions caused after usage of drug even though most of them were not aware about pharmacovigilance program and lack of training in ADR reporting among dental professionals.

Many studies conducted across the country conclude that there is gradual growth in awareness about adverse drug reactions among health care professionals. Further we noticed positive attitude of dental practitioners towards ADR and its reporting. As this is a single center study with limited numbers of dentists; the results of the study may not be generalized. A multicentric study may provide greater insight about underlying factors for under reporting of ADRs among dental professionals in India.

IV. CONCLUSION:

The present study concludes that lack of knowledge and problem in attitudes of dental doctors as causative factors in under reporting of ADRs. These factors include lack of awareness about ADR reporting system, inadequate training to recognize ADRs, fear factors. These factors should be given more importance while designing awareness programs and pharmacovigilance related continued dental education programs and training.

REFERENCES


AUTHORS

First Author – Sneha Menga
Differences of Skin Normal Microbiota in Adult Men and Elderly

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**Department of Dermatology and Venerology, Faculty of Medicine, Universitas Sumatera Utara, Medan, Indonesia
***Department of Microbiology, Faculty of Medicine, Universitas Sumatera Utara, Medan, Indonesia

Introduction: Skin is the largest human body organ, colonized by a variety of microorganisms that are mostly harmless or even beneficial to the host. Microbiota includes bacteria, fungi, viruses, and archaea that inhabit various areas of the body. Microbiota is a dynamic and will be shift its diversity with age.

Objective: To see the difference in normal skin microbiota in adult men and elderly.

Methods: This research is an observational study using a case control design to see differences in normal skin microbiota in 10 adult men and 10 elderly men. Each skin smear was taken on the forehead, axilla and forearms of the patient. Cultivation of bacteria or fungi is carried out and then isolates of bacterial or fungal are identified using Vitek-2 compact.

Results: The forehead was dominated by phylum Firmicutes (adult men: 74%, elderly men: 82.3%) followed by Actinobacteria (adult men: 25.9%, elderly men: 17.6%). Axilla was dominated by phylum Firmicutes (adult men: 77.2%, elderly men: 86.9%) followed by Actinobacteria (adult men: 22.7%, elderly men: 13%). In the forearms was dominated by phylum Firmicutes (adult men: 57.5%, elderly men: 77.7%) followed by Actinobacteria (adult men: 42.4%, elderly men: 22.2%).

Conclusion: Based on the predominant phylum, the normal microbiota of the skin on the forehead, axilla and forearms of adult men and elderly is not too different. Based on the three location, we found the forearms area had the highest diversity of microbiota and was followed by the forehead area and the least diversity was found in the axilla area.

Index Terms- Microbiota, microbiome

I. INTRODUCTION

The term “normal microbial flora” denotes the population of microorganisms that inhabit the skin and mucous membranes of healthy normal persons. The microorganisms that live inside and on humans (now referred to as the normal microbiota) are estimated to outnumber human somatic. The genomes of these microbial symbionts are collectively defined as the microbiome. Human skin microbiomes refer to the entire collection of bacterial microbes, archaea, fungi, viruses, and mites that are on human skin. Sequencing of the skin microbiome showed that the human skin microbiota comprises around 113 phylotypes that belong to six bacterial divisions. Analyses of the topographical diversity of microbes of the human skin using 16S rRNA gene phylotyping revealed that 19 phyla are known to be part of the bacterial skin microbiome. Major examples are Actinobacteria (51.8%), Firmicutes (24.4%), Proteobacteria (16.5%) and Bacteroidetes (6.3%). The majority of the identified genera are Corynebacterium, Propionibacterium and Staphylococcus.

The skin microbiome is dynamic during a human lifespan. In utero, fetal skin is sterile, but minutes after birth, colonization begins to occur. The initial microbial colonization of the skin in infants is influenced by the route of delivery. In infants, during the first year of life, the skin bacterial communities show high interindividual variation, along with tremendously diverse in both community composition and timing of bacterial acquisition. During the transition through puberty, the skin microbiome again shifts dramatically from predominance of Firmicutes, Bacteroidetes, and Proteobacteria to more lipophilic Corynebacteriaceae and Propionibacteriaceae. Further alterations during later stages of life have not yet been explored.

The diversity of these transient and permanent microbes on our skin is dependent on the topographical regions of the body that have distinctive characteristics (pH, moisture, salinity, and sebum content), and may also vary due to intrinsic factors (e.g. genotype, age, and sex) and extrinsic individual dependent factors such as occupation, lifestyle, geographical location, and use of antibiotics, or cosmetics. The stability of the microbial community are determined primarily by the specific physiological characteristics of the skin sites; different distribution of hair follicles, eccrine and apocrine glands, and sebaceous glands contribute to the variable cutaneous microenvironments and likely select for subsets of bacteria that can thrive in those specialized conditions. Several structural and functional changes in the skin occur intrinsically as the skin ages. Skin aging is characterized by a decrease in sweat, sebum and the immune functions thus resulting in significant alterations in skin surface physiology including pH, lipid composition and sebum secretion. These physiological changes provide potential alterations in the skin ecology that may affect the skin microbiome.

Investigations in recent years in the human microbiome project have revealed the main impact of microbiota on the host. Human skin microbiota is able to control the colonization of potentially pathogenic microorganisms. Commensal skin
microbiota contributes to host health and plays a role in protection against various infections.  

Most of the literature on skin microbiota concentrates on the role of pathogens from various types of microbiota on the skin, but little research has been done on the effect of skin microbiota on skin health. Commensal skin microbiota is very important for the integrity of the structure and function of the skin barrier. Therefore, characterizing skin microbiota will provide a basis for understanding the role of microbiota in the skin barrier function, and the balance between health and skin disease. Microbes are thought to play a role in the pathophysiology of various skin diseases with predilection in specific skin areas. Where previous studies regarding the description of skin microbiota in adult men and elderly men are still very limited, so we interested to know about the proportion of skin microbiota in adult men and elderly men based on the location of the topography on the skin.

II. METHOD

This research was conducted from October 2019 to November 2019. It was an observational study with a case control design involved 10 adult men (18 – 59 years old) and 10 elderly men (60 – 74 years old) who came to Departement of Dermatology and Venerology Haji Adam Malik General Hospital Medan. The researcher recorded patient demographic data include the patient’s identity (name, date of birth, gender, last education, occupation and address). Then anamnesis is performed including the absence of dermatology diseases in the patient. After the patient signed an informed consent then the material was taken with a skin smear using a sterile cotton swab on the forehead, armpits and forearms as long as 2 x 5 cm in the forehead, 2 x 5 cm in the armpit and 4 x 10 cm in the forearm area. The specimens were brought to the microbiology laboratory for cultivation on media nutrient agar and Saboraud’s Dextrose Agar. Incubated for 24 hours at a temperature of 35 - 37° Celsius. Then examination of the bacterial species that have been cultured using Vitek-2 Compact. This research was carried out after obtaining permission from the Research Ethics Commission of the Faculty of Medicine, Universitas Sumatera Utara and a research permit from the Directorate of Human Resources and Education of the Research and Development Installation of H. Adam Malik General Hospital Medan.

III. RESULTS

A total of 20 subjects; 10 adult men and 10 elderly men, with forehead, armpits and forearms swab’s sampling, the following types of microbiota were obtained:

| Table 1. Proportion of normal skin microbiota species in adult men and elderly forehead |
|---------------------------------|-----|-----|-----|
| **Species**                     | Adult | Elderly |
| Staphylococcus epidermidis      | 7    | 5    | 14.7 |
| Staphylococcus hominis ssp hominis | 6    | 5    | 14.7 |
| Staphylococcus warneri          | 3    | 11.1 | 8.8  |
| Micrococcus luteus              | 3    | 11.1 | 11.8 |
| Staphylococcus aureus           | 2    | 7.4  | 5.9  |
| Kocuria varians                 | 2    | 7.4  | 2.9  |
| Staphylococcus saprophyticus    | 1    | 3.7  | 5.9  |
| Staphylococcus capitis          | 1    | 3.7  | 8.8  |
| Micrococcus luteus              | 1    | 3.7  | 0    |
| Kocuria rosea                   | 1    | 3.7  | 2.9  |
| Staphylococcus haemolyticus     | 0    | 0    | 5.9  |
| Staphylococcus vitulinus        | 0    | 0    | 5.9  |
| Staphylococcus sciuri           | 0    | 0    | 5.9  |
| Granulicatella adiacens         | 0    | 0    | 5.9  |
| **Total**                       | 27   | 100  | 34   |

Based on table 1, we found only two varians phylum; **Firmicutes** and **Actinobacteria**, which **Firmicutes** is dominant from forehead both of adult and elderly men (adult: 74.0%, elderly: 82.3%). From genera level, we found 2 genera in adult (Staphylococcus: 74.0% and Micrococcus: 25.9%) and 3 genera in elderly (Staphylococcus: 76.4%, Micrococcus: 17.6% and Abiotrophia: 5.8%). **Staphylococcus epidermidis** was the dominant species in adult’s forehead and in elderly men (adult: 25.9%, elderly: 14.7%).

| Table 2. Proportion of normal skin microbiota species in the axilla of adult and elderly men |
|---------------------------------|-----|-----|-----|
| **Species**                     | Adult | Elderly |
| Staphylococcus epidermidis      | 6    | 27.2 | 17.4 |
| Staphylococcus hominis ssp hominis | 5    | 22.7 | 34.7 |
| Staphylococcus capitis          | 2    | 9.1  | 0    |
| Staphylococcus aureus           | 1    | 4.5  | 4.3  |
| Staphylococcus saprophyticus    | 1    | 4.5  | 4.3  |
| Staphylococcus warneri          | 1    | 4.5  | 4.3  |
| Streptococcus paraanguinis      | 1    | 4.5  | 0    |
| Micrococcus luteus              | 1    | 4.5  | 4.3  |
| Micrococcus blyae               | 1    | 4.5  | 0    |
| Kocuria rosea                   | 1    | 4.5  | 4.3  |
| Kocuria varians                 | 1    | 4.5  | 0    |
| Kocuria kristinae               | 1    | 4.5  | 4.3  |
| Staphylococcus haemolyticus     | 0    | 0    | 8.7  |
| Granulicatella adiacens         | 0    | 0    | 8.7  |
| Aerococcus viridans             | 0    | 0    | 4.3  |
| **Total**                       | 22   | 100  | 23   |

Based on table 2, we found only two varians phylum; **Firmicutes** and **Actinobacteria**, which **Firmicutes** is dominant from axilla both of adult and elderly men (adult: 77.2%, elderly: 86.9%). From genera level, we found 3 genera in adult (Staphylococcus: 72.7%, Micrococcus: 22.7% and Streptococcus: 57.0%).
4.5%) and 4 genera in elderly (Staphylococcus: 73.9%, Micrococcus: 13.0%, Abiotrophia: 8.6% and Aerococcus: 4.3%). Staphylococcus epidermidis was the dominant species in adult’s axilla and Staphylococcus hominis ssp hominis in elderly.

### Table 3. Proportion of normal skin microbiota species in the forearms of adult and elderly men.

<table>
<thead>
<tr>
<th>Species</th>
<th>Adult</th>
<th></th>
<th>Elderly</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Micrococcus luteus</td>
<td>8</td>
<td>24.2</td>
<td>5</td>
<td>13.9</td>
</tr>
<tr>
<td>Staphylococcus hominis ssp hominis</td>
<td>6</td>
<td>18.2</td>
<td>5</td>
<td>13.9</td>
</tr>
<tr>
<td>Staphylococcus epidermidis</td>
<td>3</td>
<td>9.1</td>
<td>6</td>
<td>16.7</td>
</tr>
<tr>
<td>Staphylococcus warneri</td>
<td>3</td>
<td>9.1</td>
<td>2</td>
<td>5.5</td>
</tr>
<tr>
<td>Kocuria rosea</td>
<td>3</td>
<td>9.1</td>
<td>3</td>
<td>8.3</td>
</tr>
<tr>
<td>Staphylococcus capitis</td>
<td>2</td>
<td>6.1</td>
<td>1</td>
<td>2.8</td>
</tr>
<tr>
<td>Staphylococcus haemolyticus</td>
<td>2</td>
<td>6.1</td>
<td>1</td>
<td>2.8</td>
</tr>
<tr>
<td>Kocuria varians</td>
<td>2</td>
<td>6.1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Staphylococcus aureus</td>
<td>1</td>
<td>3.0</td>
<td>4</td>
<td>11.1</td>
</tr>
<tr>
<td>Staphylococcus saprophyticus</td>
<td>1</td>
<td>3.0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Enterococcus hirae</td>
<td>1</td>
<td>3.0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Micrococcus lylae</td>
<td>1</td>
<td>3.0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Staphylococcus vitulinus</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2.8</td>
</tr>
<tr>
<td>Staphylococcus sciuri</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2.8</td>
</tr>
<tr>
<td>Staphylococcus arlettae</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2.8</td>
</tr>
<tr>
<td>Staphylococcus cohnii ssp urealyticus</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2.8</td>
</tr>
<tr>
<td>Streptococcus mitis</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2.8</td>
</tr>
<tr>
<td>Enterococcus ceorum</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2.8</td>
</tr>
<tr>
<td>Enterococcus columbae</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2.8</td>
</tr>
<tr>
<td>Aerococcus Viridans</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2.8</td>
</tr>
<tr>
<td>Alloiococcus otitis</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2.8</td>
</tr>
<tr>
<td>Total</td>
<td>33</td>
<td>100</td>
<td>36</td>
<td>100</td>
</tr>
</tbody>
</table>

Based on table 3, we found only two varians phylum; Firmicutes and Actinobacteria, which Firmicutes is dominant from forearms both of adult and elderly men (adult: 77.2%, elderly: 86.9%). From genera level, we found 3 genera in adult (Staphylococcus: 54.5%, Micrococcus: 42.4% and Enterococcus: 3.0%) and 6 genera in elderly (Staphylococcus: 63.8%, Micrococcus: 22.2%, Enterococcus: 5.5%, Streptococcus: 2.7%, Aerococcus: 4.3% and Alloiococcus: 2.7%). Micrococcus luteus was the dominant species in adult’s forearm and Staphylococcus epidermidis in elderly.

### IV. DISCUSSION

Study by Wilantho et al on the forehead of 10 adult men and 10 elderly men, found the most dominant phylum is Proteobacteria followed by Firmicutes and Actinobacteria. From the level of phylum Proteobacteria, the most dominant genera was found Rhizobiales (adult: 31.3%, elderly: 32.1%). From the phylum Firmicutes, found the most dominant genera is Staphylococcus (adult: 23.4%, elderly: 9.5%) and the dominant species is Staphylococcus epidermidis (adult: 17.4%, elderly: 31.3%). From the phylum Actinobacteria, found the most dominant genera is Propionibacterium (adult: 7%, elderly: 0.9%). In this case, there is a difference between our study with Wilantho et al. Our study found the predominant phylum was Firmicutes (adult: 74.0%, elderly: 82.3%) and Actinobacteria (adult: 25.9%, elderly: 17.6%). This study didn’t found bacteria from the phylum Proteobacteria and also bacteria from the genera Propionibacterium. There is also similarities result with study by Wilantho that we found from Phylum level, which the dominant genera from phylum Firmicutes is Staphylococcus (adult: 74.0%, elderly:76.4%) and dominant species is Staphylococcus epidermidis (adult: 25.9%, elderly: 14.7%).

Study by Staudinger et al from the forehead of adult men, found 4 bacterial phylum. The most dominant phylum is Actinobacteria, followed by Firmicutes, Proteobacteria and Bacteroidetes. The dominant genera was found Propionibacterium (Actinobacteria) and Staphylococcus (Firmicutes). This result is different from the research obtained. The phylum was dominated by Firmicutes and followed by Actinobacteria and our study didn’t found Proteobacteria and Bacteroidetes.Staphylococcus (Firmicutes) and Micrococcus (Actinobacteria) were the most common genera that was found.

Study by Trocz et al from the axilla of adult men, found the most dominant phylum are Firmicutes (72.2%) and Actinobacteria (26.8%) and the most dominant genera was found Staphylococcus. This is consistent with our study where the most dominant phylum in the axilla was found Firmicutes (77.2%) and Actinobacteria (22.7%) and the genera Staphylococcus (72.7%). Trocz also found the genera Streptococcus, Micrococcus and Aerococcus in the axilla and this is the same as the results of our study.

Study by Uzeh et al from the axilla of adult men, species dominated was found Staphylococcus Epidermididis (35%) . The same result was also found by Costello et al. Whereas in adult men axilla were dominated by Staphylococcus. This is consistent with our studies which is the most common bacteria found Staphylococcus epidermidis in axilla of adult men (27.2%).

Slightly different from the study conducted by Gao et al, from the axilla of adult men, found that microbiota in axilla was dominated by the genera Corynebacterium, followed by Staphylococcus and Betaproteobacteria. In our study, we found the genera that predominates in the adult’s axilla area is the Staphylococcus followed by Actinobacteria. In our study, we didn’t found bacteria from genera Corynebacterium or Betaproteobacteria.

Study by Zhai et al from forearms of adult men obtained the most dominant phylum; Firmicutes, Proteobacteria and Actinobacteria and the most dominant genera found Staphylococcus. This results is the same as of our study where in the forearms of adult men the most common was the phylum Firmicutes (57.5%) and the genera Staphylococcus (54.5%). Different results were obtained in the forearm of elderly men in zhai’s study which obtained the most dominant phylum; Proteobacteria, Actinobacteria and Firmicutes and the most dominant genera is Moraxella, while in our studies are dominated by the phylum Firmicutes (77.7% ) and the genera Staphylococcus (63.8%).

Gao et al in his study on the forearms of adult men (6 people) found that the most dominant phylum was Actinobacteria (51.4%), Firmicutes (23.8%), and Proteobacteria (19.4%) and based on the genera level obtained.

Propionibacterium (22%), Corynebacterium (19%), Staphylococcus (11.1%) and Streptococcus (5.8%). These results differ from our study which the most dominant phylum in the forearms of adult men is Firmicutes (57.5%) and Actinobacteria (42.4%). Based on the level of the most dominant genus Staphylococcus (54.5%) and followed by the genus Micrococcus (42.4%) and Enterococcus (3%).

On examination of three skin locations, forehead, axilla and forearms in adult men and elderly, Firmicutes and Actinobacteria are the dominant phylum and Staphylococcus is the most dominant genera which found on the forehead (74%), axilla (72.7%) and forearms (54.5%). Of the three locations compared, were found in the forearms area (both in adult men and elderly) with the highest diversity of genera and species bacteria. And this is in accordance with the research by Perez et al which on the forehead, axilla and forearms of adult men obtained Firmicutes and Actinobacteria as the dominant phylum, with Staphylococcus is the most dominant genus, found in >80% in the forehead and axilla area and <50% in the arm. Of the three locations compared by Perez et al also found that the highest number of genera and species bacteria were found in the forearms, followed by the forehead and at least in the armpit area.

In this study, majority Gram positive bacteria was found on the forehead, axilla and forearms. This is similar to the study conducted by Staudinger et al who conducted microbiota examination on the forehead and forearms of adult men obtained only Gram-positive bacteria. Previous studies have also reported that Gram-positive bacteria are more common in superficial skin areas.

V. CONCLUSIONS

Based on the predominant phylum, the normal microbiota of the skin on the forehead, armpits and forearms of adult men and elderly is not too different. Of the three locations compared, it was found that the forearm area had the highest diversity of microbiota and was followed by the forehead area and the least diversity was found in the armpit area.

VI. SUGGESTION

Conduct further research with a larger sample size for identification of skin microbiota.

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The competitiveness of tourism enterprises

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Abstract- In order to improve the competitiveness of tourism startups, tourism enterprises of Vietnam need to move forwards to catch up with the global trend of developing OTA businesses - Online Travel Agent (which Vietnam is gradually shaping), to approach travelers around the world.

Index Terms- Competitiveness, tourism, enterprises.

I. INTRODUCTION

A specific characteristic of the tourism industry is that the relevant factors in the industry are always in the trend of having to innovate constantly to avoid erosion. In the coming decades when the sharing economy is growing, as technology changes and the level of globalization with increasingly widespread connectivity, tourism businesses in general and businesses starting a business in this industry is even more fierce. The writer wants to come here to gather and share new challenges so that the young entrepreneurs of the startup members have a more objective view in the upcoming fierce competition.

II. SITUATION OF TOURISM BUSINESSES IN VIETNAM AND TOURISM STARTUPS

At the conference to summarize the work of 2018 and deploy the tasks in 2019 of the Vietnam National Administration of Tourism, there were positive figures for the industry...

In 2018, it is estimated that Vietnam has welcomed 15.6 million international visitors, serving over 80 million domestic visitors. The total revenue from tourists reaches more than VND 620,000 billion. The localities that are the major tourist centers of the country are Hanoi and Ho Chi Minh City. Ho Chi Minh City, Quang Ninh and Da Nang. This year Vietnam also received many prestigious and prestigious awards in the world for the industry such as: Asia's leading travel destination award at the World Travel Award (WTA). Forbes put Vietnam as a top destination in 2019 and has announced a list of 14 tourist destinations for 2019 for tourism enthusiasts. Vietnam is one of the list of 14 places in the world travelers should visit thanks to Beautiful ancient, unique cuisine. These places are full of culture with art galleries, historical museums, many delicious restaurants, top chefs, etc.

Towards the Plan for 2019, striving to reach over 18 million international visitors and 85 million domestic visitors. The total revenue from tourism reaches over VND 700,000 billion.

This shows that the demand for supply is increasing to meet the growing demand of diverse tourists.

Until recently, according to Vietnam statistics, there were 2,053 international travel businesses, including 8 state-owned enterprises, 641 joint-stock enterprises, 15 joint-venture enterprises, 1,389 limited liability companies and private enterprises. Multiply. The increase or decrease of these businesses is also very frequent, the number increases more than the number of reduction, for example, in September 2018, the Vietnam National Administration of Tourism has appraised 48 applications for issuance, change, re-issuance and withdrawal of business licenses International practice, including: granting 30 new licenses, exchanging 15 licenses and withdrawing 03 licenses.

Along with the participation in the tourism industry ecosystem of service businesses is an equally strong development, the hotel and accommodation establishments of international standards, big businesses are very brave, invest in developing tourism facilities, such as Vinpearl Joint Stock Company in the newly opened 4 international 5-star hotels of Vinpearl Hotel in Hue, Quang Binh, Thanh Hoa and Lang Son with a 5-star service system. international standards of Vinpearl. In addition, Muong Thanh Group organized the opening of Muong Thanh Grand Son La Hotel in Son La City, bringing the total number of Muong Thanh Group hotels to 50 units, etc.

Above is the overall picture of supply and demand of the current tourism market in Vietnam. With specialized human resources, there is a shortage of skilled and skilled professional personnel, sufficient qualifications, and abundant resources of public universities, public and private universities. Tourism in order to quickly awake young workers to society is seeing this smoke-free technology as a spearhead of the economy being strongly promoted.

Along with the current Entrepreneur movement, starting a business is everywhere, and supporting start-ups to become a national policy, a startup ecosystem is gradually becoming clearer. However, for a tourism business to develop and survive sustainably, the article will introduce the competencies needed in this area to consider to race against challenges, to maintain, grow or survive in a red environment of competition.
III. INTRODUCING OTA BUSINESSES - NEW TREND - WITH APPRECIATION FOR THE PROS AND CONS OF THIS MODEL

Firstly, it is necessary to understand that TA is a traditional Travel Agent channel, while OTA is the abbreviation for Online Travel Agent - online travel agent - Travel products and services agent: tours, air tickets, hotel rooms, passenger cars, etc., for online travel service providers

According to Google and Temasek’s study of Southeast Asia’s Internet economy, online travel ranked third in terms of growth and revenue contribution, the annual growth rate is 15% / year (this ratio for e-commerce is 32% and for online advertising is 18%).

Also according to this study, Vietnam’s online travel market (both hotel and flight booking) is forecast to reach USD 9 billion by 2025, which shows that the development of OTA channel is quite large.

The Fourth Industrial Revolution is changing everything in many industries, and tourism is an industry that is directly affected, according to experts, in the future just one touch operation on electricity Smart mobile phones connected to the internet, tourists can sign up for all services anywhere from transportation, hotels, dining to entertainment ...

In an analysis of research companies and major tourism enterprises in Vietnam, there were comments that: Vietnam has many advantages to develop online tourism. But now, nearly 80% of the domestic online travel reservation market is being exploited by foreign businesses. Mr. Pham Thanh Cong - representative of Nielsen Vietnam Company - emphasized that by 2030, the internet access volume of ASEAN region will account for 44.6% worldwide. Therefore, ASEAN will be a major region of the world for e-commerce development. Together with the growth of connected consumers in Vietnam and ASEAN countries in general, ASEAN tourism will be developed. Particularly in Vietnam, urban people have a high demand for connecting by phone and online shopping related products. According to the Google Consumer Barometer Survey of Vietnamese phone usage, Vietnamese people watch the phone 150 times a day, equivalent to 177 minutes; Of which, up to 48% look for hotel information, 42% look for experience tourism and 37% look for flight information. The impact of digital technology on consumer activities has given rise to a new concept of “connected consumers”. They are young consumers, very confident when connecting information on social networking sites. They are willing to spend a lot on shopping, entertainment and travel. With the majority of young people under 30 years old, Nielsen’s study of connected consumer behavior in Vietnam in 2017 estimates that the number of connected Vietnamese consumers will increase from 23 million (2017), up to 46 million people (by 2025), with annual spending of nearly US $ 100 billion, double that of 2017

The majority of online booking market in Vietnam is dominated by foreign businesses such as Agoda.com, Trivago.com ..., Take a look at a few OTA channels that are thriving in Vietnam:

- Booking.com is known as the largest travel ecommerce site in the world with more than 15,000 users with 204 representative offices in more than 70 countries around the world. Booking.com is one of the most used hotel OTA channels. This website connects over 1,500,000 great accommodation places in the world, from luxury hotels and resorts to homestay and hostel services, even tree houses or igloos, etc.
- Expedia.com is one of the fastest growing online travel portals in Asia, offering travelers a wide selection of hotels, activities and travel services to meet every possibility. finance and operations of all types of tourism at competitive prices. With over hundreds of thousands of hotel partners around the world and the ability to offer the comprehensive number of flights available on Expedia.com, guests can book all the services needed for a vacation - a room. meet all financial capabilities, activities of all types and tourism services
- Agoda.com is an online booking company for hotels focused primarily in the Asia Pacific region, with existing offices in Singapore, Bangkok, Hong Kong, Kuala Lumpur, Phuket, Bali, Sydney, Tokyo, Seoul, Beijing, Shanghai, and Manila.
- Traveloka.com is the leading online travel company in Southeast Asia, Traveloka meets a variety of travel needs on the same platform, helping customers get great travel. This is also one of the favorite hotel OTA channels in Vietnam market.
- TripAdvisor, Inc. is a US travel agency that specializes in providing travel-related reviews. This hotel reservation website also includes interactive travel forums. TripAdvisor is founded by Stephen Kaufer

IV. ANALYZE AND PROPOSE SOLUTIONS TO IMPROVE COMPETITIVENESS FOR TOURISM STARTUPS

Through the above cases, it can be said that online travel in the world in general and Vietnam in particular is no longer a trend but an essential activity for an enterprise that wants to compete and integrate.

To be able to compete in an Internet booming world, the era of technology 4.0, it is possible to use Big data to analyze and find the best solution for all activities quickly, or using artificial intelligence. In order to mitigate many of the old common constraints, startups need to identify the problem that needs to be addressed.

- With home advantage, thanks to the thorough understanding of the market and national culture, a close relationship with local suppliers, it is easy to match with existing business practices, if trying. Better than the fair business, this is a big strength in the competition that Vietnamese startup needs to take advantage of
- With the youth of learning and intense passion, young people of Vietnam have also inherited many of the world’s elite to create innovation and apply modern technology.
- The essential qualities of a young entrepreneur are professional knowledge, this is the field of tourism, this is the advantage of indigenous people in their environment.
- Perseverance in starting a business is also quite important, because something new needs to be tested back and forth many times before continuing to operate to achieve the desired results.
- With high support from the Vietnam National Administration of Tourism, the Ministry of Science and Technology, the Tourism Association, promoting smart tourism as well as the current status of application of information technology in tourism in Vietnam today.
- Governmental organizations and businesses support the creation of a startup ecosystem to connect, support and encourage Vietnamese entrepreneurs to start innovation ...

- Introducing seven outstanding technology trends in the tourism industry in 2019:
  - Internet of Things (IoT) one of the emerging technology trends;
  - Identification technology, which includes fingerprint recognition, facial recognition, retina scanning and many other biometric identifiers;
  - Virtual reality (VR) This is one of the most promising technology trends for travel-related companies, because it allows customers to experience virtual reality before visiting specific destinations.
  - Augmented reality (AR) augmented reality is similar to virtual reality, but involves augmenting real people around, through graphic overlays, people in the tourism industry can greatly enhance tell the customer experience, provide them with valuable information, or even pure entertainment.
  - Robotics are becoming increasingly popular these days, with artificially intelligent robots, often equipped with voice recognition technology, that are used in place of information points of chains like Hilton. Service robots, room service robots and receptionists also appear in hotel houses. Moreover, travel agents are using robots to pre-screen, making waiting times more efficient for customers.
  - Artificial intelligence (AI) Artificial intelligence is also being used in other ways. For customer service purposes, with chatbots possessing the ability to provide quick response times for issues or queries, hotels and other companies operating in the travel industry can use location. Artificial intelligence to accurately and seamlessly sort through data. It will be able to draw conclusions about business performance or trends related to customer satisfaction, and even manage inventory in a smart way.
  - Big Data (Big Data) Big data is a fact of life. One of the biggest uses for this data is personalization improvements, with travel agencies using the information they collect to make specific adjustments to their services. In particular, hoteliers can use big data for revenue management purposes, using historical occupancy rates and other past trends to better predict demand levels.

The remaining challenges remain about the Capital Fundamentals; Technology; Experience; Integrating Digital Technology into services; Payment System; The unification of local laws, etc., will also be matters that need to be completed within a certain time and accompanying conditions.

It is important to see the general trend of the world, we can not help but look at ourselves to change, to create, to integrate is extremely necessary and careful.

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The Effect of Advertising and Personal Selling of Brand Awareness in Vocational High School YPT Palembang

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Abstract- The purpose of this study was to determine the effect of advertising and personal selling on increasing brand awareness in Vocational high school YPT Palembang Development Schools. The population in this study is the students guardians. Vocational high school Pembangunan YPT Palembang Vocational Data collection technique is carried out by distributing questionnaires to 100 student guardians. This study uses primary data obtained from questionnaires and the analysis technique used is multiple regression analysis techniques. The results of this study indicate that Advertising and Personal Selling partially and simultaneously have a significant effect on brand awareness in Vocational high school Pembangunan YPT Palembang. Suggestions that can be given in this study are the management of the Vocational high school Pembangunan YPT Palembang can fulfill the improvement of the quality of teachers and the completeness of teaching and learning facilities and promotion activities both through the media and directly, so that the quality of graduates and the quantity of new students continue to increase.

Index Terms- advertising, personal selling, brand awareness.

I. INTRODUCTION

The 12-year compulsory education program consists of elementary and secondary education at the elementary, junior high to senior high / vocational levels. Senior High Schools (SMA) and Vocational High Schools (SMK) are useful as determinants for students to continue their higher education or work. Based on the National Education System Law No. 20 of 2003, high school is a high school in the general category that prepares students to continue to tertiary education. Meanwhile, Vocational High School is a secondary education which prioritizes the development of student skills. Vocational High Schools (SMK) aim to produce skilled and ready-to-work human resources.

The government is currently paying more attention to Vocational High Schools (SMK). According to Presidential Instruction No. 9 of 2016, Vocational High Schools (SMK) are included in revitalized vocational education institutions. "Vocational School is one of the educational institutions which is said to be the most relevant solution in overcoming employment problems, as well as fostering domestic industries" (www.tirto.id/persisssue-smk-stigma-putus-school-to-unemployment-cPhn, accessed April 5, 2019). Therefore, both state and private SMKs are expected to be able to compete with high schools to increase the number of students. In addition, the site edukasi.kompas.com also revealed that the government began directing junior high school graduates to continue their education to vocational high schools and in the future, the government estimated the proportion of vocational schools to be more than high schools, which was around 60 percent for vocational schools and 40 percent for senior high schools.

Based on information from the Ministry of Education and Culture, the number of Vocational High Schools in Palembang City is 80 schools, consisting of: 9 State Vocational Schools and 71 Private Vocational Schools (Dapodikdasmen, 2019).

The large number of private SMKs opens up the possibility of competition to get new students each year in the city of Palembang. "The phenomenon that has happened so far, 'favorite' schools are always flooded with students to reject prospective students, while schools that happen to be 'not favored' are somewhat stagnant in getting prospective students, both in quality and quantity" (Zulaikha, 2017) revealed that the lack awareness of school branding is the cause of the lack of 'prestige' of the school to become a favorite school. According to him, private schools only do promotions once a year. Behind these promotional activities, on average, the school does not realize that promotional activities can build brand awareness. The results of his research concluded that as an institution that deals directly with the community, schools also need to build brand awareness.

Just like schools in general, promotions conducted by schools are presented in the form of conventional advertisements without social media. According to Situmorang (2017) advertising aimed at motivating potential buyers by supporting the superiority of goods / services. Ads (advertisements) conducted by the YPT Development Vocational School using print media. Print media used are brochures and banners. In addition to print media, the school also uses social media such as Websites, Instagram, LinkedIn, Twitter, YouTube and Facebook.

Advertising aimed at motivating potential buyers in the way
that goods / services are offered (Situmorang, 2017). Therefore, advertising (advertising) is part of a promotional strategy to increase brand awareness. Ads (advertisements) that can retain consumers' memories are advertisements that contain messages by displaying various pleasures (Pratama, 2011).

According to Normalitasari, et al (2015), to achieve the quality of education services, teachers and school staff can provide attention, understanding, and direct the wishes of customers of educational services directly. Therefore, teachers and staff have an important role to do personal selling which is expected to increase brand awareness. The study found that personal selling has the potential to verbally as a promotional medium to potential customers (Kotler & Armstrong, 1994: 596). Tambunan and Wijakasana (2019) explained that the better advertising and personal selling in promotion strategies would increase brand awareness.

Several factors can affect the brand awareness is advertising and personal selling. Based on the above background, encourage researchers conducted a study entitled “The Effect of Advertising and Personal Selling of Brand Awareness in SMK Pembangunan YPT Palembang”

II. LITERATURE REVIEW

A. Advertising

Image according to Kotler and Keller (According to Kotler & Keller (2007: 244), "advertising is all forms of paid non-personal presentations and promotion of ideas, goods, or services with certain sponsors." Based on the research of Pondaag and Soegoto (2016) Advertising is a promotional mix that is very well known among the general public.

Advertising is an advanced communication process that brings audiences to the most important information that they really need to know (Jefkins, 1997: 16). Frank Jefkins' statement above places advertisements as one form of message delivered by producers to the public as their potential customers. With advertising, the audience is expected to obtain as much information from an advertised product or service.

Advertising provides a message in the presentation of an information. According to Boyd (2000: 78), messages are the sum of signs or signals that try to express one or more ideas. The instructions depend on the media used and the goals of the speaker (behavior that will be influenced).

B. Personal Selling

According to Simamora (2000: 758) Personal Selling is a presentation or oral presentation in a conversation with one or more prospective buyers with the aim of making a purchase. In private sales exclusive interpersonal contact occurs, someone makes a sales presentation to another person or group of potential buyers. Personal sales audiences can be customers, organizational customers, or marketing intermediaries.

Personal selling is direct communication (face to face) between sellers and prospective customers and forms the customer's understanding of the product so that they will try and buy it (Tjiptono 2008: 224).

C. Brand Awareness

According to Shimp (2010), brand awareness is the ability for brands to appear in the minds of compilation customers who are clarifying certain product categories and making it easy for the name to emerge, furthermore, brand awareness for basic dimensions in brand equity.

In line with Shrimp (2010), according to Tjiptono (2005), brand awareness (brand awareness) is the ability of consumers to facilitate or remember about brands that are members of certain product categories.

III. RESEARCH ELABORATIONS

The Influence of the Relations Between Advertising Variables and Personal Selling Against Brand Awareness

Effect of Relationship The relationship between advertising and personal selling variables on brand awareness was revealed by Berry (2000) cited by Tjiptono (2014) that brand awareness is part of service branding to market a service.

Meanwhile, as we already know from the theory explained by Kotler (2010: 426) in the previous section, advertising and personal selling are part of the promotion. Promotion is a form of communication with the market that presents the brand of the company itself (Kotler, 2010). Presented brand is a form of communication made by a company regarding its identity and purpose through advertising, service facilities, and service provider appearances (Berry, 2000). Variable Advertising and Personal Selling Against Brand Awareness

According to Keller (1993, 2012) quoted by Tjiptono (2014) the key to creating brand equity is brand knowledge, which consists of brand awareness and brand image. Having a strong brand is a vital aspect of a company, because the advantages that can be obtained from a wide range of Branding are not only relevant for goods producers, but also very crucial for service companies that are intangible, inseparable, variable, and perishable. Strong brands help customers visualize and understand intangible products. Brands in the service context are often interpreted as "promises" (Berry, 2000; Berry & Pasuruan, 1991).

Based on the picture above, Berry (2000) explains each of the chart points quoted from Keller (1993), including:

1. Presented Brand is a controlled company communication about its identity and purpose through advertisements, service facilities, and the appearance of service providers. This includes the company's name, logo and visual presentation.

2. External brand communication refers to information received by customers about the company and its services which are in principle not controlled by the company and services that are not in principle controlled by the company. The main form of communication is an external brand company.

3. Brand awareness is the ability of customers to recognize and remember the brand when given certain instructions or cues.

4. Brand meaning refers to the customer's dominant perception of the company's brand. Although the brand presented by the brand and external communication contribute to brand meaning, the main source of influence for customers who have actually experienced service is the experience concerned.

5. Customer experience with the company refers to the customer's actual experience in buying and communicating the company's previous services.

6. Brand equity is the differentiation effect of a combination of brand awareness and brand meaning on customer responses to brand marketing (Keller, 1993).
Presented brands can increase brand awareness positively and significantly which are marked with thick arrows. Presented brand is a form of communication made by a company regarding its identity and purpose through advertising, service facilities, and the appearance of service providers (Berry, 2000). Therefore, it can be concluded that advertising and personal selling are forms of presented brands that have a direct relationship to brand awareness. Based on the background, the formulation of the problem, research objectives, the theoretical basis and theoretical framework. Then the hypothesis proposed in this study are:

H1: There is a positive and significant effect of personal selling variables on Brand Awareness at the YPT Palembang Vocational Development.

H2: There is a positive and significant influence of the advertising variable on brand awareness at the YPT Palembang Vocational Development.

A. The Scope Of Research

The scope of this research is more focused on the effect of advertising and personal selling on brand awareness in private educational institutions, especially Vocational High Schools (SMK), namely SMK Development YPT Palembang.

B. Research Design

C. The research design included a descriptive causality study. Because seen from the main purpose of the variables to be studied this is to describe the causal relationship of the phenomenon or problem solving studied to see the effect of Advertising and Personal Selling on Brand Awareness at SMK YPT Palembang.

D. Data Types and Sources

Source of data needed in this study is primary data. Primary data collection in this study by distributing questionnaires and conducting interviews directly with parents of students.

E. Population and Sample

Population is a generalization consisting of objects / subjects that have certain qualities and characteristics determined by researchers to be studied and then drawn conclusions (Sugiyono, 2012). The population that is the object of research is the guardians of class X, XI, XII students at the SMK Development YPT Palembang in the 2016/2017 school year, 2017/2018, and 2018/2019 as many as 753 people. From the results of calculations using the Slovin formula obtained as many as 100 people, then samples were taken at random without regard to strata in the population itself using simple random sampling techniques.

F. Data Analysis Technique

1. Instrument Testing

Arikunto (2013: 203) data collection instruments are tools that are selected and used by researchers in their activities to collect data so that these activities become systematic and made easy by them. In this study the instrument used was a questionnaire, which is a list of statements given to employees and leaders or superiors.

- Test Validity
  Validity test is used to measure the validity or validity of a questionnaire. A questionnaire is said to be valid if the questions on the questionnaire are able to reveal something that will be measured by the questionnaire Ghozali (2012). Criteria are said to be valid if the value of r count> value of r table.

- Reliability Test
  Reliability test is a tool to measure a questionnaire which is an indicator of a variable. A questionnaire can be declared reliable if the answers from respondents are consistent or constant.

2. Analysis of Multiple Linear Regression

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To answer the problem formulation in this study, the analysis conducted is multiple regression analysis. This analysis is used to analyze the effect of the independent variables on the dependent variable, namely the Effect of Advertising and Personal Selling on Brand Awareness of SMK YPT Palembang. With the formulation as follows:

\[ Y = a + b_1X_1 + b_2X_2 + b_3X_3 + e \]

Where:

- \( Y \) = Brand Awareness
- \( a \) = constant
- \( b_1, b_2, b_3 \) = Coefficient of the regression line
- \( X_1 \) = Advertising
- \( X_2 \) = Personal Selling
- \( E \) = Standard error

3. **Test F**
   - If F arithmetic \(< F \) table then \( H_0 \) is accepted and \( H_a \) is rejected. This means that there is no influence of the independent variables on the dependent variable simultaneously.
   - If F arithmetic \( > F \) table then \( H_0 \) is rejected and \( H_a \) is accepted. This means that there is an influence of the independent variables on the dependent variable simultaneously.

4. **Test T**
   - If F arithmetic \(< T \) table then \( H_0 \) is accepted and \( H_a \) is rejected. This means that there is no influence of the independent variables on the dependent variable simultaneously.
   - If F arithmetic \( > T \) table then \( H_0 \) is rejected and \( H_a \) is accepted. This means that there is an influence of the independent variables on the dependent variable simultaneously.

**IV. RESULTS OR FINDING**

1. **Descriptive test results**
   Descriptive statistics provide a general description of the research object that is sampled as well as being focused on the maximum, minimum, average, and standard deviation values. Based on sample data obtained from 100 trustees of Palembang YPT Vocational School students with statistics on Advertising, Personal Selling and Brand Awareness variables can be seen in the table below:

<table>
<thead>
<tr>
<th>Descriptive Statistics</th>
<th>N</th>
<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advertising</td>
<td>100</td>
<td>36</td>
<td>60</td>
<td>58.92</td>
<td>4.543</td>
</tr>
<tr>
<td>Personal selling</td>
<td>100</td>
<td>51</td>
<td>85</td>
<td>83.60</td>
<td>5.643</td>
</tr>
<tr>
<td>Brand Awareness</td>
<td>100</td>
<td>18</td>
<td>30</td>
<td>29.76</td>
<td>1.457</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sources: Primary Data Processed, 2019

2. **Multiple linear regression**
   The results of multiple regression tests in this study can be seen in the following table:

<table>
<thead>
<tr>
<th>Coefficients(^a)</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>B</td>
<td>Std. Error</td>
</tr>
<tr>
<td>1</td>
<td>(Constant )</td>
<td>.085</td>
</tr>
<tr>
<td></td>
<td>Advertising</td>
<td>.720</td>
</tr>
<tr>
<td></td>
<td>Personal Selling</td>
<td>.229</td>
</tr>
</tbody>
</table>
Coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>.085</td>
</tr>
<tr>
<td></td>
<td>Advertising</td>
<td>.720</td>
</tr>
<tr>
<td></td>
<td>Personal Selling</td>
<td>.229</td>
</tr>
</tbody>
</table>

a. Dependent Variable: Brand Awareness

Source: Primary data processed, 2019

Multiple linear regression equation $Y = 0.085 + 0.720X_1 + 0.299X_2 + e$

If we pay attention to this equation, the constant (a) of 0.085 can be interpreted that without an increase (Advertising 0 units), the Brand Awareness of SMK YPT Palembang Development will remain at 0.085. Then from the equation also shows the regression coefficient (b1) which results obtained by 0720 this figure can be interpreted that if Advertising rises by 1 unit, the Brand Awareness Vocational School Palembang YPT Development will increase to 0.720. Furthermore, obtained by the regression coefficient (b2) which results obtained by 0.299 this figure can be interpreted that if Personal Selling rises by 1 unit, the Brand Awareness Vocational School Palembang YPT Development will increase to 0.299. Therefore it can be said that the Advertising and Personal Selling variables have an influence and are in line with a positive sign on Brand Awareness. This means that if Advertising and Personal Selling are increased, the Brand Awareness of the YPT Palembang Vocational Development will increase and vice versa.

3. Determination Coefficient Test (R2)

The coefficient of determination (R2) aims to measure how far the ability of the model can explain the variation of the dependent variable. If the value of R2 is close to one, it can be said the stronger the ability of the independent variables in the regression model, and vice versa.

II. TABLE DETERMINATION COEFFICIENT TEST RESULTS

<table>
<thead>
<tr>
<th>Model</th>
<th>F hit</th>
<th>F table</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>171.833</td>
<td>2,48</td>
<td>0,000</td>
</tr>
</tbody>
</table>

Model Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.883</td>
<td>.780</td>
<td>.775</td>
<td>.194</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Personal Selling, Advertising

Based on the statistical results above, it shows that the correlation value = 0.883 shows that between Advertising and Personal Selling to Brand Awareness has a very close and direct relationship, while Adjusted R Square is obtained at 0.775 which means Advertising and Personal Selling has a contribution of 77.5% of the Brand Awareness of the remaining 22.5% is influenced by other variables not examined.

4. F Test

According to Sugiyono (2012) F test From the results of calculations using SPSS 22 for windows, the f test table is obtained as follows:

III. TABLE F TEST RESULT

APPENDIX

Sources: Primary Data Processed, 2019.

5. T test

From the results of calculations using SPSS 22 for windows, the t test table is obtained as follows:

IV. TABLE T TEST RESULT

<table>
<thead>
<tr>
<th>Model</th>
<th>t</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>1.310</td>
</tr>
<tr>
<td></td>
<td>Advertising</td>
<td>7.267</td>
</tr>
<tr>
<td></td>
<td>Personal Selling</td>
<td>2.213</td>
</tr>
</tbody>
</table>

a. Dependent Variable: Brand Awareness

Sources: Primary Data Processed, 2019.
From the t-test results obtained t value of the independent variable namely: T-value of 7.267 > 1.672 with a significant level of probability of 0.000 <0.05. Then there is a significant influence between Advertising significant effect on Brand Awareness variable. Thus means the first hypothesis (H1) is accepted.

2. T-value of 2.213 with a significant level of probability of 0.029 <0.05. Then there is a significant influence between Personal Selling on Brand Awareness. Thus means the second hypothesis (H2) is accepted.

PRACTICAL IMPLICATIONS
1. Effect of Advertising on Brand Awareness at the YPT Palembang Development Vocational School

From the results of this study indicate that Advertising, has a significant effect on Brand Awareness of the YPT Palembang Vocational Development. The results of this study are in line with research conducted by Munyaradzi Mutsikwa1, Kossam Dhliwayo, Clay Hutama Basera (2013) from Zimbabwean Universities which shows that Advertising has a positive and significant effect on brand awareness. But Sawant (2012) in his research on the impact of advertising on brand awareness and consumer preference (with special references to men's wear) states that advertising is usually a form of promotion that is responsible for popularizing products/services, but to build brand awareness is not enough just to advertising so the results of this study state that advertising has a positive and not significant effect on brand awareness. From the description above, the authors assume in Advertising, in addition to highlighting the quality of information content, attractive design strategic placement will affect the success or failure of Advertising activities, because the purpose of Advertising is not only to introduce products but also to attract consumers to buy products.

2. Effect of Personal Selling on Brand Awareness at the YPT Palembang Development Vocational School

From the results of this study indicate that Personal Selling has a significant effect on Brand Awareness of the YPT Palembang Vocational Development. The results of this study are in line with research conducted by Abdul Jumaat bin Mahajar and Bodi Binti Mohd Yunus (2011) The Effectiveness Of The Promotional Tools In Creating Awareness Towards Customers Of Islamic Banking In Malaysia which shows that Advertising has a positive and significant effect on brand awareness. Furthermore Pirathhepan and Pushpatan (2012) research revealed that the better Personal Selling in promotional strategies will increase Brand Awareness.

From the description above, the authors assume in Personal Selling, consumers can not only find out information about the products offered but also by direct interaction with representatives of the company/school consumers can know the extent of the performance of resources/labor owned by the company both in terms of knowledge, attitudes and abilities in serving konuen. Therefore the company must really place its human resources who have high dedication to the company to conduct personal selling and if possible do special training for employees who will be given the task of conducting personal selling activities.

V. CONCLUSIONS AND SUGGESTION
1. Conclusions

Based on the results of the research that has been described, it can be concluded that advertising and personal sales have a positive and significant relationship to Brand Awareness Vocational Development of Palembang YPT.

2. Suggestion

The suggestions that the author can give in this study are as follows:

1. The manager of the Palembang YPT Development Vocational School can fulfill the improvement of the quality of teachers and the completeness of teaching and learning facilities and promotion activities both through the media and directly, so that the quality of graduates and the quantity of new students continue to increase.

2. For future researchers, it is hoped that the results of this study can be used as additional information and add samples or other variables specifically about brands.

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Comparison of Richmond Agitation Sedation Scale (RASS) And Ramsay Sedation Scale (RSS) With Bispectral Index to Evaluate Depth of Sedation in Patients at The Intensive Care Unit in Adam Malik General Hospital Medan

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Abstract - Background: Management of sedation and analgesia in the Intensive Care Unit requires parameters to evaluate the sedation that can be done by objective or subjective methods. Objectively, we can use the Bispectral Index (BIS), while subjectively we can use the sedation scale, such as Richmond Agitation Sedation Scale (RASS) and Ramsay Sedation Scale (RSS).

Objective: This study aims to compare the correlation between BIS with RASS and RSS.

Method: Thirty-four patients who were treated in the Intensive Care Unit, mechanically ventilated and receiving Midazolam sedation with a cross-sectional analytic design were observed with BIS (target 65-85), then observed with RSS and RASS sedation scales. Patients with muscle relaxation treatment, central nervous system disorder, GCS <8, and unstable hemodynamics were included the exclusion criteria in this study.

Results: The average value of Richmond Agitation Sedation Scale (RASS) was -0.88 and Ramsay Sedation Score (RSS) was 3.55 after the administration of sedation. The correlation of Bispectral Index when evaluating the depth of sedation in patients at Intensive Care Unit with the Richmond Agitation Sedation Scale (RASS) sedation scale showed a non-significant weak correlation (r = -0.232 p > 0.05) compared to the correlation of Ramsay Sedation Score (RSS) sedation scale to Bispectral Index (r = 0.350 p <0.05).

Conclusion: RSS and RASS scoring systems had weak correlation to BIS but can be used to evaluate the depth of sedation in the Intensive Care Unit where RSS showed a better correlation than RASS.

Index Terms- Bispectral Index (BIS), Richmond Agitation Sedation Scale (RASS), Ramsay Sedation Scale (RSS).

I. INTRODUCTION

Most patients in the Intensive Care Unit experience pain, agitation, or anxiety during treatment and include indications for administration of sedation and analgesia.1 Sedation should be given to patients with critical illness who are treated in the Intensive Care Unit to reduce anxiety in patients.2 The main principle of care in the Intensive Care Unit is to provide comfort so that patients can tolerate to an unfriendly environment in the Intensive Care Unit.3 Management of analgesia and sedation in the Intensive Care Unit requires evaluation and also monitoring parameters to detect and measure the degree of pain, agitation, and sedation.4

Several sedation scales have been applied to evaluate sedation. Sedation levels on these scales are assessed and monitored using a number of different methods. In clinical practice, several assessments have been used that are objective methods (measuring plasma concentrations of sedation drugs, frontal electromyogram, lower oesophageal contraction, electroencephalogram, Bispectral Index monitoring (BIS), auditory evoked potentials) and subjective methods such as Ramsay Sedation Score, Motor activity scale, Richmond Agitation Sedation Scale (RASS), Riker Sedation-Agitation Scale (RSAS).5

In 1974, Ramsay published the well-known Ramsay Sedation Scale (RSS) by evaluating the effects of dalphaxolone or alphadolone sedation in 30 patients at the Intensive Care Unit using 6 point anxious or agitation scale to patients who did not have a response to stimulation. Since being published, the Ramsay scale has been used by many researchers and has also been used in 20 of 31 randomized controlled trials (RCTs) to compare sedation drugs with sedation quality or duration of mechanical ventilation. In 2002 the Richmond Agitation Sedation Scale (RASS) was introduced. The RASS scale was designed to have precise, unambiguous definitions for the level of sedation in the assessment of wakefulness, awareness, and general response resistance (open eyes, eye contact, physical movements) to sound and physical stimuli that are present in logical development.6

Bispectral Index (BIS) is a new electroencephalogram parameter specifically developed to measure the effects of sedation and hypnotics that are produced by anesthetic drugs. The main role of BIS is to measure the depth of anesthesia and it is useful for adjusting the dose of sedative drugs. The BIS index is a...
number between 0 and 100 on a scale that correlates between a good clinical outcome and the state of the EEG during anesthetic administration. BIS value close to 100 represents a clinical state of "awake / fully conscious" while BIS value of 0 has the meaning that there is no EEG activity.7

There was a correlation between BIS and RASS to evaluate the depth of sedation at the Intensive Care Unit in patients undergoing Flexible Fiberoptic Bronchoscopy (FFB) (p <0.05). The study results show that BIS monitoring is a meaningful tool that can be applied as an additional and alternative method for assessing sedation, especially for high-risk patients who are susceptible to sedation or over-sedation.8

At present, the use of BIS has limitations where not all hospitals have these facilities so that subjective modalities are used more often. Sedation scales that are often used are the Ramsay sedation scale (RSS) and the Richmond agitation sedation scale (RASS). Several studies had shown results that the BIS value is significantly correlated with the RASS score for evaluating sedation in patients at the Intensive Care Unit. However, studies supporting the correlation of BIS with other sedation scales such as the Ramsay Sedation Scale (RSS) are still lacking. Thus, the current study aims to assess the comparison of BIS correlation with RASS and BIS correlation with RSS in patients at the Intensive Care Unit, so that a sedation scale that is correlated well with BIS can be used to evaluate a better depth of sedation.

II. METHODS

This study is an analytic study with a cross-sectional design carried out in the Intensive Care Unit at Haji Adam Malik General Hospital Medan. Consecutive sampling is a sample selection technique by which all subjects who come and meet the selection criteria are included in the study until the number of subjects is met. After obtaining approval from the Ethics Committee, Faculty of Medicine, University of North Sumatra, based on inclusion and exclusion criteria 34 research samples were collected. All samples were given sedation drugs (Midazolam) and BIS values were measured. After the BIS value reached 65-85, the patient was observed and we recorded the level of sedation (BIS can be used to evaluate a better depth of sedation).8

Based on table 4.1 in this study, based on job followed by entrepreneur (23.5%) samples with job as a housewife, 8 (23.5%) samples with job as a farmer and 2 (5.9%) samples with job as a civil servant. Based on statistical tests, it was found that distribution of demographics data based on age group was normal with p> 0.05 with mean (mean ± SB) of 49.7 ± 1.0.

Based on table 4.1, 34 samples were found, including 18 male (52.9%), and 16 female (47.1%). From the statistical test result, distribution of demographic data based on gender was found normal with p value> 0.05.

Also from table 4.1, age group obtained by this study was 7 (20.6%) with an age range of 18-37 years, 20 (58.8%) samples with an age range of 38-57 years and 7 (20.6%) samples with age above 57 years. Based on statistical tests, it was found that distribution of demographics data based on age group was normal with p> 0.05 with mean (mean ± SB) of 49.7 ± 1.0.

Based on table 4.1 in this study, based on age group followed by 18 years (58.8%) with an age range of 18-37 years, 20 (58.8%) samples with an age range of 38-57 years and 7 (20.6%) samples with age above 57 years. Based on statistical tests, it was found that distribution of demographics data based on age group was normal with p> 0.05 with mean (mean ± SB) of 49.7 ± 1.0.

The last characteristics of this study was body weight with the mean Predicted Body Weight (PBW) of 55.94 ± 7.4.

Based on statistical tests, it was found that distribution of demographics data based on gender was found normal with p value> 0.05.

Also from table 4.1, age group obtained by this study was 7 (20.6%) with an age range of 18-37 years, 20 (58.8%) samples with an age range of 38-57 years and 7 (20.6%) samples with age above 57 years. Based on statistical tests, it was found that distribution of demographics data based on age group was normal with p> 0.05 with mean (mean ± SB) of 49.7 ± 1.0.

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In this study based on table 4.2, we found a moderate positive correlation (0.350) between BIS and RSS using Pearson correlation and statistically it was significant with p value < 0.05.

4.3 Overview of Correlation Between Bispectral Index (BIS) and Richmond Agitation Sedation Scale (RASS)

<table>
<thead>
<tr>
<th>Depth of sedation</th>
<th>BIS N</th>
<th>%</th>
<th>RASS N</th>
<th>%</th>
<th>Pearson correlation</th>
<th>p-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild sedation</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>5,9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate sedation</td>
<td>34</td>
<td>100</td>
<td>30</td>
<td>88,2</td>
<td>-0,232</td>
<td>0,187</td>
</tr>
<tr>
<td>Deep sedation</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>5,9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>34</td>
<td>100</td>
<td>34</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Pearson test

In this study based on table 4.3, we found that there is a weak negative correlation (-0.232) between BIS and RASS using Pearson correlation and statistically it was insignificant with a p value > 0.05.

IV. CONCLUSIONS

From the results of this research conducted to see the comparison of Richmond Agitation Sedation Scale (RASS) and Ramsay Sedation Scale (RSS) with Bispectral Index (BIS) to evaluate the depth of sedation in patients at the Intensive Care Unit, it can be concluded that:

1. The average value of Richmond Agitation Sedation Scale (RASS) was -0.88 and Ramsay Sedation Scale (RSS) was 3.55 after the administration of sedation.
2. Bispectral Index Correlation when evaluating the depth of sedation in patients at the Intensive Care Unit with the Richmond Agitation Sedation Scale (RASS) showed a non-significant weak negative correlation (r = -0.232, p > 0.05) compared to the correlation of the Ramsay Sedation Scale (RSS) using Bispectral Index (r = 0.350, p < 0.05).

REFERENCES


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Professional Identity Construction of Three Teachers Based in Community of Practice in a University in Vietnam

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Abstract- The present study tries to explore three aspects concerning teacher professional identity construction and answer these questions: 1. How do university EFL teachers in Vietnam understand their professional identity? 2. How do university EFL teachers in Vietnam construct their professional identity in community of practice? The university EFL teachers who participate in the present study are from a university in Thai Nguyen, Vietnam. They are divided into three groups and are categorized as beginner teachers, teacher development and experienced teachers. According to the survey, the academic identity, teacher identity and institutional identity make up the professional identity of EFL teachers of the university, in which the community organizes where teachers work together and the teaching community. Teaching involves interaction between teachers and students of great significance in building EFL teachers' career identities. Furthermore, the results show that the collaborative and caring community helps raise awareness about the development of new teachers and emotional motivation and supports resources from organizations, colleagues and positive feedback. Extreme teachers help teachers a lot in developing integrated professional identity. Finally, some suggestions are given for university teachers, teacher educators and organizational leaders.

Index Terms- university EFL teacher in Vietnam; professional identity; community of practice; narrative inquiry

I. INTRODUCTION

In recent years, teachers' professional identity was under a wide attention. Miller (2011) compared some definitions of teachers' professional identity, she wrote that "identity is ... relational, negotiated, constructed, enacted, transforming, and transitional."

Fang and Mao (2008) did an investigation in 441 university teachers of China, and they found that the degree of professional identity is related with teacher's educational background, titles and years of teaching.

Xu and Fan (2009) discussed the dual identities of university EFL teachers and proposed that teachers' professional boundaries come from the lower social respect and university administrative culture.

II. THEORETICAL BASIS

Wenger (2006) defined Community of Practice (CoP) is a group of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly. A CoP is distinguished by the presence of three dimensions: a domain that focuses identity and action; a community comprised of members, their relationships, and the trust, belonging, and reciprocity that characterize their interactions; and a practice, a repertoire of tools, methods, and skills that evolve through members’ learning, use, and innovation. Wenger proposed the concept of dualities to examine the forces that create and sustain a CoP in 1998, namely, participation-reification duality, local-global duality, designed-emergent duality and identification-negotiability duality. Identification explains how individuals take ownership of collective meaning and shapes that meaning through negotiation and the power to influence action toward community goals. It is a process of building “membership” through an investment of the self, providing experiences and materials, in relations of association and differentiation. Negotiability is the degree of controlling over meaning we are invested. Identification is made possible through three modes of belonging in Wenger's...
Community of Practice: engagement, imagination and alignment. But all three modes of belonging are not necessary in an individual’s identification in a community. Later, Wenger (1998: 154-155) proposed five types of trajectories of learning in community of practice: peripheral trajectories, inbound trajectories, insider trajectories, boundary trajectories, outbound trajectories.

In this study, the author chose Wenger's theory for 3 reasons. First, Wenger's theory concerns about what happened on the person and how the person connected self with other things and other persons, it can explain their behavior, and shed light on person's inner world. So with Wenger's theory, we can find out how university EFL teachers identify themselves. Second, the process of identification is dynamic and shifting, Wenger provided a perfect and logical basis to explain how teachers make meaning of their experience and themselves in the negotiation with changing outside context. Moreover, the trajectories of learning proposed by Wenger also can be used to describe the path of university EFL teachers' professional development, so their path of professional identity construction also will be clear.

### III. RESEARCH METHODOLOGY

#### 3.1 Research questions

1. How do the three university EFL teachers in Vietnam understand their professional identity?
2. How do the three university EFL teachers in Vietnam construct their professional identity in community of practice?

#### 3.2 Research subjects

The institution under investigation is a university belonging Thai Nguyen university.

The three female teachers as the research subjects all come from there, they studied in this university as undergraduate students of English major when they were young, and they chose to be an EFL teacher in this university after graduation.

In this paper, Linh was in the fifth years of teaching, the author labeled her as the novice teacher in this paper; Trang has 10 years working experience and she was marked as an experiencing teacher; and Loan has over 20 years working experience and she was recognized as an experienced teacher.

### TABLE 1. BASIC INFORMATION OF THREE TEACHERS

<table>
<thead>
<tr>
<th>Name</th>
<th>Age</th>
<th>Gender</th>
<th>Title</th>
<th>Degree(when interviewed)</th>
<th>Working Years</th>
<th>Times of interviews</th>
</tr>
</thead>
<tbody>
<tr>
<td>Linh</td>
<td>30</td>
<td>Female</td>
<td>Lecture</td>
<td>Master of English major</td>
<td>5 years</td>
<td>1</td>
</tr>
<tr>
<td>Trang</td>
<td>35</td>
<td>Female</td>
<td>Lecture</td>
<td>Master of English major</td>
<td>10 years</td>
<td>1</td>
</tr>
<tr>
<td>Loan</td>
<td>Approximately 50</td>
<td>Female</td>
<td>Lecture</td>
<td>Master of English major</td>
<td>Above 20 years</td>
<td>1</td>
</tr>
</tbody>
</table>

#### 3.3 Methods and instruments

Case study and narrative inquiry are the methods used in this study. A case study is an intensive analysis of an individual unit (e.g., a person, group, or event) stressing developmental factors in relation to context (Flyvbjerg, 2011). The aim of the narrative is “understanding and making meaning of experience, and understand how people think and act in the situated contexts in which they live through their stories Narrative is the best way to think about experience”(Clandinin and Connelly, 2000:80). In the researches of identity, case study and narrative inquiry are of great significance.

The author used two basic ways to collect the data: interview and observation. In consideration of different experience the teachers have, the author chose semi-structured interview. The author would like to explore the university EFL teacher’s identity by questions which mainly from the perspective of personal family background, educational background, views on teacher-students relationship, on the Assessment System and teacher training programmes. Observation offers the author an opportunity to get close to the interviewees and observe their behavior in natural situation, and it can ensure the data's validity and authenticity.

#### 3.4 Data collection and analysis
The author interviewed the three teachers respectively and interviews were recorded by a telephone with recording function. Then the author went into their classrooms for observation, and the interviews to their students were finished in classroom. The author chose method of Thematic Analysis to examine and analyze the collected data. First, the author translates the interviews and observation notes which were originally conducted in Vietnamese into English. Then, the author finds out some codes and incidents which are significant to the three teachers. At last, the author combined vertical and horizontal analysis in exploring the construction of university EFL teachers' professional identity. Vertical analysis helped in explaining one university EFL teacher's professional identity based on her experience as a student, as a teacher. While horizontal analysis focused on the comparative analysis between three cases.

IV. NARRATIVE INQUIRY INTO THREE VIETNAMESE UNIVERSITY EFL TEACHERS' PROFESSIONAL IDENTITY

4.1 Story of Linh

4.1.1 Linh's Biography

Linh has worked in this university for 5 years. Comparatively, she was the youngest member of the community, for the School has not recruited a new university EFL teacher in recent years. She was teaching English to non-English major students in this semester, and she has taught English two.

Linh was an introverted person, but in her class, she "likes to show her extroverted side to communicate with students openly and unconstrainedly". According to her students, Linh was "hardworking", "responsible" and "easygoing". Linh described herself as "passionate" and her not-explicit passion mainly presented in the careful preparation of lessons, her gentleness for the students and tireless of teaching rather than an energetic voice in her class.

4.1.2 Linh's Life as a University EFL Teacher

The Development of the Consciousness of a University Teacher

Linh never thought about to be a teacher when she was an undergraduate student. When she studied for her Master Degree in another Normal University, she taught college English to the freshmen and tutored some high school students. It was at that time some people said that she is suitable to be a teacher and the idea of being a teacher planted in her mind. And the teaching experience helped her build the confidence of being a teacher.

Linh experienced an adjustment stage when she began to work in this university. She adapted to her teacher identity gradually in teaching practice. When she was a student, she thought that teachers are professional and formal. Although she has some teaching practice when she was a student, she felt that she was just "a worker" who works for others. When she became a real teacher, she realized that university teacher is not as simple and easy as she saw.

A Responsible Teacher

Linh was a tolerant "elder sister" for students at the beginning, but gradually, she found that it is not enough to be a "sister" for students. She thinks she is a friend of students, so she always be tolerant, but some of her students told her that she should be more strict to students, for her gentleness in classroom cannot make all students follow her orders, then she realized that keep authority is important.

Although preparing lessons took lots of time, Linh always find some time on reading. The interviewer felt that Linh has a strong awareness of academic research. She has already published several papers and led two academic research projects. For her, a qualified university EFL teacher should have systematic knowledge, management ability and competence of academic research. Linh's understanding of qualified EFL teachers matches the current requirement for university teachers and shows that she absorbed the new thoughts in teachers training program.

4.1.3 Summary

Linh was in a stable stage. She mentioned the family's support was very important to her. Her husband who worked in the same university can understand and support her. Linh has no child but has the plan of baby, and she showed her worry about future.

“I am not sure about the future, and the uncertainty of future makes me worried. I am facing many pressures, from work, from college, and even from family. Family pressure mainly comes from my gender, especially in consider the new family member's coming. Female teacher always shouldered more burden than male. In a family, women need to take care of housework, children as well as her own work.” (Linh, interview, 28 Oct. 2012)

Linh has advantages in age and strong awareness of academic research. She became a university EFL teacher when College English Teaching Reform has launched for some years, she has been well trained and accepted the newest ideas of Teaching Reform. So for her, she internalized the outside requirements and prepared herself as a teacher as well as a researcher. In finding her professional identity, she experience a lot change in finding the “feeling of being a teacher” which reified in her views on teacher-student relationship.

4.2 Story of Trang:

4.2.1 Trang's Biography

When Trang graduated from this university, she stayed and taught College English to senior class of non-English major students, 3 years later, she began to teach students of English major courses like Comprehensive English, English Listening. She has won the first title in teaching contest in university level and her capacity of teaching has been recognized by her colleagues and leaders. Her students described her as “good temper”, “interesting”, and “thoughtful”. Trang gave her students lot of autonomy, and she paid much attention on students' doing and spared more time for students do the presentation on class.

When talked about the reason why Trang chose to be a teacher, she said that “I want to be a teacher since I was in junior high school. I was the English course leader at that time, I helped my teacher to arrange the class, leaded my classmate to read text we have learned, which made me feel a kind of honor. So I thought it is good to be a teacher in the future.” And she became an English teacher after graduated.

4.2.2 Trang’s Life as a University EFL Teacher

A “Beginner” and “Practitioner”

Trang used “beginner” to describe herself, and stressed on keeping study: “I am a beginner. There are so many challenges and I feel the need of studying. It seems that everything just begin to me. Although I learned something from what I have experienced, I feel that there are more things need to learn.” Trang also
described herself as a “practioner” who knows some theories and willing put theories into practice. It seemed that Trang accepted the Teaching Reform and realized there are more challenge will be confronted.

**Self-identification in Teaching and Research Practice**

Trang found her identity mainly in teaching and research practice. Trang has her own idea of relationship between teacher and students, she preferred to keep a few distance to protect her privacy as well as approved of an equal and friendly relationship. Trang explained that she is a person with a strong sense of being teacher. She tried to be mature and be decent in front of students, so she can have the authority. “I think more about how to help students to learn, so I will use less time on talking current news or jokes.”

When Trang entered into this institution, the School involved in College English Teaching Reform, the Department of College English developed College English as a distinctive course which became one of National-level Quality Courses later. Trang was a part of it, and she was the teacher of Oral English and Speech course. Some methods such as “Task-based Teaching method, Communicative Teaching method” presented and teachers were asked to put these into practice to foster students' learning autonomy, Trang accepted them naturally. She said that she has an open mind and she has been trained and familiar with these new teaching methods in her Teaching Methods class as a graduate student, and she is familiar with computer, she like new things and adapt them quickly.

Trang said that she has a passion of change. Such passion of making change showed not only in her class teaching but also in academic research. Yet this academic research interesting did not appear at the beginning, she has been pushed by the Assessment System to write academic papers, but later something unknown enhanced her understanding of academic research. This “something unknown” may be self-requirement of professional developing. But for her heavily workload of teaching, Trang shared 80% of time in teaching, while the rest 20% went to academic research.

**An Active Member in the Institution**

Trang was an active member in the institution, which not only presented in her willingness to be part of collective activities such as sport meeting, new year party or teaching competition, but also showed in her willingness to communicate with the senior members. When Trang entered the SFL, she also benefit from the Tutorial System, an elder teacher was assigned to help her get familiar with textbook, the processes of teaching in the first year. So she can get familiar with conditions quickly. Yet the tutor in academic research failed her at the first time, she expressed herself “has no idea on what to do” at that time, but she kept on asking help from other senior and experienced teachers.

In this semester, Trang has some administrative works to do, she was in charge of postgraduates who gave English classes to non-English major students, and she needed to spare her time to teach them. In the third interview which made in this winter vacation, Trang could have the time of rest, but she still work as an editor of English textbook, she said that although she want to take a break, things on hand cannot make her stop.

**4.2.3 Summary**

Trang felt happy to be a teacher for this job brings her “a fulfilling life, contacting with cultured people and respect from the whole society.” And she has a high level of job satisfaction. According to Trang, reflection on herself in time made her see herself clearly. Trang was a thinker rather than a follower. Being a part of College English Teaching Reform and doing the administrative work enhanced her sense of belonging. Trang become accountable to the community of practice and could think more about the outer context and environment. She has her own thought on many things and she was in her way of becoming important in the community.

**4.3 Story of Loan: An Energetic Leader**

**4.3.1 Loan’s Biography**

Loan was busy but “fulfilling” in this semester. Her students described her as “knowledgeable”, “vigorous”, “strict” and “meticulous”. Her students said that Loan was energetic in classroom, her infectious enthusiasm can affect the students. At the same time, she was a disciplinarian who strict to students on learning. Students also said that Loan is an easygoing person after class.

Loan said that she was very simple at the beginning of her career, what she want was to be a good and simply teacher who imparting knowledge and never thought about making money, also she described that she has not ambitions in career at that time. The first class she taught was Listening, she has no feelings like confusion or lost, she just accepted her identity as a teacher smoothly.

**4.3.2 Loan’s Life as a University EFL Teacher**

**A “Guider” for Students**

Loan has a high reputation in students, she explained that because she has her unique understanding of being a university EFL teacher and she has her belief of teaching in classroom. In Loan’s mind, teacher should be a “guider” rather than other figures. And she paid attention on educating students as “whole person”, and stressed their emotional experience through classroom.

“A teacher’s role is helping students' learning. Teachers are richer in knowledge and experience than students, then teacher should be a guider. I don’t think that we are friends. We do have friendship, but teacher should give other things more than friendship.

**A Reflective Practitioner**

Loan said that “outlines” and the “records” helped her to summarize her teaching practice in time. Through reflection, Loan summarized some good experience and imperfect places need to be improved in teaching.

“Having taught English for so many years, I refined some experience. In the end of each semester, I always write down something to summarize the lessons I learned from my students, then I can improve myself in the next semester. So I will retain the right thing I have done. When I open a course, I will put forward of an outline, which including teaching aim, teaching content learning outcome and my requirements. This outline will not present to the college, I do it voluntarily and I am the one who read it. In the first of class in a new semester, I will tell students my way of teaching, the expectation to them, learning methods and assessment methods. Usually the students in my class will think that I’m tough in the first time, because I often say rule No. 1, rule No. 2 and so on. But these rules work. These teaching experiences are accumulated up slowly.” (Loan, interview, 26 Oct. 2018)
Now her enthusiasm for scientific research was rising. She realized the both teaching and scientific researchers are important and scientific research can facilitate teaching. In the past six months, Loan already finished six articles. She stresses on combination of teaching and scientific researches for many times.

A Leader in the Community

In the interview, Loan pointed out a fact that young teachers do not want to go out for a long-term study when in consideration of the family, especially the female teachers, who have to take efforts to balance their family and career. She said that “so did I when my son was little”, for her husband worked far from home and she has to spare more time on taking care of her son. But now the situation is much better, her son grown up to a self-sufficient age in her teens, with the supportive husband, she can focus on her work and studying. As the leader of her teaching and research section and the main instructor of National Teacher Training Programmes, Loan showed her confidence in these activities. She has no worries about heavy work might impact on her family and she enjoyed in this busy but fulfilling life.

4.3.4 Summary

Loan's case illustrated her identity shifting experience as a middle-aged female teacher, she was more family-focus, subsequently crossed the boundary and got a more meaningful life which required by the institution. Now she found herself as a liberal person. Where there is reform, there will be changes and conflicts in thoughts. Loan was one followed the wave of reform, and she learn the newest things continuously, and now she was an active participator who plays the leading role in the reform.

V. RESULTS AND DISCUSSION

5.1 Result of Research Question 1: How do the three university EFL teachers in Viet Nam understand their professional identity?

Teachers' professional identity never be a single conception, according to the narrative stories of the three teachers, their integrated professional identity can be generally demonstrated 3 interactive aspects: academic identity, teacher identity and institutional identity, and the 3 aspects are intertwined in the teachers work and life. Their understanding of professional identity reified in their thoughts and translated into teaching and working practice. The interviewer felt that they were stressed on their teacher identity, then their academic identity, while their institutional identity rather implicit in their narrative. They all mentioned the most important work as a teacher should be imparting knowledge and educating students.

a) Academic Identity

Taylor (1999) believed that the “academic identity” including three levels: the workplace, the discipline and the universal notion of what it means to be an academic. Here the academic identity in the thesis is related with discipline and academic research. University EFL teachers’ academic identity comes with discipline specific and disciplinary academic research, and they are professional for their scholarship. The specializing of disciplines distinguishes them from other discipline, and their academic work constructs their recognized image in academic fields. The academic identity corresponds to the formulation of research-oriented teacher.

All three teachers showed the willing to be a research-oriented teacher. Linh has the awareness of academic research as the youngest teacher. Trang called herself “a participator” in academic research. Loan stressed her academic identity through doing researches actively.

b) Teacher Identity

University EFL teachers’ teacher identity was produced in the interaction with students in English classes. Teacher identity generated with teachers' understanding of this occupation and their responsibility. The approvals from students in teaching community enhance the awareness of this identity, and those approvals reified as students' willing contact with teachers, their greeting, text message as festival bless. And it mainly reified in teacher's view on teacher-students relationship and their teaching beliefs.

Linh has been a “tolerant elder sister”, and later she tried to keep authority in front of students and be a “responsible” teacher. Trang described herself as “a friend who keeps distance from students”. Loan defined herself as a “guider” to her students.

c) Institutional Identity

University EFL teachers belong to a teaching institutional community where they worked together, they involved in some institutional activities, and they served the institution as common members, office directors, programme leaders and so on. Institutional identity related to the work place and it is the membership in the teaching institution.

Linh was not an active member and she felt that she is in the outside of the institutional community, without much right of speaking. Trang was an active member of the institution and did some administrative work, which was both challenge and opportunity, and it was reified the recognition of her capabilities. Loan was a leader in the institutional community.

5.2 Result of Research Question 2: How do university EFL teachers construct their professional identity in community of practice?

Here we discussed their professional identity, so some meaningful communities they were or are in should be mentioned: institutional community, teaching community, other learning community (refers to the community formed in teacher training programs, part-time jobs, oversea visit study and so on other learning/teaching practice unconnected with the institution). Temporary other learning/teaching community may help a lot in getting the newest pedagogic knowledge and improving teaching ability, but institutional community and teaching community played the most important roles in the process of teachers' professional identification.

Teaching community which involves the teacher and the students plays an important role in the construction of teacher identity and academic identity. Students' feedback affect teachers' sense of achievement and sense of being a teacher, for example. Linh confirmed herself as a teacher in students’ supportive words and benign teacher-students relationship. At the same time, university EFL teachers teaching beliefs and philosophy were put into practice in the classroom, for teachers who combined the teaching and academic research, their research results reified in their teaching practice. University EFL teachers' professional
identity grows in the interaction between teacher and the students and substantiates in classroom.

Based on three teachers' stories, the author summarized three important factors that influence the construction of teachers' identification in the institutional community. Emotional motivation involves in the development of teachers' sense of belonging which is the basic and important emotional motivation to develop a university EFL teachers' professional identity especially for a new member. Group activities strengthen the members' sense of cohesion and pride. Another motivation is the Assessment and Award Mechanism, which is tied to the Professional Titles Assessment System and Employment System for university teachers; it is motivation as well as pressure.

Resources support includes political, financial, material and chances support in the construction of teachers' professional identity. All three teachers confirmed the situation that many favorable policies in the institution aim to accelerate the development of teachers. Beside the multimedia in English class, the well-equipped office in new teaching building.

Colleagues' and institution leaders' positive feedback is also an important factor in the identification, especially for younger teachers. For instance, the institution hold regular demonstration lessons and ask younger teachers involved in to improve their teaching ability they all benefit a lot from that suggestions of future improvement and grown up through those communication of instructional experience.

VI. CONCLUSION

Teacher education involves both personal and professional, the point of teacher training programs is not only a matter of improving teachers' teaching skills, research methods or knowing newest pedagogic information, but also a matter embracing humanity, including cultivate their awareness of professional development, enhance their sense of responsibility, repel the job burnout and so on. From the three cases, we can see that university EFL teachers have different concerns in different stages. For example, younger teachers always face the problems such as lacking belongings and confidence. So the training programs, workshop, seminar should come into play in solving those problems that teachers are facing with or will confront.

The study also shed light on teachers' professional development. First, teachers' professional development should be self-initiated. Second, reflect the context as well as oneself in time can help a teacher do better in professional development. Reflection is a process of teachers' recalling, thinking and evaluating their past teaching experience, which give meaning to the decision they made, the thing they done, and it is also a process of identification. People are socially connected beings, how we see ourselves affected by the shared meanings and rules of the community, and we negotiated in the interaction with others and changing outside world. Understanding the context can help us explain our behavior and make a right decision, and is as vital to become a good teacher as understanding ourselves in reflection.

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AUTHORS

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Profile of Implanon Acceptors at The Rivers State University Teaching Hospital, Southern Nigeria: Ten Years Review

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Abstract- Background: Implanon, a single rod long acting reversible implant contraceptive containing 68mg of etonogestrel, has been described as highly effective and is of similar effectiveness to sterilization.

Objective: To determine the profile of implanon acceptors at the RSUTH, a South South tertiary hospital.

Method: The case records of all the clients who accepted implanon at RSUTH between 1st January, 2008 and 31st December, 2017 were retrieved, studied and the information analysed using statistical package for social sciences (SPSS) IBM version 25.0 (Armonk, NY).

Results: Out of 1893 contraceptive acceptors during the study period, 308 (16.3%) accepted implanon. Majority of the clients 124 (40.3%) were between the age range of 30-34, married 293 (95.1%), multiparous 228 (74.0%), Christians 296 (96.1%) and 302 (98.1%) had formal education. Clinical personnel were the commonest source of information 231(75%).

Conclusion: Implanon was used mostly by young, married and educated multiparous women. Education and increased patient awareness will increase its desirability and uptake.

Index Terms- Implanon, contraceptives, acceptors, Rivers State University Teaching Hospital.

I. INTRODUCTION

The possibility of the sub-dermal contraceptive implant began when silicone in the 1940s was found to be bio-compatible with the body. Long acting reversible contraception has gained wider acceptance for decades due to overwhelming conveniences to the users and higher probability of future fertility upon discontinuation1,2. Implanon which is a single rod sub-dermal implants was developed by Organon and contains 68mg of etonogestrel (3-ketodesogestrol) which provides contraception for three years. It is silicone free and releases about 60-70 micrograms of etonogestrel initially reducing to 25-30 micrograms at the end of third year. Some data have shown its effectiveness for 5 years 1,2. Implanon is a safe, very effective, convenient and reversible long term contraceptive with a one year failure rate of 0.05% 2,4.

Implanon acts by inhibiting ovulation, thickening the cervical mucus and altering the lining of the endometrium. Hormonal protection starts within 24 hours of insertion and return of fertility is almost immediately after removal. It is made up of 40mm by 2mm semi rigid single rod inserted subdermally in the medial aspect of the middle third of the non-dominant upper arm by a trained provider 5,6. It is inserted within 5 days of a menstrual cycle. It is safe for lactating mothers, adolescents, diabetics and hypertensives 4. It reduces the risk of ectopic pregnancy, pelvic inflammatory disease and improves dysmenorrhea. Implanon has also been documented to reduce frequency and severity of sickle cell crisis making it suitable for use by patients with sickle cell anaemia by stabilizing cell membrane, reducing the clogging rate and improving the red cell transit time1,2,5,6.

The two commonly used and available contraceptive implants currently available in the family planning clinic of this hospital are Jadelle and Implanon. There has never been any study on contraceptive implants in the centre. This study was designed to determine the profile of the acceptors of implanon, the acceptance rate and sources of contraceptive information over a period of 10 years.

II. MATERIALS AND METHODS

This retrospective study was carried out at the family planning clinic of the Rivers State University Teaching Hospital (RSUTH), a newly established teaching hospital in Port Harcourt, the capital of Rivers State in South-South geopolitical zone of Nigeria. The clinic gets its clients from within and outside the hospital. It has its own records section different from the hospital records and this makes it easy to retrieve the clients’ case notes. The clinic is headed by a consultant Gynaecologist, with the support of trained family planning nurses and resident doctors.

At presentation, the clients were warmly welcomed by trained family planning nurses and physicians who also counseled them. The clients were allowed to make informed choice based on their needs and available contraceptives suitable for them. Thereafter medical history and clinical examination were done. Urine analysis and pregnancy test were also done for the clients and informed consent obtained.

Insertion and removal of implanon were carried out in strict compliance with the manufacturer’s protocol. In the absence of complications, post insertion follow up visits were at 4 weeks, 3 months, 6 months and thereafter annually. They were counseled to report to the clinic if any complications occur and also to discontinue the method if the side effects were unbearable. At each
visit, the blood pressure and weight of the clients were recorded and complications managed appropriately after evaluating the clients. The evaluation included history of complaints, clinical examinations and sometimes ancillary investigations to rule out the possibility of an organic cause. A client is lost to follow up if she defaulted for more than 6 months.

The record cards of all the clients that accepted implanon between 1st January, 2008 and 31st December, 2017 were retrieved and studied. The information extracted from the cards included the socio-demographic characteristics of the clients, indications for their use and source of information concerning contraception. The data was analyzed with the statistical package for social sciences (SPSS) IBM version 25.0 (Armonk, NY) using frequency counts and percentages.

III. RESULTS

During the study period, there were 1893 contraceptive acceptors out of which 308 women (16.3%) accepted implanon. All the implanon inserted were done in the first 7 days of menstruation after excluding pregnancy. One hundred and ninety six (63.6%) women used implanon for birth spacing, 100 (32.5%) had completed their family size and used it to prevent further pregnancy. There was no reason for the use of implanon indicated in the cards of 12 (3.9%) clients.

The ages of the clients ranged from 19 to 46 years. Majority of the clients 265 (86.1%) were between the age range of 25 to 39 years with age range 30-34 years being the highest, 124 (40.3%). The mean age was 31.4±4.9 years. Majority of the clients were multiparous women, 228 (74%) and Christians 296 (96%). The parity range was 0 to 7 and modal parity was para 3. Eight (2.6%) were nullipara while 37 (12%) were grandmultipara. Three hundred and two (98%) of the clients had formal education out of which 209 (67.9%) had secondary level of education while 82(26.6%) and 11(3.5%) had tertiary and primary levels of education respectively.

Majority of the clients were married 293(95.1%) while 15 (4.9%) were single. The occupation of the clients were not documented in the patients’ cards therefore could not be analysed. The socio-demographic characteristics of the implanon acceptors are shown in table 1.

Sources of information on contraception are shown in table 2. Two hundred and thirty one (75%) women obtained their information concerning contraception from clinical personnel, 34 (11%) from friends and relatives, 16 (5.2%) from community health workers and 9 (2.9%) from print and media. Radio/Television and outreach contributed 2 (0.7%) and 3 (1%) respectively.

Table 3 shows the yearly trend of acceptors of implanon. In 2008, 6 (2.5%) women accepted and used implanon. No new client used implanon in 2009. 2016 recorded the highest uptake, 71 (39.9%). From 2010 to 2015, 14 (5.3%), 15 (8.7%), 42 (21.1%), 17(10%), 39 (28.3%) and 56 (32%) women used this type of contraception respectively. After 2016, there was a decline in the use of implanon in 2017 with 48 (34.3%) women using it.

<table>
<thead>
<tr>
<th>Table 1</th>
<th>Socio-demographic characteristics of the clients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable</td>
<td>No.</td>
</tr>
<tr>
<td>AGE</td>
<td></td>
</tr>
<tr>
<td>&lt;20</td>
<td>3</td>
</tr>
<tr>
<td>20-24</td>
<td>23</td>
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<tr>
<td>25-29</td>
<td>78</td>
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<tr>
<td>30-34</td>
<td>124</td>
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<tr>
<td>35-39</td>
<td>63</td>
</tr>
<tr>
<td>40-44</td>
<td>16</td>
</tr>
<tr>
<td>45-49</td>
<td>1</td>
</tr>
<tr>
<td>EDUCATIONAL STATUS</td>
<td></td>
</tr>
<tr>
<td>No formal education</td>
<td>6</td>
</tr>
<tr>
<td>Primary</td>
<td>11</td>
</tr>
<tr>
<td>Secondary</td>
<td>209</td>
</tr>
<tr>
<td>Tertiary</td>
<td>82</td>
</tr>
<tr>
<td>RELIGION</td>
<td></td>
</tr>
<tr>
<td>Christianity</td>
<td>296</td>
</tr>
<tr>
<td>Islam</td>
<td>6</td>
</tr>
<tr>
<td>Others</td>
<td>6</td>
</tr>
<tr>
<td>PARITY</td>
<td></td>
</tr>
<tr>
<td>Nullipara</td>
<td>8</td>
</tr>
<tr>
<td>Primipara</td>
<td>35</td>
</tr>
<tr>
<td>Multipara</td>
<td>228</td>
</tr>
<tr>
<td>Grand multipara</td>
<td>37</td>
</tr>
<tr>
<td>MARITAL STATUS</td>
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<tr>
<td>Single married</td>
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<td>married</td>
<td>293</td>
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<table>
<thead>
<tr>
<th>Table 2:</th>
<th>Sources of information on contraception</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sources of Information</td>
<td>No. of clients</td>
</tr>
<tr>
<td>Clinical personnel</td>
<td>231</td>
</tr>
<tr>
<td>Friends/relatives</td>
<td>34</td>
</tr>
<tr>
<td>Community Health Worker</td>
<td>16</td>
</tr>
<tr>
<td>Print Media</td>
<td>9</td>
</tr>
<tr>
<td>Radio/Television</td>
<td>2</td>
</tr>
<tr>
<td>Outreach</td>
<td>3</td>
</tr>
<tr>
<td>Others</td>
<td>13</td>
</tr>
</tbody>
</table>
Table 3: Yearly trend of acceptors of implanon.

<table>
<thead>
<tr>
<th>Year</th>
<th>No</th>
<th>Total no. of contraceptive users</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2008</td>
<td>6</td>
<td>237</td>
<td>2.5</td>
</tr>
<tr>
<td>2009</td>
<td>0</td>
<td>220</td>
<td>0</td>
</tr>
<tr>
<td>2010</td>
<td>14</td>
<td>264</td>
<td>5.3</td>
</tr>
<tr>
<td>2011</td>
<td>15</td>
<td>172</td>
<td>8.7</td>
</tr>
<tr>
<td>2012</td>
<td>42</td>
<td>199</td>
<td>21.1</td>
</tr>
<tr>
<td>2013</td>
<td>17</td>
<td>170</td>
<td>10.0</td>
</tr>
<tr>
<td>2014</td>
<td>39</td>
<td>138</td>
<td>28.3</td>
</tr>
<tr>
<td>2015</td>
<td>56</td>
<td>175</td>
<td>32.0</td>
</tr>
<tr>
<td>2016</td>
<td>71</td>
<td>178</td>
<td>39.9</td>
</tr>
<tr>
<td>2017</td>
<td>48</td>
<td>140</td>
<td>34.3</td>
</tr>
</tbody>
</table>

IV. DISCUSSION

The acceptance rate of implanon during the study period was 16.3% which was second to intrauterine contraceptive device (IUCD) acceptance rate of 43% \(^7\). This is similar to a study done in South Africa \(^8\). This is more than 13%, 4% and 9.6% acceptance rates recorded in Jos, Port Harcourt and Uyo respectively \(^9\)\(^-\)\(^11\). The yearly distribution of implanon showed a progressive increase in the first five years with no record of acceptance in 2009. It is possible that the state ministry of Health did not make implanon available in the family planning clinic that year. There was a decline in the acceptance of implanon in 2013. Thereafter it started rising again up till 2017 when the rate declined again. Therefore the acceptance and use of implanon fluctuated during the study period. This trend is similar to a study done in Port Harcourt \(^10\). The fluctuation might be due to multiple national strikes by health workers in Nigeria. The decline in the acceptance of implanon in 2017 might also be due to the rising cost of implanon.

Though implanon has one rod which makes it easier to insert and remove than the older ones with six rods, the number of women who accepted and used it during the study period was still small. This may be due to the invasive nature of this method of contraception. The highest barrier to its use is the high cost in addition to shortage of the implants and equipment for insertion \(^11\) which could have contributed to its absence in 2009. The expensive nature of training and retraining providers with the skills of insertion and removal of implanon also contribute to the high cost of the implant. This high cost of the implants has prevented widespread provision of implanon in resource poor countries like Nigeria \(^11\).

The socio-demographic characteristics of the clients are also in keeping with findings of earlier studies \(^12\)\(^-\)\(^14\). Majority of the clients were young, married and multiparous who would want to space childbirth rather than postponing pregnancy for complete family size. About a third of the clients used implanon to limit the family size. This is not surprising because cultural and religious reasons have made our women in Nigeria not to accept permanent contraceptive methods \(^15\)\(^-\)\(^18\). Over half of the clients preferred spacing the births with implanon showing they prefer implanon for short term contraceptive purpose. Majority of the women were Christians. This is not surprising because majority of the population in south south Nigeria are Christians.

Counseling for the insertion and removal of implanon was easy as most of the clients had formal education. There were 3 (1%) adolescents who used implanon during the study period. In our environment, adolescents are at risk of having unwanted pregnancies, unsafe abortion and all its complications \(^19\)\(^-\)\(^21\). Adolescents have been shown to be an ideal population for the use of implants and the contraceptive CHOICE project \(^22\) showed good acceptance and continuation rates among adolescents. Therefore it is necessary to intensify efforts at reaching the adolescents especially in higher institutions and telling them how effective the contraceptive is at the same time encouraging them to use barrier method to prevent STDs.

Majority of the clients heard of the family planning through clinic personnel in keeping with the results of earlier study \(^8\)\(^,\)\(^11\)\(^,\)\(^12\)\(^,\)\(^16\)\(^,\)\(^18\). This may explain the low uptake rate of modern contraceptives especially in Nigeria. The contribution from non medically related sources like print and media was low in this study as reported in previous studies \(^10\)\(^,\)\(^12\)\(^,\)\(^23\). Therefore efforts should be made to increase the publicity of contraceptives through both the electronic and print media in southern Nigeria. Acceptance of implanon also depends on the information and counseling provided by the family planning providers. The training and retraining of service providers on the use of implanon by the government will go a long way in reducing the cost of implanon and increasing its uptake.

V. CONCLUSION

Implanon is a contraceptive implant mainly used by young, married, multiparous and educated women who would want to space their childbirths. Making the implant readily available and subsidizing its cost will increase the acceptance rate of implanon. Also increasing the information on this type of contraceptive through the media will go a long way in its awareness and acceptance.

CONSENT: It is not applicable.

ETHICAL APPROVAL: Ethical approval was given by the Hospital’s Ethics committee.

COMPETING INTERESTS: Authors have declared that no competing interests exist.

REFERENCES


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The Effect of FlexiTime on Employee Performance in Financial Institutions in Kericho Town

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Abstract- Job design is a process that entails putting together specific duties and responsibilities to create a variety of tasks that define the duties and responsibilities for individuals to carry out in their day to day work. Job design is very crucial for individual satisfaction and employee performance. It also ensures that a job is done efficiently, economically, reliably and safely. Therefore, the main purpose of this study was to find out the effect of flexitime on employee performance in financial institutions in Kericho town, Kenya. With the financial institutions struggling with challenges such as increased operating costs and downsizing, they have adopted some job design strategies whose effect on employee performance has not been established. The study adopted a descriptive survey research design and to achieve the study objective further, inferential statistics was utilized using the Pearson correlation to establish the relationship between the employee performance against flexitime. Mixed-methods approach was used by doing a census on the target population of 29 financial institutions and stratified the financial institutions into categories. Convenience sampling was done one each from Human Resources, Sectional Heads, Cashiers and Operations Manager per institution per strata where a sample size of 116 respondents was obtained. Questionnaires were used and a response rate of 73.3% was realized. Validity was ensured through subject matter experts whereas a reliability coefficient of 0.801 was established through Cronbach’s alpha coefficient. The study findings indicated that flexitime had a strong positive association with employee performance of the financial institutions within Kericho County since it had a coefficient of 0.657 (r=0.657, p=0.000). Therefore, the study concludes that flexitime significantly affected employee performance in financial institutions in Kericho town. The study highly recommends the improvement of the use of flexitime work arrangement in the financial institutions. The study forms a useful reference material that will be used by institutions to develop more effective job design strategies that shall enhance employee performance and satisfaction and inculcate the useful attributes of technology use. It will further broaden the scope of performance appraisal and help regulatory institutions and agencies in policy development and formulation.

Index Terms- FlexiTime, Financial institutions, Employee performance, Job design

I. INTRODUCTION

Job design is a process that entails putting together specific duties and responsibilities of an individual to create a variety of tasks to create a composite that will guide employees in attaining their performance targets (Truss et al., 2014). Organizational theorists strived to enhance on efficiency and effectiveness of organizations by establishing a certain set of principles during the early part of this century. According to Brown and Hervey (2011), the key driving force of an organization is the desire for increased efficiency as the ultimate criteria in which organizations utilize for the management to attain rational administrative practices and procedures. They further noted that several classical theorists developed sets of principles that were thought to maximize the efficiency of organizations including the banking sector which is becoming highly competitive. The principles emphasize the importance of having clear and unequivocal hierarchies of authority, centralized systems of decision making, stressed on the importance of strict observance to rules, procedures, regulations, and division of labor. More emphasis was on the latter principle that was believed to manifest a great impact on the worker and the organization. Alber (2007) re-emphasized, “Maximum work efficiency could be achieved if jobs were simplified and specialized to the greatest possible extent.” Of essence was the notion that an employee would function most efficiently if he performed the same task over and over again. Numerous studies, however, indicate that work designed according to these classical and scientific management principles does not either necessarily improve the efficiency of the employee nor the productivity of the organization hence the institutions should redefine their job design to achieve employee motivation (Slocum and Sims, 2000).

Several studies, however, have challenged the principles of classical and scientific management particularly in the banking and financial institutions which have been tremendously undergone technological digitization (Alber, 2007). Undisputedly, job design has been one of the most effective tools applied for maximizing on individual’s performance. In this reference, job design can be defined as the deliberate work arrangement and purposeful job planning including all the task aspects and their effect on the employee. According to Knapp and Mujtaba (2010), it also includes changing the content and processes of a task to optimize employees’ productivity and motivation. Broadly the job design concept features are characterized through task identity, task variety, task significance and task autonomy (Slocum and
Effective job design strategies inculcate employee involvement forecasting not only the outcomes and organizational success but also the outcomes of the individual employee (Bates, 2004). However, organizations and particularly the banking sectors’ job designs, perceive an imbalance between job demands and the employee’s abilities to cope up with the targets (World of Work Report, 2011). With such a working environment filled with conflicting demands from work place and family commitments, flexitime arrangement as a job design strategy becomes appropriate (Grantol-Vallore and Donaldson, 2001).

According to Rau and Hyland, 2002, flexitime arrangement is a job design strategy that alters the standard workday of an employee in an organization. The strategy comprehends the organizational goals as well as the employee’s flexibility in their job. The increased demand to integrate economic, technological advancements and social responsibilities have encouraged many institutions to adopt the flexitime strategy (Hill et al., 2001). O’Driscoll et al. (2003) pointed out that the use of the strategy for many years although little literature is available on its effectiveness in the banking sector. He further noted that employees’ control and flexibility are critical in achieving employee motivation to meet their targets in the organization. According to Galinsky et al. (2008), flexitime strategy helps achieve employee access to mental health, turn over, and absenteeism thus increased profit turn over. Although the strategy is becoming popular for considerations, there is insignificant information on its effects on employee performance particularly in the banking sector.

The financial and banking sector in Kenya is becoming highly competitive with the increased demand for growth in digitization and technology used in its operations (Banking Survey, 2010). The demand in growth is associated with an industry-wide branch network expansion strategy across the region (Think Business, 2012); digitization and automation of a large number of services (Banking Survey, 2010). The emphasis for digitization has led to increased competition culminating in increased innovations among the financial institution players. In today’s competitive environment in the industry, the distinguishing feature has been exemplary customer services whereby some institutions have managed to edge higher than the others (Armstrong, 2007). Bloom and Reenen (2007) argued that for financial institutions to competitively edge higher, they have continually searched to attract new customers and retain the existing ones through developing innovative programs and employee motivation strategies.

Consequently, financial institutions have continually restructured their operations and job design strategies to develop more cost-effective and efficient organizational operations. Such one strategy as proposed by Kombo and Tromp (2006), is through constant job design arrangement to maximize the employee performance. An analysis by Macpherson (2017) shows that there is apprehension and anxiety mounting currently within Kenya’s banking and financial institutions sector resulting from powerful converging internal and external pressures to its employees in balancing their social life and meeting the job targets. As pointed by O‘Driscoll et al. (2003) on the need for employee flexibility in their workplace, evidence on flexitime arrangement in the banking system is not clear thus the consequential effect on actual individual performance.

II. PROBLEM STATEMENT

To keep up with the face pace of the current economic development across the globe, financial institutions have created new job design strategies that have enabled them to embrace digitization and compete to survive the market challenges. Currently, financial institutions in Kenya are struggling with threatening challenges such as increased operational costs, continually reducing profits, redundance of employees, bottleneck competition, legislative and policy changes and job-hopping. The important aspects that earn competitive advantage are customer satisfaction and customer service; therefore, an understanding of the existing and expected jobs and the anticipated amount of productivity from the specific workers is essential. Besides, as the financial institutions embark on digitization into their job design strategies, its impact on the applied job strategies cannot be disregarded. Many organizations have embraced flexitime arrangements in their job design as a model for improving organizational performance. Although the financial institutions have adopted the strategy to achieve a competitive advantage, there is little known literature about its effect on the employee performance of such institutions. According to ILO (2010), many organizations and especially financial institutions, involve their employees with longer working hours which demotivates the worker as the employees fail to balance their job and their outside work. The results are increased absenteeism, psychological stress and increased employee turnover which reduces profit turn over in the organization. Although many organization have integrated the flextime arrangement into their job design, Kamau et al. (2015) pointed the lack of enough literature on the strategy’s effect on organizational performance particularly in the financial and banking sector. The researcher therefore isolated this as an interest especially due to high digitization in the banking sector.

III. JOB CHARACTERISTICS THEORY

The theory is one of the fundamental theories of job design, first proposed by Richard Hackman and Greg Oldman in 1160. This theory argues that for employees to be more encouraged and contented with their jobs certain characteristics must comprise the job. In a nutshell, these characteristics create the conditions viable for allowing the employees to experience psychological satisfaction which is critical as it relates to the outcomes of the job and leads to high work motivation. Gomez et al. (2010) argued that the intensity of an individual employee's need for growth highly determines the strength in the link between the job characteristics, psychological states and the work outcomes. Job design strategies are not only geared at improving employee performance but also the organizational productivity. The Job Characteristic Theory emphasizes on core characteristics and their link to job and employee outcomes. This study improves on this theory by linking flexitime job design to the core characteristics and employee performance as the key outcome.
Conceptual Framework

Independent Variable

- Flexitime
  - Flexible work schedule
  - Staff wellness
  - Increased income

Dependent Variable

- Employee performance
  - Employee productivity
  - Motivation
  - Satisfaction
  - Work life balance

Intervening Variable

- Digitization
  - Internet connectivity
  - Integrated management systems

IV. RESEARCH DESIGN

The study employed a descriptive survey design that applied mixed methods of qualitative and quantitative analysis. Sekaran (2003) highlighted that a research design could either be exploratory, descriptive, experimental or hypothesis testing. According to Leedy and Ormrod (2001), it involves the identification of the features of a particular phenomenon based on observation or examination of the correlation between two or more phenomena. A descriptive survey is appropriate when explanations of events or opinions are anticipated (Oso and Onen, 2009). In the study, descriptive survey design was applied because it was found to be flexible enough to provide an opportunity for considering different aspects of a problem under study (Creswell, 2003)

Validity and Reliability of instruments

According to Naibei (2015), instrument validity is the extent to which the instrument can measure and provides the desired data. He further described validity as “extend to how well the results of a study measure what they are intended to measure.” The researcher sought the expert’s judgment in the construction of the questionnaire.

Instrument reliability refers to its ability to provide consistent results. A pilot test was carried out and Cronbach’s alpha coefficient of 0.801 was established. Any value above 0.7 is adequate (O. Mugenda and Mugenda, 2003)

V. RESULTS AND DISCUSSION

Data analysis employed descriptive and inferential statistics.

Table 4.9: Descriptive analysis of flexitime on employee performance

<table>
<thead>
<tr>
<th>Variable</th>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly agree</th>
<th>Total N</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Row N (%)</td>
<td>Row N (%)</td>
<td>Row N (%)</td>
<td>Row N (%)</td>
<td>Row N (%)</td>
<td>Row N (%)</td>
</tr>
<tr>
<td>Flexitime assists employees balance work and family</td>
<td>16 (18.8%)</td>
<td>0 (0.0%)</td>
<td>8 (9.4%)</td>
<td>43 (50.6%)</td>
<td>18 (21.2%)</td>
<td>100.0%</td>
</tr>
<tr>
<td>Flexible working schedules has enabled employees, engage in other activities</td>
<td>8 (9.4%)</td>
<td>89.4%</td>
<td>26 (30.6%)</td>
<td>25 (29.4%)</td>
<td>18 (21.2%)</td>
<td>100.0%</td>
</tr>
<tr>
<td>Flexible working hours aids reduction of work-related tension</td>
<td>8 (9.4%)</td>
<td>0 (0.0%)</td>
<td>8 (9.4%)</td>
<td>51 (60.0%)</td>
<td>18 (21.2%)</td>
<td>100.0%</td>
</tr>
<tr>
<td>Employees working in organizations that embrace flexi time have increased morale and productivity</td>
<td>0 (0.0%)</td>
<td>89.4%</td>
<td>8 (9.4%)</td>
<td>59 (69.4%)</td>
<td>10 (11.8%)</td>
<td>100.0%</td>
</tr>
<tr>
<td>It is easier for an organization to implement change</td>
<td>0 (0.0%)</td>
<td>89.4%</td>
<td>16 (18.8%)</td>
<td>41 (48.2%)</td>
<td>26 (33.5%)</td>
<td>100.0%</td>
</tr>
<tr>
<td>Flexitime mitigates against negative effect</td>
<td>0 (0.0%)</td>
<td>89.4%</td>
<td>16 (18.8%)</td>
<td>51 (60.0%)</td>
<td>10 (11.8%)</td>
<td>100.0%</td>
</tr>
<tr>
<td>Flexitime reduces staff absenteeism, sluggishness and turnover</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td>26 (30.6%)</td>
<td>59 (69.4%)</td>
<td>0 (0.0%)</td>
<td>100.0%</td>
</tr>
<tr>
<td>Flexible work schedules are an efficient way of optimizing organizations resources</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td>17 (20.0%)</td>
<td>60 (70.6%)</td>
<td>8 (9.4%)</td>
<td>100.0%</td>
</tr>
<tr>
<td>Flexible working hours has enabled employees to indulge on other economic activities</td>
<td>0 (0.0%)</td>
<td>0 (0.0%)</td>
<td>26 (30.6%)</td>
<td>51 (60.0%)</td>
<td>8 (9.4%)</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Source: Research. data (2019)
The data in Table 4.9 showed that the respondents agreed 43(50.6%) that flexitime as a job strategy assists employees to balance work and their family responsibilities followed by those who strongly agreed 18(21.2%) then strongly disagreed 16(18.8%) and those who were neutral 8(9.4%). Less than half of the respondents 26(30.6%) were neutral on the fact that use of flexible working schedules has enabled employees to engage in other economic activities to supplement their employment as the only source of income followed by the respondents who agreed 25(29.4%) then strongly agree 18(21.2%) and a tie of 8(9.4%) among those who said that they strongly disagree and disagree. More than half of the respondents indicated that they agree 51(60%) that use of flexible working hours aids in the reduction of work-related tension in the workplace followed by the respondents who strongly agree 18(21.2%) and a tie of strongly disagree and disagree at 8(9.4%).

The majority of the respondents indicated that they agree 59(69.4%) that employees working in organizations that embrace flexitime job strategy have increased morale and higher productivity, followed by 10(11.8%) who strongly agree and a tie of disagreeing and neutral at 8(9.4%). Less than half of the respondents agreed 41(48.2%) that it is easier for an organization to implement change where the employees embrace flexible work schedules followed by those who strongly agree 26(23.5%) then 16(18.8%) who were neutral and 8(9.4%) who disagreed. More than half of the respondents agreed 51(60%) that flexitime strategy mitigates against the negative effects of employees working for long hours to the advantage of the organization followed by the respondents who were neutral 16(18.8%) the those who strongly agreed 10(11.8%) and 8(9.4%) who disagreed.

Inferential analysis

Table 4.16: Flexitime regression coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
</tr>
<tr>
<td>(Constant)</td>
<td>2.262</td>
<td>.211</td>
</tr>
<tr>
<td>1 Flexitime</td>
<td>.432</td>
<td>.054</td>
</tr>
</tbody>
</table>

Source: Research data (2019)

The flexitime significance level stands at 0.000, which is less than the 0.05 significance level of the study, implying that flexitime affects employee performance in financial institutions.

VI. SUMMARY

The study indicated that there was a high positive association between flexitime and employee performance of the financial institutions. The results indicated a unit increase in flexitime would lead to an increase in employee performance, and the null hypothesis is rejected implying that flexitime has a significant positive effect on employee performance in financial institutions in Kericho town.

VII. CONCLUSION

The findings established that flexitime had a high explanatory power on employee performance in financial institutions. The results also showed that flexitime was positively associated with employee performance and regression findings indicated a strong positive relationship which revealed that there was significant effect of flexitime on employee performance.

VIII. RECOMMENDATION

The analysis of the data in the study necessitates the following recommendations: Based on the study findings that flexitime is highly correlated with employee performance then we can recommend that there is need for financial institutions to improve the use of flexitime work arrangement since the enhancement of these flexible working schedules has greatly impacted on employee performance. The study further recommends that other institutions should adopt a flexible work arrangement since it has proven to boost employee performance.

The majority of the financial institutions fall under the private sector; this implies that the public sector can adopt the same so that it can achieve the desired productivity. The implication is organizations that have embraced this strategy have alleviated conflict between family and work issues, negative effects of employees working for long hours, stressful work environments, reduces absenteeism and sluggishness. It was also noted that these financial institutions ought to have developed flexitime with proper working schedules, work duration and methods that involve task assessment which keeps track of the amount of work done. Thus, ensure the professional development of employees and less fatigue which develops through the non-flexible schedules.

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Management of Endo-Perio Lesion: A Case Report

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Abstract: One of the most challenging problems encountered by the clinician is the endo-perio lesion. It is a perplexing problem faced in diagnosing the lesion and a dilemma as to which part of the lesion to be addressed first. There are various schools of thought as to which approach to take in managing such lesions. Some say endodontic lesion is to be addressed primarily and other school advocates for treating periodontal lesions first. To address this issue, a proper diagnosis is to be formulated which can only be achieved by recording a comprehensive history and meticulous examination of the defect. Examination of the endo-perio lesion involves thorough clinical assessment, radiographic assessment, vitality testing, root fracture assessment without which a firm diagnosis and complete treatment plan cannot be made. The lesion can only be treated if it is classified correctly and many authors over many decades have proposed various classification which has helped in categorizing the lesion and planning the management of the same. One such classification is Simon classification (1972) which classified the lesion into primary endo, primary perio, and combined endo-perio lesions. This gave an insight to the clinicians as to which part of the lesion to treat first to achieve favorable results. This case report discusses the management of an endo perio lesion.

Index terms: Endo-Perio lesion, Primary-end, Primary-perio, Combined Endo-perio

I. Introduction

For many years there was a dilemma on the interrelationship between and endodontic and periodontal disease. According to the data, pulpal and periodontal diseases are responsible for more than 50% of tooth mortality. Sometimes the patient may present with a condition where both the lesions are present simultaneously in the same tooth. This leads to a state of confusion for the clinician to formulate a diagnosis and to determine which condition to give priority. The diagnostic criteria used to distinguish between a disease that may have originated from the pulpal necrosis or from attachment loss are not always sufficiently specific to allow determination of the disease etiology. To understand this complicated disease, it is important to understand the anatomy and the structures of the tooth which are affected and the role they play in propagating the lesion in a certain direction so that they become primary-endo or primary-perio. There are times when both lesions occur concurrently, these types of lesions are called Combined perio-endo lesions and the clinician must determine the causative factor of the established lesion and the route of infection to plan the treatment accordingly. There may be certain conditions where the destruction of the tissue has already started and the other may have contributed to the disease later on. Hence, it is critical in the case of perio-endo lesion to diagnose the case and make a treatment plan for the same. Hiatt (1977) has suggested that such lesions be considered endodontic in nature for treatment planning purposes, since endodontic therapy alone may resolve the lesion. [1] However, resolution of the defect is highly dependent on the primary source and the chronicity of the lesion; treatment may eventually involve both endodontic and periodontal treatment according to Benenati et al (1981). [2]

To establish correct diagnosis, it starts with recording clinical case history followed by clinical examination of the affected tooth and surrounding region by inspection of the area, this can be done by direct vision, indirect vision or also under assisted vision or magnification using loupes or microscope to detect for any presence of decays and infiltrated restorations, lines of fracture, dyschromia, all related elements to pulpal diseases and possible fractures.

Palpation is done to assess for any tenderness in the mucosal region covering the root surface and the apical region for any infection, any signs of inflammation which is frequently associated with endodontic lesion and sometimes with periodontal lesions as well.

Percussion of the involved tooth will give clarity on the area the inflammation is present as
positive lateral percussion is suggestive of periodontal involvement and vertical percussion is a sign of endodontic involvement.

Evaluation of the tooth mobility is suggestive of periodontal involvement due to the destruction of the supporting structures like periodontal ligament, cementum and alveolar bone leading to abnormal movement of the tooth in the alveolar socket.

Clinical tests are imperative for obtaining a correct diagnosis and differentiating between endodontic and periodontal disease. The extraoral and intraoral tissues are examined for the presence of any abnormality or disease. One test is usually not sufficient to obtain a conclusive diagnosis. Radiographic examination of the lesion is one of the important assessment tools to guide the type of tissue involved i.e. pulpal, periodontal or both. Other tests like: Pulp vitality test, Cold test, Electric pulp testing, blood flow test, Cavity test, Restored teeth testing, Pocket probing, Fistula tracking, Lesion with narrow sinus tract-probing, Cracked tooth testing with Transillumination, Wedging, Staining, Selective anesthesia can be done to determine and diagnose the lesion.

Classifying the lesion also plays an important role in treatment planning, hence various authors over many years have classified endo perio lesion and various ways. [3-9] The first classification of the endo perio lesion was given by Oliet and Pollock in 1968 [10] and after that, many classifications have been proposed for endo-perio lesion.

This case report discusses the management of an Endo-perio case with both endodontic treatment as well as periodontal surgical intervention.

II. Case Report

A 49-year-old female patient reported to the division of Periodontology with a chief complaint of pain in the upper front tooth region with respect to 11 and 21 since 3 months. She also informed about the mobility of teeth 11 and 21 since 2 months. She noticed pus discharge from 21 region one month back for which she did not take any medication. The patient was a systemically healthy patient with no history of any dental treatment.

Intraoral clinical examination of the lesion was done by conduction a visual examination that revealed Non-curious teeth with respect to r.t 11 and 21, supragingival plaque and calculus, sinus tract in relation to 21, Midline diastema in 11 and 21 region. Gingival findings revealed generalized inflamed marginal gingival which was reddish-pink in color with greyish brown diffused melanin pigmentation, rolled out margins, soft & edematous in consistency, presence of bleeding on probing and attached gingiva showing loss of stippling. Periodontal examination showed deep periodontal pocket in relation to 21 (mesially – 09 mm, mid buccally – 11 mm, distally – 12 mm) and grade-2 mobility of tooth 11 and 21. Radiological examination was done and IOPA revealed interdental bone loss mesial of tooth 11, mesial and distal of tooth 21. It also revealed a loss of interproximal contact (midline diastema) in between 11 and 21.

A diagnosis of Primary periodontal lesion with a secondary endodontic lesion in relation 21 with a periodontal abscess in relation to 21 was established. According to the classification proposed by Simon et al, 1972 [11] based on clinical and radiological examination.

According to Rotstein et al in 2004, lesion should be first treated endodontically along with Phase-I of periodontal therapy i.e. scaling and root planning. [12] Further management of the lesion should be carried out post-evaluation after 2-3 months as suggested by Parolia et al in 2013. [13]

Treatment Plan was formulated and was divided into different phases. Periodontal therapy consisted of scaling and root planning: Correction of brushing technique; Patient Motivation; Oral Hygiene instructions, Occlusal correction for the TFO in relation to 11 and 21. Subsequently, Root canal therapy was carried out in relation to 21.

After BMP was done, canals were dried using absorbent paper points (DentsplyTM Maillefer) and the interappointment dressing was done with calcium hydroxide and temporary filling (cavit 3M, ESPE). The patient was recalled after 10 days and calcium hydroxide was removed from the canals using EDTA and sodium hypochlorite 5.25% after which canal was irrigated with normal saline and dried using absorbent paper point and obturated with corresponding # F2 gutta-parch point/cone of Pro-taper systemTM by cold lateral
compaction of the gutta-percha using root canal sealer. The access cavity was sealed using glass ionomer cement (Fuji IITM, GC Corporation, Japan). Post obturation IOPA was taken to assess the completed root canal therapy. (Fig 8) After the endodontic therapy was completed, splinting of the mobile teeth were done using composite resin reinforced with Co-axial wire from 13 to 23 to reduce the occlusal load and mobility of the teeth and also to stabilize the teeth in form & function by distribution of the occlusal forces. After one week the patient was recalled for assessment of the tooth.

After adequate maintenance phase, periodontal surgery consisting of open flap debridement in relation to 11, 21 and 22 regions was planned. Patient was anesthetized with 2% Lidocaine with 1:80,000 epinephrine by giving Nasoplatine nerve block, Infraorbital nerve block on both left and right side of the face following which a full-thickness mucoperiosteal flap was raised by giving crevicular incisions from 11 to 22 and two releasing incisions i.e. distal to 11 and distal to 22 from the line angle of the tooth was given extension till alveolar mucosa for ease in reflection and better repositioning of the flap. (Fig 9) Bony defects were debrided of any granulation tissue using curettes (#1- #2; #3 - #4 GraceyTM curettes) Residual calculus and altered cementum was removed using a curette and pocket lining were removed. After thorough root planning and complete removal of the granulation tissue, residual calculus, altered cementum, root surface was assessed to be smooth and shiny and free of any debris.(Fig 10) The flap was readadapted, approximated and stabilized with simple interrupted sutures using 3-0 silk sutures. (Fig 11) Post-operative instructions were given to the patient and medication i.e analgesics (Tab ibuprofen 400mg thrice a day) was prescribed for 3 days. The patient was asked to maintain good oral hygiene and use of 0.2 % chlorhexidine mouthwash twice a day for 07 days. The patient was recalled after 1 week for the removal of the suture.

On the assessment of the surgical site after one week, the site showed uneventful healing and sutures were removed and the patient was put on the maintenance phase and was recalled for follow up according to Merin’s classification for recall assessment. Reassessment of the region was done after 2 months and after 3 months post periodontal surgery. Periodontal pockets were reassessed by probing. Mobility was checked by the digital method of assessment of mobility using the blunt end of the mouth mirrors and finger/digit. Re-enforcement of plaque control; re-assessment of plaque and calculus; re-assessment of mobility; re-inforcement of oral hygiene instruction and brushing technique was carried out in each maintenance visit.

Evaluation of the lesion was done after 3 months post flap surgery. On examination, it was observed that the patient was keeping good oral hygiene. There was an absence of bleeding on probing in relation to 11,21 and 22 region. Resolution of the inflammation was observed and a considerable amount of reduction in the periodontal pocket depth in 21 region from previously mesial – 09 mm, mid buccal – 11 mm, distal – 12 mm to mesial – 02 mm, mid buccal – 02 mm, distal – 02 mm.(Fig 13, 14) On examination it was also observed that color of the gingiva was coral pink with melanin pigmentation, marginal gingiva was knife-edge in contour, firm and resilient in consistency, position of the marginal gingiva which was previously at CEJ has shrunk below CEJ approximately 3 mm as a compensation to the resolution of the inflammatory component and removal of the granulation tissue. IOPA was taken which revealed a decrease in radiolucent areas in relation to 21. The healthy tissues show signs of resolution of signs of inflammation and reattachment. (Fig 15) The mobility component reduced from Grade-II to Grade-I in tooth 11 and 21. This healthy tissue helps in regeneration and creeping attachment.

IV. Discussion

Tissues of periodontium and pulpal tissue share a common embryonic origin. The origins of both the tissue are mesodermal. Subsequently, the development takes one from the dental papilla and other from the dental sac. The inter-relationship between both is unique and closely related. Simring and Goldeberg, 1964 [14] elaborated the inter-relationship between the periodontal tissues and the endodontic tissues and has aroused a lot of controversies, speculations, and confusion regarding the same. A true Endo-perio lesion (EP) or true combined endo-perio disease is when the pulpal lesion communicates with the periodontium via apical foramina, lateral canals or through furcation. Harrington and Steiner [15] also defined an Endo perio lesion as a non-vital tooth that shows the destruction of periodontal attachment reaching the whole way to the root apex or a lateral canal, for which both root canal treatment and periodontal therapy are required.

The sequelae of endodontic involvement and periodontal disease are increased periodontal probing depths, localized gingival inflammation or swelling, bleeding on probing, suppuration, fistula formation, tenderness to percussion, increased tooth mobility, angular bone loss, and pain.
Classifying the endo-perio lesion is a challenge for the clinician as the disease remains symptom-free and only expresses once the acute exacerbation of it happens. This exacerbation can be due to the pulp involvement presenting as a periapical abscess or as periodontal involvement as a periodontal abscess or dull groaning pain pathognomonic of periodontal pocket pain. According to Simon et al 1972, endo-perio lesion can be classified into Primary endodontic lesion, Primary endodontic with secondary periodontal involvement, Primary-periodontal, primary periodontal with secondary endodontic involvement, or True combined lesion. The latest classification is given by the world workshop of Periodontology in 2017 divided the lesion into two according to etiology. [16] First, endodontic and/or periodontal infections and second, trauma and/or iatrogenic factors. Endo-perio lesion caused due to endodontic and/or periodontal infections can be triggered by a carious lesion that affects the pulp and, secondarily, affects the periodontium, or by periodontal destruction that secondarily affects the root canal; or by both events concomitantly. Whereas endo-perio lesion caused due to trauma and/or iatrogenic factors can be triggered by root/pulp chamber/furcation perforation; root fracture or cracking; external root resorption; pulp necrosis draining through the periodontium.

It is important for the clinician to diagnose the case as it helps in treatment planning and further management of the case. Management of the cases with Endo-perio lesion most of the time begins with root canal therapy and rarely it requires initial periodontal intervention. But at times of periodontal abscess complicates the clinical scenario with pain and discomfort. The same needs to be addressed by incision and drainage to overcome the acute symptoms. Most of the endo perio cases resolve with good prognosis and follow-up shows reduction in the periapical radiolucency. In cases with primary-perio and combined lesions, periodontal surgical intervention becomes inevitable for success and good prognosis of the tooth/teeth. Flap surgery/ Open flap debridement, removal of the remaining calculus, altered cementum and removal of the granulation tissue reduce the inflammation in the region and healthy tissue can be achieved and regeneration can be attempted.

V. Conclusion

Endo-perio lesion is a complicated disease that requires a meticulous diagnosis and schematic treatment planning. Comprehensive management of the lesion will lead to a better prognosis of the involved tooth/teeth. This can only be achieved with proper case selection, history taking, clinical examination, and vitality testing and reaching to a proper diagnosis. Management of such lesion is made easy once proper protocols are followed and care is taken for both pulp and periodontal tissues and follow-up of the case is done. Hence, an interdisciplinary approach is a boon for the management of endo-perio lesion for successful management of such lesions.

Appendices

Appendix 1: Fig 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18

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Appendix 1

Fig 1 – Pre op presentation of the patient

Fig 2 – Pre op periodontal probing showing 10 mm using UNC 15 w.r.t. 21 (mesial)

Fig 3 - Pre op periodontal probing showing 11 mm using UNC 15 w.r.t 21 (mid-buccal)
Fig 4 - Pre-op periodontal probing showing 13 mm using UNC 15 w.r.t 21 (distal)

Fig 5 - Pre op IOPA w.r.t 21 showing periapical radiolucency
Fig 7 - Pre op OPG

Fig 8 – Root Canal Treatment done w.r.t 21
Fig 9 - Intra op – incision w.r.t 11, 21 and 22 (crevicular and vertical release incisions)

Fig 10 - Intra op – Flap reflection, debridement and scaling & root planning done w.r.t 11 and 21
Fig 11 - Flap approximation, stabilization and flap closure achieved using 3-0 silk sutures

Fig 12 - IOPA showing Splinting done w.r.t 13, 12.11,21, 22 and 23
Fig 13 - 3 months post op periodontal probing showing reduction to 2 mm w.r.t 21 (mesial)

Fig 14 - 3 months post op periodontal probing showing reduction to 2 mm using UNC 15 w.r.t 21 (mid buccal)

Fig 15 - 3 months post op IOPA showing reduction in the periapical radiolucency
Fig 16 - 3 months post op

Fig 17 - 3 months post op

Fig 18 - 3 months post op
The Effects of *Khat* Consumption on Family Relationships in Kamukunji Constituency, Nairobi County, Kenya

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Abstract- There are debates whether Khat is a contributor to divorce and family break ups and social disorder like crimes and theft. This is corroborated by constant media highlights. For example, Mungai (1983) Khat consumption retards development and prosperity of both the individual and his nation. It makes one sleepy at odd times when others are working. It makes one weak hence less resistance to diseases. Khat chewers will care less about family, nutrition and health but spend many hours chewing and looking for the substance. Thus, this study aimed at examining the effects of Khat consumption on family relationships in Kamukunji constituency, Nairobi County, Kenya. Guided by the Structural Functionalism Theory and Conflict Theory, the study reviewed a number of existing literature relating to the problem of family relationships associated with Khat consumption. The study was conducted in Kamukunji Constituency of Nairobi County. The Somali community is the dominant tribe in the larger part of the suburb. This study applied exploratory and descriptive survey research designs with a mixed method approach. This study targeted the entire Khat consumers’ households and retail traders in Kamukunji constituency. The sample consisted of 335 main consumers who used questionnaires, 5 key informants, 19 FGDs and 70 retailers (used questionnaires) selected through ward-clustering and then snowball sampling. Piloting was conducted in Kibra constituency using 30 consumers’ households and 10 retail traders. Validity was examined by aligning the questionnaire with the Structural Functionalism and Conflict Theory. Reliability statistic of was assessed through obtaining a Cronbach alpha of 0.914. The Statistical Package for the Social Sciences (SPSS - Version 20) was used for both descriptive and inferential statistics. The study applied the three analytical types of Univariate, bivariate and multivariate analysis. Qualitative data were analyzed through the process of coding where common themes were identified and examined in relation to the context, meaning and circumstances. The study found that whereas the consumption of Khat has been perceived to be associated with men’s low levels of sexual interest and libido, in the study area, it is noted among the majority of the respondents, especially men that their interest in sex increased with consumption of Khat. However, there was an interesting difference where more women observed that Khat consumption diminishes sexual interest. Most of the Khat users had a history of Khat use in their family and the social economic implication associated with Khat use in Kamukunji Constituency is comparable to other studies carried out in other parts of the world. There is urgent need to create awareness on Khat consumption and available treatment and rehabilitation services for those who are willing to reform and that schools and religious institutions can be excellent avenues for information dissemination.

Index Terms- Khat, Khat consumption, Family relationships, Structural Functionalism, Social Conflict

I. INTRODUCTION

The consumption of mood enhancing substances has been documented from ancient times. Drugs and alcohol has had an influence on both cultures and civilization processes throughout history of humanity. This is not only limited to African but also the Sumerians, the Greeks, the Romans, the British and even the Chinese (Gately, 2008). Archaeological and documentary evidence describe the ancient use of the substances, ranging from the use of opium in ancient Greece, harmal in West Indies, cannabis in Western china, nutmeg in ancient India, cocoa leaf among the Mayan cultures, and psilocybin across North Africa, among others. For a quite number of decades and centuries, the world population has been fermenting grains and fruits to produce alcoholic drinks. In fact, the known earliest evidence of humans engaging in brewing alcohol are shown by the residues in pottery jars found in northern China that are thought to have been produced between 7000 and 6600 B.C. (Gateley, 2008).

*Khat* (*Catha edulis*) is an ever green plant grown by grafting and cultivated as a bush or small trees. It grows at an attitude of 1500-2500 meters above the sea level under optimal conditions requiring 10 years to attain maturity. According to Anderson and Carrier (2009), it is a hardy crop which grows in arid areas up to ten meters tall under normal circumstances and grows up to five meters in non-equatorial regions.

The origin of *Khat* is not known and has raised various arguments. Many believe that it its origin can be traced in parts of Ethiopia, which was later on spread by the immigrants across East Africa and Yemen. Others hold that Yemen was its initial origins before spreading to nearby countries. Whether Ethiopia or

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Yemen, Khat proliferated and spread to other countries like Kenya, Somalia, Malawi, Uganda, Tanzania, Arabia, Congo, Madagascar, Zimbabwe, Zambia and South Africa. It is also cultivated in Afghanistan and Turkistan. In ancient times chewing of Khat was used as an anti-depressant and was associated with leisure activities due to its loquacious nature after consumption while inducing vivid debate. Botanically Khat was first identified by Forskal in 1762 in Yemen who categorized it as a plant belonging to the Spinosia Family. Currently it is classified under the family Celastraceae (Andualem, 2002).

According to Beckerleg (2009), Khat is the main contributor to divorce and family break ups and social disorder like crimes and theft. This is corroborated by constant media highlights. For example, Mungai (1983) Khat consumption retards development and prosperity of both the individual and his nation. It makes one sleepy at odd times when others are working. It makes one weak hence less resistance to diseases. Khat chewers will care less about family, nutrition and health but spend many hours chewing and looking for the substance.

According to Beckerleg (2010), majority of Khat consumers in East Africa are of the Somali, Ethiopia origin and the Swahili Communities. He further posits that the attitude of people to Khat consumption varied in relation to the degree and amount of consumption. These studies found out that majority of respondents had dissenting attitude to its heavy use whereas it may have a demurring social and health effect on the chewer and entire family life. The population of Somalis within the city of Nairobi is the highest within Kamukunjii Constituency. However, population data quantifying the levels of Khat use is varied. The only reliable published evidence of Khat use in Somalia is a study conducted in Hargeisa, which found that 31.3% of the population use Khat on a weekly basis (Beckerleg, 2010).

Apparently, the number of people who use Khat is no longer a concern, but the consumption pattern amongst users. This study assumed that the pattern of use is the key determinant of how big the impact of Khat has on a user and family relationship. While Khat is not a physically addictive substance, psychological addiction has been reported among the abusers where chewing grows into a habit that some users find develop challenges that relate to their family members. Thus, this study was carried out with the objective to examine the effects of Khat consumption on family relationships in Kamukunji constituency, Nairobi County, Kenya.

II. LITERATURE REVIEW

According to Stefan and Mathew (2005), Khat chewers on daily basis are estimated to constitute 10 million people worldwide. Majority of these are in Eastern Africa and Arabian Peninsula. Fitzeguard and Housley (2009) described Khat as a cool drug which is viewed as a sign of defiance in Embu and Mbere districts while among the Somalis it is an element of bondage and socialization that brings together comrades in a session known as Fadhiga dens. They further, illustrates that there is substantial evidence suggesting many negative consequences on Khat misuse, including violence within marital life, time wastage and misuse of household resources, and the social relationships that go beyond the family. This is supported by Kassim et al. (2011) in a study conducted in London, who found that the socio-economic impacts of Khat consumption are manifold, including crime increase to the extreme extent. The study further found that Khat consumption destabilizes the marriage institution and social life of the entire community. Murray (1984) postulates that the study on family life is generally a foundation for policy formulation of a society aiming at strengthening family health and stability such that any change to the positive achievement of the society impacts negatively on the marital and household life that may resulting deep division and conflict over the invading behavior.

Khat consumption is said to have effects on ones’ libido. Using 214 male respondents, Hakim (2002) in a study carried out at Ghandi Memorial Women Hospital in Ethiopia between 1992 and 1995 found that Khat has negative consequences on the sexual performances of the consumers. He reports that there was a depressed overall sexual potency especially on Khat consumers compared to non Khat consumers. This view is corroborated by Mwenda, et al (2003), who found that Khat usage lowers libido in human and may also lead to sexual impotence following long term use. They concluded that chewing has negative impacts on human reproductive health although the precise mechanism affecting reproductive physiology was not elucidated. Halbach (1972) illustrates that chronic consumption of Khat leads to spermatozoa deficiency and impotence at a later stage. Aden, et al. (2006) explicates that, in regard to men chewers, long term usage leads to constriction of blood vessels supplying blood to the reproductive tract causing inhibited urine flow and inability to attain or sustain an erection. In addition, they further state that in women who chew Khat, drying of the lining of the reproductive tract leading to pain and blistering during sexual intercourse is common. Chewing Khat during pregnancy leads to reduced birth weight a sign of infant mortality. Jibril and Yussuf (2012), in their study in Norway state that, Khat is a factor inducing conflict in marital relationships and source of protracted disagreement leading to divorce. These inhibit conflicts and aggressions caused by the chewer after consumption and disputes due to its various negative implications on the marital relation. In Kenya data on impact of Khat on marital relationships was lacking hence knowledge gap that calls for investigation.

In relation to the problem of family relationships, the Structural Functionalism Theory assumes that a working society is always stable and organized. The stability of the society has essential characteristics basically pegged on societal consensus. Under this context, it is said that all the members of the society acknowledge and appreciate the common set of believes, values and behavior. From this background, a society is having elements that are inter-related and function together which forms a system-like stricture. The structure is the key concern and driver of stability attributes and hence the solidarity of the society. Structural functionalism considers this social structure and its organization superior and more beneficial than the individual. This relates to the aspects spelt out in the top down theory that postulates that persons come into society and then shaped by the social environment exposed to them through socialization and interactions with various existing institutions including the family, education, media and religion (Shoham et.al, 2015). In contrast, conflict theory states that conflicts arise due to competition for limited resources.
III. METHODS

The study was conducted in Kamukunji Constituency of Nairobi County. The Somali community is the dominant tribe in the larger part of the suburb. According to the Nairobi county office, one month in 2012, Kamukunji was the contributor of approximately 25% of the City County’s taxes. The commercial activities in the estate includes Khat trade, night lodges, shopping malls, small stalls, among others. This study applied exploratory and descriptive survey research designs. This is a mixed method model which gives room for a concurrent application of both qualitative and quantitative strands during a research process (Creswell and Plano, 2011). Descriptive survey design was employed to gather adapt on the current status of the subject matter- Khat consumption and trade described “what exists” with respect to variables or conditions stated. The blend of the descriptive survey and exploratory designs was also informed by the need to facilitate the operations of the investigation into better and efficient coherence with compact entity.

This research targeted the entire Khat consumers’ households and retail traders in Kamukunji constituency. The study also involved five (5) ward administrators who were the Key Informants (KI1, KI2, KI3, KI4 and KI5) and four (4) elders, four (4) religious leaders, three (3) women & three (3) youth representatives and five (5) county administrators. Since it was difficult to get a complete official list of Khat chewers in Kamukunji (sampling frame) and due to cost and accessibility challenges, this study selected a subset of 335 main consumers, 5 key informants, 19 FGDs and 70 retailers as respondents from the entire Khat consumers and retail traders in the region through snowball sampling. The use of snowball sampling in quantitative technique is premised in Coleman (1958).

To calculate the required sample size for Khat consumers, this study proposed a 95% confidence on the population proportion which corresponds to 5% level of significance. Cochran (1953) formulae was used, which requires the standard error to be computed by dividing the confidence interval by 1.96 (The value which corresponds to the area under the normal distribution). Thus the standard error obtained was 5/1.96 = 2.55. Since there were no previous data on the population of Khat consumers in Kamukunji, the study assumed the proportion to be 50% since other things being equal. The sample size obtained was 385. To factor in for the non-response, this study inflated the sample size by 10%, yielding 424.

The sample was distributed proportionately into the five wards in Kamukunji. Thus the ward with high population had a bigger portion of the sample. The distribution was based on 2009 census of which Pumwani ward had 17% of the population, Eastleigh North 20.41%, Eastleigh South 31.26%, Airbase 20.36% and California 10.24%. For qualitative data a purposive sampling technique was used where 5 key informants were interviewed and three focus group discussions were conducted on 19 individuals. Three focus group discussions were conducted, where opinion leaders who included religious leaders, scholars, administrators, women representatives, youth and elders participated. A structured interview with open ended questions on socio-economic aspects of Khat consumption and trade within the region was administered to these opinion leaders.

Piloting was conducted in Kibra constituency, located in Southland area of Nairobi where the questionnaires were administered to 30 consumers’ households and 10 retail traders. The study was done by aligning the questionnaire with the main theories of this study namely Structural Functionalism and Conflict Theory as well as the study objectives. Like items with internal consistency were put together to define various variables. The researcher listed all questions relating to the study and submitted them to the supervisors to assess for validity of the questions.

Family relationship measured in terms of physical insults, verbal insults, use of threats, violence outside, violence within, threats to leave and keeps on blaming reported a reliability statistic of 0.914 where Cronbach alpha greater than 0.9 is an excellent Internal consistency.

The researcher applied for a research permit to collect data from the National Council of Science and Technology. The questionnaires were hand-delivered, and completed promptly. Thirty trained research assistants were used of which the questionnaires were filled while the researcher waited, thereby providing clarification where necessary. Interview tool or instrument was administered on the five ward chiefs who constitutes the key informants to the study. They were assembled at Sub-county commissioner’s board room and the interview guide supplied to them where questions were orally advanced to them in a chronological order. On the other hand, three focus group discussions on the 19 FGDs grouped in the order of six and another six and seven individuals were carried out on different occasions.

To analyze the quantitative data, the researcher engaged, at first, instance, in data preparation stages. The stage involved examination of raw data after collection through carefully scrutiny while simultaneously carrying out data cleaning and editing. The responses were assigned number codes for easy entry to the data base and keyed in electronically. The coding involved organizing data into limited categories in relation to appropriate research objectives. Then the data was presented in a systematic organized unity and order that enabled its easy and objective interpretations which in turn enhanced it to be subjected to a smooth statistical treatment.

The Statistical Package for the Social Sciences (SPSS - Version 20) was used for both descriptive and inferential statistics. The study applied the three analytical types of Univariate, bivariate and multivariate analysis in a sequence manner of data categorization to standardize the accuracy and validity of the analysis processes to the qualitative data. Qualitative data were analyzed through the process of coding where common themes were identified and examined in relation to the context, meaning and circumstances.

IV. RESULTS

The concern about the Khat consumers’ spouses was investigated the results presented using figure 1
Most of the Khat consumers (47.16%) believed that their spouses were comfortable with their behavior, while a sizable number were not comfortable with the question. Khat consumption was found to weaken sexual performance while to some respondents Khat enhanced hallucination and led to masturbation hence a significant number of divorce cases. More than half of the respondents claimed that Khat consumption affected their sleep. The Survey response per gender reported that eight out of ten males preferred regulation as compare to 75% of the females who advocated for regulation while others preferred outlawing. Three out of ten Khat consumers surveyed earned between 2000-5000 Kenya shillings per month and those who earned above 20,000 were two in every ten consumers with the difference being quite significant. The study found a significant association between marital status and monthly income.

Khat consumers who were single had a much more stable family relationships compared to married and divorcee while the females Khat consumers had a weaker family relationships compared to the males. The younger consumers had a stronger family relationships compared to their older counterparts while employed consumers had more stable family relationships compared to unemployed and those who earned more had more stable relationship compared to those who earned less. The explanatory variables which had a negative effect on household economy were: number of hours spent on Khat per day, number of years one has been consuming Khat, gender, age and marital status. There was significant association between income and marital status and that Khat consumption in Kamukunji Constituency did not differentiate the consumers' level of income and marital status.

Most of the Khat retail traders were aged 40 years and below and were married with more than one child. Khat retail trade was found to be more lucrative with two thirds of the males who sell Khat, consumed it compared to partly thirty percent of females who retail at the same time consume. Most retailers consume for leisure, to reduce stress and minimize boredom and to attract customers. Majority of the Khat traders were not involved in other forms of trade business since they found Khat retail to be lucrative.
Finally, I thank all friends and support personnel who have contributed to the success of this study.

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Toxicological and Histological Studies of the Ethyl Acetate, Aqueous and N-Butanol Fractions of the Leaf of *Combretum Molle* (R.Br. Ex. G. Don) to Wistar Rats

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Abstract- This work was carried out with the aim of determining the acute toxicity and histology of the aqueous, n-butanol and the ethyl-acetate fractions of the leaves of *Combretum molle* to Wistar rats. Ethanol was used as solvent for extraction, after which differential fractionization was carried out using distilled water, ethyl acetate and n-butanol. The limit test at 5000 mg/kg of the Organization for Economic Cooperation and Development (OECD) guidelines were used for the study. In the acute toxicological investigation, there was no mortality in the experimental animals after orally administering the fractions of *C. molle* 5000 mg/kg indicating that the LD₅₀ was above 5000 mg/kg. There was no histological alterations or changes at the extract dose of 5000 mg/kg body weight in the kidney organs of rats in the control group, but all the other organs from the fractions tested displayed certain observed alterations. Tubular vacuolation (TVN), Lymphocyte hyperplasia (LH), Glomerular necrosis (GN), Plaques formation (P), Tubular necrosis (TN) and Tubular distortions (TD) were observed in the kidneys. There was no histological alterations or changes at the extract dose of 5000 mg/kg body weight in the internal organs of rats in the control group and in the liver of group VI, but all the other organs from the fractions tested displayed certain observed alterations. Vascular congestion (VC), vascular congestion with slight necrosis (VCN) and hepatocellular necrosis (HN) were observed in the livers of all the groups administered the fractions.

Index Terms- Combretum molle, plant fractions, acute toxicity, Wistar rats,

I. INTRODUCTION

Thousands of secondary plant products have been identified and it is estimated that thousands of these compounds still exist (Koehn and Carter, 2005). Since secondary metabolites from plants have been elaborated within living systems, they are often perceived as showing more “potentials and are biologically non-toxic than totally synthetic molecules” making most of them, good candidates for further drug development (Koehn and Carter, 2005). According to Alaribe (2008) majority of Nigerian homes, maintain some sort of private family traditional medicine practitioner. Existing data and contemporary researchers seem to authenticate the assumption for general health improvement of the masses by traditional healers. Ethnobotany is a preliminary method of research, suitable for gathering information on the use of plants. It has been proven, time and time again, that the medical knowledge handed down by the common people constitutes sources of information useful for scientific research and that many plants utilized exclusively in popular tradition, when exposed under scientific investigation, have been found to be useful for different sectors in the industry, therefore science and tradition have a strong connection between them. Science in fact often has traditional origins (Lentini, 2000). The use of plants in the tropical and subtropical regions is diversified and most of the uses are for medicine, source of food, clothing and shelter. However, the medicinal uses of plants are rapidly declining among the present generation of local people because of modernization and civilization (Cox, 2005).

II. MATERIALS AND METHODS

Source and preparation of plant materials

The plant leaves were collected from neighboring communities near ABU dam, in Samaru, Zaria (latitude 11.07°N, longitude 7.73°E and altitude 613meters), Nigeria. These were brought and identified by a Taxonomist with voucher number 900191 at the Herbarium unit of the Department of Biological Sciences, Ahmadu Bello University Zaria. The plant parts were air-dried for two weeks at room temperature (25°C) in the laboratory and then ground to powder.

Extraction procedures

The ground plant parts were extracted at the Department of Pharmacognosy, Faculty of Pharmaceutical Sciences, Ahmadu Bello University Zaria, following the methods of Sofowora (2006).

Preparation of Ethanol Extraction of *C. molle*

Approximately 400 g of the dried leaves of *C. molle* were extracted with 10 litres of 80% (v/v) ethanol by maceration at (25°C) for 3 days. The total mixture was strained and filtered. The filtrate was concentrated to dryness on a water bath at 100° C to obtain the dry extract after which was stored at -20°C for further studies.

Differential Fractionation of the Ethanol Extract of C. molle in Different Solvents
The dried ethanol extract obtained from the leaves of C. molle (50 g) were each suspended in 1 litre of distilled water and partitioned in sequence with ethyl acetate (1 litre), and n-butanol (1 litre). The different solvent fractions were concentrated on a water bath at 100°C to obtain the dry extract after which was stored at -20°C.

Acute Oral Toxicological Evaluation of the fractions of C. molle
This study was carried out according to the Organization for Economic Cooperation and Development (OECD) guidelines (OECD, 2000). Acute oral toxicity refers to those adverse effects occurring following oral administration of a single dose of a substance, or multiple doses given within 24 hours. This is a measure of the interaction of induced substance with biomolecules after a single administration within fourteen days.

Limit Test at 5000 mg/kg for the Experimental Rats study
The limit test is primarily used in situations where the experimenter has information indicating that the test plant is likely to be nontoxic. Since there was prior information on the use of the test plant (Wickens, 2000), therefore the limit test was used.

Animals (Wistar rats)
A total of 12 female albino rats of Wistar strain weighing about 230 – 280 g were obtained from the Animal house, Department of Pharmacology and Therapeutic, Faculty of Pharmaceutical Sciences, Ahmadu Bello University, Zaria, Nigeria. They were fed a standard rat pellet diet and water was provided and maintained under standard laboratory conditions (Temperature 21-24 °C, relative humidity 40 - 60%).

Grouping and Administration of plant fractions
A total of 12 female albino Wistar rats were used for the acute toxicity study. The test substance was administered orally, in a single dose by gavage intubation cannula. The animals were divided into 4 groups of 3 each. Group I rats were given ethyl-acetate leaf fraction. Group II rats were given n-butanol leaf fraction. Group III rats were given aqueous leaf fraction. Group IV served as normal healthy control. The weight of experimental rats was measured and recorded on Days 1, 7 and 14 respectively. The histological parameters of the experimental animals were evaluated after 14 days. The Wistar rats were subjected to fasting (for food but not water over-night) prior to dosing. Following the period of fasting, they were weighed, and the test substance administered. After the substance was administered, food was not given to the rats until after 3-4 hours. The plant fractions at fixed doses of 5000 mg/kg body weight were administered to 3 groups, each containing 3 rats which was done in two stages. A single rat each from the first 3 groups were administered the plant fractions (5000mg/kg) and observed for 24 hours, after which all of them survived. The 2 remaining rats were also administered the dose and were observed during the first 30 minutes, periodically for 4 hours, then hourly the first 24 hours and daily thereafter, for a total of 14 days. All observations were systematically recorded, with individual records being maintained for each animal.

III. RESULTS AND DISCUSSION

Table 1. Average body weight of the rats after oral administration of the fractions of C. molle measured in grams (g), (Mean ±SE)

<table>
<thead>
<tr>
<th>GROUPS (fractions of extracts)</th>
<th>Day 0</th>
<th>Day 7</th>
<th>Day 14</th>
</tr>
</thead>
<tbody>
<tr>
<td>I (ethyl-acetate leaf)</td>
<td>247±1.0</td>
<td>253±1.0</td>
<td>261±1.0</td>
</tr>
<tr>
<td>II (n-butanol leaf)</td>
<td>235±1.0</td>
<td>237±1.0</td>
<td>241±1.0</td>
</tr>
<tr>
<td>III (aqueous leaf)</td>
<td>256±1.0</td>
<td>260±1.0</td>
<td>263±1.0</td>
</tr>
<tr>
<td>V (control)</td>
<td>229±1.0</td>
<td>234±1.0</td>
<td>236±1.0</td>
</tr>
</tbody>
</table>

Mean body weight ± SE

Acute toxicological evaluation
The body weights of all tested groups increased progressively throughout the duration of the experiment (Table 1). The effect of the extract in causing drowsiness in all the treated groups was observed for the first hour after administering the fractions of C. molle, compared with control which showed no drowsiness. No mortality was recorded for any treated groups throughout the duration of the experiment. Since the treatment did not result in latent toxicity, the LD₅₀ was therefore estimated to be above 5000 mg/kg.

Histopathology of the kidneys of the animals
There was no histological alterations or changes at the extract dose of 5000 mg/kg body weight in the kidney organs of the experimental animals. The histological studies of the kidneys and livers of the animals showed that there was no histological alterations or changes at the extract dose of 5000 mg/kg body weight in the kidney organs of the experimental animals.
rats in the control group, but all the other organs from the fractions tested displayed certain observed alterations. Tubular vacuolation (TVN), Lymphocyte hyperplasia (LH), Glomerular necrosis (GN), Plaques formation (P), Tubular necrosis (TN) and Tubular distortions (TD) were observed in the kidneys of groups I-III (Plates I---III).

**Histopathology of the liver of the animals**

There was no histological alterations or changes at the extract dose of 5000 mg/kg body weight in the internal organs of rats in the control group and in the liver of group III, but all the other organs from the fractions tested displayed certain observed alterations. Vascular congestion (VC), vascular congestion with slight necrosis (VCN) and hepatocellular necrosis (HN) were observed in the livers of groups I--III (Plates IV--VI).

Plate I: (A) Photomicrograph of the Rat Kidney under control treatment showing normal tubules and glomerulus, compared with; (B) Orally administered ethyl-acetate leaf fraction above showing moderate glomerular distortion (GD) and tubular necrosis (TN). (Magnification, × 400).
Plate II: (A) Photomicrograph of the Rat Kidney under control treatment showing normal tubules and glomerulus, compared with: (B) Orally administered n-butanol leaf fraction above showing plaques formation (P) and slight tubular distortion (TD). (Magnification, ×400).
Plate III: (A) Photomicrograph of the Rat Kidney under control treatment showing normal tubules and glomerulus compared with; (B) Orally administered aqueous leaf fraction above showing plaque formation (P), with slight tubular distortion (TD). (Magnification, × 400).

Plate IV: (A) Photomicrograph of the Rat Liver of control showing normal hepatocytes, compared with; (B) Orally administered ethyl-acetate leaf fraction above shows vascular congestion (VC). (Magnification, × 400).
Plate V: (A) Photomicrograph of the Rat Liver of control showing normal hepatocytes compared with; (B) Orally administered N-butanol leaf fraction above also showing normal feature. (Magnification, × 400).
In the acute toxicological investigation, there was no mortality in the experimental animals at all treatment doses of 5000 mg/kg body weight. The acute toxicity did not result in any mortality therefore the mean lethal dose (LD₅₀) cannot be determined, rather estimated that it is above 5000 mg/kg. There were no signs of toxicity effects such as change in skin color, behavioral pattern nor diarrhea. This finding suggests that, the fractions at the limit dose tested are nontoxic and safe in oral formation. According to the chemical labeling and classification of acute systemic toxicity recommended by OECD, (2000) the fractions of Combretum molle were assigned class 5 status (LD₅₀ > 5000 mg/kg) which is the lowest toxicity class. This is in line with the investigation of David et al. (2015) in the study of the toxicological evaluation of aqueous and acetone extracts of Combretum molle leaves in Wistar Rats. They observed that the limit dose of 2000 mg/kg did not cause any mortality or signs of acute toxicity in the rats tested during the observation period. Similarly, Kamo et al. (2015) studied the acute and subacute toxicity effects of hydro-alcoholic extract of Terminalia mantaly. They also observed that, the limit dose of 5000 mg/kg did not cause any mortality or signs of acute toxicity in the mice tested during the observation period. Similarly, Dodehe et al. (2012) investigated the acute and sub-acute toxic study of aqueous leaf extract of Combretum Molle in Wistar rats. They observed that the limit dose of 8000 mg/kg did not cause any mortality or signs of acute toxicity in the mice tested during the observation period. Also, Oyewo et al. (2012) investigated the effects of aqueous extract of Citrullus lanatus on the histology of the kidney of adult Wistar Rats. The aqueous extract of Citrullus lanatus was given once a day to the animals for 27 days of which there was no mortality recorded. The kidney administered leaf ethyl-acetate had slight hyperplasia, which is similar to the work of David et al. (2015) who studied the toxicological effects of aqueous and acetone extracts of Combretum molle twigs in Wistar rats. They observed hepatotoxicity and mesengial hyperplasia in the livers and kidneys. This is different from the result of Oyewo, et al. (2012) who did not record any histological distortion of the kidney after the administration of the extract. This could also be as a result of different concentrations used for the test. There were no histopathological alterations observed from the liver administered aqueous leaf and leaf n-butanol fractions. This is similar to the work of Zaza et al. (2016) investigated the oral toxicity of the X₁₂ fractions of Terminalia ivorenensis, observed no histological distortion of the liver.

IV. CONCLUSION

There was no mortality observed for all the leaf fractions tested on the Wistar rats. This finding suggests that, the fractions at the limit dose of 5000 mg/kg body weight tested are nontoxic and safe in oral formation. The histological investigation, however, showed certain alterations in the cellular anatomy of the liver and kidney. This alterations are biomarkers of toxicity and cellular damage to the liver and kidney. Caution therefore should be taken in the continuous intake of C. molle at high concentrations, since it may result to permanent damage of tissues.

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Mobility of charge carriers in the novel green organic semiconductor, Iodine doped Cis 1,4 polyisoprene (Natural Rubber) using SCLC method

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Abstract- Advantages like low temperature processing, cost, and flexibility make organic semiconductors an ideal choice for the new generation electronic devices ranging from LEDs, Solar cells to RFID tags. Many of these devices, especially OLEDs are already conqured the consumer electronics market in a large scale. Ironically the potential for large scale production of these polymeric devices are posing a threat to the emission issues and waste disposal. This warrants the development of green organic semiconductors. It has been shown that natural rubber (cis 1,4 polyisoprene) which is a green and natural polymer abundantly available in tropical areas like Asia can be made into semiconducting by doping process, and can be used in organic electronic devices. However the important parameter of mobility of charge transport in iodine doped natural rubber has yet to be explored or reported. In this paper the mobility of hole transport in iodine doped natural rubber has been reported for the first time using SCLC method. Interesting results are obtained which confirm the potential of iodine doped natural rubber to be an alternative low cost and green organic semiconductor.

Index Terms- Organic electronics, Green organic semiconductors, Mobility by SCLC method.

I. INTRODUCTION

The recent trends in organic electronics focus on the synthesis of new semiconducting materials from green polymers. Use of green organic materials in electronic devices can help to overcome the possibility of organic electronic waste disposal [1] to a great extent. Further the organic semiconducting materials presently used for devices fabrication are of high cost and therefore development of low-cost indigenous materials are essential for organic device commercialization. Natural polymers having large number of double bonds present in its polymer backbone are shown to be transformed to conducting polymers by suitable doping agents. There are many chemical and physical methods reported [2][3][4] for the synthesis of conducting polymers from natural materials. Among these, doping is a facile method for the synthesis of organic semi conducting materials.

cis-1, 4 polyisoprene (Natural rubber), a green polymer, having a typical non-conjugated structure[2] was shown to be a potential natural polymer to form conjugated structure because of the presence of large number of double bonds in its polymer chain. The conjugation in natural rubber can be made by doping with [3] suitable electron accepting materials, which facilitates charge transfer through the polymer chain. M Thakur reported [2] that natural rubber on doping with iodine, its conductivity gets raised by 10 orders of magnitude. Liming Dai et al. clearly explained [5][3] the mechanism of iodine doping in polyisoprene with the formation of charge carrier complexes. As per this, on doping natural rubber with iodine, as a first step conjugation is induced in the polymer chain followed by the formation of cationic iodine complexes (I3- and I5-). The charge transfer thus occurs in the polymer chain by double bond shifting. Sreeja et al. optimized [6] the molar ratio for better conductivity Fassena et al.[7] and Shiju et al.[8][9] studied [10][11] the electronic parameters like HOMO LUMO and application of these complexes in organic electronic devices like, OFET, schottky diode etc. Even though a number of characteristics like conductivity, HOMO, LUMO, Bandgap, etc. of conducting cis-1,4 polyisoprene have been reported, there is no report available on the mobility of charge carriers in this green semiconductor. In this context this paper reports for the first time, the evaluation of mobility charge carriers in conducting natural rubber using space charge limited current (SCLC) method.

II. EXPERIMENTAL

1.1 Materials
cis 1,4 polyisoprene, MoO3 and Iodine are purchased from Sigma Aldrich. Polyisoprene is used without any purification and iodine is re-sublimated before the synthesis. The ITO substrate with surface resistance 10-12 Ω /cm2 is also purchased from Sigma Aldrich and is used as substrate for the test device fabrication. The solvent, Toluene (research grade) is procured from Merck and used after proper distillation. Aluminum slugs from Sigma are used for depositing cathode electrode for the test device.

1.2 Synthesis of Iodine doped Natural Rubber

The mixture of polyisoprene and iodine purified by distilling with toluene in the molar ratio, given by, [C≡C] : [I2] = 40:1. 10.73 mg of polyisoprene and 1 mg of iodine are taken in 1 ml of distilled toluene for the doping process. The prepared samples are then sealed in amber vial and stirred for 150 hours continuously for doping reaction to complete. The color of the solution is seen to be gradually changing from purple to dark
brown. UV-Vis spectrum of the sample are taken in equal time intervals during the reaction period to check the extent of doping.

1.3 Test device fabrication (DUT)

The structure of the test devices fabricated are ITO/MoO3(2nm)/NRI2/MoO3(10nm)/Al and ITO/NRI2/MoO3(10nm)/Al (schematics are shown in Fig 1 a&b). For fabricating the test devices, first, two ITO substrates are patterned by etching its half portion using zinc powder and 6N HCl. The etched ITO substrates are cleaned with a cleaning protocol involving a cleaning liquid, Hellmanex purchased from Osilta. The substrates are sonicated in a 1% Hellmanex solution of water for 5 minutes at 70°C. This is followed by the rinsing of the substrates in boiling water twice and then sonication in IPA for five minutes. In the next step, damp rinsing with deionized water (DI) and finally drying under nitrogen flow are employed. Finally the cleaned ITO substrates are treated in a UV-Ozone cleaner for 10 minutes.

Fig 1. The schematic structure of the test devices (a) Device with hole transporting layer (b) device without hole transporting layer.

A thin layer of MoO3 (2nm) are first deposited on the cleaned ITO substrates by physical vapor deposition (PVD). The MoO3 is evaporated by electrical heating in a molybdenum boat under 1X10⁻⁵ mbar pressure through a shadow mask. The polyisoprene iodine complex is then spin coated over MoO3 deposited ITO substrate at 1500 rpm for 90 seconds to form thin film around 150 nm thickness using SPS make Spin 150 spin coater. Finally another layer of MoO3 and Al are deposited again by PVD. Here the MoO3 is applied as Electron blocking (EBL) layer (figure 1. a). One more device (figure 1. b) is prepared without MoO3 EBL layer in cathode side for understanding the effect of such a layer. Al layers are deposited through a shadow mask by physical vapor deposition at 10-5 mbar pressure. Thus two hole only test devices are fabricated one having EB layer and another without it. As the doped rubber is p-type material the transport is mainly due to holes. The Current–Voltage characteristics of the devices are measured using Keithley 2400 source meter interfaced with a computer using lab-view software.

1.4 SCLC method

For extracting the mobility of charge carriers (here holes) Space Charge Limited Current (SCLC) method has been employed. The J–V characteristics of disordered organic semiconductors are seen to follow a power law behavior J ∝ V^n, (with n=1 for ohmic, n=2 for Trap free SCLC, and n=2 for exponentially distributed trap SCLC regimes). At the lower voltages the conduction is Ohmic with n=1. At higher voltages n increases from 2 to 3 signifying space charge limited conduction (SCLC) with a transition from trap free (TF-SCLC) regime to exponentially distributed trap (EDT-SCLC) regime[12].

In SCLC region current and voltage maintains a quadratic relationship [13] and the current density in this region is expressed by child’s law [14].

\[ J_{dc} = \frac{9}{8} \varepsilon_0 \varepsilon_r \mu_e \frac{V^2}{L^2} \] (1)

This when translated into the log–log plot of J–V gives[15] a linear ohmic region (slope = 1) at low voltages which moves to a trap free (TF-SCLC) regime (slope = 2) followed by an exponentially distributed trap (EDT-SCLC) regime (slope = 3), as the trap states[16][17] start to dominate by localizing charge carriers. However the SCLC region (slope=2) considered here for the mobility calculation as per the equation (1)

III. RESULT AND DISCUSSION

The formation of NRI2 complex is analyzed by UV-Vis spectroscopy (Avantus AvaSpec-2048 spectrometer). The UV-Vis spectrum of pristine natural rubber and that of iodine doped ones are taken in equal intervals of 5 hours spanning the whole reaction period. Fig 2 shows these UV-Vis spectra of (1) pristine rubber solution in toluene (rose color), (2) that at the start of the reaction -black, after 75 hours – (red color), and after 150 hours (blue color) of reaction respectively.
It can be seen from the spectra above that at the start of reaction there is a decrease in the absorption for the wavelengths, 300 nm to 400 nm and an absorption band at 500 nm which is the indication of iodine molecules present in the sample. For 75 hours, the intensity of absorption band at 500 nm gets reduced and after 150 hours this absorption band vanishes. The vanishing of absorption band at 500 nm and the presence of new weak absorption peaks in 300 to 450 nm region indicated the doping process. The color of the solution become dark brown at 150 hours of stirring is another indication of the formation of iodine complexes.

While fabricating the test device for current voltage characterization, MoO$_3$ was used as an electron blocking layer (EBL) in between the doped rubber layer and Al in the first device. MoO$_3$ was used as Hole transport layer (HTL) in between the ITO and doped rubber to facilitate smooth flow of holes to the ITO electrode. The role of the MoO$_3$ both as HTL at anode side and EBL at the cathode can be seen from the band matching diagram shown in the figure below: 6.25 eV is the work function of MoO$_3$ while 2.9 eV and 5.2 eV are the LUMO and HIMO of the iodine doped natural rubber. This band diagram clearly shows the role of MoO$_3$ as HTL at anode side and EBL respectively. Thus while both the test devices works with holes as the major charge carrier and the additional HTL layer in device (a) helps a better smooth collection of charges compared to device (b).

The double logarithmic graph of devices with hole transporting layer and without hole transporting layer are plotted in fig 5 and fig 6 respectively. The SCLC voltage region is determined [13] for each devices from the double logarithmic plot of J-V characteristics. As the current varies exponentially the slope of the plot changes. The region where slope is 2 is considered as SCLC region, where the relation between current and voltage is expressed as $J \propto V^2$. The device with hole transporting layer have SCLC region at low voltages when compared with device without hole transporting layer. The lnJ versus lnV plot is fitted for equation (1) at the SCLC region and the value of mobility is extracted. The fitting is depicted in the plots with red color. The capacitance of the devices are measured using a capacitance meter and the value of permittivity is calculated using equation (2). The mobility values are calculated using equation (1). The mobility values of the devices are tabulated in Table 1. It is interesting to note that the mobility values remain the same order of magnitude in both cases indicating that the work function - LUMO difference between iodine doped rubber and Al is sufficiently high to prevent electron injection to the effect of affecting mobility values. However here MoO$_3$ will help to block the electrons from passing to the anode and also to avoid Al diffusion to the semiconductor surface at the interface. Passivation effect of the ITO surface reduce the chances of shorting the device.
Figure 5: Fitted double logarithmic J-V curve of ITO/MoO$_3$/NRI$_2$/MoO$_3$/Al device

Figure 6: Fitted double logarithmic J-V curve of ITO/NRI$_2$/MoO$_3$/Al device

Table 1: The mobility value of NRI$_2$/test devices

<table>
<thead>
<tr>
<th>Sl No</th>
<th>Device structure</th>
<th>Mobility Cm$^2$/Vs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>ITO/MoO$_3$/NRI$_2$/MoO$_3$/Al</td>
<td>3.906 X 10$^{-4}$</td>
</tr>
<tr>
<td>2</td>
<td>ITO/ NRI$_2$/MoO$_3$/Al</td>
<td>3.345 X 10$^{-4}$</td>
</tr>
</tbody>
</table>

IV. Conclusion

The green organic semi conducting material from natural rubber is synthesized by doping with iodine. The extent of doping is analyzed using UV-Vis spectroscopy and the time required for the effective doping is optimized. The mobility of the material is calculated by fabricating test devices and their results are obtained. The effectiveness of MoO$_3$ of as cathode buffer layer is also discussed and found that its effect is discerning in terms of the order of mobility values and it acts more as a passivation layer. The mobility values of the like, OSC, OFET etc.

ACKNOWLEDGEMENT

The author is thankful to Ministry of Human Resource Development (MHRD), India and Kerala State Council for Science Technology and Environment (KSCSTE) for financial support for carrying out this work. We also thank Abhinav T, Rosemary Davis, Siddharth S and Pratheek M, Department of Physics, NIT, Calicut for their help and support.

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Electronic Cargo Tracking System and Its Effects On Revenue Realization in East Africa Member Countries

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Abstract- Revenue Realization is a management system that measures revenue. The process can be used to identify factors that drive revenue, measures the performance of these factors, and taking action to maximize revenue. In the East African region, Cargo travels for long distance. Unfortunately however there is an increase of theft, tax evasion, delays in clearance which results to increased cost. The main purpose of the research study was to establish the electronic cargo tracking system and its effect on revenue realization in East Africa Member Countries. The study was guided by four objectives: To establish the effect of operational performance on revenue realization. To find out the effect of cost on revenue collection on revenue realization. To establish the effect of tax losses on revenue collection on revenue realization. The study was guided by two theories namely: Transaction Cost Theory and Institutional theory. The study used an explanatory research design. The study targeted 51 senior staff, 94 middle management staff and 141 junior staff. The sample size was 47 senior staff, 92 middle management staff and139 junior staff. Questionnaires were the major data collection instruments. The data was analyzed using descriptive and further inferential statistics including correlation and regression analysis. The findings show a positive relationship between and operational performance and revenue performance. The relationship is significant (r = 0.143, p>0.05) thus operational performance has significant influence on revenue performance. There was a positive relationship between cost and revenue performance. The relationship was significant at (r = 0.042, p<0.05), thus cost has significant effect on revenue performance. There was a positive relationship between tax evasion and revenue performance. The relationship is significant at (r = 0.116, p>0.01), thus tax evasion has effect on revenue performance. The value of R2 is 0.239, revealing 23.9% variability in factors relating to operational performance, cost and tax evasion accounted to revenue performance variables in the model developed. The model remains significant if at least one of the coefficients is not equal to zero. The study concluded that electronic cargo tracking system has not fully reduced time in cargo clearance. Staffing cost was still a challenge at the border posts of East African Member states since the introduction of electronic cargo tracking system. There were some cases of revenue leakages at the border posts even after the introduction of electronic cargo tracking system. The study recommended that East Africa member states should come up with a common policy on ICT integration on cargo clearance. East Africa member states should come up with a common policy on staffing at the border posts. East Africa member states should ensure that Electronic cargo tracking system eliminated the staffing cost by integrating all cargo clearing activities into the system. East Africa member states should come up with a common policy on how to prevent tax evasion. Electronic cargo tracking system should be one of the measures of ensuring there are no leakages relating to taxes. The study findings narrowed into three effects of electronic cargo tracking system on revenue performance in East Africa Member Countries. Suggestion for further study is recommended to identify other effects of electronic cargo tracking system on revenue performance in East Africa Member Countries.

Index Terms-
Electronic cargo Tracking System

This is a technology solution that enables real-time tracking of cargo from point of loading to point of discharge or offloading

Tax Evasion

Tax evasion is the illegal evasion of taxes by individuals, corporations, and trusts. Tax evasion often entails taxpayers deliberately misrepresenting the true state of their affairs to the tax authorities to reduce their tax liability and includes dishonest tax reporting, such as declaring less income, profits or gains than the amounts actually earned, or overstating deductions.

Revenue Collection

Relates to a government agency's actions to collect outstanding financial obligations from the public

I. INTRODUCTION

Revenue collection has become an integral part of any society. It has emanated from early history of civilization through which government got funding so as to sustain its operations for the public good (Agbesi, 2013). Tax revenue collection should
comply with best practices of equity, ability to pay, economic efficiency, convenience and certainty. Just like any other organization, the government also looks at all ways and means to reduce the expenditure so as to have a reciprocal effect of the public national debt of the economy (Ireland, P., 1994). Various accounting and control procedures are usually adopted in order to ensure that the spending is in line with government policy and framework. Some of the controls include budgetary measures, checks and balances and many others. This engulfs the whole rationale of any corporate be it public or non-public institution which institutes to lower expenditure and increase in revenue so as to attain ultimate objectives (Apondi, 2015).

Electronic cargo tracking in developing countries has been associated with several benefits to the transporters that include increased efficiency and productivity which results in a cost reduction benefits. The system also aides in improved reliability and service quality, usually thought of as tools to retain good customers and grow market share and revenue and lastly there is improved shipment and container integrity, built around a core of security issues (Dennis & Shepherd, 2011). The system similarly present benefits to the public sector. With the implementation of the system, there is improvement in efficiency and effectiveness of operational performance. It is a tool which is double edged with the expectation that reduction in illicit trade caused by diversion lead to increased collection of revenue from imports. The process of information processing by the border officials and other intelligence agencies is currently quite taxing and the vulnerabilities associated with container stacking are also quite high. The introduction of real-time information processing enable information to be received and dealt with much faster and also decongest the clearing process (Grottel, 2017).

II. RESEARCH AND COLLECT IDEA

Transaction Cost Theory

The transaction cost theory as advanced by Williamson (1985) opines that the costs of establishing and monitoring the actions of partners in influencing the entry mode choice. Transaction cost theory propose that if there are market based measures, business players was because a firm can benefit from the economies of scale of the market place. However, McIvor (2005) elucidates that a firm faces increased costs in finding or negotiating a market based agreement due to difficulties of estimating all contingencies in the agreement or because of the inability to receive a fair price due to the problems arising from information asymmetry. The use of the radio frequency identification (RFID) system use in monitoring of cargo in transit, in particular, has created enormous value by improving transit management in long global supply chains, helping reduce inventory costs by up to 70 percent while improving the service offered (Norov & Akbarov, 2012).

Institutional Theory

The theory recognizes the embedment of institutional actors. Institutional theorists suggest that organizational actions and processes are driven by their actors in order to justify and plausibly explain their actions. According to this perspective, strategy implementations are rationally accounted for by organizational actors and rooted in the normative context. Organizations adopt a standardized set of practices The Kenya Revenue Authority would need to align internally to be able to ensure that the new introduced system becomes part of their day to day activities. The implementers of the system would therefore need to educate the staff members internally on the benefits of the system both internally and externally in order to achieve the desired results. By educating the members internally the users of the systems was able to “own” the system (Raghu & Harrop, 2013).

Revenue Realization

Revenue collection is an integral component of fiscal policy and administration in any economy because of its influence on national government operations and the grassroots. It is the fuel of every government as it is the main instrument through which government funding is ensured. Revenue collection should comply with best practices of equity, ability to pay, economic efficiency, convenience and certainty (Visser & Erasmus, 2005). For a government to match its performance with the needs and expectations of its citizens, it should increase its fiscal depth without incurring costly recurring overheads (Gidisu, 2012). Sound revenue system for governments is a vital pre-condition for the success in promoting efficiency in the service delivery and economic development at the counties (Ngotho & Kerongo, 2014). For most developing countries, revenue collection goes hand-in-hand with economic growth and the revenue is the lifeblood for governments to deliver essential services and to make long-term investments in public goods (OECD, 2008).

Operational Performance

Barka (2012) carried out a study to find out a relationship between operational performance and profitability. The data from ceramic companies in Bangladesh have been taken to find out why the ceramic industry is growing rapidly which was useful to get to wholesome result. A number of operating ratios has been established as a proxy for operational efficiency. To find out the findings of the study quantitative method has been employed. Standard Deviation, Correlation and simple Linear Regression have been used with the help of predictive analytics SPSS software in order to arrive at the end result of the study. The profitability can be deduced from the fixed asset turnover. Besides it is not statistically significant. Therefore it can be said that the key performance indicators of operational performance have a relationship with the profitability in the context of the ceramic companies of Bangladesh.

Cost

Gitau & Nzuki (2014) studied how the use of ICT has modernized cost of Tax administration procedures and improved revenue Collection at Large Taxpayer Department of Tanzania Revenue Authority. ICT was introduced into the department in 2001 for easy maintenance and timely access of records and fast processing of return so as to remove postal delays; minimize operational costs; curb cheating and plug revenue loss (TRA 2010e). Large Taxpayers and Large Taxpayer Department staff (100%) agree that, since 2001 time for processing return and responding to queries have been reasonably shortened (Victor – Numbing 2009). TRA reports reveal that, actual revenue collection increased from TZS. 204.397.5 Million in 2001/02 to TZS. 1,605,751.2 Millions in 2008/09 while revenue contribution share rose to 41% in 2008/09 from 23% in 2001/02. Although other factors in the economy like; increased internal trade, reduced importation and more reliance on home products may cause the
increase, if there is no good tax administration, revenue was not reflected in collections. The fact that revenue has increase proves that, ICT use enhance better tax administration.

**Tax Loss**

Manji (2015) studied the determinants of tax revenue performance in the Southern African Development Community. The results generally highlight the robust role of taxation (tax rates and tax policy harmonization variables) (alongside other important determinants) in improving tax revenue in the region, providing empirical support for extant anecdotal evidence. The empirical finds the importance of FDI towards tax revenue collected in the SADC and the existence of reverse causality (that is, a causal relationship between FDI and taxation or vice versa). Policy considerations include the need for SADC countries to carry out extensive pro-regional (coordinated) tax reforms, create a regional tax forum and promote initiatives aimed at improving FDI and ultimately tax revenue (as per existing regional protocols).

**III. STUDIES AND FINDINGS**

Majority of respondents were neutral that electronic cargo tracking system has reduced time in cargo clearance as shown by (M=3.0282 SD=1.17118), this shows that electronic cargo tracking system has not fully reduced time in cargo clearance. The study findings agrees with Al-Hawary & Abu-Laimon (2013) who argued that regional Electronic cargo tracking systems have made it possible to inspect and clear containers within the pre-set organizational benchmarks. Respondents agreed that electronic cargo tracking system has reduced cargo theft as shown by (M=4.2056 SD=0.93192), this shows that there has been reduction in cargo theft since the introduction of electronic cargo tracking system, the study findings agrees with Broadway (2012) who argued that direct benefits to electronic cargo tracking to the transporters include increased efficiency and productivity, often thought of as cost reduction benefits. The system also aides in improved reliability and service quality, usually thought of as tools to retain good customers and grow market share and revenue and lastly there is improved shipment and container integrity, built around a core of security issues.

Respondents agreed that electronic cargo tracking system has enabled data to be captured on the system as evidenced by (M=3.5484 SD=1.31546), this shows that electronic cargo tracking system has improved how data was captured on goods on transits among East African member states. The study findings agrees with Busse et al (2012) who argued that the electronic cargo tracking system offers a platform whereby data can be analyzed accurately and therefore KRA being able to generate useful insights into its operational performance and is done on a real time basis and therefore the information collected and circulated is timely and relevant. Similarly, an electronic system eliminates the paper works involved in the old ways of doing business.

Majority of respondents were neutral that electronic cargo tracking system ensures internal control systems are enhanced as shown by (M= 3.3234 SD=0.59179), this shows that electronic cargo tracking system has not fully improved the internal controls at boarder post, this has led to delays of cargo on transits. The study findings agrees with Calabrese & Eberhard-Ruiz (2016) who argued that ECT system also has been associated with increased quality of service and cost control which means that customers are willing to do business with the revenue authority and this leads to more trade and revenue collection.

Respondents were neutral that electronic cargo tracking system has reduced staffing cost as shown by (M= 3.4476 SD=1.39304), this shows that staffing cost was still a challenge at the border posts of East African Member states since the introduction of electronic cargo tracking system. The study findings agrees with Calabrese & Eberhard-Ruiz (2016) who argued that the electronic cargo tracking system offers a platform whereby data can be analyzed accurately and therefore KRA being able to generate useful insights into its operational performance and is done on a real time basis and therefore the information collected and circulated is timely and relevant.

On whether electronic cargo tracking system has reduced documentation cost, majority of respondents were neutral as shown by (M= 3.2823 SD=1.36800), this shows that there’s were still costs associated with the documentations on clearance of cargo at the border posts which has not been solved by electronic cargo tracking system. On whether electronic cargo tracking system has reduced the cost of tax collection, majority of respondents were neutral as evidenced by (M= 3.2137 SD=1.30349), this shows that there were still costs associated with tax collection since the introduction of electronic cargo tracking system. The study findings agrees with Calabrese & Eberhard-Ruiz (2016) who argued that ECT system also has been associated with increased quality of service and cost control which means that customers are willing to do business with the revenue authority and this leads to more trade and revenue collection.

On whether electronic cargo tracking system has helped curb revenue leakages, majority of respondents were neutral as shown by (M= 3.4073 SD=1.44237), this shows that there were some cases of revenue leakages at the border posts even after the introduction of electronic cargo tracking system. The study findings disagrees with Barka (2012) who argued that detection of tampering while on transit is done immediately and hence preventing loss before arrival at the unloading port. Monitoring of any change is registered by RFID signals from the truck associated with the opening of the container. Real-time reporting of any exception and incident of container security violation to destination custom and port authorities for remedial action before arrival is core issue.

Respondents were neutral that electronic cargo tracking system has improved targeted tax collections this was shown by (M= 3.1452 SD=1.38057), this shows that there has been little improvement in tax collection since the introduction of electronic cargo tracking system. The study findings disagrees with Calabrese & Eberhard-Ruiz (2016) who argued that ECT system also has been associated with increased quality of service and cost control which means that customers are willing to do business with the revenue authority and this leads to more trade and revenue collection.
collection. This is because goods arrive at the border points and are quickly cleared to leave for the next station.

On whether electronic cargo tracking system has sealed loopholes for importers this was shown by (M= 3.0685 SD=1.28812), this shows that there were still loopholes for importers at the border posts which enabled tax evasion. The study findings agrees with Bennet (2014) who argued that with the implementation of the system, there is improvement in efficiency and effectiveness of operational performance. ECTS helps government agencies in enhancing enforcement of cargo handing regulations, maintaining the region as the preferred trade route for cargo and thereby improving tax collection by curbing incidents of dumping. Respondents were neutral that electronic cargo tracking system has improved monitoring transit cargo this was evidenced by (M= 2.9516 SD=1.32160), this shows that electronic cargo tracking system made little improvement monitoring transit cargo at the border posts. The study findings agrees with Barka (2012) who argued that monitoring of any change is registered by RFID signals from the truck associated with the opening of the container. Real-time reporting of any exception and incident of container security violation to destination custom and port authorities for remedial action before arrival is core issue.

Respondents who were neutral indicated that electronic cargo tracking system data is shared on a real time basis resulting to reduced dumping this was evidenced by (M= 3.1129 SD=1.29283), this shows that electronic cargo tracking system data was not fully shared on a real time basis which has not full reduced dumping of goods. The study findings agrees with Barka (2012) who argued that Monitoring of any change is registered by RFID signals from the truck associated with the opening of the container. Real-time reporting of any exception and incident of container security violation to destination custom and port authorities for remedial action before arrival is core issue.

On whether revenue realization is a management system that measures revenue, respondents agreed as evidenced by (M= 3.8629 SD=1.06725), this shows that electronic cargo tracking system has improved revenue realization. On whether electronic cargo tracking system enhances Trade facilitation was evidenced by (M= 4.3105 SD=0.81577), this shows that electronic cargo tracking system had enhanced Trade facilitation. On whether electronic cargo tracking system has the advantage of expanding the revenue sources this was shown by (M= 3.8629 SD=1.06725),

IV. CONCLUSION

The study concluded that electronic cargo tracking system has not fully reduced time in cargo clearance. There has been reduction in cargo theft since the introduction of electronic cargo tracking system. Electronic cargo tracking system has improved how data was captured on goods on transits among East African member states. Electronic cargo tracking system has not fully improved the internal controls at boarder post; this has led to delays of cargo on transits.

Staffing cost was still a challenge at the border posts of East African Member states since the introduction of electronic cargo tracking system. There have been still costs associated with the documentations on clearance of cargo at the border posts which has not been solved by electronic cargo tracking system. There were still costs associated with tax collection since the introduction of electronic cargo tracking system. Electronic cargo tracking system has not all reduced operational cost at the border posts.

There were some cases of revenue leakages at the border posts even after the introduction of electronic cargo tracking system. There has been little improvement in tax collection since the introduction of electronic cargo tracking system. There were still loopholes for importers at the border posts which enabled tax evasion. Electronic cargo tracking system made little improvement monitoring transit cargo at the border posts. Electronic cargo tracking system data was not fully shared on a real time basis which has not full reduced dumping of goods.

V. PPENDICES

Appendix I: Introduction Letter
Date: ............................
To Chief Executive Office

..............................................................

NAIROBI,
Dear Sir/ Madam,
RE: CONSENT FOR PROVISION OF ACADEMIC DATA
I am an MBA student. I wish to conduct a study entitled “electronic cargo tracking system and its effect on revenue realization in East Africa Member Countries.”

To facilitate the completion of this study, I wish to humbly request for your assistance with certain data from your organization. I have attached a copy of the questionnaire. Kindly answer all the questions as completely as possible. The study results are intended for academic purposes only and will be treated with utmost confidentiality. No specific reference will be made on your organization and only the summary results will be made public.

I look forward to your utmost support and remain grateful.
Appendix II: Questionnaire

PART A: BACKGROUND INFORMATION

1. Gender of the respondent
   Male [ ] Female [ ]

2. Designation: …………………………………………………

3. Number of Years in Service
   0 – 5 [ ] 6 – 10 [ ]
   11 – 15 [ ] 16 – 20 [ ]
   Over 20 years [ ]

4. Highest Education Level Attained:
   a) Diploma [ ]
   b) Undergraduate [ ]
   c) Postgraduate [ ]

SECTION B: REVENUE REALIZATION
a. Kindly indicate the extent to which the following on revenue realization using the scale: 1-strongly disagree, 2-disagree, 3-neither agree nor disagree, 4-agree and 5-strongly agree. Please (√) as appropriate.

<table>
<thead>
<tr>
<th>Aspects</th>
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<th>4</th>
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<tbody>
<tr>
<td>Revenue performance is a management system that measures revenue</td>
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<tr>
<td>Electronic cargo tracking system has improved revenue performance</td>
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<td>Electronic cargo tracking system enhances Trade facilitation</td>
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<tr>
<td>Electronic cargo tracking system has the advantage of Expanding the revenue sources</td>
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</tbody>
</table>

SECTION C: OPERATIONAL PERFORMANCE
A. With regard to effect of operational performance on revenue performance on East Africa Member Countries using the scale: 1-strongly disagree, 2-disagree, 3-neither agree nor disagree, 4-agree and 5-strongly agree. Please (√) as appropriate.

<table>
<thead>
<tr>
<th>Factors</th>
<th>5</th>
<th>4</th>
<th>3</th>
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<tbody>
<tr>
<td>Electronic cargo tracking system has reduced time in cargo clearance</td>
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<tr>
<td>Electronic cargo tracking system has increased quantity of cargo cleared</td>
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<td>Electronic cargo tracking system has reduced cargo theft</td>
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<tr>
<td>Electronic cargo tracking system has enabled cargo documents being processed online</td>
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<td>Electronic cargo tracking system has enabled data to be captured on the system</td>
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<td>Electronic cargo tracking system ensures internal control systems are enhanced</td>
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SECTION D: COST
A. In relation to effect of cost on revenue collection revenue performance on East Africa Member Countries using the scale: 1-strongly disagree, 2-disagree, 3-neither agree nor disagree, 4-agree and 5-strongly agree. Please (√) as appropriate.

<table>
<thead>
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<th>Factors</th>
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<th>4</th>
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<tbody>
<tr>
<td>Electronic cargo tracking system has reduced staffing cost</td>
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<td>Electronic cargo tracking system has reduced documentation cost</td>
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<td>Electronic cargo tracking system has reduced clearance documentation cost</td>
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</tbody>
</table>
Electronic cargo tracking system has reduced the cost of tax collection

Electronic cargo tracking system has reduced operational cost

SECTION D: TAX EVASION
A. On the effect of tax losses on revenue collection on revenue performance in East Africa Member Countries using the scale: 1-strongly disagree, 2-disagree, 3-neither agree nor disagree, 4-agree and 5- strongly agree. Please (✓) as appropriate.

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<th>Factors</th>
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<th>4</th>
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<tbody>
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<td>Electronic cargo tracking system has helped curb revenue leakages</td>
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<td>Electronic cargo tracking system has improved targeted tax collections</td>
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<td>Electronic cargo tracking system has sealed loophole for importers</td>
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Existence Of Indigenous Legal Communities On Land In Procurement Of Land For Public Interest

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Abstract: Land acquisition under the pretext of public interest, sometimes injures the community, including the Customary Law Community (MHA), because the use of land taken by the government is not as originally planned, and even tends to give birth to misery of the community which was once the rights holder. Many cases have arisen between the Government, Regional Government and the private sector with the Customary Law Community (MHA), related to the implementation of development and investment on land which is the property of the MHA. Research Objectives: 1) Analyzing and discovering the philosophical basis of the protection of property rights of customary law communities. 2) Analyzing and finding the existence of customary community ownership rights in land acquisition for public interest. This type of research is normative juridical research. Basically, indigenous peoples have a philosophical foundation that is closely interrelated with their customary land or customary rights. Customary law communities have full customary authority for the control and use or management of their customary land, but in formal legal jurisdiction their authority is not as strong as that of the State such as the State set out in the Basic Rules of Agrarian Principles (UUPA). The existence of customary law communities in defending their customary rights over land is emphasized in their respective regional regulations in accordance with the characteristics and characteristics of indigenous and tribal peoples in certain areas.

Keywords: Philosophical, rights, community, customary law, land

1. INTRODUCTION

In order to realize a just and prosperous society, the government made a general plan regarding the supply, allocation and use of agrarian resources for development needs in order to achieve the greatest prosperity of the people. With this general plan, land use can be carried out in a guided and orderly manner so as to bring maximum benefits to the country and the people. Land is one type of object that still has a very important position in the governance of community life. Moreover, the compilation of the modernization era, all trajectories have begun to be driven, the role of the land is more advanced. At the time of increasing land values increased by urban communities whose growth rates are increasing, so that the demand for land is increasing and scarce. (Muhammad Yusrizal, 2017). Land and development are an inseparable unity. Besides land also has a social function, in the sense that land owned by someone does not only function for the owner of that right, but also for the Indonesian people as a whole. As a consequence the use of the land is not only based on the interests of the right-holders, but also must remember and pay attention to the interests of the community. Therefore it can be said that land has a dual function, namely as social assets and capital assets. As social assets land is a means of binding social unity among the people of Indonesia for life and living, while as capital assets land is a capital factor in development. (Hermayulis, 2000). As social assets and capital assets, the two are a unity, on which there are humans as their inhabitants and the content of natural resources in them (Elita Rahmi, 2010). Based on the authority possessed by the government in regulating the land sector, in accordance with the mandate of Article 33 paragraph 3 of the 1945 Constitution which states that: "The earth, water and natural resources contained therein are controlled by the state to be used for the greatest prosperity of the people". Then the government followed up by issuing Law Number 5 of 1960 concerning Basic Regulations on Agrarian Principles (UUPA). The provisions in UUPA itself provide a strong legal basis for the government to take land owned by the community, including taking land for public purposes as regulated in Article 18, namely: "In the public interest, including the interests of the nation and state, as well as the common interests of the people, land rights can be revoked, by providing appropriate compensation in the manner stipulated by law".

Development by the government, especially physical development absolutely requires land. This required land can be in the form of land that is directly controlled by the state or land that is already owned with rights by a legal subject. Related to the land needed for development in the form of state land, land acquisition is not difficult, that is, the government can directly apply for land rights for further use for development, but because of the limited land owned by the government, land is needed from the community including the customary law community to expedite the course of development in the public interest. The need for land to be used by the government for development purposes must not be detrimental to the rights of landowners, including the rights of indigenous.
peoples to land. Therefore, to regulate this matter, it is necessary to have a legal regulation that can provide legal protection to holders of land rights.

Legal arrangements relating to the acquisition of land for public purposes and all other relevant regulations have undergone a process of development from time to time. Some existing land acquisition regulations are considered not able to accommodate the interests of holders of land rights, so it is very necessary to have legal instruments at the level of the law to become a strong legal umbrella. To answer these complaints, the government adopted a policy by issuing Law Number 2 of 2012 concerning Land Procurement for Development in the Public Interest.

The government hopes that the issuance of this law will become a strong legal umbrella to facilitate the implementation of infrastructure development in the public interest and at the same time be able to provide legal protection to rights holders, but this still needs to be explored further to address issues related to land acquisition policies which at the same time protects the landowning community. The increase in population in Indonesia will have implications for the increasing need for public facilities related to transportation, housing, education, and so on. Fulfillment of these facilities can not be separated from the need for land as one of the authorized capital. There are almost no development activities that do not require land, so land plays an important role, even the success and failure of physical development is largely determined by the availability of land.

The government as the holder of the right to control the country, in order to fulfill the needs of the land the government has an obligation to hold it. Based on paragraph 33 of the 1945 Constitution, it is evident that the relationship between the state and the earth, water and natural resources contained therein is a relationship of control, not ownership. This is very different from colonial agrarian law which creates ownership relations between the state and land, with the existence of the principle of domain verklaring being reflected. The aim is to improve the welfare and prosperity of the people, in accordance with the ideals of the Indonesian nation when it freed itself on August 17, 1945 from dependence on other nations that have controlled, exploited, and drained the Indonesian nation and all of its natural wealth which is the right of the Indonesian people (Daniswara K. Harjono, 2010). Obviously, the ideals of the Indonesian people can be read in the Preamble to the 1945 Constitution of the Republic of Indonesia, particularly in the fourth paragraph, the formulation is as follows: "Then, in order to form an Indonesian Government that protects all Indonesian people and all of Indonesia's blood and to promote public welfare, educate the nation's life, and take part in carrying out world order based on independence, eternal peace and social justice, Indonesian national independence is drawn up. in a Constitution of the Republic of Indonesia which is formed in an arrangement of the Republic of Indonesia which is sovereign of the people based on the Almighty God, Humanity that is just and civilized, Indonesian Unity in Democracy led by wisdom in Consultative / Representative, and with realizing a social justice for all Indonesian people ".

If we look carefully at paragraph IV above, the noble ideals of the Unitary State of the Republic of Indonesia are contained, namely "a just and prosperous society". Sumario Waluyo stated that "the ideal of a just and prosperous society in the life of the Indonesian people is a central problem throughout history. In this connection, fair and prosperous are two pairs of words that are not released in the philosophy of society and are their life goals. Fair is the main emphasis and is always mentioned before the word, while prosperity is an affirmation and priority that needs to come first "(Sumiaro Waluyo, 1979).

Law Number 5 of 1960 concerning Basic Regulations on Agrarian Principles (Law No. 5 of 1960) in Article 2, states that:

1. On the basis of the provisions in article 33 paragraph (3) of the Constitution and matters as referred to in article 1, earth, water and space, including the natural resources contained therein are at the highest level controlled by the State, as power organization of the whole people.

2. The controlling right of the State referred to in paragraph (1) of this article authorizes:
   a. regulate and carry out the designation, use, supply and maintenance of the earth, water and space;
   b. determine and regulate legal relations between people and earth, water and space;
   c. determine and regulate legal relations between people and legal actions concerning earth, water and space.

3. The authority derived from the right to control from the State in paragraph (2) of this article is used to achieve the greatest prosperity of the people, in the sense of happiness, prosperity and independence in society and the free, sovereign, just and prosperous Indonesian rule of law.

4. The controlling right of the said State can be empowered by the autonomous regions and traditional law communities, only as necessary and not in conflict with national interests, according to the provisions of Government Regulations.

Provisions of Article 2 of Law No. 5 of 1960 above means that the state is given the authority to regulate, organize allotment and use of BARA. To meet the demands it is not uncommon that land owned or controlled by legal subjects as private rights is subject to the fulfillment program. So through legislation made by the government, the takeover of private rights is carried out on the grounds for public interest. There are three ways that can be done by the state to meet these needs, namely first, done in the usual way, namely through buying and selling, exchanging, and others; secondly, it is carried out through land acquisition institutions; and third, is carried out through institutions that revoke land rights.

Development activities are not only the responsibility of the government, but also the active role of private companies and the community in general is needed. To carry out development activities can not be separated from the need for land as a container of its activities.

Specifically to meet the need for land for the government and private companies, it is unlikely to use land that is directly controlled by the state due to limited land availability. As a way out is to use land rights by providing compensation to holders of land rights.
Activities to obtain land by providing compensation to those entitled to land are known as land acquisition. According to his interests, land acquisition is carried out for interests of the government or government agencies and land acquisition is for the benefit of private companies. Land acquisition for government interests is carried out with the assistance of the Land Procurement Committee formed by the Governor, while land acquisition for the interests of private companies is carried out directly by the private company without the assistance of the Land Procurement Committee. Land acquisition for the benefit of the government or government agencies is better known as the acquisition of land for public purposes, which is regulated in Presidential Decree Number 55 of 1993 concerning Land Procurement for the Implementation of Development in the Public Interest (Presidential Decree No. 55 of 1993). Following up as the implementation of this Presidential Decree, Minister of Agrarian Regulation / Head of National Land Agency No. 1 of 1994 was issued concerning the Provisions for the Implementation of Presidential Decree Number 55 of 1993 concerning Land Procurement for Implementation of Development for the Public Interest (Agrarian Regulation of the Head of BPN Number 1 of 1994).

Land Procurement for Public Interest is finally regulated by Law Number 2 of 2012 concerning Land Procurement for Development in the Public Interest (Law No. 2 of 2012) and Government Regulation Number 40 of 2014 concerning Amendments to Presidential Regulation Number 71 of 2012 concerning Procurement Implementation Land for Development in the Public Interest.

Land acquisition under the pretext of being in the public interest, sometimes injures the community, including the Customary Law Community (MHA), because the use of land taken by the government is not as originally planned, and even tends to give birth to the misery of the community which was once the rights holder. Not infrequently under the pretext of public interest, MHA land is used to fulfill these needs, for example the needs of industrial development, the construction of shopping centers that are only used by a handful of groups. Likewise, it is not uncommon for land acquisition to leave legal problems. According to Gunanegara, problems related to land acquisition are not only juridical issues, but also develop into socio-cultural and economic-political problems. (Gunanegara, 2008).

An interesting thing to study is the existence of MHA land rights as a result of land acquisition for development. MHA is a party that is very vulnerable to land acquisition activities for development in the public interest. Under the pretext in the public interest, MHA rights are often taken over without any effort to replace with other land ownership rights.

In addition, it is also interesting to study the criteria of public interest, specifically how the laws and regulations relating to land acquisition for development purposes have set these criteria. Without clear criteria on the public interest, various interpretations can be created to fill the criteria. If this is done, it is not impossible that every activity can be shaded under the pretext of public interest. It will further make land rights holders the victims.

Investment opportunities that are wide open in Indonesia, including in Maluku, provide the possibility of the acquisition of MHA rights by the Government, Regional Governments and the private sector for development and investment on the pretext of public interest. Many cases arising between the Government, Regional Government and the private sector with MHA related to the implementation of development and investment on land which is the property of the MHA. The cases that occurred such as in West Seram District (Tanahmahu District, in Southwest Maluku District (Romang Island). In addition, the planned implementation of the Masela block also in time also did not rule out a conflict of interest with the MHA.

A. Problem Formulation
1. How is the philosophical protection of customary community land rights?
2. What is the existence of customary community land rights in land acquisition for public use?

B. Research Objectives
1. Analyze and discover the philosophical basis of the protection of the ownership rights of indigenous and tribal peoples.
2. Analyzing and finding the existence of customary community ownership rights in land acquisition for public interest

C. Research Benefits
Theoretically, the results of this study are expected to contribute constructive thinking to the development of legal science, particularly state administration law and state administration law related to the state's responsibility for the protection of all people. Practically, the results of this study can be a reference for the Government and Regional Governments in carrying out development, particularly in the acquisition of land for development in the public interest.

2. RESEARCH METHOD

A. Research Type
This type of research is normative juridical research. Normative juridical research is a legal research method carried out by examining mere library or secondary material. (Soejono Soekanto and Sri Manudji, 2007)

B. Problem Approach
The first problem is using normative legal research with a philosophical approach to study and analyze the philosophical protection of the rights of indigenous peoples. The second problem uses normative legal research using a conceptual approach and case studies to determine the existence of customary law community property rights in land acquisition for public use.

C. Sources of Legal Materials
The source of legal material in this study comes from library research, where library research uses primary legal materials, secondary legal materials and tertiary legal materials. Primary legal material is material whose contents are binding because it is issued by a government or agency that has authority. And secondary legal sources are materials in the form of books and other printed materials, and software, namely by accessing a number of data via the internet (downloading) various books, scientific journals and research results, and tertiary legal materials are legal materials that are supporting primary and secondary legal materials. (Devi K. G Sondakh, 2009).

D. Legal Materials Collection Techniques
In this study, the legal material collection techniques used are primary legal materials and secondary legal materials. Secondary legal materials include materials that support primary legal materials such as text books, articles in various scientific magazines or research journals in the field of law, papers submitted in various forms of meetings such as discussions, seminars, workshops, etc. other. To support or complement this research, the authors also use case studies related to this research.

E. Legal Material Analysis Techniques
Analysis of the materials used in the study was carried out in a qualitative and comprehensive analysis. The analysis of legal material in this study was carried out using descriptive techniques, clarifying the materials by constructing law and argumentation, which were then assessed based on reasons of legal reasoning related to the problem.

3. RESULTS AND DISCUSSION

1. Regulation of Customary Law Community Rights According to National Law
In examining the substance of other constitutions that have been applied in Indonesia, such as the 1949 Constitution and the 1950 Constitution, it is certain that such regulation has never been carried out. The mandate of the 1945 Constitution was apparently not followed up, but what was done was to uniform the original arrangement owned by the indigenous people as "village". Meanwhile, recognition of the existence of indigenous peoples and customary land rights or customary rights can only be formulated in 15 (fifteen) years. Juridically, the regulation of customary rights in legislation in Indonesia is based on the Indonesian Land Law, namely Law No.5 Year 1960 concerning Basic Rules of Agrarian Basic Law No. 1960 104, September 24, 1960. With the enactment of Law no. 5 of 1960, then there was a change in Indonesian Agrarian Law. With UUPA. The colonial legal regulations were abolished and the dualism of the Agrarian Law was ended which consisted of regulations that originated in western law and which guaranteed legal certainty for all Indonesian people. Our agrarian law is then based on one legal system, namely Customary Law, as the original law of Indonesia, (Boedi Harsono, 1971) which is clearly formulated in article 3 paragraph (3) of the 1945 Constitution as the foundation. The main objectives of the Agrarian Law in general explanation are:
   a. Laying the groundwork for the drafting of national agrarian law, which will be a tool to bring prosperity, happiness and justice to the State and the people, especially peasants, in the framework of a just and prosperous society;
   b. Laying the groundwork for establishing unity and simplicity in land law;
   c. Laying the groundwork to provide legal certainty regarding land rights for the people as a whole.
Customary Law as the basis for the establishment of the National Land Law has 2 (two) positions, namely:

1) Customary Law as the main basis
   The appointment of Customary Law as the main basis in the formation of National land law can be concluded in the Consideration of UUPA letter (a), viz “In connection with what is stated in the above considerations, the need for national agrarian law, which is based on customary law on land, is simple and guarantees legal certainty for all Indonesian people, without ignoring elements that are aware of religious law”
   "Naturally the new agrarian law must be in accordance with the legal awareness of the people at large. Therefore, the Indonesian people are partly scattered subject to Customary Law, so the new agrarian law will also be based on the provisions of customary law, as original law, people in a modern country and in relation to the international world, and adapted to Indonesian socialism . As it is understood, customary law in its growth cannot be separated from political influence and colonial society which is capitalist and feudal society."

2) In connection with the incomplete written National Land Law, the Customary Law norms serve as a supplement. This is stated in the UUPA article, namely:
   "As long as the law regarding ownership rights as referred to in Article 50 paragraph (1) has not yet been formed, then the provisions of the local Customary Law and other Regulations concerning land rights which give authority as or similar to the intended in Article 20, as long as it does not conflict with the soul and the provisions of this Law."
Recognition of customary law as the basis for national agrarian law is expressly stated in Article 3 and Article 5 of the UUPA. In Article 3 it reads as follows:

Bearing in mind the provisions in Articles 1 and 2 of the implementation of customary rights and similar rights of the Customary Law communities, as long as in reality they still exist, must be such that they are in accordance with national and state interests, which are based on national unity and are not may conflict with laws and other high regulations.

In Article 5 also stated as follows:

Agrarian Law that applies to earth, water and space is Customary Law, as long as it does not conflict with national and state interests, which are based on national unity, with Indonesian socialism and with the regulations contained in this Act with other laws and regulations, everything by heeding the elements that rely on religious law.

Based on the provisions in Article 5 of the UUPA, the applicable land law is Customary Law with certain limitations. The existence of these requirements implies that the Customary Law is located as a supplementary law. Requirements and restrictions on the enactment of Customary Law and national land law are explicitly contained in article 5 of the UUPA, namely:

1. Does not conflict with national and state interests.
2. Does not conflict with Indonesian socialism.
3. Does not conflict with the provisions contained in the UUPA itself.
4. Does not conflict with other agrarian regulations.
5. Must heed the elements that rely on religious law.

In connection with the recognition of customary rights or communal rights of customary law communities in Article 3 of the UUPA, it can be stated that there are two (two) conditions, namely:

1. **Its existence**
   In terms of the existence of customary land rights or customary rights recognized as long as in reality they still exist. Thus if in areas where there are no more customary rights, then of course the customary rights will not be revived, and of course in areas where there are no customary rights will not be given new customary rights.

2. **Implementation**
   In terms of implementation, if in reality it still exists, the implementation of customary community customary rights must be such that it is in accordance with national and state interests, which are based on national unity. The exercise of customary rights or customary rights of customary law communities is also customary or may not conflict with other higher laws and regulations. (Boedi Harsono, 1971)

However, by adhering to the conception originating in Customary Law, it would be fair if the criteria for determining the existence of customary rights are based on the existence of three (three) elements which must be fulfilled simultaneously, namely:

1. The subject of customary rights, namely the customary law community, which fulfills the characteristics of termination;
2. Objects of customary rights, namely territorial land which constitutes their Lebensraum;
3. The existence of certain authority from the customary law community to manage the land of their territory, intended to determine the relationship that is pleasing to the supply, establishment, and utilization, as well as the preservation of the territory's land. (Maris Sumardjono, 2006).

Concerning customary law must not contradict other higher and higher laws and regulations, according to Gautama, (Sundargo Gautama, 1990) that:

"Customary law may not conflict with the provisions contained in the UUPA. An outline of the UUPA has been outlined what constitutes the main points of the new national agrarian legislation. Customary law which is declared to apply to land rights must not conflict with the principles stated in the UUPA. This also means that where in the UUPA are formulations of new rights regarding land, then these formulations apply, if there is no conformity between the Customary Laws on rights similar to rights new rights in the UUPA and the formulation of UUPA itself. In addition to the formulation contained in the UUPA it will be used as a guide for the perpetrators of law ".

In general explanation II number 3 relating to article 3 of the UUPA, it states that this provision first stems from the recognition of the existence of customary rights in the new agrarian law. As is known, despite the fact that customary rights exist and apply and are taken into account in judges' decisions, such rights have never been formally recognized in the law, with the result that in implementing agrarian regulations, customary rights in ancient times were often ignored.

Due to the mention of customary rights or the rights of indigenous peoples in the basic agrarian law, which in essence also means recognition of these rights, then the customary rights will be considered, as long as these rights are in fact still in the legal community concerned. For example, in the granting of land rights (for example, for business purposes), the legal community concerned will be heard beforehand and will be given an "recognitie". Which indeed he has the right to accept as the winner of the Customary Rights.

The existence of customary community rights is recognized by the UUPA, but it does not provide clear boundaries regarding whether or not customary rights exist in customary law communities. The UUPA allows the regulation of customary rights to continue according to local customary law. The lack of clarity about the existence of customary rights or customary rights can cause problems between the customary law community and the government. For this reason, it is necessary to clarify the customary rights regulation regarding customary rights related to the position, understanding and content of the National Defense Law system.

As stressed by Simarmata (Rikardo Simarmata, 2007) that the form of recognition of customary rights is more "conditional recognition". That means, customary rights held by indigenous peoples can only be done "as long as in reality they still exist, do not conflict with national interests, and may not conflict with other laws and regulations that are higher." The concept of conditional
recognition of the indigenous peoples' knowledge which was introduced by the UUPA and then followed by standard legislation afterwards actually has narrowed the space for what was mandated in article 18 of the 1945 Constitution before the amendment.

The concept of conditional recognition of customary rights or customary rights owned by indigenous peoples also took place in the early days of the new order, especially when a number of laws were issued such as law number 5 of 1967 concerning forestry article 17, and law number 11 of 1967 concerning the basic provisions of mining which have been amended by law number 4 of 2009 concerning mineral and coal mining. Both of these laws have clauses of recognition of indigenous peoples but as long as they remain in reality and do not interfere with the achievement of the objectives of the law. It is this style of recognition that makes the forestry law not optimally provide indigenous peoples with basic freedoms but rather sets boundaries that are increasingly difficult for indigenous peoples to reach.

After waiting for about 55 (fifty-five) years, it was only in 2000 that a second amendment to the 1945 Constitution resulted in a new clause regarding indigenous peoples. Article 18B Paragraph (2) of the 1945 Constitution as a result of the amendment confirms that: "The state recognizes and respects the customary law community units along with their traditional rights as long as they are still alive and in accordance with the development of the community and the principles of the Republic of Indonesia, which are regulated in the law." A similar style of regulation and recognition is also carried out in the provisions of MPR Number XVII of 1998 concerning Human Rights: Article 6 paragraph (2) of Law no. 39 of 1999 concerning Human Rights; and Regulation of the Minister of Agrarian Affairs / Head of BPN No. 5 of 1999 concerning Guidance to adjust the Customary Community Rights issue.

Recognition and respect for customary rights are contained in various regulations including regional regulations (PERDA) that use the legal basis relating to the authority to make regulations and the legal basis relating to the material regulated in these regulations. Examples of some areas that regulate recognition and respect for customary rights are regional regulations of Kampar district number 12 of 199 concerning customary rights; lebak district regulation No. 32/2001 concerning protection of the customary rights of the Baduy community; West Sumatra Regional Regulation No. 6 of 2008 concerning customary land. Some areas that are drafting Tobelo Land Rights Regulations, North Malahera Land Rights Regulations.

Recognition of the customary rights of indigenous and tribal peoples was issued in 2001 through the provisions of the MPR Republic of Indonesia No. IX / MPR / 2001 concerning the reform of Agrarian Law and Natural Resource Management.

Article 5 MPR Decree No. IX / MPR / 2001 determines, inter alia: in sub e: "developing democracy, legal compliance, transparency and optimization of people's participation; in realizing justice in the experience, ownership, use, utilization and maintenance of agrarian and natural resources "; and in sub f: "maintaining sustainability that can provide optimal benefits, both for present and future generations, by being prepared to pay attention to the capacity and support of the environment" and in sub g "carrying out social functions, sustainability, and ecological functions in accordance with social conditions local culture ", and by continuing to" respect and uphold human rights "(sub c); "Respect the rule of law by accommodating diversity in law unification" (sub c). the special thing that is put forward in article 5 of TAP MPR No. IX / MPR / 2001 is as set out in point j, namely: recognizing and respecting the rights of indigenous peoples and national cultural diversity over agrarian and natural resources."

Based on the view above it can be concluded that the existence of natural resource law and environmental law can still be seen as two sides of one currency. Both can only be distinguished but cannot be separated. [Ronald Z Titahelu, 2005].

If in the previous thinking the rights to natural resources were emphasized as the rights of the government and entrepreneurs based on fulfilling the interests of the State's foreign exchange earning and priorities in the private sector to be able to try freely, then in the current development opportunities for business must also be expanded in a balanced way by including the people's rights as referred to in item j of MPR Decree No. IX / MPR / 2001 above: "recognizing and respecting the rights of indigenous peoples and the nation's cultural diversity of agrarian resources and natural resources", and developing democracy, legal compliance, transparency, and optimization of people's participation.

This style of conditional recognition of indigenous peoples was immediately followed by Law No. 41/1999 concerning forestry and various other regulations concerning plantations, water resources management, coastal management, and small islands, utilization and preservation genetic resources, mining, natural resource management and others. As with previous legal products, all legal products produced in this reform era did indeed recognize indigenous peoples and their customary rights, but still set conditions, that the new rights could be recognized: (1) as long as in reality they still existed; (2) in tune with the times; (3) does not conflict with national interests; and (4) must be confirmed by local regulations (Rikardo Simarmata, 2007) Ownership and authority to manage natural resources in the hands of the government, private sector and local communities. For example, forests are known as state forests, private forests and also community forests, including customary forests. Even though Law No. 41 of 1999 does not prioritize community forestry referred to as customary forest as a separate category, but recognition of the existence of community forestry is a condition for the development of the people's economy. Another example is management of the coast and the sea. The authority granted by Law No. 22 of 1999 concerning regional governments, heads of provincial and district / city governments as well as villages, is a good opportunity for each local government to manage existing coastal natural resources. Even for island regions, both island provinces and island districts, authority can also be exercised over sea areas between islands. (Law Number 6 of 1996).

For example, although seaweed cultivation is carried out by coastal fishing communities. Likewise with the creation of a Sea Protection Area (a kind of Marine Protection Area or area called a sanctuary), as well as seaweed cultivation efforts, the creation of a Sea Protection Area, and so on cannot be said to be traditional activities. Although it is well known that in some countries it is known as sasi (in Southeast Maluku), and mane's (in Talaul) and eha (in sangir) which are traditional in nature, activities to organize marine protected areas and so on. In Kalimantan there are rattan forests which are cultivated by the local community. In Lampung, it is known as Repong Resin. In certain places near Jayapura, West Papua, it is known that there is a "Coffee Forest" which is cultivated by local

indigenous people. In Central Maluku it is known as “dati dati” or “dusun” in Seram. The rights that are above can be found in the knowledge of the local Customary Law.

2. Customary Law Community Rights According to Customary Law

Land has a very important position in human life, especially for the Customary Law community. The relationship between the land and the community itself always occurs in a variety of interests, the land used as a place of settlement, for the purpose of making fields, a place to take the results, a place to gather with others or a place of worship or for worship. This legal community's right to land is called land rights or customary rights. (Bushar Muhammad, 2006). The use of the term Customary Rights was first introduced by Van Vollenhoven, a Dutch legal expert named beschikkingsrecht who described the relationship between the legal community and the land itself.

According to Ter Haar: beschikkingsrecht (beschikkingsskring) as an environment everywhere practically has a term: the term is a term for the environment of "beschikkingsrecht" both as belonging - petuanan (Ambon) - and as a food-producing area - panyampeto (Kalimantan) - or as a field which is fenced off (Kalimantan), wewengkon (Java), prabumian (bali), or as forbidden land for others - tatabuan (Bolan Mongodow). Then there are terms like torluk (Angkola), limpo (South Sulawesi), nuru (Buru), payar (Bali), paer (Lombok), Ulayat (Minangkabau).

With regard to the rights of indigenous peoples to certain areas or what is commonly referred to as Customary Rights, the discussion refers to geographical units. Whereas when it comes to rights, the authorities or authorities that are based on the willingness to do or not do something above customary territory are covered. (Ronald .Z. Titahelu, 2008). As such, Customary Rights refer to a relationship between indigenous peoples and certain territories. The relationship between customary law communities and their customary lands gives birth to customary rights, and the relationship between individuals over land. (Boedi Harsono, 2003) Regarding this relationship, Ter Haar (Ter Haar Bzn-K. Ng.Soebakti Poepono) states: "The living relationship between human beings who are regularly arranged and related to one another on the one hand and the land on the other, that is, the land where they dwell, the land that feeds them, the land where they are buried and which is the residence of the refined protectors. along with the ancestral spirits of the land which permeates the life force, including the life of the Ummah and therefore depend on it, such affinity is felt and rooted in his "completely paired" mindset (participerend denken) that should be considered a legal relationship (rechtsbetrekking) humanity is against the land."

The relationship that exists between customary law communities and land as a unity that cannot be separated as a legal alliance. The legal alliances (rechtsgeeeneschappen), named, "organized groups are permanent by having their own power, also their own wealth in the form of objects that appear to be rights and not seen". (Ter Haar Bzn-K. Ng.Soebakti Poepono). It is clearly seen that to be called a legal alliance must meet several elements, namely: 1) the existence of unity; 2) has a fixed area; 3) has its own power; 4) has own wealth. In the form of objects that are visible or not.

Customary Rights are basically a right of alliance on occupied land, while the implementation is carried out both by the community itself and by the head of the association on behalf of the alliance. In general the customary area is an area in which there are parts which are naturally manifested in a single unit that are interrelated and inseparable. With this naturally formed geographical condition, what becomes the object of the Customary Rights consists of land space, waters that include lakes, rivers and coastal and marine waters, plants that live wild (trees that can be used both for wood burn or for carpentry needs). Customary territory in customary law community units in Indonesia are generally located on land along the land in the Dutch Colonial. There are some benefits to this, but there are also disadvantages. The beneficial influence certainly provides protection for the Customary Rights of its territory. For example, the charter letters issued by the kingdoms which meant to emphasize the boundaries of the relevant fellowship concerned. This kind of thing also existed in the Dutch colonial government, namely with the announcement of "ordinances": such as the village of Staatblaad 1941 No.356 and the clans of Staatblaad 1931 No.6.

As a legal alliance in defending their customary rights, basically the customary law community still practices habits repeatedly accompanied by certain sanctions, in utilizing the natural resources in them, both on land and on the coast, which are needed for Their life. Activities that utilize natural resources both on land and in coastal areas that are on the surface and that are in the ground show a tendency for environmental maintenance to damage, habits that are practiced repeatedly in various regions show variations that tend to be individualistic, although in some villages it still shows communal character.

Meanwhile, the natural mineral wealth in the bowels of the earth that can be mined such as gold, or natural resources in the form of underground water, and natural resources in the form of energy, are all in the customary territory. On top of this customary territory, there is unity of activity from the community. Unity of activity in the economic, social, cultural and even political areas, and settlements within ulayat areas is essentially based on principles inherited from the ancestors of the local customary law community, which inheritance characterizes differences influenced by the previous government system, such as the sultanate , and also differences in the characteristics of tenure and land use among the spheres of society.

3. Customary Law Community Rights in Land Procurement for Public Interest

The right to control land by the state in Indonesia is contained in Article 33 paragraph (3) of the 1945 Constitution which reads: The earth and water and the natural resources contained therein are controlled by the state and used for the greatest prosperity of the people. Before the amendment of the 1945 Constitution, Article 33 paragraph (3) was explained in the explanation of Article 33
because it arm each other, but the statutory regulations in Indonesia, giving large powers and unclear boundaries to the state to
e denial is carried out by denying the existence of customary
at the process of land acquisition is carried out with honest and fair compensation. However, in
lic" in nature, namely the authority to regulate (regulatory authority) and not the
d to public
ndividual rights over land. (B. Harsono, 2003). Ideally the relationship between land rights by the state,

Thus, according to the concept of the UUPA, the notion of being "controlled" by the state does not mean "possessed", but rather the right that authorizes the state to regulate the three things mentioned above. The contents of State authority originating from the right to control natural resources by the state are merely "public" in nature, namely the authority to regulate (regulatory authority) and not the authority to physically control land and use its land as the authority of the holders of land rights that are "private". The legal relationship between the state and land gives birth to the right to control land by the state. (A.P. Parlindungan, 1982). The relationship between customary law communities and their customary land gives birth to customary rights, and the relationship between individual and land gives birth to individual rights over land. (B. Harsono, 2003). Ideally the relationship between land rights by the state, customary rights and individual rights to land is harmonious and balanced. That is, the three rights are the same position and strength, and do not harm each other, but the statutory regulations in Indonesia, giving large powers and unclear boundaries to the state to control all land in the territory of Indonesia.

As a result, there is a dominance of the state's right to control land over customary rights and individual rights to land, thereby giving the state an opportunity to act arbitrarily and potentially violating customary rights and individual rights to land. One of the authority of the state that comes from the right to control land by the state is to give a right to land or other rights to people, both alone and with other people, as well as legal entities. The granting of this right may violate the customary rights of customary law communities which are recognized, respected and at the same time denied by the laws and regulations that deny customary rights.

Laws and regulations in Indonesia, in addition to those who recognize and respect customary rights as in the UUPA, there are also those who deny the customary community's customary rights. The denial is carried out by denying the existence of customary land which is declared as state land. With the claim of customary land as state land, it causes the loss of the rights of the customary law community / customary law community members based on their customary rights, because those rights are on the customary land.

Therefore, denial of customary land also means denial of customary community customary rights. Laws and regulations that deny customary land include: Law Number 5 of 1967 concerning "Basic Forestry Provisions"; Law Number 41 of 1999 concerning "Forestry"; Law Number 11 of 1967 concerning "Basic Mining Provisions"; and Law Number 22 of 2001 concerning "Oil and Gas.

Related to the government's authority to regulate the use, designation and provision of land, private rights crystallized in various rights as stipulated in Article 6 of the UUPA must comply with regulations based on state control over the land and natural resources contained therein. Included in this case is the right of ownership of citizens' land can be taken over or revoked in order to meet the needs of land intended for the implementation of development activities in the public interest. Considering that land acquisition involves individual or community rights, land acquisition must pay attention to the principle of justice so that it does not harm the original owner.

One of the basic principles of universal land acquisition is "no private property shall be taken for public use without just and fair compensation", meaning that the process of land acquisition is carried out with honest and fair compensation. However, in practice these principles are often ignored and the government as the organizer of the state puts forward its power by using the shield of the right to control the state and the public interest.

Efforts to bridge the people's interest in their land and fulfill the needs of land for activities have been carried out by the government by issuing Presidential Regulation No. 36/2005 concerning Land Procurement for Implementation of Development in the Public Interest in lieu of Presidential Decree No.55 of 1993. Initially Presidential Regulation No. 36/2005 the controversy stemming from an overly broad definition of public interest and guarantees of compensation for communities whose lands were taken over for development activities in the public interest.

But with the issuance of Presidential decree No. 65 of 2006 concerning Amendment to Presidential decree No. 36 of 2005, the definition of public interest is relatively firmer and has legal certainty, namely with the reduction in the types of public interest from 21 (twenty one) to 7 (seven) types and the affirmation of restrictions on land acquisition for public interest is limited to public interests carried out by the Government or Regional Government which is subsequently owned or will be owned by the Government or Regional Government.

Another important thing that should be underlined is that in the Presidential decree it is no longer possible to procure land for the implementation of development in the public interest through the revocation of land rights. This means that the government provides protection to the community not to take over their land rights by force but through the mechanism of releasing or surrendering of land rights carried out through consultation and agreement of the parties concerned.

The community basically does not mind if their land should be taken over for development purposes that aim for the common welfare, but the practice of expropriation of land so far has often been used by certain groups for their own benefit under the guise of the public interest, creating doubts in the community every time land acquisition activities are in the public interest. In the future, it is important to consider that land acquisition should not only be seen from the results, but also the process. For every development activity, whether carried out by the Government / Regional Government or the private sector, as long as it has an impact on reducing the socio-economic welfare of land rights holders, the procedures must be regulated in law.

Considering that this Presidential decree is problematic, both in terms of substance and its existence and has the potential to not apply sociologically, it is necessary to postpone its enforcement. To prevent legal vacuum, Presidential Decree No. 55/1993 was reinstated for a while until the enactment of the law on land acquisition. It is true that after the enactment of Law No. 10/2004 concerning the Formation of Laws and Regulations, the issuance of presidential decree is no longer possible (Article 7). But presidential decree No. 55/1993 which should have remained in force if it had not been replaced by this problematic Presidential decree, could be reinstated by reading the Presidential Decree as a Presidential Regulation in accordance with Article 56 of Law No.10 / 2004.

Another thing that needs attention is regarding "proper compensation losses in the manner regulated by the law", the government as the party that takes the policy based on public interest, sometimes ignores the rights of the people holding the rights to the land. Respect for land rights is of course also for the holders of their rights. Therefore, the release and acquisition of land held by indigenous peoples or customary land must also be carried out in accordance with the correct procedures and the determination of appropriate compensation. The United Nations Conference on Environment and Development, held in Rio de Janeiro in June 1992, produced a new development for indigenous peoples regarding their relationship with the United Nations. The conference recognized that indigenous peoples and their communities have a very important role in environmental management and development, based on their knowledge and traditional practices.

It was emphasized that efforts in national and international scope to implement sustainable and environmentally oriented development must recognize, accommodate, advance and strengthen the role of indigenous peoples and their communities. Article 26 of Agenda 21 (the program of action set forth at the conference) is intended for indigenous peoples. Indigenous peoples meet in the Earth Summit, which is the largest non-governmental organization forum. The forum adopted the Kari-Oka Declaration, a declaration on the environment and development. One of the results of the forum was the signing of the Convention on Biological Diversity which included conditions relating to indigenous peoples. (B. Harsono, 2003).

On June 29, 2006 the United Nations Declaration on the Rights of Indigenous Peoples was agreed upon by the United Nations Declaration on the Rights of Indigenous Peoples. This declaration is progressive because it recognizes important foundations in the protection, recognition and fulfillment of the rights of indigenous peoples. This declaration contains recognition of both individual and collective rights of indigenous peoples, the right to cultural identity, the right to education, health, language and other basic rights. This declaration recognizes the right of indigenous peoples to self-determination, and recognition of the rights of indigenous peoples to land, territories and natural resources and participation in development. As Human Rights, general rights apply the general doctrine of the state's obligation to respect (to respect), protect (to protect) and fulfill (to fulfill) the customary rights of indigenous peoples.

Look at instruments of international human rights law on economic rights. Many social and cultural related to customary rights, the government must take positive action in the form of a series of actions in respecting, protecting, fulfilling customary rights and enforcing legal rights against violations of rights that occur. Indonesia as one of the countries that signed the declaration has the mandate to adopt it in Indonesian national law. The package of four amendments to the 1945 Constitution (1999-2002) became the space where the battle of ideas took place. There are at least two components related to the relationship between indigenous peoples and natural resources (customary rights) and the relationship between the state and natural resources, which must be seen as a link. The linkage stems from the assumption that "rights" are formal, relational and discrete themes.

The most important progress from the recognition of customary rights in the Constitution in Indonesia was found as a result of the second amendment to the 1945 Constitution of the Unitary State of the Republic of Indonesia. Article 18 B paragraph (1) and paragraph (2) of the 1945 Constitution of the Unitary State of the Republic of Indonesia stated:

a. The state recognizes and respects special or special regional government units that are regulated by law.

b. The state recognizes and respects the customary law community units along with their traditional rights as long as they are still alive and in accordance with the development of the community and the principles of the Unitary State of the Republic of Indonesia, which are regulated in law.

The above provisions separate the special and special governance issues that are regulated by law (Article 18B paragraph 1) from the issue of customary rights and limitations (Article 18 paragraph 2). All this time, customary issues have often been linked to rights to natural resources drawn from the royal system in the past. The separation between Article 18B paragraph (1) and Article 18B paragraph (2) gives an important meaning to distinguish between the forms of community (customary) community and the old "royal" government that is still alive and can be special.

Even though they have recognized and respected the existence of customary law communities and their customary rights, declaration of Article 18B paragraph (2) includes several requirements that must be fulfilled by a community in order to be categorized as customary law communities and their customary rights which can be safely enjoyed. The cumulative requirements are:

a. As long as it's alive.

b. In accordance with the development of society.
Rikardo Simarmata said that the requirements for indigenous peoples and their traditional rights carried out by the 1945 Constitution after the amendment had a history that could be traced back to the colonial period. Aglemene Bepalingen (1848), Regering Regulations (1854) and Indische Staatregeling (1920 and 1929) said that native and eastern foreigners who did not want to submit to European Civil law, were subject to religious laws, institutions and customs of the people, as long as they did not conflict with generally recognized principles of justice. (Rikardo Simarmata, 2006). Such requirements are discriminatory because they are closely related to the existence of culture. The orientation of the emerging requirements is an attempt to subdue customary / local law and try to direct it into formal / positive / national law. On the other hand it also has a presumption that indigenous peoples are communities that will be "eliminated" to become modern societies, who practice the pattern of production, distribution and consumption of the modern economy.

Conditional recognition of indigenous peoples in the history of the Republic of Indonesia began with the UUPA, the old forestry law, the irrigation law on the new forestry law and several government department and government regulations. After the 1945 Constitution of the Unitary State of the Republic of Indonesia adopted four requirements for indigenous peoples, various laws that were born after the amendment followed the flow, among others by the water resources law, the fisheries law and the plantation law. This conditional recognition indicates that the government still has not seriously made clear provisions to respect and recognize the customary rights of indigenous people.

The regulation of indigenous peoples and their customary rights to date is unclear and unclear. It is not clear because there are no concrete rules about what are the rights, rights associated with the existence of society that can be enjoyed. It is said to be indecisive because there is no enforcement mechanism that can be taken in fulfilling the rights of indigenous peoples, which can be prosecuted before the court (justiciable). The lack of clarity and uncertainty occurs due to two things, namely the inability and unwillingness of the government to make general provisions regarding the recognition (rights) of indigenous peoples. Not able to because the alliance of indigenous peoples in Indonesia is very diverse based on the distribution of islands, social systems, anthropological and religious. Do not want to because a vague arrangement about the community gives space for discretion and hegemony to the government to be able to manipulate the community's original rights in the interests of exploitation of natural resources in the territory of indigenous peoples.

This unwillingness benefits the authorities and disadvantages the indigenous people. The requirements in Article 18B paragraph (2) along with a series of requirements that are continued by several natural resource laws indicate that the country cq. the new government can recognize and respect the customary rights of indigenous peoples declaratively, not yet up to legal action to protect and fulfill so that the customary rights of indigenous peoples can be fulfilled. In fact, it has not touched the mechanism of national law enforcement when there is a violation of customary rights that are considered human rights.

As already stated, the recognition of the existence of customary law communities and their customary rights is contained in Article 18 B paragraph (2) and Article 28i paragraph (3), but in reality the recognition of the existence of customary law communities and traditional rights, commonly called customary rights , often inconsistent in the implementation of national development. The emphasis on customary rights is control over customary land and all its contents by the customary law community. Mastery here is not in the sense of having but only limited to manage. This can be seen in the laws and regulations issued. In Act Number 23 of 1997 concerning Environmental Management, Act Number 22 of 2001 concerning Oil and Gas, Act Number 21 concerning Special Autonomy of Papua, Act Number 18 of 2004 concerning Plantations, and Act Number 41 of 1999 concerning Forestry.

As for example in Law No. 41 of 1999 concerning Forestry, explicitly stated that there are only 2 (two) forest statuses, namely state forests and private forests. Customary forests are referred to as state forests that are within the territory of indigenous and tribal peoples. Whereas in reality the customary forest existed before the Republic of Indonesia was established on August 17, 1945, possibly due to the recognition of the existence or existence of indigenous peoples and their customary rights. The inconsistency is due to the absence of standard criteria regarding the existence of customary law communities and their customary rights in an area.

Regarding the existence of customary rights (Hermayulis, 2008), states that at least three opinions have developed regarding customary land, namely; customary land is gone, customary land is still there, and the doubtless opinion is that ulayat land exists and does not exist. These opinions are generally related to the interests contained therein.

To find out whether customary lands in the territory of customary rights/"petuanan” in Maluku still exist or not, of course, research and research must be done to show that customary lands as customary rights / "petuanan” along with other rights that fall within the scope of the “petuanan ” area, factually still exists and is still maintained by indigenous and tribal peoples in Maluku, even though the existence of the customary land rights or land has changed because there are parts of the land that have been removed from the land due to various things related to development and economic needs of the community.

The origins of mastering a guide, according to local history, are diverse in the process in different places or islands, even though there is a common pattern. The arrival of the first people in a certain place, usually that begins the mastery of a customary territory. To fulfill their daily needs, these people first cleared a piece of land for houses and gardens, then proceed with the opening of the surrounding forest for shifting cultivation, hunting, and gathering forest products. Then they put a certain sign (usually natural signs) at the farthest points they can reach from the center of the settlement. By drawing a straight line from connecting all these points, then a complete boundary line for a state apparatus has been created.
In Southwest Maluku, West Southeast Maluku, Southeast Maluku, in general the control over customary land is only in the STATE, SOA, and HOME EYES. While it is not much different from other regencies, customary land tenure in Central Maluku and Ambon Island generally recognizes three forms of land rights, namely: state / “petuuan” land, land owned by klen (fam) or land owned by house (“dati” land) and land owned by the head of the family (heirloom). Thus the customary law community's relationship with land like this is a dominating relationship, not having a civil status, meaning that where they can occupy the land that's where they control, and use it collectively. The concept of / “petuuan” land rights is not known to exist individually, and even if there is individual property, the ownership rights are only on the plot of land which is not absolute. However, in the current development and economic needs of the community, it is unavoidable to individualize the right to customary lands in Maluku, for example “dati” land, as a relative's land which according to the norms should not be alienated or permanently transferred in the sense of being sold or sold. granted to people / legal entities from outside the customary law community concerned, it turns out that now many have been transferred ownership.

The Maluku traditional law community in general is very respectful and aware that a plot of land cultivated since ancestors is a customary land from which they live and is subject to binding customary rules. For the Maluku customary law community, the hometown or the country is indeed not only the location of houses, yards and fields, but also all objects on it (forests, hills, valleys, rivers and seas) or underground. The whole area is / “petuuan” (from the word "lord" or "owner"), so the word / “petuuan” is always mentioned by the name of the owner, for example the Hutumuri country, a country located in the Ambon city area. By saying "country" that means a / “petuuan” is a common property of the local customary law community.

The state always has communal meaning, and guidance is always the concept of shared ownership of a communal area as well. In short, the basic concept of traditional land (and sea) ownership in Maluku, in essence is a concept of joint ownership of the local customary law community. Based on this concept, the customary law of Maluku, then develops a unique concept of natural resource management in their territory in accordance with patterns of social relations and kinship that are also locally specific. According to Roem Topatimasang in Central Maluku, where the social structure is relatively more equal (egalitarian) with a system of leadership and village governance that is limited to only one country (village), the management of local natural resources is relatively simpler than other regions in Maluku. The decision making process can be done more quickly and concisely, for example, it is enough just to listen to the opinions and suggestions of all representatives of the clan or soa. In Southeast Maluku, especially in the Kei Islands, the process is somewhat different because social coatings still apply on the basis of class (caste) which is quite complicated. Management of natural resources is more complicated because it does not only involve one country, but also involves local political processes with multiple power structures (federation) of several countries called Ratshaap. As a result, the decision-making process takes longer, and often results in tension and inequality and even inequitable sharing of results among themselves.

One common feature in Maluku is that in natural resource management systems based on the principle of mutual benefit and reciprocity to maintain the balance of the natural environment called “sasi”. “Sasi” is a customary law that strictly prohibits anyone from taking something in the natural surroundings, land or sea, at a certain time in order to guarantee its sustainability. Examples of “sasi” in the land area such as “sasi ewang” (forest), sasi hamlet sago, sasi coconut (to preserve local food). In some places a kind of “eternal sasi” for sacred forests (ancestral sites), including "eternal sasi" of mangrove forests, even includes "eternal sasi" for species of wildlife that are sacred, such as all types of snakes, monitor lizards, and forest rats on Ta Island, Tanimbar Kei, Southeast Maluku.

The customary law community in Maluku and their rights over their customary lands or customary rights or custody rights were formed in a long historical process, until now it still exists and is maintained. They are also generally very respectful and aware that a plot of land cultivated since ancestors is a customary land from which they live and is subject to binding customary rules. Customary lands, known as / “petuuan” lands are essentially a concept of joint ownership of the local customary law community. Based on this concept, the customary law of Maluku, then develops a unique concept of natural resource management in their territory in accordance with the patterns of social relations and kinship that are also locally specific, called sasi.

The existence of customary rights / custody rights and management rights, in various regions in Maluku, often confront or conflict with development policies, particularly related to regional policies in the field of investment (forestry, mining, tourism and so on) which eventually lead to conflicts between indigenous and tribal peoples government institutions and with investors. Such conflicts and disputes become easier when the political law of the government, especially the local government, to protect the rights of indigenous and tribal peoples over land is still inadequate. For this reason, regional legal politics are needed that regulate the management rights and utilization of natural resources based on community interests, as protection for natural resources in the territory, as well as efforts to maintain their traditional rights over these natural resources. For this reason, Maluku Provincial Regulation No. 3/2008 concerning State Petuuan needs to be followed by the same regional regulations in regencies / cities in Maluku.

4. CONCLUSION

1. Basically, indigenous peoples have a philosophical basis that is closely interrelated with their customary land or customary rights, especially regarding the pattern of control and use, at first it must be recognized that indigenous peoples have authority that can be said to be very autonomous and absolute in the control and use of customary land and various agrarian resources in it. The state on the constitutional basis then claims the lands which have been controlled by the customary law community on the

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grounds that the customary land area needs to be protected for environmental preservation and safety or on the grounds that in the customary land area there is a very natural resource potential vital to support the interests of the State.

2. Customary law communities have full customary authority for the control and utilization or management of their customary land, but legally the authority is not as strong as that of the State as stipulated in the UUPA. The existence of customary law communities in defending their customary rights over land needs to be emphasized in their respective regional regulations in accordance with the characteristics and characteristics of indigenous and tribal peoples in certain areas. As a result of the absence of imbalance in legislation will affect the role of the community in the control and use or management of their customary land, especially those that contain natural resources which are considered vital by the State to meet the lives of many people. In reality, land problems arise and are experienced by all levels of society. Conflicts have arisen along with population growth, development progress, and increasingly broad access of various parties to obtain land as a basis for capital in various interests. The phenomenon of conflict in a number of mining cases that occurred in the regions.

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Some Theorems on Intuitionistic Multi Fuzzy Subgroups

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Abstract- In this paper, we define the algebraic structures of Intuitionistic Multi fuzzy subgroup and some related properties are investigated. The purpose of this study is to implement the fuzzy set theory and group theory in intuitionistic multi fuzzy subgroups.

Index Terms- Fuzzy set, Fuzzy subgroup, intuitionistic fuzzy set (IFS), Multi fuzzy set (MFS), Intuitionistic fuzzy subgroup (IFS), Multi fuzzy subgroup (MFSG), Intuitionistic Multi fuzzy Subgroup (IMFSG)

I. INTRODUCTION

The idea of Intuitionistic fuzzy set was given by krassimiri, T. Atanassov [1], S. Sabu and T.V. Ramkrishan [6] Proposed the theory of multi fuzzy sets interms of multi dimensional membership functions. N. Palaniappan, S. Naganathan and K. Arjunan introduced the theory of Intuitionistic fuzzy subgroup is an extension theories of fuzzy subgroups. R. Muthuraj and S. Balamurugan [4] proposed the multi fuzzy group and its level subgroups. In this paper, we define a new algebraic structure of Intuitionistic multi fuzzy subgroups and study some of their related properties.

II. PRELIMINARIES

2.1 : Definition
Let x be any non – empty set. A fuzzy subset α of x is α : x → [0,1].

2.2 : Definition
Let A be a fuzzy set on a group G. Then A is called a fuzzy subgroup of G if for all x, y ∈ G.

(i) A(x, y) ≥ min { A(x), A (y)}
(ii) A(x⁻¹) = A (x)

2.3 Definition
Let X be a fixed non – empty set. An Intuitionistic fuzzy set (IFS) A of X is an object of the form

A=\{(x,α(x), β(x)) : x ∈ X\}, where α(x) : x → [0,1] and β(x) : x → [0,1]

Define the degree of membership and degree of non – membership of the element x ∈ X respectively and for any x, y ∈ X, We have 0 ≤ α(x) + β(x) ≤ 1

2.4 Definition
Let x be a non empty set. A multi fuzzy set (IFS) A in x is defined as a set of ordered sequences.

A = \{(x, α_i, (x), α_2(x),…. α_i(x)) ; x ∉ X\}, where α_i : x → [0,1], for all i

2.5 Definition
An IFS A = \{(x, α(x), β(x)) ; x ∉ G\} of a group G is said to be

Intuitionistic fuzzy subgroup of G (IFS) if,

(i) α(x, y) ≥ min (α(x), α(y)) and β(x, y) ≤ max (β(x), β(y))
(ii) α(x⁻¹) = α (x) and β(x⁻¹) = β(x), for all x, y ∈ G

2.6 Definition
A multi fuzzy set A of a group G is called a multi–fuzzy subgroup of G (MFSG) if for all x, y ∈ G

(i) A(x, y) ≥ min (A(x), A(y))
(ii) A(x⁻¹) = A (x)

2.7 Definition
An IFS A = \{(x, α(x), β(x)) ; x ∉ G\} of a group G is said to be

Intuitionistic Multi fuzzy subgroup of G (IMFSG) if,

(i) α(x, y) ≥ min (α(x), α(y)) and β(x, y) ≤ max (β(x), β(y))
(ii) α(x⁻¹) = α (x) and β(x⁻¹) = β(x)

2.8 Definition
Let A= \{(x, α_A (x), β_A (x)), x ∉ X\} and B = \{(x, α_B (x), β_B (x)), x ∉ X\} be any two IFS’s of X, then

(i) A ⊆ B if and only if α_A (x) ≤ α_B (x) and β_A (x) ≥ β_B (x) for all x ∈ X
(ii) A = B if and only if α_A (x) = α_B (x) and β_A (x) = β_B (x) for all x ∈ X
(iii) A ⊕ B = \{(x, (α_A ⊕ α_B) (x), (β_A ⊕ β_B) (x)) ; x ∉ X\} where,

(α_A ⊕ α_B) (x) = Min \{ α_A (x), α_B (x)\} and
(β_A ⊕ β_B) (x) = Max \{ β_A (x), β_B (x)\}

(iv) AUB = \{(x (α_A U α_B) (x), (β_A U β_B) (x)) ; x ∉ X\}

Where,

(α_A U α_B) (x) = Max \{ α_A (x), α_B (x)\}
(β_A U β_B) (x) = Min \{ β_A (x), β_B (x)\}

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III. PROPERTIES OF INTUITIONISTIC MULTI FUZZY SUBGROUPS

3.1 Theorem

Let A be a IMFSG of a group G and e is the identity element of G. Then
(i) $\alpha(A(x)) \leq \alpha(A(e))$ and $\beta(A(x)) \geq \beta(A(e))$, for all $x, y \in G$
(ii) The subset $H = \{x \in G / \alpha(A(x)) = \alpha(A(e))$ and $\beta(A(x)) = \beta(A(e))\}$ is a group of G.

Proof:
(i) Let $x, y \in G$
$\alpha(A(x)) = \min \{\alpha(A(x)), \alpha(A(y))\}$
$= \min \{\alpha(A(x)), \alpha(A(x^-1))\} \leq \alpha(A(x^{-1})) = \alpha(A(e))$  
Hence, $\alpha(A(x)) \leq \alpha(A(e))$

and
$\beta(A(x)) = \max \{\beta(A(x)), \beta(A(y))\}$
$= \max \{\beta(A(x)), \beta(A(x^-1))\} \geq \beta(A(x^{-1})) = \beta(A(e))$
$\beta(A(x)) \geq \beta(A(e))$

(ii) Let $H = \{x \in G / \alpha(A(x)) = \alpha(A(e))$ and $\beta(A(x)) = \beta(A(e))\}$
Clearly, H is non-empty set as $e \in H$

Let $x, y \in H$
Then $\alpha(A(x)) = \alpha(A(y)) = \alpha(A(e))$

$\alpha(A(xy)) \geq \min \{\alpha(A(x)), \alpha(A(y))\}$
$= \min \{\alpha(A(x)), \alpha(A(x^-1))\}$
$= \min \{\alpha(A(x)), \alpha(A(y))\}$
$\alpha(A(x)) \geq \alpha(A(x^-1))$

Therefore, $\alpha(A(x)) \geq \alpha(A(e))$

and Obviously
$\alpha(A(e)) \geq \min \{\alpha(A(e)), \alpha(A(e))\}$
$= \min \{\alpha(A(x)), \alpha(A(y))\}$
$\alpha(A(e)) \geq \alpha(A(x^-1))$

Therefore, $\alpha(A(x)) \geq \alpha(A(e))$

$\beta(A(xy)) = \beta(A(e))$

Let $x, y \in H$, Then $\beta(A(x)) = \beta(A(y)) = \beta(A(e))$

$\beta(A(xy)) \leq \max \{\beta(A(x)), \beta(A(y))\}$
$= \max \{\beta(A(x)), \beta(A(x^-1))\}$
$= \max \{\beta(A(x)), \beta(A(y))\}$
$\beta(A(x)) \leq \beta(A(e))$

Therefore, $\beta(A(x)) \leq \beta(A(x^-1))$

and
$\beta(A(x)) \leq \max \{\beta(A(x)), \beta(A(y))\}$

$\beta(A(xy)) \leq \max \{\beta(A(x)), \beta(A(y))\}$

3.2 Theorem: A is an IFSG of G if and only if $A^C$ is a IMFSG of G

Proof:
(i) Suppose A is an IFSG of G

Then for all $x, y \in G$
$\alpha(A(xy)) \geq \min \{\alpha(A(x)), \alpha(A(y))\}$
$1 - \alpha(A(xy)) \geq 1 - \min \{1 - \alpha(A(x)), 1 - \alpha(A(y))\}$
$\beta(A(xy)) \leq \max \{\beta(A(x)), \beta(A(y))\}$

and
$\beta(A(xy)) \leq \max \{\beta(A(x)), \beta(A(y))\}$

3.3 Theorem

Let A be any IMFSG of G with identity ‘e’. Then (i) $\alpha(A(xy)) = \alpha(A(x)) = \alpha(A(y))$ and $\beta(A(xy)) = \beta(A(x)) = \beta(A(y))$ for all $x, y \in G$

Proof:
(i) Given A is an IMFSG of G

$\alpha(A(xy)) = \alpha(A(x))$ for all $x, y \in G$

$\alpha(A(x)) = \alpha(A(xe)) = \alpha(A(xy^{-1}y))$
$= \alpha(A(xy^{-1})) = \alpha(A(x^{-1}y))$
$\geq \min \{\alpha(A(xy^{-1}), \alpha(A(y))\}$
$= \min \{\alpha(A(e), \alpha(A(y))\} = \alpha(A(y))$

Therefore, $\alpha(A(x)) \geq \alpha(A(y))$

Now $\alpha(A(y)) = \alpha(A(yxy^{-1})) = \alpha(A(xy^{-1}))$
$\alpha(A(y)) \geq \min \{\alpha(A(xy^{-1}), \alpha(A(x))\}$
$= \min \{\alpha(A(e), \alpha(A(x))\} = \alpha(A(x))$

$\alpha(A(x)) \geq \alpha(A(y))$

Therefore, $\alpha(A(x)) = \alpha(A(y))$

(ii) $\beta(A(xy)) = \beta(A(e))$ for all $x, y \in G$

$\beta(A(x)) = \beta(A(xy^{-1})) = \beta(A(xy^{-1}))$
$\beta(A(x)) \leq \max \{\beta(A(xy^{-1}), \beta(A(y))\}$
$= \max \{\beta(A(x), \beta(A(y))\} = \beta(A(y))$

Therefore, $\beta(A(x)) \leq \beta(A(y))$
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AUTHORS

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Complementary and alternative medicine (CAM) use among patients presenting in OPD at tertiary care hospital, Rajasthan; a Questionnaire based study

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Abstract- Concurrent CAM utilization with conventional medicines is increasing both in developed and developing countries. A questionnaire based study was conducted among the patients attending OPD of a tertiary care institute of Southern Rajasthan. The aim of the study was to find out the pattern of CAM use in patients as well as their attitude and perception regarding CAM therapies.

Ayurveda (56%) was the most commonly used CAM therapy followed by homeopathy (34%). 76% patients did not inform their physicians about CAM use. 57.2% patients started using CAM on advice of a relative or friend. ‘No or less adverse effects’ (69.6%) was the most common reason for CAM preference over conventional medicines. 65.5% patients believed that CAM therapy do not cause any adverse effect.

Patients generally consider CAM therapies as safe and devoid of any adverse effects. Nondisclosure of CAM utilization to concerned physician can lead to adverse effects and drug interaction between CAM and conventional medicines. Thus there is a need to increase awareness among patients as well as more such studies need to be conducted in patients and in general public to know the current scenario of extent, pattern and prevalent misconception in society regarding CAM use.

Index Terms- complementary and alternative medicine (CAM)

I. INTRODUCTION

National center for complementary and alternative medicine (NCCAM) defines CAM as a group of diverse medical and health care systems, practices, and products that are not generally considered part of conventional medicine.[1] Conventional medicine (allopathic medicine) is medicine as practiced by holders of M.D. and M.B.B.S degrees and by allied health professionals, such as physical therapists, psychologists, and registered nurses. Wide variety of alternative medicine is practiced all over India i.e. Ayurveda, Homeopathy, Unani, Herbal, Chinese, Acupuncture, Yoga etc. In India commonly used CAM therapies have been given official recognition and a separate department was established in 2003 by the Government of India named as ‘AYUSH’. This department has the responsibility of developing and propagating officially recognized CAM systems - Ayurveda, Yoga, Naturopathy, Siddha, Unani, and Homoeopathy.

Use of CAM is increasing not only in adult population, but also in pediatric age groups. According to a survey done by National Institute of Health (NIH) in USA approximately 38 % of adults in the United States and 12 % of children use some form of complementary and alternative medicine (CAM).[2] Usually the patients of chronic and intractable diseases end up using CAM after taking conventional medicine, but in some diseases they may use CAM as initial treatment.

There can be many reasons why patients opt for CAM. It has been reported by some studies that conventional healthcare is perceived as ineffective, having too many adverse effects or too expensive.[3,4] However dissatisfaction with conventional system may not be the only reason why patients turn to CAM. Concurrent use of CAM with conventional medicine is also widespread and poses a potential risk of drug interaction. This risk of drug interaction further increases because many a time’s patients do not inform their physician about CAM use. There are also many misconceptions among patients regarding CAM use.

Studies regarding CAM use have been done in other countries, but only few studies have been reported in India.[5,6,7] Also most of the studies on CAM utilization have focused on special patient group, very few studies have observed CAM use among patients attending outpatient department of a general hospital. Thus this study is planned to develop a baseline data of CAM use among patients presenting in outpatient department of a tertiary care teaching hospital in Southern Rajasthan.
II. LITERATURE SURVEY

CAM utilization is a universal phenomenon both in developing as well as developed countries. Type of CAM use can vary from country to country. Studies have been conducted in other countries & few in India, most of the studies have observed CAM use among specific patient group e.g. pediatric patients, cancer patients, epilepsy patients etc.[8,9,10]

A recent study has done by Adams D et al, assessed CAM use among pediatric patients in two hospitals of Canada. CAM use was widely prevalent, 42% in one hospital and 71% in another. Most common CAM therapies used were massage, chiropractice, relaxation and aromatherapy. Most responders felt that CAM was helpful & many of them did not discuss their CAM use with their physician.[11]

A systematic review assessing CAM use in cancer patients has been done by Adams M et al. In this review an average 31.4% CAM use was found among cancer patients across all the studies included. CAM use was more in females, married people, higher earners & better educated patients. CAM use was most common among breast cancer patients. Most of the studies suggested that only half of the cancer patients inform their physician about CAM use.[9]

In a recent study done by Bililig SG et al CAM use was observed among patients attending Dermatology outdoor, and it was found that 43.7% patients were using at least one CAM method & 20.8% were using two or more CAM methods.[9] An Indian study by Tandon M assessed CAM use among epileptic patients & found CAM use in 32% patients. Ayurvedic medicines were most common frequently used CAM therapy. Influence by ‘family and friends’ was most common reason for trying CAM in those patients.[10]

Most of the above mentioned studies have examined CAM use among specific patient group. Very few studies are available which have focused on CAM use in patients attending outpatient department of a general hospital. Hori S et al have conducted a study on CAM use among outdoor patients of a general hospital in Japan. CAM use was high (50%) among patients surveyed, while reporting of CAM use to concerned physician was low (42%). Similar to other studies CAM use was more in females as compared to males.[13]

Another Indian study has assessed prescription of CAM medicine by practitioners of modern medicine. 12% of prescriptions contained CAM medicines, mainly ayurvedic drugs. CAM medicines mainly consisted of liver tonics, anti-inflammatory & analgesic ointments.[14]

During literature search only limited studies were found assessing CAM use among outdoor patients. We were not able to find any such study from Rajasthan. Thus, present study was conducted among outdoor patients of a general hospital associated with a tertiary care teaching institute in southern Rajasthan.

III. AIMS & OBJECTIVES-

1. To find out the pattern of CAM use among patients presenting in outpatient department.
2. To find out the attitude of patients towards CAMuse.
3. To develop a baseline data of CAM use in a tertiary care teaching hospital of Rajasthan.

IV. METHODOLOGY-

Type of study: This was a cross sectional, observational, questionnaire based study

Place of study: The study was conducted in a Tertiary Care Hospital of Rajasthan

Duration of study: 2 months

Sample size: 200

Inclusion Criteria: All patients visiting out-patient department of the hospital who were using CAM

Exclusion Criteria:
1. Patients of age less than eighteen years.
2. All those who denied participation in the study.

Procedure:
1. Approval from Institutional Ethics Committee was taken before starting the study.
2. Patients attending the out-patient department of hospital were randomly contacted personally.
3. The study was explained to them in brief in a language they can understand. Patients who were using CAM were included in the study.
4. Consent of participants was taken in written informed consent form. (Appendix2).
5. A pre-decided questionnaire was provided to them which included thirteen questions for assessment of pattern of CAM use & attitude of patients towards CAM therapy. They were asked to fill the questionnaire, with the help of the investigator if they were not able to understand it. It required approximately 10 to 15 minutes in filling the questionnaire. (Appendix1)
6. All data collected were analyzed using appropriate statistical tests.

V. OBSERVATION AND RESULTS-

A total of 200 patients who were using CAM were recruited in the study. Out of these 87 (43.5%) were males and 113 (56.5%) patients were females. 107 (53.5%) patients belonged to age group 20-40 years, 88 (44%) were from 40-60 years and 16 (08%) patients were of
86 (43%) patients were illiterate, 52 (26%) were educated up to senior secondary level, 33 (16.5%) were undergraduate and 39 (19.5%) were postgraduate.

**Pattern of CAM use**

Ayurveda was most commonly used CAM therapy, out of 200 patients 114 (56%) were using ayurvedic medicines. Second most common CAM therapy used was homeopathy, which was used by 68 (34%) patients. Out of 200 patients contacted 185 (92.5%) were such who have used CAM in past also. Cardiovascular problems (n=33, 16.5%) were the most common conditions for which CAM was used followed by allergic conditions (n=32, 16%). (Figure 1)

**Figure 1: Figure showing five most common conditions for which CAM was used**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Reason</th>
<th>Patients who preferred conventional system over CAM therapy (n=144)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No/less adverse effects</td>
<td>33 (22.91%)</td>
</tr>
<tr>
<td>2</td>
<td>Cheaper</td>
<td>04 (2.77%)</td>
</tr>
<tr>
<td>3</td>
<td>Easy to take</td>
<td>03 (2.08%)</td>
</tr>
<tr>
<td>4</td>
<td>No relief by CAM therapy</td>
<td>97 (67.36%)</td>
</tr>
<tr>
<td>5</td>
<td>Any other reason</td>
<td>07 (4.86%)</td>
</tr>
</tbody>
</table>

56 (28%) patients preferred CAM over conventional medicine, while 144 (72%) patients gave preference to conventional medicine over CAM therapy. Among 56 patients who preferred CAM, no or less side effects (69.6%) was the most common reason given followed by low cost (10.7%). (Table 1)

**Table 1: Table showing frequency of reasons for CAM preference**

Among 114 patients who preferred conventional medicine, no relief by CAM therapy (67.36%) was the most common reason for their preference followed by no or less side effects (22.9%). (Table 2)

**Table 2: Table showing frequency of reasons for preference of Conventional Medicines**

<table>
<thead>
<tr>
<th>S. no</th>
<th>Reason</th>
<th>Patients who preferred CAM therapy over conventional system (n=56)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No/ less adverse effects</td>
<td>39 (69.64%)</td>
</tr>
<tr>
<td>2</td>
<td>Cheaper</td>
<td>06 (10.71%)</td>
</tr>
<tr>
<td>3</td>
<td>Easy to take</td>
<td>03 (5.35%)</td>
</tr>
<tr>
<td>4</td>
<td>No relief by conventional</td>
<td>04 (7.14%)</td>
</tr>
<tr>
<td></td>
<td>treatment</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Just to explore other option</td>
<td>04 (7.14%)</td>
</tr>
</tbody>
</table>

**Perception regarding adverse effects and interactions**

Out of 200 patients, 131 (65.5%) believed that CAM therapy do not cause any adverse effect, 9 (4.5%) patients admitted that CAM can also cause adverse effect while 60 (30%) patients were not sure about adverse effect with CAM therapy.
Regarding interaction between CAM and Conventional medicines, 118 (59%) patients were ignorant about this fact. 65 (32.5%) patients believed that these two therapies do not interact when taken together, while 17 (8.5%) patients said that CAM and Conventional medicines can interact when given together.

VI. DISCUSSION

In the present study pattern of CAM use and attitude & misconceptions of patients regarding CAM was assessed in patients attending outpatient commonly used CAM therapies. Use of CAM therapies varies from country to country depending upon their cultural beliefs and indigenous medicines prevalent e.g. in China, traditional Chinese medicine such as herbal medicine, acupuncture, acupressure, qi gong and t’ai chi chu’an are widely used, while in Japan kampo and acupuncture are commonly used as CAM therapy.[13]

Cardiovascular problems were the most common conditions for which CAM was used followed by allergic conditions. Studies have shown that CAM usage is more in patients suffering from chronic diseases.[7] As common cardiovascular as well as allergic conditions are chronic in nature, high CAM utilization is found in such patients.

76% of patients did not inform their physicians regarding CAM usage. This figure is alarming and is higher than reported by other studies. Other studies have found that about 60% of patients do not disclose their CAM use to concerning physician.[13,16] This trend can be dangerous as modern medicines and CAM medicines can have potential interactions when taken together and physician’s unawareness can result into serious consequences. Interestingly 63.5% patients admitted that their physician had asked them about CAM usage. This figure is reassuring, but shows that some percentage of patients did not disclose their CAM use even after physician’s questioning. Patients may find it hard to report their CAM use for fear of anticipating a negative response and disapproval from their doctor.[17]

More than half of the patients (57.2%) started CAM on advice of a friend or a relative. Other studies have also reported similar results where CAM therapy was started under influence of some friend or relative.[15,18] Only 34% patients were using CAM on advice of a CAM practitioner. This trend is again undesirable as CAM and modern medicine can interact and there can be adverse effects by CAM therapies, CAM usage should be under guidance of an authorized practitioner.

65.5% patients believed that CAM therapies do not cause any adverse effect or cause minimum adverse effect, while 59% patients were ignorant that CAM & modern medicines can interact.

CAM therapies are generally considered devoid of adverse effects by the patients. This is further strengthened by the finding that the most common reason for CAM preference in the present study was ‘no or less side effects by CAM. However this misconception among patients can be dangerous as many studies have reported that CAM therapies can cause serious adverse effects.[8,19] Thus physicians need to be more vigilant and inquire about CAM, simultaneously there is a need to remove departments of a general hospital associated with a tertiary care teaching institute of southern Rajasthan. Ayurveda (56%) was found to be the most commonly used CAM therapy. This is in consensus with other studies done in India that have also reported ayurveda as the most commonly used CAM therapy.[7] As ayurveda is the indigenous medicine system of India, it is the most commonly used CAM therapy. Homeopathy (34%) was the next commonly used CAM therapy. Other Indian studies have also reported homeopathy as one of the commonly used CAM therapy in India.[7,15] Studies done in other countries have reported massage, spiritual practices, acupuncture etc. as the most misconceptions in patients regarding adverse effects with CAM therapy. This can be done through awareness campaigns & better establishment of ‘AYUSH’ centers, so that most of the CAM utilization occurs in guidance of authorized practitioners.

There were some limitations in the present study. The study findings could not be applied to general public as the study was limited to patients attending the hospital OPD. Therefore it is recommended that several studies of similar kind especially in community setup need to be conducted to know the extent and pattern of CAM use in the society as well as attitude and perceptions of people towards CAM therapies.

VII. CONCLUSION

The results of the present study show that Ayurveda is the most commonly used CAM therapy. Disclosure rate to concerned physicians about CAM use is low. Patients are largely unaware about the fact that CAM medicines can cause adverse effects & can interact when combined with conventional medicines. Thus physicians should be more vigilant about CAM utilization of their patients and there is a need to increase awareness among patients regarding safety of CAM.

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AUTHORS

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The Effect of Expression Box Media on The Ability to Express Language and Self-Confidence in Group B Children in AR Rasyid Kindergarten Sidoarjo

Liez fitri Machfudzoh, Budi Purwoko, Muhammad Turhan Yani

Abstract- This research aims: (1) To find out the effect of the expression box media on the ability to express language in group B children in Ar Rasyid Sidoarjo Kindergarten; (2) To determine the effect of the expression box media on the ability of self-confidence in group B children in Ar Rasyid Sidoarjo Kindergarten. This research is based not only on the problems that occur in group B children in Ar Rasyid Sidoarjo Kindergarten, it is also based on innovations in learning done in kindergartens.

This research was conducted with a quantitative approach with an experimental method. The techniques and data collection used were Pretest and Posttest which function to find out the influence of expression box media on the ability to express language and self-confidence in kindergarten B. This study uses two classes, first the control class and the second the experimental class whose research uses the design Quasi Experimental. The research data shows the results obtained tcount> ttable with a real level of 5% so that 9.2> 0.5 with the average difference in the experimental class and the control class. The average experimental class was 8.60 and the average control class was 6.87.

Based on the results of data analysis, it can be concluded that (1) the expression box media influences the ability to express language (2) the expression box media influences the ability of self-confidence in kindergarten B children in Ar Rasyid Sidoarjo.

Index Terms- expression box, express language, self confidence

I. PRELIMINARY

Education of children aged early (ECD) is the level of education before primary education, which is a development effort aimed at children from birth to the age of sixth. The educational process is carried out by providing educational stimuli to help physical and spiritual growth and development so that children have readiness to enter further education. This period is also the foundation for developing cognitive, motor, language, socio emotional, religious, and moral abilities.

Agree with (Uthman, 2011: 2) which states that early childhood is a Golden Age period, which is a golden period because at this early age (0-6 years) various psychological, cognitive, language, social emotional and spiritual abilities are in the developing period. Where all these abilities will develop very well if the child gets attention from the surrounding environment. Therefore in the development of children is very important the direction of parents and teachers when they are at home and at school.

Based on Law Number 20 of 2003 concerning the National Education System Article 1 Number 14 states that "Early childhood education is a coaching effort aimed at children from birth to the age of six years which is carried out through the provision of educational stimuli to help physical and spiritual growth and development so that children have readiness to enter further education.

Whereas the T safe for children is one form of education on the track “The general objective of education of children of age early is developing a variety of potential children early so that they can adjust to terhadap environment. This should be the main goal for educators, namely parents and teachers to help foster and hone abilities that are already owned or not possessed by children, by conducting guidance and guidance it is expected that children can develop their abilities in dealing with future environments.

Aspects of early childhood development must be developed maximally, there are two aspects of development that will form other aspects, namely aspects of language development and aspects of social emotional development. In the development of language aspects are divided into several parts one of which is expressing language, at the age of 5-6 years children are expected to express language. The first time children get language lessons from the surrounding environment such as from family, peers and the community or mother tongue. In addition, children’s language development is enriched and complemented by the community environment where children live.

This will form the personality or special characteristics of children in language. Language learning for children ages early is
very important therefore kindergartens to be one that deserves to be precise they learn berbahasa and expected the child to develop vocabulary, increase vocabulary in children will very quickly when children have started to speak.

Susanto (2014) “The growth and development of a child is determined by innate and environmental factors, as well as interactions on each factor, this is because with the mutual interaction it will help the child to develop abilities in terms of language. Another opinion says that the basic education of a golden age child in a human life span that period cannot be repeated, so if an error occurs in the child's development at that time will have an impact on the child in the future then at that time called "critical period". Therefore, every parent must supervise and worry about their child's development if the child's development is not the same as in general.

Language has a very important role for every individual and, therefore, should developments dikembar ngkan since age early. According to the theory of language learning behaviorism the ability to speak and understand language is obtained through environmental stimuli. Children are only passive recipients of environmental pressures. Children do not have an active role in verbal behavior. One part of development is the ability to tell stories. Storytelling is an activity that someone does verbally to others with tools or without tools about what must be conveyed or informed in the form of messages.

Language recognition for children from an early age is expected to be able to acquire good language skills, many children can speak but have not heard clearly what is said, it is due to the lack of environmental contribution and maximum intellectual development. According to Syaodih (2013) that aspects of developing language begin with the imitation of sound and humility, subsequent developments are closely related to the development of intellectual and social abilities. In line with social development, the use of language is effective since one needs others to communicate with each other. Beginning children can communicate that is from feeling (sound sounds without meaning) then followed by being able to say one, two syllables, compile simple sentences and so on to socialize using complex language in accordance with the level of social behavior, when early childhood can speak well they will easily adjust to the social environment and can express their thoughts using the language to be conveyed so that other people can understand what is said by the child.

In aspects of social and emotional development, it is divided into several parts, among others, the confidence that children must have when children are 5-6 years old. In the early days the child's behavior is sometimes still unstable, it is very necessary to develop social and emotional values in children. Development in children is better started since children age early, because early childhood is to be directed to interact or bersosial with the family environment or the surrounding community. The hope is that children are sensitive to the environment in which the child is located. In accordance with the opinion expressed by Papalia (in Susanto 2014) "the foundation in psychosocial development includes children's emotions and initial experiences with parents."

On the developmental aspects sosial emotional in children aged early to be developed one of them is confidence in each child. Because the attitude of confidence is an attitude that will build a child's self in interacting with the community. According to the Ministry of National Education (2012: 21) self-confidence is "an attitude that shows understanding one's abilities and the value of self-esteem". Confidence needs to be instilled in children from an early age in a fun way, so that children do not get bored quickly. To foster self-confidence in children it must be often trained so that children are not always afraid and reject themselves when they get the activities requested by the teacher to appear in front of friends and other people, for example telling stories, singing and so forth.

According to Nurla (2011: 60) revealed that "self-confidence is an extraordinary force, self-confidence is like a reactor that generates all the energy that is in a person to achieve success". As the next generation of the nation, self-confidence is very important to be instilled in students so that children grow into someone who is able to develop their potential.

Based on observations at Ar Rasyid Kindergarten, there are many children whose language development is not perfect, for example children aged five to six years, who have not been able to express the language perfectly, the child should have entered an age where children can speak clearly and can tell well. This could be due to lack of stimulus received by children. On the other hand the social emotional development of children also affects the child's language development. In kindergarten is seen when the teacher asks children to tell stories in front of their friends and teachers, self-confidence in kindergarten children aged 5-6 years is still lacking, this is due to the lack of trust given by their closest people to the child.

To reduce the problems as above, the teacher can practice the ability to express language by asking children to tell what is being experienced by the child, to create confidence in the child the teacher can ask the child to tell his experience by standing in front of his friends and teacher. Both of these are expected to increase the ability to express language and self-confidence in children. So that children feel interested in this, the teacher can use the media. According to Susilana (2007) Media itself means that media is part of the communication process, media that can be used can be in the form of expression boxes. An expression box is a box that contains a variety of facial expressions inside. The expression box is a media that has a visualization effect that can stimulate the eyes to be transmitted to the brain so that children can express their feelings with their language. Develop children's language and attitude of confidence in children can be a way to play, one with a medium through which researchers are using the media expression box. This expression box is expected to help improve children in expressing language and self-confidence. Where the child will tell a picture of the expression he has taken in the expression box. The teacher can ask the child to tell stories in front of his friends to practice the self-confidence that exists in the child.

Based on the description above, this research is directed at the application of media which is expected to improve the development of expressing language and self-confidence in children aged 5-6 years with the level of Kindergarten B at Ar Rasyid Sidoarjo kindergarten. the researcher use of media expression box designed as attractive as possible for children age prematurely.
II. RESEARCH METHODS

The research approach used is quantitative research according to Creswell (2013: 32) that quantitative research is a way to test certain theories in a study conducted by examining the relationships between existing variables. Based on the classification of this type of research included in the type of experimental research. According to Jannah (2016: 8) experimental research is research to determine the causal relationship between variables by manipulating one variable (independent variable), making other variables constant (secondary variables) and measuring the related variables. Experimental research is research in which the given treatment (treatment) in the form of learning by using media expression box and make observations in learning activities in the classroom as well as performing measurements on a pretest and post-test after being given treatment.

The research was carried out using the design or experimental design of the Quasi Experimental model, where this design had a control group but could not function fully to control the external variables that influenced the implementation of the experiment. This study uses Nonequivalent Control Group Design, which is a group experiments and control groups were not chosen randomly (Sugiyono, 2014: 79).

III. RESULTS

1. Pretest - Postest Descriptive Statistics (Language Skills)

In the next stage, one-time pretest - posttest was given to the experimental and control groups. Researchers observe learning activities in the preparation center. The results of the pretest - posttest can be seen as follows:

![Graph showing control class pretest-posttest results](image)

<table>
<thead>
<tr>
<th>Table 3.1</th>
<th>Descriptive Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N</td>
</tr>
<tr>
<td>experimental pretest</td>
<td>15</td>
</tr>
<tr>
<td>experimental posttest</td>
<td>15</td>
</tr>
<tr>
<td>pretest control</td>
<td>15</td>
</tr>
<tr>
<td>control posttest</td>
<td>15</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>15</td>
</tr>
</tbody>
</table>

Based on table 3.1, the mean value of the pretest revealed language in the experimental class is 7.00, the minimum value is 4, the highest value is 10, the standard deviation is 1.927. N use values mean post t es t of the experimental class 10, 80, the minimum value of 8, the highest score of 13 and a standard deviation of 1.656. While the mean value of pretest t control classes 6, 33, 4 minimum value, maximum value 9, standard deviation of 1.589. The mean value of the t-test pos is control class 6, 87, minimum value 4, maximum value 10, standard deviation 1.642. The comparison chart for each of these categories can be seen in the image below:
Based on the results of statistical accounts presented in the bar chart, indicating that an increase in significant average value of the results of the pretest to post t test on the experimental class aspects of language skills. Whereas the control class did not experience a significant increase.

2. **Pretest - Postest Descriptive Statistics (Emotional Social Ability)**

In the next stage, one-time pretest - posttest was given to the experimental and control groups. Researchers distributed observation sheets. The results of the pretest - posttest can be seen as follows:

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental pretest</td>
<td>15</td>
<td>3</td>
<td>7</td>
<td>5.07</td>
<td>1.335</td>
</tr>
<tr>
<td>Experimental posttest</td>
<td>15</td>
<td>7</td>
<td>11</td>
<td>8.60</td>
<td>1.352</td>
</tr>
<tr>
<td>Pretest control</td>
<td>15</td>
<td>3</td>
<td>8</td>
<td>5.27</td>
<td>1.335</td>
</tr>
<tr>
<td>Control posttest</td>
<td>15</td>
<td>4</td>
<td>8</td>
<td>5.60</td>
<td>1.352</td>
</tr>
<tr>
<td>Valid N (listwise)</td>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Based on table 4.5, the mean pretest value of the experimental class's confidence ability is 5.07, the minimum value is 3, the highest value is 7, the standard deviation is 1.335. Mean posttest scores for the experimental class 8, 60, minimum 7, highest 11 and standard deviation 1.352. While the mean pretest value of control class 5, 27, minimum value 3, maximum value 8, standard deviation 1.335. The mean posttest of control class 5, 60, minimum value 4, maximum value 8, standard deviation 1.352. The comparison chart for each of these categories can be seen in the image below:
Based on statistical calculation results are presented in the bar chart, indicating that a significant increase in the average value of the results of the pretest to post test the experimental class aspects of emotional social ability. Whereas the control class did not experience a significant increase.

3. Normality test

Normality test is performed to test whether the research variables are normally distributed or not. Testing the normality of data results of this study using the Kolmogorov-Smirnov statistical test. This data testing criterion compares the Asymp probability. Sig (2-tailed) with Alpha (α). If the Asymp probability. Sig (2-tailed) > Alpha (α), then the data normality test is said to be successful (the data is normally distributed), otherwise if the Asymp probability. Sig (2-tailed) < Alpha (α), then the data normality test is said to be unsuccessful (data not normally distributed). As for the results of the calculation as follows:

<table>
<thead>
<tr>
<th>Learning outcomes</th>
<th>Kolmogorov-Smirnov a</th>
<th>Shapiro-Wilk</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Statistics df Sig.</td>
<td>Statistics df Sig.</td>
</tr>
<tr>
<td>pretest</td>
<td>173 30 0.022</td>
<td>948 30 0.151</td>
</tr>
<tr>
<td>posttest</td>
<td>147 30 0.098</td>
<td>932 30 0.057</td>
</tr>
<tr>
<td>control pretest</td>
<td>152 30 0.076</td>
<td>938 30 0.082</td>
</tr>
<tr>
<td>control posttest</td>
<td>149 30 0.085</td>
<td>932 30 0.056</td>
</tr>
</tbody>
</table>

Can be seen data that are normally distributed is a significance value (Sig.) > 0.05. In the results of the above table, it can be seen that the significance value (sig.) = 0.151 > 0.05, then the data is stated to be normally distributed.

4. Homogeneity Test

After knowing the level of normality of the data, the homogeneity test is then performed. Homogeneity test is used to determine the level of variance similarity between the two groups, namely the experimental group and the control group. To accept or reject the hypothesis by comparing the price of sig on Levene's statistics with 0.05 (sig> 0.05). Homogeneity test results can be seen in the following table:

<table>
<thead>
<tr>
<th>Test of Homogeneity of Variance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
</tr>
<tr>
<td>student learning outcomes</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Based on the results of the calculation of homogeneous data known significance value (Sig.) Of 0.300> 0.05 so that it can be concluded that the variance of the experimental and posttest control data is the same or homogeneous.

5. Hypothesis testing
Analysis data technique used to manage quantitative data in the form of numbers using statistical analysis t-test (paired t-test). This statistical analysis is used to determine whether there are differences in language skills and emotional social abilities in kindergarten B children between before (pretest) and after (posttest) get treatment (treatment) in the form of learning using expression box media. Hypothesis test results with the Paired Samples Test as follows:

<table>
<thead>
<tr>
<th>Table. 3.5</th>
<th>Paired Samples Test</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Paired Differences</th>
<th>The Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
<th>95% Confidence Interval of the Difference</th>
<th>Lower</th>
<th>Upper</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pair 1 Pretest</td>
<td>-3.667</td>
<td>.844</td>
<td>.154</td>
<td>-3.982</td>
<td>-3.351</td>
<td>-23.790</td>
<td>29</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Experiment</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Posttest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pair 2 Pretest</td>
<td>-4.33</td>
<td>.935</td>
<td>.171</td>
<td>-7.83</td>
<td>-6.08</td>
<td>-2.538</td>
<td>29</td>
<td>.017</td>
<td></td>
</tr>
<tr>
<td>Control - Posttest</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Based on the results of the table above obtained sig (2-tailed) value of 0.000 <0.05, it can be concluded that there are differences in the average learning outcomes of students for pretest and posttest.

IV. DISCUSSION

In chapter will explain the results of research on the effect of the expression of media city on the development of language skills and self-esteem in children in group B at TK Rashid Sidoarjo. The results of the study will be explained as follows:

A. The influence of expression box media on the development of expressing language

In chapter IV, it has been explained about the results of research that expression box media influence the development of expressing language in children aged 5-6 years. This is stated by the difference in the mean pretest and posttest in the experimental class is 7.00 <10.80. Other evidence shows the influence of the media box with the ability to express language of expression seen in the value - average posttest experimental group was 10 , 80 , and value - average posttest control group 6.87 , which means that H 0 is rejected while the different test post- The test shows the number sig. 0.000 <0.050, which means that H 0 is rejected and proved that there is a difference between the post-test on the control class and experimental class.

Learning activities that use expression box media that have been applied to children aged 5-6 years have an impact on the development of children's language skills. According to (Susanto 2014) there are three factors that influence the development of the child upon ability to speak one of which is environmental factors where p rosess mastery of the language depending on the stimuli from the outside environment. In general, children are introduced to language since the beginning of child development, one of which is called motherese, which is the way mothers or adults teach children to learn languages through the process of imitation and repetition of those around them.

Stages of language development of children aged early by Guntur (in Susanto, 2014) of language development has four phases are divided into the vulnerable age of each show its own characteristics. One of them at stage three for children aged 3-5 years at this stage children can make sentences and extend words into one sentence. While on stage four for children aged 6-8 years, Diita ndai with the ability to combine simple sentences and complex sentences.

B. The influence of expression box media on the development of self-confidence

Seen from the results of the research in chapter IV the influence of the expression box media in emotional emotional aspects on the development of self-confidence in children aged 5-6 years, there is an effect, it is stated by the different mean pretest and posttest scores in the experimental class is 5 , 07 <8.60. Other evidence shows the influence of the media box with the ability to express language of expression seen in the value - average posttest experimental group was 8 , 60 and value - average posttest control group 5.60 , which means that H 0 is received while the different test posttest shows the number sig. 0.000 <0.050, which means that H 0 is rejected and proved that there is a difference between the post-test on the control class and experimental class.

According to Syaifullah (2010: 11) s self-confidence is difficult to say clearly, but most likely people who are confident will be able to accept themselves, ready to accept the challenge in the sense of wanting to try something new even though he is aware that the possibility of wrong must exist . People who are confident are not afraid to say they can in front of the crowd. In this sense children are asked to try something new such as telling stories in front of many people (friends, teachers and parents).

According to Gael Lindenfield (1997: 9), the stages of self-confidence of children aged 5-6 years namely trying to master the environment and defend themselves testing new memories and understanding skills, experimenting with gender roles,
experimenting, acting actively and starting to make friends. Children’s self confidence is very influenced by how parents or educators grow these feelings.

V. CONCLUSION

Based on the results of the research discussion from Chapter V and the research objectives, the research conclusions regarding the influence of the expression box media on the development of expressing language and trust in children aged 5-6 years are as follows:

1. Learning activities with expression box media significantly influence the ability to express language. This influence was realized because the use of expression box media where the results of the experimental group were better than the control group. This can be seen from the p value 0,000 < 0,05.

2. Learning activities with expression box media significantly influence the ability to express language. This influence was realized because the use of expression box media where the results of the experimental group were better than the control group. This can be seen from the p value 0,000 < 0,05.

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Oil Price Volatility And External Debt Management In Nigeria: Empirical Evidence

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ABSTRACT

Oil price volatility effect on macroeconomic indices globally has been a long debate among scholars. This study examined the impact of oil price volatility on external debt management in Nigeria. The study employs the use of secondary data obtained from the Central Bank of Nigeria (CBN) Statistical Bulletin, 2018, World Bank, International Debt Statistics and Debt Management Office of Nigeria. The data were subjected to ADF test, Johansen co-integration test, Granger Causality test and Vector Auto-Regression (systems model) to estimate parameters and test outlined hypotheses using Wald Test Chi-square outcome. The empirical results of the study evidenced a significant impact of oil price volatility on capital investments, while external debt servicing and aggregate external debt was impacted insignificantly for same period under study. The study therefore, recommends; Debt Management Office of Nigeria to be empowered more constitutionally to create a centralized unit within its operations as an institutional strategy to monitor the practical aspects of the execution of external debt and setting up of follow-up team with feedback measures to ensure that such borrowed funds are utilized for designed purposes.

Keywords: Oil price, volatility, external debt, management.

I.0 INTRODUCTION

The global financial crisis dated in 2008 which also led to the down turn of oil price and other essential commodities, crashed the crude oil price in particular from over 140 dollars per barrel to as low as 39 dollars per barrel within (Adeniyi et al., 2015). Fortunately, previous administrators comprising of former president Olusegun Obasanjo, and the then economic team:
Ngozi Okonjo-Iweala and Chukwuma Soludo had accumulated foreign reserves amounted to 53 billion dollars and also had some savings in the excess crude account despite the insistence from state Governors in disbursing it in disguise of financing capital budgets. Thus, with the significant slide of revenue in the system, Nigeria was able to go through the period without the economy going into spin (Adedipe, 2004). Alternative measures were suggested and some were adopted to help the system (Nigeria) to curtail this ups and down syndrome. Thereafter, oil prices rebound; the country again relaxed and went back to business as usual. Within the last three years, upstream oil companies have faced over 75 percent dip in their revenues as barrel prices dipped from $100 to below $30 per barrel (Englama et al., 2010). And for the commodity producers that depend on import of raw materials seem to struggle with the exchange rate dilemma orchestrated by oil price volatility. According to Adedipe (2004), country like Nigeria that depends solely on crude oil proceeds, the retrogressive impact of recent oil prices cannot be overemphasized in view of sustainable economic development and survival of allied industries and its debt management capabilities.

The country has seen crude oil prices increase from $113 to $147 per barrel and then retreat to the current level under $54 per barrel. Thus, Government established the Petroleum Support Fund (PSF) to reduce the shocks from the oil price decline in 2006. Which main objective is to stabilize the domestic effect of fluctuations in crude oil prices in the international crude oil markets, but how well the Petroleum Support Fund (PSF) has materialized this objective remains unveiled (Nwanna & Eyedayi, 2014). Adedipe (2004) also argued that the attendant problems associated with oil price volatility in Nigeria is inability of the institutions to finance its fiscal projects, decrease in standard of living and persistent rise in its debts profile.
The current standard of living in Nigeria exhibited that 60% of our populace live below one dollar per day. The resulting decline in the non-oil sector reinforces and there is also sharp decline in economic performance due to imbalance in sales of crude oil (Ibrahim, Ayodele, Hakeem & Yinka, 2014).

Notably, sustainability of any economic performance is anchored largely to the diversification of such economy. For instance, in developed economy like Canada, oil price volatility does not necessary posed severe threat as several measures are been put in place to combat such occurrences (Ibrahim el tal., 2014). Ayoola (2013) argues that Nigeria as a mono-product economy remains susceptible to the movements in international crude oil prices. Yusuf (2015) also contends that oil price plays a critical role in Nigeria in the conduct of fiscal and monetary policies because it accounts for average of 80% of government revenue, 90-95% of the foreign exchange earnings and 12% of the real gross domestic product. However, despite the windfall from oil prices doing boom eras, Nigeria still has an increasing proportion of impoverished population and experienced continue stagnation of the economy (Okonjo-Iweala and Osafo-Kwaako, 2007).

Nevertheless, the consistent fall in the purchasing power of the naira and the rising poor standards of living amongst Nigerians cannot be avoided in an economy that depends solely on proceeds of crude oil. The effects of oil price volatility seem to be very significant and destabilizing especially in the area of external debt management strategy (Omotola & Saliu 2009).

In view of the above, it pings in the heart of many; home and abroad to question the true position of Nigerian external debt profile in respect to the recent down turn on oil prices volatility globally.
Therefore, the broad objective of this study is to investigate the impact of oil price volatility on external debt management in Nigeria. However, target objectives of the study are:

I. To examine the influence of oil price volatility on capital investments in Nigeria.

II. To determine the effect of oil price volatility on external debt servicing in Nigeria.

III. To examine the effect of oil price volatility on aggregate external debt in Nigeria.

This study will illuminate the fact that external debt management in Nigeria is anchored on the trend of oil price volatility. Therefore, this study will stimulate research of specific objective of oil price volatility and external debt management strategies. It will also come up with policy option for regulatory authorities and the Nigerian government to redesign effective measures (diversification) to suite the current polity geared towards achieving sustainable economic growth in Nigeria.

The rest of the study is subdivided into: Review of related literatures, methodology, analyses and interpretation of data, summary, concluding remarks and recommendations.

2.0 REVIEW OF RELATED LITERATURES

2.1 CONCEPTUAL FRAME WORK

This section is mainly concerned with the clarifications, conceptual linkages and historical perspective of the major components of the study.

BACKGROUND OF GLOBAL OIL PRICE TREND: Records shows that as from the early 1940s to the late 1970s the international oil price was relatively stable having only little or no changes. Then from the late 1970 to the early 1980s the price of oil increased reasonably with respect to the establishment of OPEC and the intermittent bridges in the supply of crude oil. OPEC first exercised its oil controlling power during Yom Kippor War which started in 1973 by
imposing an oil restriction on western countries as a result of U.S and the Europe support for Israel. Production of Oil was reduced by five million barrels a day, this cut back amounted to about seven percent of the world production and the price of oil increased 400 percent in six months. From 1974 to 1978 crude oil prices were relatively stable ranging from $12 to $14 per barrel. Then between 1979 and 1980 during the Iranian revolution and Iraq war, the world oil production fell by 10% and caused the increase in crude oil price from $14 to $35 per barrel.

Increasing oil prices forced leading consumers and firms to adopt a more conserve energy, people purchased cars that could manage fuel and organizations purchased machine that were more fuel efficient (Sharma 1998). Increased oil price also enlarged search and production by nations that were not members of OPEC. Beginning from 1982 to 1985 OPEC wanted to stabilize the price of oil through production of quotas, but safeguarding efforts, global economic downturn and wrongful quotas produced by OPEC member countries contributed to the plunging of oil prices beneath $10 per barrel.

From the Mid-1980s the volitlity in the price of oil has occurred more frequent than the past. OPEC has continually been trying to influence oil price to ensure its stability through allocation of production quotas to its member countries but has been unable to stabilize it; as OPEC share of the world oil production has fallen from 55 percent in 1976 to 42 percent today.

Oil prices matter in the economy in various ways; changes in oil price directly affect transportation costs, heating bills and the prices of goods made with petroleum products. Oil price spikes induce greater uncertainty about the future, which affects households and firms spending and investments decisions.

**HISTORICAL CHECKS ON OIL DISCOVERY AND PRODUCTION IN NIGERIA**
Quest for oil began in 1900s by a German company named Nigeria Bitumen Corporation, but there was no success until 1955 when oil was discovered in Oloibiri in the Niger delta region (now Bayelsa State) by shell-BP. Nigeria started exporting crude oil in 1958 but in major quantity in 1965, after the establishment of the bonny island on the coast of Atlantic and the pipeline to link the terminal.

In 1970, as the Biafra war ends, there was an increase in world oil price and Nigeria benefited immensely from this rise. Nigeria became a member of Organization of petroleum exporting countries (OPEC) in 1971 and the Nigerian National Petroleum company (NNPC) which is a government owned and controlled company was established in 1977. By the late 1960s and early 1970s, Nigeria had attained a production level of over 2 million barrels of crude oil a day. Although there was a decline in production of crude oil in the 1980s due to economic down turn, by 2004 Nigeria bounced back producing 2.5 million barrels per day, but the Niger delta crisis and the global financial crises in 2008 reduced Nigeria oil production and the world oil price.

The discovery of oil brought in the eastern and mid-eastern regions of Nigeria, this brought hope of a brighter future for Nigeria in terms of economic development as Nigeria became independent, but there were also grave consequences of the oil industry; as it fuelled already existing ethnic and political tension. The tension reached its peak with the civil war and reflected the impact and fate of the oil industry. Nigeria survived the war and was able to recover mainly from the huge revenue gained from oil in the 1970s. The Nigeria gained wholesomely from the nearly 36 months oil boom, the boom generates a lot of funds needed to meet all development need but the oil revenue which was supposed to be a blessing became a curse due to its misappropriation of windfall gain from oil.
The enormous impact of the oil shock on Nigeria grabbed the attention of scholars who tried to analyze the effect of oil price on economic sustainability, as well as its ability to manage inherent external debt profile. A set of radical oriented writers were interested in the nationalization that took place during the oil shock as well as the linkages between oil and an activist foreign policy. Regarding the latter, the emphasis was on OPEC, Nigeria's strategic alliance formation within Africa, the vigorous efforts to establish the Economic Community of West African States (ECOWAS), and the country's attempts to use oil as a political weapon, especially in the liberation of South Africa from apartheid. Many people had hoped that Nigeria will become an industrial nation and a prosperous nation from the benefits of oil but they were greatly disappointed when we Nigeria hit a major financial crisis that led to the restructuring of the economy (Odularu, 2007).

THE CONCEPT OF EXTERNAL DEBT IN NIGERIA

External debt according to World Bank (2004) is defined as debt owed by the government to non-residents repayable in terms of foreign currency, goods or service. External debt is one of the sources of financing capital formation in any economy. It is generally expected that Nigeria and other developing countries, facing paucity of capital, will acquire external debt to augment domestic saving (Pattito, poirson & Ricci, 2010). The main lesson of oil price volatility with external debt management literature is that a country should borrow abroad as long as the capital acquired produces a rate of return that is higher than the cost of the foreign borrowing. Although there is nothing wrong in borrowing, the utilization of the borrowed fund is what matters. The incidence of the debt crises in Nigeria hampers economic performance because a large portion of the country’s oil proceeds is required to service the debt. Thus, the net
crude oil earnings were grossly inadequate to effectively finance developmental projects after servicing such debts.

In consonance, external debt refers to the resources of fund in use in a country which is not generated internally and does not in any way come from any local citizens, whether corporate or individual. External debt is the portion of a country’s debt that was borrowed from foreign lenders including commercial banks, government or international financial institutions. On the other hand, debt management is the scope of technical and institutional arrangement of liabilities of a given country so as to pragmatically check its burden within sustainable limit. The technical aspect is concerned with the determination of the amount of debt the economy can sustain and that the conditions of borrowing are favorable and consistent with future debt servicing ability. While, the institutional aspect includes the administrative, organizational, legislative, accounting and monitoring aspect of managing both new and old stock of debt. In both aspects, more attention is given to reducing the debt service burden.

It is no exaggeration to claim that Nigeria’s huge foreign debt burden was one of the hard knots of the Structural Adjustment Programme (SAP) introduced in 1986 (Ojo, 1989). Prior to the $18 billion debt cancellation granted to Nigeria in 2005 by the Paris Club, the country had external debt of close to $40 billion with over $30 billion of the amount being owned to Paris Club alone (Semenitari, 2005). The history of Nigerian’s huge debts can hardly be separated from its decades of continued recklessness of its rulers. Nigeria’s debt stock in 1971 was $1 billion (Semenitari, 2005). by 1991, it risen to $33.4 billion, and rather than decrease, it has been on the increase, particularly with the insurmountable regime of debt servicing and the insatiable desire of political leaders to obtain loans for the execution of dubious projects (Semenitari,
The huge debt was too much burden on the country, in terms of its servicing, leaving it with little to perform her constitutional obligations to the citizenry.

Debt crisis is a serious problem facing the third world countries today, and Nigeria is not an exception. This problem could be traced from the era of colonization and as a result of incorporation of Nigeria into the third world capitalist system. This problem experienced by these economies has created doubt as to whether development is indeed possible in these nations. Though, there is nothing wrong in a country going into borrowing, what matters is the proper management of the debt. For a country to grow, it needs capital and where this is not available, it poses huge problem for economic performance and development of the said economy. A country finds itself in debt when there exist a vast gap between domestic savings, investment and export earning in absolute term over time.

The debt crisis experienced by Nigeria has created quite a number of problems which has slowed down the pace of economic performance in the country, but what can be done about this situation we find ourselves into? Nigeria’s position gets worse as the gap widens and debt cumulate side by side with perpetual accumulation of interest rates. That notwithstanding, Nigeria has maintained a constant flow of net import and this is why the country is compelled to borrow externally thereby inhibiting its developmental strives.

Thus, African countries have acquired a large sum of external debt overtime to bridge the gap between domestic savings and investment. This process was influenced by the act of the traditional concept of bridging the savings investment gap in order to accelerate the process of economic performance. This conventional undertone was that the gap between savings and investment can be bridged either by reducing domestic savings or augmenting domestic savings.
with borrowed external funds. In the former case, economic performance would either exacerbate, decline or stagnate and income would be depressed, while in the latter, economic performance would accelerate if the external funding (debt) were optimally deployed to finance viable projects.

However, the entire numerous problems facing Nigeria today, the external debt burden is obviously not sea paged and very pernicious and malignant one. Debt as many would imagine, constitute a very large and big hindrance to the development process especially within the context of a dependent capitalist formation. In a debt ridden economy, for instance, economic benefit which would have been channeled into social profitable investment outlet was diverted into debt servicing. A sustainable external debt service position depends on among other things, the deployment of external borrowing in productive investment.

In order to resolve the debt problem facing the economy today, the Federal Government embarked on various policy measures aimed at resolving the debt crisis. One of such policy was the Structural Adjustment Programme introduced in July 1986. SAP was expected to remove all the problems in Nigeria economy. But unfortunately, SAP created more problems than it came to solve. Other strategies are, debt cancellation, debt exchange swaps, debt conversion, debt repudiating, and debt restructuring.

After the Nigeria civil war, there has been a decline in the relative position of agriculture in the country with the advent of crude oil production. Irrespective of the oil boom, Federal Government has embarked on non-productive project that do not have the capacity to grow the economy. This is against the economic idea of investing in productive ventures basically to have other sources of foreign earnings to the national treasury. Consequently, exacerbate the country’s
external debt profile. No doubt, external debt is good and bad depending on the management and application of the said debts.

AIMS AND STRATEGIES OF EXTERNAL DEBT MANAGEMENT IN NIGERIA

Nigeria’s external debt management strategies have varied from time to time since the early 1980’s when the debt crisis became looming. However, this comprehensive following policy objective upholds:

- To evolve strategies for increasing crude oil earnings thereby reducing the need for external borrowing.
- To stipulate the criteria for borrowing from external sources and determine the type of projects for which external fund may be obtained.
- To outline the mechanism for servicing external debt of the public and private sector.
- To define the roles and responsibility of the various organs of the federal and state government as well as the private sector in the management of external debt.

The following managerial strategies were issued as regards to external funding in Nigeria:

- Economic sector projects should have positive internal rate of return as to offset cost of borrowing in the long run
- Social services or infrastructure would be ranked on the basis of their cost/benefit ratio.
- Projects to be financed with external funds (debt) should be supported with feasibility studies, which include debt (loan) acquisition, deployment and retirement schedule.
➢ External debt for private and public sector with quick returns should be sourced from international capital markets while debt for social services could be sourced from conventional financial institutions.

➢ Borrowing by state government, parastatals and agencies should receive approval from the federal government to ensure that the borrowing conforms to national objectives. While approvals granted to the private sector should not constitute federal government guarantee of foreign currency undertaking.

➢ The state government’s borrowing proposals should be submitted to the Federal Ministry of Finance and Central Bank of Nigeria (CBN) for consideration before they are incorporated in the final public sector borrowing for the annual budgets.

➢ State government and their agencies as well as, Federal parastatals should device their debts through the foreign exchange Market (FEM) and inform the Federal Ministry of Finances for record purpose. For failure to service their debts the naira equivalents would be deducted at source before the balance of their statutory allocations are allotted.

2.2 THEORETICAL FRAMEWORK

This study is moored on the theoretical linkage of dependency and debt overhang theories.

DEPENDENCY THEORY: Dependency theory holds that “the condition of underdevelopment is precisely the result of the incorporation of the Third World economies into the capitalist world system which is dominated by the West and North America” (Randall and Theobald 1998), hence in managerial studies, dependency implies a situation in which a particular country or region relies on another for support, survival and general economic performance.
The third world countries are the economically underdeveloped countries of Asia, Africa, Oceania, and Latin America, considered as an entity with common characteristics, such as poverty, high birthrates, and economic dependence on the advanced countries. The term therefore implies that the third world is exploited, and that its destiny is a revolutionary one.

Distinctively, the underdevelopment of the third world is marked by a number of common traits; distorted and highly dependent economies devoted to producing primary products for the developed world and to provide markets for their finished goods; traditional, rural social structures; high population and widespread poverty. Despite the widespread poverty these countries, the ruling elites of most third world countries are outrageously wealthy (Woldu, 2000). The wind of change of the late 60s and early 70s with the advent of crude oil had liberated most of the third worlds, Africa and Nigeria, thus rendering whatever differences in the rate of development a peculiarity to the specific country concerned.

In the Nigerian perspective, to answer correctly the question; is it environment or is it in our nature; that we failed or refused to develop, is necessary as it has been rendered impossible by the current political atmosphere fueled by some kind of anti-colonialism; now turned into anti-imperialism, which forecloses all discussions by insisting that “we are our own”. This posturing had not only dissuaded us to ask this basic question but had indeed put thick blinkers into our eyes that we cannot see in reality, even though we are living in the thick of our unpalatable reality of underdevelopment (Kyari, 2008).

**DEBT OVERHANG THEORY:** One of the theories linking external debt management is debt overhang theory. Krugman (2009) sees debt overhang as a situation in which the expected repayment on foreign debt falls short of the contractual value of the debt and showed that there is a limit at which accumulated debt will distort investment and economic performance. The same
way, Borenszten (2009) argued that the debt overhang crisis is a situation in which the debtor country benefits very little from the returns on any additional investment because of the debt service obligation. In line with these, Desta (2015) found that a negative relationship existed between external debt and economic growth which justified the existence of debt overhang hypothesis. Similarly, Iyoha (2009) found that in sub-Saharan African countries the external debt to Gross National Product (GNP) ratio is high and creates debt overhang problems which consequently affect investment and growth negatively. This is based on the premise that, if debt will exceed the countries repayment ability, there is tendency of future expected debts service to likely effects the country’s output level. And as such, future returns on any investment accrue to the creditor for bigger debt servicing. This may discourage capital accumulation and promotes capital flight (Elbadawi & John, 2014).

2.3 EMPIRICAL REVIEW

Oil price volatility has received significant considerations for its perceived key role in macroeconomic indices dynamism. The consequences of the vast oil price volatility on macroeconomic indices has been a great concern among policy makers, as well as the entire populace of Nigeria considering the major oil price shocks that hits the global economy. However, the followings are related verified empirical works of the studied phenomenon.

According to Trung and Vinh (2011) there are two reasons why macroeconomic indices should be affected by oil shocks. First, increase in price of oil leads to lower aggregate demand given that income is redistributed between net oil import and export countries. Oil price spikes could alter economic activity because household income is spent more on energy consumption, and firms reduce the amount of crude oil it purchases which then leads to underutilization of the factors of production like: labor and capital. Secondly, the supply side effects are related to the
fact that crude oil is considered as the basic input to production process. A rise in oil price will lead to a decline in supply of oil due to the fact that a rise in cost of crude oil production will lead to a decline in potential output. Basically, five of the last seven United States of America recessions were preceded by significant increases in the price of crude oil (Sill, 2009).

According to Amano and Norden (1998) many researchers suggest that oil price volatility has a significant consequence on economic activity and the effect differ for both crude oil exporting countries and crude oil importing countries. It benefits the crude oil exporting countries when the international oil price increases but it poses a hiccups for the crude oil importing countries.

Plante (2008), posits theoretically that the immediate positive effect of oil price volatility is the increase in the cost of product for oil importing countries, this is likely to reduce output and the magnitude of this will depends on the demand side for crude oil. Higher oil prices lower disposable income which then leads to a reduction in consumption. Once the increase in oil price is believed to be permanent, private investments will decrease. But if the oil price volatility is perceived as transitory, oil is used less in production and the productivity of labor and capital will decline and potential output will fall.

Kutan and Wyzan (2005) using an extended version of the Balassa-Samuelson model finds evidence that oil price volatility had a significant effect on the real exchange rate during 1996 to 2003 and that the Balassa- Samuelson working through productivity changes may be present though its economic significance may not be large.

Cashin et al., (2004) carried out a study on over 50 commodities exporting developing countries and found a long-run relationship between exchange rate and the exported commodity’s price in one third of their sample.
In a recent study, Ozsoz and Akinkunmi (2011) also demonstrated the positive effects of international oil prices on Nigeria’s exchange rate.

Olomola (2006) investigated the impact of oil price shocks on aggregate economic activity in Nigeria using quarterly data from 1970 to 2003. He discovered that contrary to previous empirical findings, oil price shocks do not affect output and inflation in Nigeria significantly. However oil price shocks were found to significantly influence stock of external debt.

From the empirical purr view of studies examined globally and within the national hedge on the studied phenomenon, external debt management as not been holistically examined as an explained variable in respect to oil price volatility in Nigeria. Thus, it is imperative therefore to examine oil price volatility impact on external debt management in Nigeria. This is because external debt rate in Nigeria is becoming an economic evil that affects basic macroeconomic indices in the economy.

3.0 METHODOLOGY OF THE STUDY

This study adopts the *ex-post facto* research design. This research design is adopted because of its strength and it is the most appropriate to use when it is practically impossible to manipulate variables employed.

**RESEARCH HYPOTHESES**

The research hypotheses in this study are formulated in the null form in order to bring forth clarity of purpose.

**H01**: Oil price volatility has no significant impact on capital investment in Nigeria.

**H02**: Oil price volatility has no significant impact on external debt servicing in Nigeria.
**H03:** Oil price volatility has no significant influence on aggregate external debt in Nigeria.

**REQUIRED DATA AND SOURCES**

Considering a study of this nature, it is imperative to choose data that will permit the estimation and testing of the hypotheses formulated. International crude oil prices (ICOP) as the explanatory variable (oil price volatility) while capital investments (PINV), external debt servicing (EXDS) and aggregate external debts (EXDA) values are used as explained variables (external debt management) independently for the period under study.

The average monthly data are employed for this study, span within June, 2017 to December, 2018. The data were obtained from Central Bank of Nigeria (CBN) statistical bulletin 2018, World Bank, International Debt Statistics, 2019 and Debt Management Office of Nigeria.

**METHOD OF DATA ANALYSIS**

Basic econometric tools such as: (a). Unit root test, using Augmented Dickey Fuller (ADF) Approach. (b). Co-integration test with Johansen Approach (c) Granger Causality test and (d) Vector Auto-Regression (system models) shall be employed for the analysis of the data-set and the estimation of the models.

**SPECIFICATION OF MODEL**

In accordance with the formulated hypotheses in this study, the models will be built as: capital investment (PINV), external debt servicing (EXDS) and aggregate external debts (EXDA) as determinant for external debt management, which are the explained variables while International crude oil prices (ICOP) is the explanatory variable employed in the study. Specifications of these econometric models are based on economic theory relating to the studied phenomenon that requires basically:
1. Determination of the explained and the explanatory variables.

2. Theoretical apriori expectation and signs of functional parameters relationships.

3. Determination of the mathematical form of model (Gujarati, 2004).

In analyzing the studied phenomenon we adopt and modified an empirical model of Nwoba, Nwonu & Agbaeze (2017). Their model was used to examine the impact of fallen oil price on the Nigeria economy.

Their model will be adjusted to reflect the current study showing the functional relationship of the variables employed.

\[ \text{PINV} = f (\text{ICOP}) \] \hspace{1cm} \text{Eqn1} \\
\[ \text{EXDS} = f (\text{ICOP}) \] \hspace{1cm} \text{Eqn2} \\
\[ \text{EXDA} = f (\text{ICOP}) \] \hspace{1cm} \text{Eqn3} \\

Where,

\text{PINV} = \text{Capital investment.} \\
\text{EXDS} = \text{External debt servicing} \\
\text{EXDA} = \text{Aggregate external debt} \\
\text{ICOP} = \text{International crude oil prices} \\

The econometric specification of the explicit form of the regression models is given as follows;

\[ \text{PINV}_t = a_0 + a_1\text{ICOP}_t + U_{et} \] \hspace{1cm} \text{Eqn(4)} \\
\[ \text{EXDS}_t = a_0 + a_1\text{ICOP}_t + U_{et} \] \hspace{1cm} \text{Eqn(5)}
\[ EXDA_t = a_0 + a_1 ICOPS_t + Ue_t \] ................................. \textit{Eqn(6)}

Where:

\[ a_0 = \text{Intercept} \]

\[ a_1 = \text{Coefficient of the explanatory variable to be estimated. It measures the effect of a unit change in oil price on external debt management in Nigeria.} \]

\[ Ue_t = \text{Error term of the models. It account for other variables not attended to in the models.} \]

\textbf{A-priori Expectation of the Study}

Thus, it is expected that the coefficients of variables in the study should be greater than zero. \textit{i.e., Eq4a1}>0, Eq5a1>0 Eq6a1>0

\textbf{Decision Rule:} Inference about the hypotheses is made by considering chi-square outcomes in absolute terms and the critical values (probabilities) associated with individual variables. In this study the decision rule is to reject the null hypotheses (H0) if the critical values (probabilities) are less than 5% significance level.

\textbf{4.0 ANALYSIS AND INTERPRETATION OF DATA}

\textbf{Table 1.1 Unit Root Test Results}

<table>
<thead>
<tr>
<th>Variables</th>
<th>ADF t-Statistics</th>
<th>Critical Value @5%</th>
<th>Order of Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>ICOP</td>
<td>-3.871286</td>
<td>-1.962813</td>
<td>1(1)</td>
</tr>
<tr>
<td>PINV</td>
<td>-6.858708</td>
<td>-3.065585</td>
<td>1(1)</td>
</tr>
<tr>
<td>EXDS</td>
<td>-2.523855</td>
<td>-1.962813</td>
<td>1(1)</td>
</tr>
<tr>
<td>EXDA</td>
<td>-3.946888</td>
<td>-3.733200</td>
<td>1(1)</td>
</tr>
</tbody>
</table>

\textbf{Source:} E-view 9 output
Table 1.1 shows unit root test results for specified variables in the study. The results revealed stationarity of variables (integrated) at first difference, symbolized by: $1(1)$ at 5% significant level. This implies that variables have no unit root problem. A variable is said to have no unit root problem if the test statistics is greater than the critical value in absolute terms. This means that variables employed can be used for meaningful decision making.

**Table 1.2 Johansen Cointegration Test Results**

Date: 12/12/19   Time: 10:10
Sample (adjusted): 2017M08 2018M12
Included observations: 17 after adjustments
Trend assumption: Linear deterministic trend (restricted)
Series: PINV EXDS EXDA ICOP
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

<table>
<thead>
<tr>
<th>Hypothesized</th>
<th>Trace</th>
<th>0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of CE(s)</td>
<td>Eigenvalue</td>
<td>Statistic</td>
</tr>
<tr>
<td>None *</td>
<td>0.975265</td>
<td>131.7913</td>
</tr>
<tr>
<td>At most 1 *</td>
<td>0.937077</td>
<td>68.89926</td>
</tr>
<tr>
<td>At most 2</td>
<td>0.591926</td>
<td>21.88003</td>
</tr>
<tr>
<td>At most 3</td>
<td>0.323453</td>
<td>6.642796</td>
</tr>
</tbody>
</table>

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

**Source:** E-view 9 output.

Table 1.2 evidenced the Johansen cointegration test result that indicates the existence of two cointegrating equations. This implies that, there exists a long run relationship among variables...
employed in this study. We arrive at this conclusion by comparing the trace statistic against the Critical Values at 5% significant level.

### Table 1.3 Granger Causality Test Results

VAR Granger Causality/Block Exogeneity Wald Tests  
Date: 12/12/19 Time: 17:28  
Sample: 2017M06 2018M12  
Included observations: 17  

<table>
<thead>
<tr>
<th>Dependent variable: PINV</th>
<th>Excluded</th>
<th>Chi-sq</th>
<th>Df</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>EXDS</td>
<td>12.29113</td>
<td>2</td>
<td>0.0021</td>
<td></td>
</tr>
<tr>
<td>EXDA</td>
<td>4.464118</td>
<td>2</td>
<td>0.1073</td>
<td></td>
</tr>
<tr>
<td>ICOP</td>
<td>10.40832</td>
<td>2</td>
<td>0.0055</td>
<td></td>
</tr>
<tr>
<td>All</td>
<td>24.67460</td>
<td>6</td>
<td>0.0004</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dependent variable: EXDS</th>
<th>Excluded</th>
<th>Chi-sq</th>
<th>df</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PINV</td>
<td>52.75349</td>
<td>2</td>
<td>0.0000</td>
<td></td>
</tr>
<tr>
<td>EXDA</td>
<td>7.639730</td>
<td>2</td>
<td>0.0219</td>
<td></td>
</tr>
<tr>
<td>ICOP</td>
<td>0.210209</td>
<td>2</td>
<td>0.9002</td>
<td></td>
</tr>
<tr>
<td>All</td>
<td>85.47901</td>
<td>6</td>
<td>0.0000</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dependent variable: EXDA</th>
<th>Excluded</th>
<th>Chi-sq</th>
<th>df</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>PINV</td>
<td>1.353366</td>
<td>2</td>
<td>0.5083</td>
<td></td>
</tr>
<tr>
<td>EXDS</td>
<td>2.681495</td>
<td>2</td>
<td>0.2617</td>
<td></td>
</tr>
<tr>
<td>ICOP</td>
<td>1.650465</td>
<td>2</td>
<td>0.4381</td>
<td></td>
</tr>
</tbody>
</table>
Table 1.3 portrays the causal relationship among variables employed. The p-value of 0.0055 of international crude oil prices (ICOP) in respect to capital investment (PINV) is less than 5% significant level, which means that there exist a causal relationship between the two variables, while the p-values of international crude oil prices in respect to external debt serving (EXDS) and aggregate external debt (EXDA) of 0.9002 and 0.4381 respectively are greater than 5% significant level, which means that there exist no causal relationship between international crude oil prices and external debt servicing and aggregate external debt in Nigeria.

Table 1.4 First System Model Results

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C(1)</td>
<td>0.602460</td>
<td>0.283220</td>
<td>2.127182</td>
</tr>
<tr>
<td>C(2)</td>
<td>-0.046264</td>
<td>0.283781</td>
<td>-0.163028</td>
</tr>
<tr>
<td>C(3)</td>
<td>0.005009</td>
<td>0.001665</td>
<td>3.008742</td>
</tr>
<tr>
<td>C(4)</td>
<td>-0.002640</td>
<td>0.002546</td>
<td>-1.037131</td>
</tr>
<tr>
<td>C(5)</td>
<td>-1.887274</td>
<td>24.15857</td>
<td>-0.078120</td>
</tr>
<tr>
<td>C(6)</td>
<td>-26.73021</td>
<td>20.88612</td>
<td>-1.279807</td>
</tr>
<tr>
<td>C(7)</td>
<td>33.73645</td>
<td>19.50288</td>
<td>1.729819</td>
</tr>
<tr>
<td>C(8)</td>
<td>-57.06248</td>
<td>23.48189</td>
<td>-2.430064</td>
</tr>
<tr>
<td>C(9)</td>
<td>2116.316</td>
<td>1824.979</td>
<td>1.159639</td>
</tr>
</tbody>
</table>

R-squared 0.854840 Mean dependent var 1097.406
Adjusted R-squared 0.709680 S.D. dependent var 740.9674
Table 1.5 Second System Model Results

Dependent Variable: EXDS
Method: Least Squares (Gauss-Newton / Marquardt steps)
Date: 12/12/19   Time: 17:39
Sample (adjusted): 2017M08 2018M12
Included observations: 17 after adjustments

EXDS = C(10)*PINV(-1) + C(11)*PINV(-2) + C(12)*EXDS(-1) + C(13)*EXDS(-2) + C(14)*EXDA(-1) + C(15)*EXDA(-2) + C(16)*ICOP(-1) + C(17)*ICOP(-2) + C(18)

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C(10)</td>
<td>-50.00837</td>
<td>-2.005143</td>
<td>0.0799</td>
</tr>
</tbody>
</table>

Null Hypothesis: C(7)=C(8)=0
Null Hypothesis Summary:

Restrictions are linear in coefficients.

Source: Author’s computation: E-view 9 output.
Table 1.6 Third System Model Results

Dependent Variable: EXDA
Method: Least Squares (Gauss-Newton / Marquardt steps)
Date: 12/12/19  Time: 17:43

<table>
<thead>
<tr>
<th>C(11)</th>
<th>174.7305</th>
<th>24.98943</th>
<th>6.992176</th>
<th>0.0001</th>
</tr>
</thead>
<tbody>
<tr>
<td>C(12)</td>
<td>0.901693</td>
<td>0.146599</td>
<td>6.150725</td>
<td>0.0003</td>
</tr>
<tr>
<td>C(13)</td>
<td>0.492102</td>
<td>0.224168</td>
<td>2.195234</td>
<td>0.0594</td>
</tr>
<tr>
<td>C(14)</td>
<td>-1258.635</td>
<td>2127.378</td>
<td>-0.591637</td>
<td>0.5704</td>
</tr>
<tr>
<td>C(15)</td>
<td>3992.772</td>
<td>1839.210</td>
<td>2.170917</td>
<td>0.0617</td>
</tr>
<tr>
<td>C(16)</td>
<td>547.4842</td>
<td>1717.403</td>
<td>0.318786</td>
<td>0.7581</td>
</tr>
<tr>
<td>C(17)</td>
<td>773.2981</td>
<td>2067.790</td>
<td>0.373973</td>
<td>0.7181</td>
</tr>
<tr>
<td>C(18)</td>
<td>-189235.6</td>
<td>160705.7</td>
<td>-1.177529</td>
<td>0.2728</td>
</tr>
</tbody>
</table>

R-squared: 0.982425
Adjusted R-squared: 0.964851
S.E. of regression: 35156.93
Akaike info criterion: 24.07808
Sum squared resid: 9.89E+09
Schwarz criterion: 24.51920
Log likelihood: -195.6637
Hannan-Quinn criter.: 24.12193

F-statistic: 55.90029
Durbin-Watson stat: 2.156107
Prob(F-statistic): 0.000003

Wald Test:
Null Hypothesis: C(16)=C(17)=0
Null Hypothesis Summary:

<table>
<thead>
<tr>
<th>Normalized Restriction (= 0)</th>
<th>Value</th>
<th>Std. Err.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C(16)</td>
<td>547.4842</td>
<td>1717.403</td>
</tr>
<tr>
<td>C(17)</td>
<td>773.2981</td>
<td>2067.790</td>
</tr>
</tbody>
</table>

Restrictions are linear in coefficients.

Source: Author’s computation: E-view 9 output.
Sample (adjusted): 2017M08 2018M12
Included observations: 17 after adjustments

\[
\text{EXDA} = C(19)\text{PINV(-1)} + C(20)\text{PINV(-2)} + C(21)\text{EXDS(-1)} + \\
C(22)\text{EXDS(-2)} + C(23)\text{EXDA(-1)} + C(24)\text{EXDA(-2)} + C(25)\text{ICOP(-1)} + \\
C(26)\text{ICOP(-2)} + C(27)
\]

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>C(19)</td>
<td>0.003504</td>
<td>0.926682</td>
<td>0.3812</td>
</tr>
<tr>
<td>C(20)</td>
<td>0.002644</td>
<td>0.698019</td>
<td>0.5049</td>
</tr>
<tr>
<td>C(21)</td>
<td>3.51E-05</td>
<td>1.580349</td>
<td>0.1527</td>
</tr>
<tr>
<td>C(22)</td>
<td>-4.97E-05</td>
<td>-1.462631</td>
<td>0.1817</td>
</tr>
<tr>
<td>C(23)</td>
<td>0.988213</td>
<td>3.064201</td>
<td>0.0155</td>
</tr>
<tr>
<td>C(24)</td>
<td>-0.384562</td>
<td>-1.379260</td>
<td>0.2051</td>
</tr>
<tr>
<td>C(25)</td>
<td>-0.304805</td>
<td>-1.170744</td>
<td>0.2754</td>
</tr>
<tr>
<td>C(26)</td>
<td>-0.219454</td>
<td>-0.700081</td>
<td>0.5037</td>
</tr>
<tr>
<td>C(27)</td>
<td>30.38048</td>
<td>1.247023</td>
<td>0.2477</td>
</tr>
</tbody>
</table>

R-squared  0.833363  Mean dependent var  11.91176
Adjusted R-squared  0.666726  S.D. dependent var  9.232069
S.E. of regression  5.329661  Akaike info criterion  6.489504
Sum squared resid  227.2423  Schwarz criterion  6.930617
Log likelihood  -46.16079  Hannan-Quinn criter.  6.533352
F-statistic  5.001073  Durbin-Watson stat  2.281143
Prob(F-statistic)  0.017621

Wald Test:
Equation: Untitled

<table>
<thead>
<tr>
<th>Test Statistic</th>
<th>Value</th>
<th>df</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-statistic</td>
<td>0.825233</td>
<td>(2, 8)</td>
<td>0.4722</td>
</tr>
<tr>
<td>Chi-square</td>
<td>1.650465</td>
<td>2</td>
<td>0.4381</td>
</tr>
</tbody>
</table>

Null Hypothesis: C(25)=C(26)=0
Null Hypothesis Summary:

<table>
<thead>
<tr>
<th>Normalized Restriction (= 0)</th>
<th>Value</th>
<th>Std. Err.</th>
</tr>
</thead>
</table>

http://dx.doi.org/10.29322/IJSRP.10.01.2020.p97101
C(25) -0.304805 0.260352
C(26) -0.219454 0.313469

Restrictions are linear in coefficients.

Source: Author’s computation: E-view 9 output.

The system models from table 1.4 to 1.6 portray the lags collective impact of oil price volatility on external debt management in Nigeria. The chi-square outputs from the Wald Test will be used to test the hypotheses formulated in the study.

Using the a priori criteria of evaluating the parameters, the variables met a priori expectations hence fulfilling the economic criterion of the models.

The results also show that ICOP is statistically significant to PINV, while ICOP is statistically insignificant to EXDS and EXDA respectively both in short and in the long run. Furthermore, the results of the test of the overall significance of the models using the F-statistics show that all models are statistically significant. We arrive at this conclusion because the F-statistics are greater than the F-probabilities of each model. Coefficient of determinations (R²) indicates that 85% of total variation in PINV is explained by the explanatory variable (ICOP) in the first system model as well as 98%, and 83% in the second and third system models. Finally, the Durbin-Watson statistics falls within the acceptance region of 2, thus, indicating the absence of first order autocorrelation.

TEST OF HYPOTHESES

Table 1.4, 1.5 and 1.6 above reveals that international prices of crude oil (ICOP), as proxy of oil price volatility has an associated chi-square probabilities values of 0.0055, 0.9002 and 0.4381 at 5% significant level respectively. This implies that oil price volatility has a significant impact on capital investment in Nigeria for the period under study. Hence the null hypothesis is
rejected. While oil price volatility has an insignificant impact on external debt servicing and aggregate external debt, hence their null hypotheses are accepted. Therefore, we conclude that oil price volatility has no significant impact on external debt servicing and aggregate external debt in Nigeria for the period under study.

4.1 DISCUSSIONS OF FINDINGS

The outcome of the system models (VAR) reveals that oil price volatility evidenced from monthly data sourced has a significant impact on capital investment in Nigeria, while oil price volatility in respect to external debt servicing and aggregate external debt shows an insignificant impact for the same period under.

However, the first lag coefficients of oil price volatility; C (5) and C (16) to capital investment (PINV) and external debt servicing (EXDS) are linear (positive) despite oil price volatility insignificant relationship with external debt servicing. This implies that increase in price of crude oil by a percentage also increases capital investment and the amount used to offsets external debt in Nigeria by 33% and 5% respectively within same period of study. Conversely, the first lag coefficient of oil price volatility, C (25) to aggregate external debt (EXDA) is non-linear (negative) and insignificant in relationship. Implying that, an increase in price of crude oil by a percentage will reduce the stock of external debt recorded in Nigeria by 30% for the period under study.

This finding conforms to the findings of Amano & Norden (1998), according to him; oil price volatility has a significant consequence on economic activity and its effect differ for both crude oil exporting countries and crude oil importing countries. However, it benefits the exporting countries when the international oil price increases but it poses a hiccups for the importing countries.
4.0 CONCLUDING REMARKS

Oil price volatility and external debt management has been a contemporary issue in the Nigerian economy. This study evidenced that oil price volatility has impacted significantly on capital investments in Nigeria for the period under study. However, the explanatory variable employed in the study (international prices of crude oil) also reveals contrary that, oil price volatility does not have a significant impact on external debt servicing and aggregate external debt in Nigeria for the period under study.

Our conclusion therefore, is that oil price volatility do necessarily determined the extent to which Nigeria external debt profile is rising and it requires a proactive and effective administration to curtail it.

Based on the empirical findings of this study, we recommend that:
Debt management office of Nigeria should be empowered more constitutionally as to create a centralized unit within its operations as an institutional strategy to monitor the practical aspects of the execution of external debt and setting up of follow-up team with feedback measures to ensure that such funds are utilized for designed purposes.

REFERENCES


Oyetunji, B. (2013). Oil price and exchange rate volatility in Nigeria. A research project submitted to the Department of economics and development studies, College of Development studies, Covenant University, Ota.


**APPENDIX**

**DATA EMPLOYED**

<table>
<thead>
<tr>
<th>Monthly Crude Oil Prices from June, 2017 to December, 2018 (ICOP)$</th>
<th>Capital Investment Values (PINV)$</th>
<th>External Debt Servicing Values (EXDS)$</th>
<th>Aggregate External Debt Values (EXDA)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>46.17</td>
<td>239.45</td>
<td>131.05</td>
<td>1,479,235,000</td>
</tr>
<tr>
<td>47.66</td>
<td>438.7</td>
<td>155.42</td>
<td>1,358,911,000</td>
</tr>
<tr>
<td>49.94</td>
<td>321.38</td>
<td>163.81</td>
<td>1,494,837,00</td>
</tr>
<tr>
<td>52.95</td>
<td>241.69</td>
<td>363.51</td>
<td>15,514,450,000</td>
</tr>
<tr>
<td>54.92</td>
<td>351.25</td>
<td>382.5</td>
<td>17,560,270,000</td>
</tr>
<tr>
<td>59.93</td>
<td>519.47</td>
<td>393.96</td>
<td>10,799760,000</td>
</tr>
<tr>
<td>61.19</td>
<td>552.39</td>
<td>249.33</td>
<td>2,015,364,000</td>
</tr>
<tr>
<td>66.28</td>
<td>759.28</td>
<td>213.73</td>
<td>2,554,868,000</td>
</tr>
<tr>
<td>63.46</td>
<td>960.89</td>
<td>381.2</td>
<td>2,977,080,000</td>
</tr>
<tr>
<td>64.17</td>
<td>1,152.80</td>
<td>251.79</td>
<td>3,499,549,000</td>
</tr>
<tr>
<td>68.79</td>
<td>883.87</td>
<td>415.66</td>
<td>4,341,668,000</td>
</tr>
<tr>
<td>51.83</td>
<td>918.55</td>
<td>527.18</td>
<td>5,207,497,000</td>
</tr>
<tr>
<td>50.36</td>
<td>874.84</td>
<td>679.3</td>
<td>5,993,035,000</td>
</tr>
<tr>
<td>72.67</td>
<td>1,108.39</td>
<td>828.1</td>
<td>7,023,393,000</td>
</tr>
<tr>
<td>71.08</td>
<td>2,681.08</td>
<td>941.7</td>
<td>7,897,637,000</td>
</tr>
<tr>
<td>75.36</td>
<td>1,496.71</td>
<td>1,060.60</td>
<td>8,876,188,000</td>
</tr>
<tr>
<td>76.73</td>
<td>1,061.01</td>
<td>353,093.54</td>
<td>9,760,884,000</td>
</tr>
<tr>
<td>62.32</td>
<td>2,451.20</td>
<td>464,047.50</td>
<td>18,913,44,000</td>
</tr>
<tr>
<td>53.96</td>
<td>2,321.10</td>
<td>582,174.70</td>
<td>18,792,83,000</td>
</tr>
</tbody>
</table>

Unit Root Test Result for ICOP

Null Hypothesis: D(ICOP) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=3)

<table>
<thead>
<tr>
<th>t-Statistic</th>
<th>Prob.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Augmented Dickey-Fuller test statistic</td>
<td>-3.871286</td>
</tr>
<tr>
<td>Test critical values:</td>
<td></td>
</tr>
<tr>
<td>1% level</td>
<td>-2.708094</td>
</tr>
<tr>
<td>5% level</td>
<td>-1.962813</td>
</tr>
<tr>
<td>10% level</td>
<td>-1.606129</td>
</tr>
</tbody>
</table>

Warning: Probabilities and critical values calculated for 20 observations and may not be accurate for a sample size of 17

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(ICOP,2)
Method: Least Squares
Date: 12/11/19   Time: 23:30
Sample (adjusted): 2017M08 2018M12
Included observations: 17 after adjustments

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>D(ICOP(-1))</td>
<td>-0.996608</td>
<td>0.257436</td>
<td>-3.871286</td>
<td>0.0014</td>
</tr>
</tbody>
</table>

R-squared | 0.482368 | Mean dependent var | -0.579412
Adjusted R-squared | 0.482368 | S.D. dependent var | 11.97835
S.E. of regression | 8.618015 | Akaike info criterion | 7.202609
Sum squared resid | 1188.323 | Schwarz criterion | 7.251622
Log likelihood | -60.22218 | Hannan-Quinn criter. | 7.207481
Durbin-Watson stat | 1.941308 |

Unit Root Test Result for PINV

Null Hypothesis: D(PINV) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=3)

<table>
<thead>
<tr>
<th>t-Statistic</th>
<th>Prob.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Augmented Dickey-Fuller test statistic</td>
<td>-6.858708</td>
</tr>
<tr>
<td>Test critical values:</td>
<td></td>
</tr>
<tr>
<td>1% level</td>
<td>-3.920350</td>
</tr>
<tr>
<td>5% level</td>
<td>-3.065585</td>
</tr>
<tr>
<td>10% level</td>
<td>-2.673459</td>
</tr>
</tbody>
</table>

Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 16

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(PINV,2)
Method: Least Squares
Date: 12/11/19   Time: 23:35
Sample (adjusted): 2017M09 2018M12
Included observations: 16 after adjustments

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>D(PINV(-1))</td>
<td>-2.387867</td>
<td>0.348151</td>
<td>-6.858708</td>
<td>0.0000</td>
</tr>
<tr>
<td>D(PINV(-1),2)</td>
<td>0.831626</td>
<td>0.230843</td>
<td>3.602563</td>
<td>0.0032</td>
</tr>
<tr>
<td>C</td>
<td>237.6491</td>
<td>118.2075</td>
<td>2.010440</td>
<td>0.0656</td>
</tr>
</tbody>
</table>

R-squared 0.831379  Mean dependent var -0.798750
Adjusted R-squared 0.805437  S.D. dependent var 0.1035.286
S.E. of regression 456.6572  Akaike info criterion 15.25310
Sum squared resid 2710965.  Schwarz criterion 15.39796
Log likelihood -119.0248  Hannan-Quinn criter. 15.26052
F-statistic 32.04798  Durbin-Watson stat 2.201037
Prob(F-statistic) 0.0000

Unit Root Test Result for EXDS

Null Hypothesis: D(EXDS) has a unit root
Exogenous: None
Lag Length: 0 (Automatic - based on SIC, maxlag=3)

<table>
<thead>
<tr>
<th>Augmented Dickey-Fuller test statistic</th>
<th>t-Statistic</th>
<th>Prob.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>-2.523855</td>
<td>0.0151</td>
<td></td>
</tr>
</tbody>
</table>

Test critical values:
1% level  -2.708094
5% level  -1.962813
10% level  -1.606129

Warning: Probabilities and critical values calculated for 20 observations and may not be accurate for a sample size of 17

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EXDS,2)
Method: Least Squares
Date: 12/11/19   Time: 23:42
Sample (adjusted): 2017M08 2018M12
Included observations: 17 after adjustments

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>D(EXDS(-1))</td>
<td>-0.616789</td>
<td>0.244384</td>
<td>-2.523855</td>
<td>0.0226</td>
</tr>
</tbody>
</table>

R-squared 0.281513  Mean dependent var 6947.225
Adjusted R-squared 0.281513  S.D. dependent var 106417.2
S.E. of regression  90203.07  Akaike info criterion  25.71454
Sum squared resid  1.30E+11  Schwarz criterion  25.76355
Log likelihood  -217.5736  Hannan-Quinn criter.  25.71941
Durbin-Watson stat  2.113004

**Unit Root Test Result for EXDA**

Null Hypothesis: D(EXDA) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=3)

<table>
<thead>
<tr>
<th>t-Statistic</th>
<th>Prob.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Augmented Dickey-Fuller test statistic</td>
<td>-3.946888</td>
</tr>
<tr>
<td>Test critical values:</td>
<td></td>
</tr>
<tr>
<td>1% level</td>
<td>-4.667883</td>
</tr>
<tr>
<td>5% level</td>
<td>-3.733200</td>
</tr>
<tr>
<td>10% level</td>
<td>-3.310349</td>
</tr>
</tbody>
</table>


Warning: Probabilities and critical values calculated for 20 observations and may not be accurate for a sample size of 16

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EXDA,2)
Method: Least Squares
Date: 12/12/19  Time: 09:43
Sample (adjusted): 2017M09 2018M12
Included observations: 16 after adjustments

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>D(EXDA(-1))</td>
<td>-1.115679</td>
<td>0.282673</td>
<td>-3.946888</td>
<td>0.0019</td>
</tr>
<tr>
<td>D(EXDA(-1),2)</td>
<td>0.470757</td>
<td>0.242159</td>
<td>1.944002</td>
<td>0.0757</td>
</tr>
<tr>
<td>C</td>
<td>-7.376017</td>
<td>3.304807</td>
<td>-2.231905</td>
<td>0.0455</td>
</tr>
<tr>
<td>@TREND(&quot;2017M06&quot;)</td>
<td>0.599722</td>
<td>0.284607</td>
<td>2.107191</td>
<td>0.0568</td>
</tr>
<tr>
<td>Mean dependent var</td>
<td>0.570103</td>
<td>-0.162500</td>
<td></td>
<td></td>
</tr>
<tr>
<td>S.D. dependent var</td>
<td>0.462628</td>
<td>6.391127</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Akaike info criterion</td>
<td>4.685057</td>
<td>6.138951</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Schwarz criterion</td>
<td>263.3971</td>
<td>6.332098</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hannan-Quinn criter.</td>
<td>-45.11161</td>
<td>6.148842</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Durbin-Watson stat</td>
<td>5.304545</td>
<td>2.223392</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prob(F-statistic)</td>
<td>0.014698</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Johansen co-integration test results**

Date: 12/12/19  Time: 10:10
Sample (adjusted): 2017M08 2018M12
Included observations: 17 after adjustments
Trend assumption: Linear deterministic trend (restricted)
Series: PINV EXDS EXDA ICOP
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

<table>
<thead>
<tr>
<th>Hypothesized No. of CE(s)</th>
<th>Eigenvalue</th>
<th>Trace Statistic</th>
<th>0.05 Critical Value</th>
<th>Prob.**</th>
</tr>
</thead>
<tbody>
<tr>
<td>None *</td>
<td>0.975265</td>
<td>131.7913</td>
<td>63.87610</td>
<td>0.0000</td>
</tr>
<tr>
<td>At most 1 *</td>
<td>0.937077</td>
<td>68.89926</td>
<td>42.91525</td>
<td>0.0000</td>
</tr>
<tr>
<td>At most 2</td>
<td>0.591926</td>
<td>21.88003</td>
<td>25.87211</td>
<td>0.1450</td>
</tr>
<tr>
<td>At most 3</td>
<td>0.323453</td>
<td>6.642796</td>
<td>12.51798</td>
<td>0.3833</td>
</tr>
</tbody>
</table>

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

<table>
<thead>
<tr>
<th>Hypothesized No. of CE(s)</th>
<th>Eigenvalue</th>
<th>Max-Eigen Statistic</th>
<th>0.05 Critical Value</th>
<th>Prob.**</th>
</tr>
</thead>
<tbody>
<tr>
<td>None *</td>
<td>0.975265</td>
<td>62.89207</td>
<td>32.11832</td>
<td>0.0000</td>
</tr>
<tr>
<td>At most 1 *</td>
<td>0.937077</td>
<td>47.01923</td>
<td>25.82321</td>
<td>0.0000</td>
</tr>
<tr>
<td>At most 2</td>
<td>0.591926</td>
<td>15.23723</td>
<td>19.38704</td>
<td>0.1811</td>
</tr>
<tr>
<td>At most 3</td>
<td>0.323453</td>
<td>6.642796</td>
<td>12.51798</td>
<td>0.3833</td>
</tr>
</tbody>
</table>

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by $b^*S11*b=I$):

<table>
<thead>
<tr>
<th>PINV</th>
<th>EXDS</th>
<th>EXDA</th>
<th>ICOP</th>
<th>@TREND(17 M07)</th>
</tr>
</thead>
<tbody>
<tr>
<td>-0.001941</td>
<td>-5.43E-06</td>
<td>-0.045435</td>
<td>-0.082593</td>
<td>0.149576</td>
</tr>
<tr>
<td>-0.006169</td>
<td>4.32E-06</td>
<td>0.150588</td>
<td>0.280457</td>
<td>0.449692</td>
</tr>
<tr>
<td>0.000167</td>
<td>8.71E-06</td>
<td>-0.069187</td>
<td>-0.156359</td>
<td>0.228863</td>
</tr>
<tr>
<td>-0.000641</td>
<td>4.90E-06</td>
<td>-0.097320</td>
<td>0.108063</td>
<td>-0.211084</td>
</tr>
</tbody>
</table>

Unrestricted Adjustment Coefficients (alpha):

<table>
<thead>
<tr>
<th>D(PINV)</th>
<th>259.6195</th>
<th>201.5125</th>
<th>166.1496</th>
<th>29.49187</th>
</tr>
</thead>
<tbody>
<tr>
<td>D(EXDS)</td>
<td>-67335.64</td>
<td>-8788.612</td>
<td>18928.14</td>
<td>-6183.278</td>
</tr>
<tr>
<td>D(EXDA)</td>
<td>0.127597</td>
<td>-3.450908</td>
<td>0.753466</td>
<td>1.755586</td>
</tr>
<tr>
<td>D(ICOP)</td>
<td>2.456525</td>
<td>-3.325184</td>
<td>1.493228</td>
<td>-3.083173</td>
</tr>
</tbody>
</table>

1 Cointegrating Equation(s): Log likelihood -414.8500
Normalized cointegrating coefficients (standard error in parentheses) @TREND(17 M07)

<table>
<thead>
<tr>
<th>PINV</th>
<th>EXDS</th>
<th>EXDA</th>
<th>ICOP</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.000000</td>
<td>0.002799</td>
<td>23.40785</td>
<td>42.55149</td>
</tr>
<tr>
<td>(0.00045)</td>
<td>(3.93751)</td>
<td>(5.87043)</td>
<td>(10.3689)</td>
</tr>
</tbody>
</table>

Adjustment coefficients (standard error in parentheses)

| D(PINV) | -0.503923 | (0.17978) |
| D(EXDS) | 130.6989  | (17.7597) |
| D(EXDA) | -0.000248 | (0.00282) |
| D(ICOP) | -0.004768 | (0.00393) |

2 Cointegrating Equation(s): Log likelihood -391.3404

Normalized cointegrating coefficients (standard error in parentheses) @TREND(17 M07)

<table>
<thead>
<tr>
<th>PINV</th>
<th>EXDS</th>
<th>EXDA</th>
<th>ICOP</th>
</tr>
</thead>
<tbody>
<tr>
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Adjustment coefficients (standard error in parentheses)

| D(PINV) | -1.747075  | (0.45213) |
| D(EXDS) | 184.9168   | (56.6377) |
| D(EXDA) | 0.021041   | (0.00655) |
| D(ICOP) | 0.015745   | (0.01138) |

3 Cointegrating Equation(s): Log likelihood -383.7218

Normalized cointegrating coefficients (standard error in parentheses) @TREND(17 M07)

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Adjustment coefficients (standard error in parentheses)
Vector Autoregression Estimates
Date: 12/12/19  Time: 17:23
Sample (adjusted): 2017M08 2018M12
Included observations: 17 after adjustments
Standard errors in ( ) & t-statistics in [ ]

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Scribal copies of pre-modern texts and the digital environment: A case study of the Odia Sarala Mahabharat

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Asst. Professor in Odia, Ravenshaw University, Cuttack

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Abstract- No other text fascinates the Odia mind as the eponymous Sarala Mahabharata. As of now we have at least four complete editions of the text beginning from the last quarter of the nineteenth century to the third quarter of the twentieth century. In spite of this, the question of ‘authentic text’ is yet to be settled; consequently there continues to be a call by textual scholars to restore the ‘authentic text’. This is natural, given that there are around 280 palm leaf manuscript scribal copies of the text in the Odisha State Museum alone and no two copies are exactly the same. Hundreds and thousands of copies exist in private possession and are yet to be taken up for study. Understandably, no textual scholar would be able to investigate all the extant copies to arrive at the so-called ‘authentic text’. This paper argues that in view of the special nature of the Sarala corpus, finding an authentic way of ‘doing the Mahabharata’ would be more fruitful than looking for the authentic text. In view of the unlimited possibilities offered by the digital environment and scope for computation, this paper reviews the approaches of scholars to the text and offers a new method of ‘doing the Mahabharata’. It will study the textual transmission of Sarala Mahabharata in Odisha, and argue for the need for digital archiving andcurtain to enable fine-grained corpus analysis for enhanced textual criticism.

Index Terms- Manuscript culture, textual criticism, corpus analysis

I. INTRODUCTION

The Mahabharata of Sarala Das in Oriya language which was created in about 15th – 16th century A.D. was a long lived poetic endowment gift in a phase of all India vernacularization. This spacious work is interpreted as the earliest initial scribble of Oriya epic and consequently serves as a model archetype for the blooming of additional epic literature in Orissa in the medieval phase. The author of the text casted himself as Sarala Das for his for his fidelity to the goddess Sarala (a village female deity who synthesizes sakta and vaishnaba analysis in herself) and thus he had this name after the collection of the Mahabharat in Odia. (1) This Mahabharat of Sarala Das is not the accurate veracious furnishing of the Sanskrit Mahabharat of Vysa. It is only an encyclopedic epitome of the Socio-Political-Cultural build up Of India along with Orissa in the medieval phase in the clutch of the aspects of the Sanskrit epic. The author calls it as Mahabharat yet he makes use of sections of other Puranas and upu-Puras. He homogenizes them with territorial customary chronicle familiar to him. All most all significant angle of research of the topical Mahabharat in Oriya is the identity and nature of the content. As it focus one’s attention on the early and medieval phase its dominance has been observed by the historians and language experts who occasionally have been convinced to use it for further historical research.(2)

Hence in this working paper our emphasis is the textual problem, critical editions, apply digital humanities method, POS tagging and chunking of a classical text.

II. STATEMENT OF THE PROBLEM:

‘The textual problem’ and ‘critical editions’:-

- The main aim of centre for Odishan studies. The Sarala Mahabharata is a relevant specimen of the ‘textual problem’ in the manufacture of academic version.

Actually Sarala Mahabharat was brought to the centre of attention in the 17th-18th century A.D. by Pitambara Das, the writer of Odia Nrushingha purna and before that in Orissa’s Pandit and colon people gave priority to Jaganatha Das’s Bhagavata, Dandi Ramayana of Balarama Das, Haribansha of Achyutananda Das and some of the books of ‘Bhakti’ by the enthusiasts of Chaitanya.

- It is well known as of now that the great researcher Professor ArtaBallav Mohanty’ study of the Odia Mahabharata brought out by Directorate of culture in the year 1964 is less than complete and perhaps unreliable. According to the own statement of Professor Mohanty, his study was established on 11 manuscripts accessible at that time. In spite of the inadequate number of manuscripts mentioned to, a analysis of subsisting literature on this proposal displays that the Arta Ballav Mohanty’s adition is at best an extensive encyclopedic edition of Sarala Mahabharatatas.

- Secondly According to eminent scholar Sj. Gopinath Mohanty, that the author of the Mahabharata was not Sarala but Sarola and that the text was written in tenth century. But in Artabhallava’s edition says it was based on two oldest extant manuscripts, collected from a private source and other is yet to be known.

- There are also a handful of private venture to translate, edit and publish some chapters of Mahabharata. All of
them expect an analytical study therapy of odia Mahabharata.

- At present 240 Mahabharata manuscripts have been collected from beyond Orissa and considered the momentousness of Mahabharata as a cross disciplinary description of Odisha’s by gone Socio-cultural history.

Thus an up to date newfangled critical edition of Mahabharata in Odia and in English is essential.

There exists no account of how the non-appearance of par textual components besides from the colophons may be taken into account learning of Sarala manuscripts. Far apart from printed books, embellished and enhanced illuminated manuscripts, palm leaf manuscripts exists an exceptional set of issues as the differentiation of text and paratext.

In the transmission activity of the manuscripts, certain unavoidable components are consolidated as a part of the main text. Whatever such components are to be read as mere additions or alteration or misrepresentation. It is essential to faithful and detailed study of Mahabharata and rationalizes the variation between additions and alterations and various authentic trademarks for the development of a critical edition.

Bibliographic note:

The main framework of the narrative of the Sarala Mahabharata but has made several fluctuations and has attached to it substantially the stories of his own formation and various other matters known to him.

In the 19th century we find the name in the text of ‘William Hunter’s Orissa’ in the year 1872 expressed that sarala Das kavi stayed 300 years ago, transcribed Mahabharata into oriya (3) in the year 20th century A.D. there was an expanding study on odia Mahabharat in the well known established odia magazines like “Utkala Sahitya” ‘Mukura’ and Jhankar, pandit Mrutyuniya Rath emerged a comprehensive wall-to-wall review on sarala Mahabharat in 1911 in murura, and then in 1915, Gopinatha Nandasharma in Utkala sahitya (4)

In 1898: Manmohan chakravarty dates the constitution to “not later than 16th century like the original Sanskrit it forms a of diagnostic experiment and takes of about two thousand folios. It did not affect to any literary conclude and the verse generally unequally. That verse is popularly known as “Dundu bruta”. But it has the benefits of having antiquated the Sanskrit Mahabharat among universal. (5)

In the year 1903: Madhusudan Das classify Sarala Mahabharata as Purana and concluded his analysis in just one paragraph (6)

In the year 1904 Researcher Shyamasundar Rajguru clarity and describes’ Sarala as “Adikabi “of odia literatur (see: Biographical note on Sarala appears in Utkala sahitya, year 7, No-4, April, 1904)

In 1911 , Pt. Mrutunjaya Rath wrote “sarala charita “ (A biography of sarala ) (8) According to Rath sarala was born between 1435 AD to 1479 AD during the reign of Kapilendra Deva , around 1415 and Mahabharata was composed in 1465 AD.

In 1926: A marshalling discourse of sarala Mahabharata writing by Gopinatha Nanda Sharma, titled as Sri Bharat Darpan : maheralize in the from of a book contained nine chapters . (9)

In 1948: Another eminent analyst Padit Nilkantha Das in 1948-1953 Sarala and setup its historical awareness of the early and medieval phase of India.

In 1950s and 60s there was a intense debate between two literary magazines ‘Jhankara’ and ‘Dagara’ based on the bnature and content of Mahabharata . The noted contributor of this debate were ‘GopinathaMohanti’, Banshidhara Mohanty, Achyutananda Das , and Krushna Chandra Panigrahi . The study was further concentrate with John Bolton’s curiosity in it and by the critical analysis by si. Suchidananda Mishra and others It was G.N. Dash (Gaganendranath Dash ) and man y others it was G.N. Dash who chlenge the view that sarala Das deliberately worn history in the anthology of his mahabharat. And he recommended that in order to his mahabharat one must know the periodical time which he was following and that one mast not forfet his sakata hindu mins (10) Krushna Chandra Panigrahi. Researcher. Well known historian of odisha was very courageous on the historical consciousness of the poet (11) He endow numerous historical and geographical references in sarala Mahabharata which part was not mentioned in the original Sanskrit Mahabharata text panigrahi appreciating the views of his ancestors like Mrutunjaya Rath , Gopinatha Nanda Sharama and Nilakantha Das made a meticulous painstaking study of the Mahabharata and proposed that the poet had responsively and knowingly established various historical character and episodes of early and medieval India . (12) He has carefully studied the references and contents to sustain that actually poet was a historian.

The clarification of Panigrahi on the history of Orissa and India in Sarala Mahabharata has been challenged by professor G.N. Dash in an appreciative intelligent thoughtful focus on odia . Just have a look, one action – packed debate of G.N. Dash can be stated below :-

Where did Sarala Das noticed the political defense history of India of his period and were his origin ? How could he direct draw his attention towards history and how could he be able to protect the past in such a systematic correct manner. In the different episodes of his Mahabharata. But in the point of geographical information given by Sarala Das sometimes not accurate and also imperfect and it cannot be acquired by the contemporary researchers.

III. AIM AND OBJECTIVE

To seriously survey and critically evaluate the editorial exercises accepted for the preparation of Sarala Mahabharata and to rethink scholastic hypothesis about the text and the context. Moving into the archives and museum, one should discover an unbelievable captivating and outstanding assortment of documents to be worked on.

All of this makes it possible to invest in the collection and digitization of manuscripts so as to enable shape required for linguistic anatomization of the Sarala Mahabharata manuscripts. It will be early to create postages for a ancient text. All this will assist the inscription the historical challenge of earmark the past in a contemporary version.
IV. RESEARCH QUESTIONS
(a) Which procedure was chose to take up for the selection of the primary text for the production of a modern version.
(b) What was the nature of investigation and comparison?
(c) Which as pacts of manuscripts were taken into consideration?
(d) In which method we develop pos tag set for ancient text

Part –B
We can consider Sarala Mahabharata as a research base for further advance study. Creating a database for developing cataloguing indexing, digitalization and detailed linguistic analysis, and study of POS tagging and chunking method proves that a classical text and modern technological method came to under one roof. Here we saw five examples, that based on how we cataloguing manuscript classical text.

SAHADA BRUKHYARA MAHATMYA
[[Goloka\JJ brukya\N_NN]]_NP[[karatara\N_NN rathe]\N_NST]]_NP [[chakrara\N_NN]]_NP
[[MahakaLapa\JJ brukhya\N_NN]]_NP [[Se\PR_PRP]]_NP
[[Harai\V_VM_VF]]_VGF [[mahApAtaka\N_NN]]_NP \copyright

In this example in the case ‘Goloka brukya ’ the word ‘Golaka’ which qualifies the noun word ‘ Brukhya ’. According to chunk role adjectives appearing before a noun will be grouped together with the noun chunk. In this issue whether to chunk the word is chunked as [[Goloka\JJ Brukya\N_NN]]_NP which is a noun chunk. Similarly the word ‘karatara and Rathe’ is tagged as noun. The issue is whether to chunk the word is chunked as [[karatara \N_NN]]_NP and Rathe [[\N_NN]]_NP. The word ‘Caka’ which is tagged as common noun is chunked as [[Caka \N_NN]]_NP. In the case ‘MahAkaLapa Brukhyara’ the word ‘MahAkaLapa’ which qualifies the noun word ‘Brukhyara’. Here the word ‘MahAkaLapa’ tagged as adjective and the word ‘Brukhyara’ tagged as common noun. In this issue whether to chunk the word is chunked as the [[MahAkaLapa\JJ Brukhyara \N_NN]]_NP which is a noun chunk. Because adjectives appearing before a noun will be grouped together with the noun chunk. The word ‘Harai’ which is tagged as finite verb is chunked as [[Harai \V_VM_VF]]_VGF (finite verb chunk).

The word ‘mahApAtaka’ which is tagged as common noun is chunked as [[mahApAtaka\N_NN]]_NP.

In this research work students learn the skill of working with primary sources, the language of ancient time etc. It creates a wicker opportunity to know our language, literature, culture, society day-today life of common man, detailed History geographical and political back ground of our country.

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[5] Notes on the language and Literature of Orissa. In JASB Vol.LXVII and XVIII 1897-98 chakravarty’s consideration is basically established on his reading of the oldest manuscript he had seen the manuscript was copied on mithuna 21st in the 3rd Anka of Ramachandra Deva (1723 AD)
[6] Odia bhasha O’ prachina Odia sahitya in Utkal sahitya –Ashwina, 1311, P, 186
[7] Biographical notes on Sarala appears in Utkala Sahitya, Year 7, No—4, April 1004
[8] Ratha Mrutunjaya, Sarala charita, 1911
[10] Das, Gaganendranath, page 3, 4

AUTHORS
First Author – Dr. Bijayalaxmi Dash, Asst. Professor in Odia Ravenshaw University, Cuttack
A Clinical Study on the Effect and Efficacy of Traditional Formulation Derived by Ola Leaves Manuscript In The Management of Overweight And Obesity

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Abstract- Overweight and obesity are defined as abnormal or excessive fat accumulation that presents a risk to health. Once considered a high-income country problem, overweight and obesity are now on the rise in low and middle-income countries, particularly in urban settings. The treatment modalities have been unsuccessful even in this modern technologically-advanced era. Herbal drugs have been used in the treatment of Staulya since ancient times. Thus in this research, it was intended to investigate the effect of Virechana formulation in ola leave manuscript for overweight and obesity control in Sri Lankan context. Group A was treated with herbal formula for 4 weeks duration and Group B was firstly treated with Virechana procedure and then prescribed herbal formula for two weeks duration. When analysing the results of Group B, BMI shows a P value of 0.000 which were highly significance. The mentioned traditional herbal formula is effective for the management of overweight and obesity related parameters. But it was more effective with the combination of Virechana procedure than individual. The overall results of present study evidence that the short term administration of new herbal formulation has shown significant effect in decreasing the overweight and Obesity. So the new herbal formulation is an effective remedy for the management of Overweight and Obesity.

Index Terms- Overweight, Obesity, Staulya, Virechana

I. INTRODUCTION

Overweight and obesity are defined as abnormal or excessive fat accumulation that presents a risk to health (Finucane, et al., 2011). A crude population measure of overweight and obesity is the body mass index (BMI), a person’s weight in kilograms divided by the square of his or her height in meters. A person with a BMI of 30 or more is generally considered obese. A person with a BMI equal to or more than 25 is considered overweight (WHO, 2015).

BMI is a simple index of weight-for-height that is commonly used to classify overweight and obesity in adults. It is defined as a person’s weight in kilograms divided by the square of his height in meters (kg/m²). The World Health Organization (WHO) definition is BMI greater than or equal to 25 is overweight; a BMI greater than or equal to 30 is obesity; 30.0 - 35.0 - class I obesity; 35.0 - 40.0 - class II obesity; 40.0 - class III obesity and BMI ≥ 35 or 40 kg/m² is severe obesity (Debasis and Harry, 2008). BMI provides the most useful population level measure of overweight and obesity as it is the same for both sexes and for all ages of adults. However, it should be considered a rough guide because it may not correspond to the same degree of fatness in different individuals (Molarius, et al, 2005). The worldwide prevalence of overweight and obesity more than doubled between 1980 and 2014.

Once considered a high-income country problem, overweight and obesity are now on the rise in low and middle-income countries, particularly in urban settings (Am and Clin, 1998). In developing countries with emerging economies (classified by the World Bank as lower and middle-income countries) the rate of increase of childhood overweight and obesity has been more than 30% higher than that of developed countries. According to the proposed World Health Organization cut-off values for Asians, the percentage of Sri Lankan adults in the overweight, obese and centrally obese categories were 25.2%, 9.2% and 26.2%, respectively (WHO, 2015). Based on the cut-offs for Caucasians, these were 16.8%, 3.7% and 10.8%. Our findings were compatible with prevalence of obesity in regional countries. In addition, female sex, urban living, higher education, higher income and being in the middle age were shown to be associated with overweight and obesity in Sri Lankans (WHO, 2015).

Overweight and obesity are linked to more deaths worldwide than underweight. Those are major risk factors for a number of chronic diseases, including diabetes, cardiovascular diseases and cancer. Once considered a problem only in high income countries, overweight and obesity are now dramatically on the rise in low- and middle-income countries, particularly in urban settings (Flegal, et al., 2010).

The fundamental cause of obesity and overweight is an energy imbalance between calories consumed and calories expended (National Institutes of Health, 1998). Globally, there has been, an increased intake of energy-dense foods that are high in fat, while an increase in physical inactivity due to the increasingly sedentary nature of many forms of work, changing modes of
transportation, and increasing urbanization (Flegal, et al, 2010). Raised BMI is a major risk factor for the non-communicable diseases such as cardiovascular diseases (mainly heart disease and stroke), diabetes, musculoskeletal disorders (especially osteoarthritis - a highly disabling degenerative disease of the joints) which were the leading causes of death in 2012 in the world (Zhang and Wang, 2012).

The Ayurveda texts, ‘Charakacharya’ has described eight undesirable constitutions of the body and obesity is one of them which is described as ‘Atishthulya’. In an obese individual, Medas (Fat) is excessively nourished whereas the remaining Dhatus get underfed. When Kapha grows in an irregular fashion, fat metabolism gets affected and a person becomes obese.

The treatment modalities for overweight and obesity have been unsuccessful even in this modern technologically-advanced era. Due to the high cost of modern medical treatments and the rising number of patients with overweight and obesity directs the attention of the scientific community, doctors and patients, towards Chinese herbal medicine, Ayurveda medicine, and other popular alternative medical therapies (Guruprasad, et al., 2015). Herbal drugs have been used in the treatment of overweight and obesity (Stula) since ancient times. Natives in different continents had used herbs in their medicinal practices, while some cultures developed their own herbal medical systems, such as Ayurveda. Herbs are becoming more mainstream as advances in scientific research show the importance of herbal medicinal practices in the diagnosis, treatment and prevention of disease. The presented study provides a general understanding of the actions of herbal formula and hence a background for understanding questions of safety and side-effects, especially regarding to their presumed beneficial effect (Hasani, et al., 2009). Some Panchakarma therapy like Virechana helped to manage diseases like Sthulya and has hyperlipidemic activity too (Dissanayake and Tiwari, 2008).

Although much attention has been given to Virechana treatment formulae in Ayurveda texts for controlling obesity, no much studies have been conducted so far on Virechana formulae on traditional obesity treatment in Sri Lanka. Thus in this research, it was intended to investigate the effect of Virechana formulae in ola leave manuscript for overweight and obesity control in Sri Lankan context.

II. MATERIALS AND METHODS

General objective

Evaluate the effect and efficacy of selected Virechana formulation by ola leaves manuscript in the management of overweight and obesity.

Selection of the Patients

Volunteer patients between 18 and 60 years of age who were overweight and obese were selected from Obesity clinic, Gampaha Wickramarachchi Teaching Hospital, Yakkala and Obesity clinic, Hela Veda Piyasa, Belummahara. They were included for study if they were classified as overweight if their body mass index (BMI; weight in kilograms divided by height in square meters) was ≥25 kg/m², or obese if their BMI was ≥30 kg/m². This determination was based on heights and weights recorded in the medical records.

Design of the research

Randomized comparative clinical trial, to determine the effect of Virechana formula in the management of Overweight and Obesity. Group A was given Traditional Herbal Choorna 15g twice a day for 1 month. Group B was treated with virechana karma and after Traditional Herbal Choorna 15g twice a day for 2 weeks. On the day of Virechana 60g of same herbal formula put on to the 960ml of water and boil until reduce to 240ml. The 240 ml of decoction was given to the empty stomach. After 1 month BMI observed.

Assessment Criteria

BMI (Body Mass Index) (Singh, 1993)

Overweight – 25 – 29.9 Kg/m²

Obesity (class-I) 30 – 34.9 Kg/m²

Obesity (class-II) 35 – 39.9 Kg/m²

Data Analysis

Results were expressed as mean ± SD significant of difference was value vetoed using the SPSS statistical program package. (SPSS 16 Inc. USA) and defined at 0.05.levels of confidence.

III. RESULTS AND DISCUSSION

Table 1 Effect of the Therapy of two Groups in BMI (Before and after treatments)

<table>
<thead>
<tr>
<th>Groups N=25</th>
<th>BMI (Kg/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A BT</td>
<td>31.97±0.35a</td>
</tr>
<tr>
<td>Group A AT</td>
<td>30.46±0.42b</td>
</tr>
<tr>
<td>Group B BT</td>
<td>32.33±0.56c</td>
</tr>
<tr>
<td>Group B AT</td>
<td>30.72±0.58d</td>
</tr>
</tbody>
</table>

[In a column, data are presented as Mean± SEM of 25 patients per each group. In each column, data indicated by different superscript letters are significantly different from each other.]

Statistical analysis revealed that there was 1.50 improvement in mean value of BMI score after giving Herbal choorna in Group A and this change is statistically highly significant according to the 2-tailed test (P<0.000). There was 1.61 improvement in mean value of BMI score after giving Virechana and Herbal choorna in Group B and this change is statistically highly significant (P=0.000). And also there were strong positive correlation between before treatment and after treatment results in both groups and correlation of the Group B is more significant than Group A.
The new herbal formula consists of *Nigella sativa* (Kaluduru), *Saussurea lappa* (Suvanda Kottan), *Zingiber officinale* (Inguru), *Allium sativum* (Suda lunu), *Cassia fistula* (Ehela) and *Cassia senna* (Senehe kola). When analyzing the new herbal formula, mainly it has *Katu*, *Tikta*, *Madura rasa*, *Laghu*, *Ruksha*, *Ushna*, *Teekshna* and *Sara guna*, *Ushna veerya*, *Katu vipaka* and *Vata-Kapha shamaka*, *Virechana karma*. So literature findings revealed that the new herbal formula has *Kapha* reducing and *Virechana* activity. Dissanayake and Tiwari explained that *Sthaulya* can manage successfully by using some *Samshodana* and *Samshamana* therapy and *Panchakarma* therapy like *Virechana* and has hyperlipidemic activity too. And BMI also showed highly significant value in before and after treatments in both Groups but higher mean difference in Group B. This result shows that the *virecharana* is more helpful to maintain the balance of body tissues than oral administration of drugs. It means that *samshodana* with *samshamana karma* is more effective than individual usage of *samshamana cikitsa*.

IV. CONCLUSION

According to the above sited facts the mentioned traditional herbal formula is effective for the management of overweight and obesity related parameters. But it was more effective with the combination of *Virechana* procedure than individual. The overall results of present study concluded that the short term administration of new herbal formulation has shown significant effect in decreasing the overweight and Obesity. So the new herbal formulation is an effective remedy for the management of Overweight and Obesity.
Intangible Service Quality on Customer Satisfaction of Hotel Guest in Nigeria

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Abstract - Service organisations are significant contributors to the economy of fast developing nations. However, customers of service organisations often encounter dissatisfaction when the delivered service fails to give gratifying height of contentment, and the need to curb dissatisfaction in the face of competition is imminent, especially in the hotel industry. This study investigated the perception of consumers of three to five star hotels towards four intangible dimensions of service quality in Akwa Ibom State, Nigeria. A survey research design was adopted for the study. Data were analysed using frequency distribution statistics, Pearson correlation analysis and regression. The results showed that intangible service quality is a good determinant of customer satisfaction. The intangible dimensions of service quality, assurance, reliability, empathy and responsiveness have positive and significant impact on customer satisfaction of hotels in Akwa Ibom State. The study found that assurance is the best intangible dimension that predicts customer satisfaction while reliability and empathy are good predictors and, customers of three to five star hotels are moderately satisfied with service delivery in Akwa Ibom State. The study recommends that management of hotels should strive to deliver quality services in order to further customer satisfaction.

Index Terms - Assurance, Customer satisfaction, Hotel industry, Intangible service quality

I. INTRODUCTION

Over the years, organisations in the service industry seek for strategies that can enhance its performance, profitability, productivity and market share and service quality emerged as an exciting area of marketing to enable firms live up to expectations (Cui, Lewis and Park, 2003). Service quality is seen as a disparity linked to expectations of service and an assessment of the services rendered, and it is identified as been slanted because it is based on the decision provided by consumers and not the organisation (Machayi and Ahmed, 2016). Service quality is classified as tangible and intangible. Tangibles are the visible appearance of equipment and materials used in performing the services while intangibles are the non-physical component of service quality: reliability, responsiveness, assurance and empathy. Both dimensions of service quality are vital concepts that influence the extent and nature of customer satisfaction.

In the course of providing satisfaction to customers, some factors influence the quality of services rendered. Aggressive growth due to globalization, economic and political integration, new tourist destinations, and sophisticated nature of consumers play a part in thwarting the effort of management to provide qualitative services, and failure to provide the desired service may result in waste of resources, and dissatisfaction. Stemming customer dissatisfaction is a principal task required of management; however, for hotels to provide satisfaction, management must be aware of the right service quality dimensions which customers expect and this can be achieved through research. Research on service quality and customer satisfaction has been conducted in different industries, and little have been done in the hotel industry in Nigeria. Thus, this paper looks at the intangible dimensions of service quality and its impact on customer satisfaction of hotels in Akwa Ibom State, Nigeria.

II. LITERATURE REVIEW

2.1 Service Quality

Different views exist about quality and earlier studies defined quality as conforming to requirement where goods and services meet predetermined standards (Ekinci and Riley, 1998), but since services are hard to be condensed to a set of standards, the definition cannot be used on service quality. Machayi and Ahmed (2016) provided an explicit definition of service quality as meeting or going beyond customers’ anticipation that is, a comparison between delivered service and expectation. Service quality can be achieved when customer’s anticipations are matched with performance regularly.

Service Quality is determined from the perspective of the consumers due to the differences consumers’ exhibit in taste, values and diverse views of assessment (Chang, 2008). Service evaluation does not depend solely on the final service but also on the production and delivery process; hence the role of employees is relevant in administering the service (Kumar, Smart, Maddern and Maull, 2008; Chang, 2008).

2.2 Intangible Dimensions of Service Quality

The four intangible dimensions of service quality are: reliability, responsiveness, assurance and empathy. Reliability: This is the capability of organizations to carry out a service accurately and dependably as promised (Van, Pampallis and Bond, 2002). Responsiveness: This is the service providers’ disposition to provide immediate service; that is, customers’ demands, inquiry and criticisms should be handled instantaneously (Akbaba, 2006). Assurance: Assurance is the employees’ ability and politeness,
Empathy: Empathy is the nurture; distinguished concentration organizations provides its consumers. It involves providing customized services to consumers exclusively, and it can be done when firms are aware of consumer’s needs, preferences and name (Jones and Shandiz, 2015).

2.3 Customer Satisfaction

Early theories pinpoint customer satisfaction as evolving around disconfirmation experiences linked with consumers’ initial expectations. Customer satisfaction theoretically refers to the aftermath of acquiring and utilizing goods and services. It is the result consumers derive from comparing the advantage, and price paid for consuming goods or services (Pollack and Alexandrov, 2013). The most widely used theory of customer satisfaction is the confirmation/disconfirmation paradigm of customer satisfaction. This theory states that satisfaction or disconfirmation arises as a contention relating consumers’ expectations of goods or services with actual observed performance. The theory is of the view that confirmation arises when performance equates or exceeds expectations (satisfaction) and disconfirmation occurs as a result of performance falling below expectation (dissatisfaction) (Wicks and Roethlein, 2009; Oliver, 1980).

2.4 Relationship between Service Quality and Customer Satisfaction

In consideration, service quality and customer satisfaction are meticulously connected but despite the fact, the precise character of the consumers’ assessment and interconnectivity among them are obscured (De Ruyter, Bloemer and Peters, 1997). Researchers have established that service quality is linked with customer satisfaction, that an increase in the quality of service will result to a synonymous increase in customer satisfaction as shown in the works of Sulieman, (2013); Malik, (2012); Ahmed et al., (2010); Negi, (2009).

Sureshchandar, Rajendran and Anantharaman (2002) study, assessed the relationship service quality and customer satisfaction possess and noticed a vast colony among the constructs, that, more of service quality leads to more satisfaction. Negi’s (2009) work in the telecommunication industry established that network quality and reliability are the fundamental determinants of service quality. Accordingly, Ahmed et al., (2010) attested that tangibles, reliability, assurance and responsiveness possess necessary and explicit interconnection with the satisfaction of consumers while empathy indicated an important but contradictory interconnection with customer satisfaction. In the same vein, Malik (2012) study on four service industries: transportation, telecommunication, banking and courier revealed an explicit interconnection between service quality and customer satisfaction. Researchers have conducted study on service quality and customer satisfaction in different industries but there is variability in their findings as a result of testing different dimensions, differences in location, culture and time. Given, this study seeks to examine the intangible dimensions of service quality on the satisfaction of consumers of hotels in Akwa Ibom State, Nigeria and the variables that best predict customer satisfaction.

![Figure (1): Model of Intangible Service Quality on Customer Satisfaction](Image)

The following hypotheses are proposed for the study:

- Ho1: There is no significant relationship between reliability and customer satisfaction
- Ho2: There is no significant relationship between responsiveness and customer satisfaction
- Ho3: There is no significant relationship between assurance and customer satisfaction
- Ho4: There is no significant relationship between empathy and customer satisfaction

III. RESEARCH METHODOLOGY

3.1 Design of sample size

The hotel industry in Akwa Ibom State is growing as tourism gains awareness, and the State has a total of 311 hotels and guest houses grouped under five to one star and listed hotels. The study was narrowed to three, four and five star hotels in Uyo, Eket and Ikot Ekpene Local government areas; thus nine hotels...
falls under this category. The respondents consists of consumers from the nine hotels. The study utilized the survey research design, and the population of interest consist of 4,851 respondents and, the Taro Yamane formula was employed in determining the sample size

\[ n = \frac{N}{1+N(e)^2} \]

Where

- \( n \) = sample size,
- \( N \) = 4851,
- \( 1 \) = constant,
- \( e \) = assumed error margin or tolerable error taken as 5% (0.05).

\[ n = \frac{4851}{1+4851(0.05)^2} \]

\[ n = 369.52 \]

\[ n = 370 \]

From the above, 370 copies of questionnaire were distributed, 206 copies in Uyo, 123 in Eket and 41 in Ikot Ekpene to consumers of three to five star hotels. The proportion was derived from dividing the number of hotels in the three LGA with its total and then multiplied with the total number of the questionnaire (for Uyo: 5/9 * 307 = 206, Eket: 3/9 * 370 = 123, Ikot Ekpene: 1/9 * 370 = 41). Data for this research were collected from primary sources (questionnaire). The research instrument consists of 18 items arranged on a scale of 7 from disagree very strongly as 1, to agree very strongly as 7, while the question on the satisfaction level of hotel services was rated; not satisfactory as 1 to very highly satisfactory as 5. The wait and collect method of questionnaire administration was employed.

The study utilized the descriptive statistics, frequency distribution statistics, Pearson Product Moment correlation analysis, simple linear regression and multiple regression analysis. A regression equation to examine the impact of intangible service quality on customer satisfaction of hotels in Akwa Ibom State is expressed mathematically as follows:

\[ S = \alpha + \beta_1 (RI) + \beta_2 (RS) + \beta_3 (A) + \beta_4 (E) + e \]

Where,

- \( S \) = the dependent variable representing customer satisfaction
- \( \alpha \) = Constant,
- \( \beta_1, \beta_2, \beta_3, \beta_4 \) are the respective regression coefficient for RI, RS, A and E respectively.
- (RI) = Reliability, (RS) = Responsiveness, (A) = Assurance, (E) = Empathy, \( e \) = Error term

A construct validity was used and it was conducted by administering the research instrument to five consumers of hotels services and four academicians who are specialists in the field of marketing. The consumers and academicians agreed that the instrument is suitable for collecting data from the respondents, and this did not form part of the final sample. The Cronbach alpha reliability statistics was also employed to determine the internal consistency of the scale as shown in Table 1.

By applying Cronbach’s Alpha to test the reliability of the research instrument in Table 1, it was found that the Cronbach’s Alpha coefficient value for the 19 items for intangible service quality and customer satisfaction was 0.757, and Nunnally (1967), opined that a coefficient above 0.70 is considered sufficient for exploratory studies. Meaning, the instrument is reliable and indicates high internal consistency among items. The decision of accepting or rejecting the null hypotheses (\( H_0 \)) of the statistical test is based on 95% confidence interval. The null hypothesis will be accepted if the P-value is more than the 5% level of significance or rejected if the P-value is at or less than the 5% level of significance and the alternative will be accepted.

<table>
<thead>
<tr>
<th>Table 1: Reliability Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cronbach’s Alpha</td>
</tr>
<tr>
<td>.757</td>
</tr>
</tbody>
</table>

Table 2: Measures used in the study on a seven-point Likert scale

- **Reliability**
  - When hotels promise to do something by a specific time, it does so
  - When customers have problems, hotels shows sincere interest in solving it
  - Hotels perform its services right the first time
  - Hotels provide its services at the time it promises to do so

- **Responsiveness**
  - Employees of hotels says correctly when services will be performed
  - Hotel employees provide prompt services to customers
  - Hotel employees are always willing to help customers
  - Hotels are never too busy to respond to customers’ requests

- **Assurance**
  - The behaviour of hotel employees instil confidence in customers
  - Customers feel safe in their transactions with hotels
  - Customers are safe and secured during their stay in hotels
  - Employees of hotels are polite and courteous to customers

- **Empathy**
  - Employees of hotels are knowledgeable to answer customers’ questions
  - Employees of hotels have the skills to perform the service

- **Responsiveness**
  - Hotels give individual attention to customers
  - Hotels have employees who give personal attention to customers
  - Hotels have their customers’ best interests at heart
  - Hotels understand the specific needs of customers

### IV. DATA ANALYSIS

The data were analysed using descriptive statistics, frequencies, correlation, simple linear and multiple regression analysis. The analysis was performed with the use of statistical package for social sciences version 21.0. Three hundred and seventy copies of questionnaire were administered to customers of nine hotels in Uyo, Eket and Ikot Ekpene Local Government Area’s. One hundred and fifty four respondents showed positive response, and out of these, 21 copies of the questionnaire were incompletely and wrongly filled; thus the researcher utilized the responses from 133 respondents, making it 36.0% of the total sample.
4.1 Descriptive Statistics

Table 3: Descriptive Statistics

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS</td>
<td>3.47</td>
<td>.702</td>
<td>133</td>
</tr>
<tr>
<td>Reliability</td>
<td>5.6805</td>
<td>.89736</td>
<td>133</td>
</tr>
<tr>
<td>Responsiveness</td>
<td>5.1748</td>
<td>.60926</td>
<td>133</td>
</tr>
</tbody>
</table>

Table 3 shows the number of respondents = 133 (N), mean averages and standard deviation of the intangible dimensions and customer satisfaction (CS).

| Assurance | 4.897 | .58745 | 133 |
| Empathy   | 4.9192 | .70412 | 133 |

4.2 Correlation Analysis

Table 4: Customer Satisfaction Level with Hotel Services

<table>
<thead>
<tr>
<th>Category</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poorly Satisfactory</td>
<td>1</td>
<td>.8</td>
<td>.8</td>
<td>.8</td>
</tr>
<tr>
<td>Moderately Satisfactory</td>
<td>84</td>
<td>63.2</td>
<td>63.2</td>
<td>88.7</td>
</tr>
<tr>
<td>Highly Satisfactory</td>
<td>33</td>
<td>24.8</td>
<td>24.8</td>
<td>25.6</td>
</tr>
<tr>
<td>Very Highly Satisfactory</td>
<td>15</td>
<td>11.3</td>
<td>11.3</td>
<td>100.0</td>
</tr>
<tr>
<td>Total</td>
<td>133</td>
<td>100.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

The customer satisfaction level with hotel services indicates that customers are moderately satisfied with hotel services in Akwa Ibom State. The result shows that 8% of hotel consumers are poorly satisfied, 63.2% are moderately satisfied, 24.8%, are highly satisfied, and 11.3% have very high satisfaction.

The Pearson Product Moment Correlation Analysis was performed to find out if there exist a relationship between reliability, responsiveness, assurance, and empathy on customer satisfaction and Table 5 shows the result from the statistical analysis.

Table 5: Correlations between Intangible Service Quality and Customer Satisfaction

<table>
<thead>
<tr>
<th>Customer Satisfaction</th>
<th>CS</th>
<th>Reliability</th>
<th>Responsiveness</th>
<th>Assurance</th>
<th>Empathy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td>1</td>
<td>.425**</td>
<td>.339**</td>
<td>.469**</td>
<td>.410**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>133</td>
<td>133</td>
<td>133</td>
<td>133</td>
<td>133</td>
</tr>
<tr>
<td>Pearson Correlation</td>
<td>.425**</td>
<td>.157</td>
<td>- .014</td>
<td>.199*</td>
<td>.127</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.072</td>
<td>.874</td>
<td>.577</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>133</td>
<td>133</td>
<td>133</td>
<td>133</td>
<td>133</td>
</tr>
<tr>
<td>Pearson Correlation</td>
<td>.339**</td>
<td>.157</td>
<td>1</td>
<td>.199*</td>
<td>.127</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.072</td>
<td>.874</td>
<td>.577</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>133</td>
<td>133</td>
<td>133</td>
<td>133</td>
<td>133</td>
</tr>
<tr>
<td>Pearson Correlation</td>
<td>.469**</td>
<td>-.014</td>
<td>.199*</td>
<td>1</td>
<td>.299**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.021</td>
<td>.874</td>
<td>.577</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>133</td>
<td>133</td>
<td>133</td>
<td>133</td>
<td>133</td>
</tr>
<tr>
<td>Pearson Correlation</td>
<td>.410**</td>
<td>.049</td>
<td>.127</td>
<td>.299**</td>
<td>1</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td></td>
<td>.000</td>
<td>.874</td>
<td>.577</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>133</td>
<td>133</td>
<td>133</td>
<td>133</td>
<td>133</td>
</tr>
</tbody>
</table>

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

Table 5 shows the correlation between customer satisfaction and reliability, responsiveness, assurance and empathy. The number of cases (N) is 133 cases. The direction of the relationship for reliability is positive and the correlation coefficient (0.425) indicates a positive correlation which, when squared indicates 18.06% shared variance. Reliability helps to explain nearly 18.06 percent of the variance in respondents’ scores on customer satisfaction. Responsiveness has a positive relationship with customer satisfaction, and its coefficient is 0.339 which when squared indicates 11.49 percent shared variance. Responsiveness helps to explain nearly 11.49 percent of the variance in respondents’ scores on customer satisfaction.
Assurance exhibit a positive relationship with customer satisfaction and its coefficient is 0.469 which when squared indicates 22.01 percent shared variance. Assurance helps to explain nearly 22.01 percent of the variance in respondents’ scores on customer satisfaction. Empathy has a positive relationship with customer satisfaction, and its coefficient is 0.410 which, when squared indicates 16.81 percent shared variance. Empathy helps to explain nearly 16.8 percent of the variance in respondents’ scores on customer satisfaction.

4.3 Regression Analysis

The simple linear regression analysis was employed to examine each of the intangible service quality dimension on customer satisfaction while the multiple regression analysis was used to determine the collective impact of the intangible service quality dimensions (reliability, responsiveness, assurance and empathy) on customer satisfaction.

Table 6: Model Summary for Reliability, Responsiveness, Assurance and Empathy

<table>
<thead>
<tr>
<th>Model</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliability</td>
<td>0.180</td>
<td>0.174</td>
<td>0.638</td>
</tr>
<tr>
<td>Responsiveness</td>
<td>0.115</td>
<td>0.108</td>
<td>0.663</td>
</tr>
<tr>
<td>Assurance</td>
<td>0.220</td>
<td>0.214</td>
<td>0.623</td>
</tr>
<tr>
<td>Empathy</td>
<td>0.168</td>
<td>0.162</td>
<td>0.643</td>
</tr>
</tbody>
</table>

Table 7: Anova* for Reliability, Responsiveness, Assurance and Empathy

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Model</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Squares</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliability</td>
<td>Regression</td>
<td>11.7</td>
<td>1</td>
<td>11.7</td>
<td>28.7</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>53.3</td>
<td>13</td>
<td>0.40</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>65.0</td>
<td>14</td>
<td>0.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Responsiveness</td>
<td>Regression</td>
<td>7.49</td>
<td>1</td>
<td>7.49</td>
<td>17.0</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>57.6</td>
<td>13</td>
<td>0.44</td>
<td></td>
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<tr>
<td></td>
<td>Total</td>
<td>65.0</td>
<td>14</td>
<td>0.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assurance</td>
<td>Regression</td>
<td>14.3</td>
<td>1</td>
<td>14.3</td>
<td>36.9</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>50.7</td>
<td>13</td>
<td>0.38</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
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<td>14</td>
<td>0.0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Empathy</td>
<td>Regression</td>
<td>10.9</td>
<td>1</td>
<td>10.9</td>
<td>26.4</td>
<td>0.00</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>54.1</td>
<td>13</td>
<td>0.41</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>Total</td>
<td>65.0</td>
<td>14</td>
<td>0.0</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 8: Coefficients for Reliability, Responsiveness, Assurance and Empathy

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstd Coefficients</th>
<th>Std. Coefficient</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reliability</td>
<td>0.33 0.06 0.425</td>
<td>5.36 0.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Responsiveness</td>
<td>1.44 0.49</td>
<td>2.92 0.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assurance</td>
<td>0.39 0.09 0.339</td>
<td>4.12 0.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Empathy</td>
<td>0.71 0.45</td>
<td>1.57 0.11</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>0.56 0.09 0.469</td>
<td>6.08 0.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reliability</td>
<td>1.45 0.39 0.410</td>
<td>3.68 0.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Responsiveness</td>
<td>1.45 0.39 0.410</td>
<td>3.68 0.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assurance</td>
<td>0.40 0.07</td>
<td>5.14 0.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Empathy</td>
<td>0.40 0.07</td>
<td>5.14 0.00</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.3.1 Reliability and Customer Satisfaction: The regression analysis for reliability is discussed with the aid of the Model Summary, Anova and Coefficient Table in Table 6, 7 and 8. The model summary table (Table 6) describes the standard error of estimate, goodness of fit (R square) and Adjusted R Square. This summary tells how strong the independent variables are related to the dependent variable. It serves as the proportions of the variation in the dependent variable (customer satisfaction) being explained by the variation in the independent variable (reliability). The result shows that 17.4% (the value of adjusted R square) variations in customer satisfaction is explained by reliability. The standard error of estimate tells us about the dispersion of actual values from the regression line. This model gives a value of standard error of estimate as (0.638), meaning the actual data is 63.8% dispersed from the regression line.

The Anova table in Table 7 reveals a p-value less than the significance level 0.05 meaning that, there is a significant impact of reliability on customer satisfaction. The coefficient value for reliability in Table 8 is 0.332; that is a unit increase in reliability would result to an increase in customer satisfaction by 0.332. This shows that there is a positive impact of reliability on customer satisfaction. This explains hypothesis one:

Ho1: There is no significant relationship between reliability and customer satisfaction.

From the coefficient table in Table 8, reliability is significant at a 0.05% significance level, indicating that the null hypothesis should be rejected and, the alternative hypothesis accepted. Implying that, there is a positive significant relationship between reliability and customer satisfaction of hotels in Akwa Ibom State.
4.3.2 Responsiveness and Customer Satisfaction:

The model summary table (Table 6) shows that 10.8% (the value of adjusted R square) variations in customer satisfaction is explained by responsiveness. The standard error of estimate 0.663 shows that the actual data is 66.3% dispersed from the regression line. ANOVA table in Table 7 reveals a p-value less than the significance level 0.05 meaning, there is a significant impact of responsiveness on customer satisfaction. The coefficient value for responsiveness in Table 8 is 0.391; that is, a unit increase in responsiveness would result in an increase in customer satisfaction by 0.391. This shows that there is a significant positive impact of responsiveness on customer satisfaction, and explains hypothesis two:

Ho: There is no significant relationship between responsiveness and customer satisfaction.

The coefficient table in Table 8, shows responsiveness as significant at 0.05% significance level, thus, the null hypothesis is rejected and, the alternative accepted. Implying that, there is a significant positive relationship between responsiveness and customer satisfaction of hotels in Akwa Ibom State.

4.3.3 Assurance and Customer Satisfaction:

The model summary table (Table 6) shows that 21.4% (the value of adjusted R square) variations in customer satisfaction is explained by assurance. The standard error of estimate 0.623 shows that the actual data is 62.3% dispersed from the regression line. The Anova table in Table 7 reveals a p-value less than the significance level 0.05 meaning, there is a significant impact of empathy on customer satisfaction. The coefficient value for assurance in Table 8 is 0.561, that is, a unit increase in assurance would result in an increase in customer satisfaction by 0.561. This shows that there is a positive impact of assurance on customer satisfaction, and explains hypothesis three:

Ho: There is no significant relationship between assurance and customer satisfaction.

The coefficient table in Table 8, shows assurance as significant at 0.05% significance level, thus, the null hypothesis is rejected and, the alternative accepted. Implying that, there is a positive significant relationship between assurance and customer satisfaction of hotels in Akwa Ibom State.

4.3.4 Empathy and Customer Satisfaction:

The model summary table (Table 6) shows that 16.2% (the value of adjusted R square) variations in customer satisfaction is explained by empathy. The standard error of estimate 0.643 shows that the actual data is 64.3% dispersed from the regression line. The Anova table in Table 7 reveals a p-value less than the significance level 0.05 meaning, there is a significant impact of empathy on customer satisfaction. The coefficient value for empathy in Table 8 is 0.409, that is, a unit increase in empathy would result to an increase in customer satisfaction by 0.409. This shows that there is a positive impact of empathy on customer satisfaction. The P-value shows there exist a significance between empathy and customer satisfaction and explains hypothesis four:

Ho: There is no significant relationship between empathy and customer satisfaction.

The coefficient table in Table 8, shows empathy as significant at a 0.05% significance level, thus, the null hypothesis is rejected and, the alternative hypothesis accepted. Implying that, there is a positive significant relationship between empathy and customer satisfaction of hotels in Akwa Ibom State.

4.3.5 Intangible Service Quality Dimensions and Customer Satisfaction: To find out the overall impact that service quality has on customer satisfaction, a multiple regression analysis was done, and Table 9, 10 and 11 reveals the finding.

Table 9: Model Summary for Intangible Service Quality

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.708a</td>
<td>.501</td>
<td>.485</td>
<td>.504</td>
</tr>
<tr>
<td>a. Predictors: (Constant), Empathy, Reliability, Responsiveness, Assurance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Dependent Variable: Customer Satisfaction</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 10: ANOVA for Intangible Service Quality

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>32.608</td>
<td>4</td>
<td>8.152</td>
<td>32.117</td>
<td>.000a</td>
</tr>
<tr>
<td>Residual</td>
<td>32.489</td>
<td>128</td>
<td>.254</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>65.098</td>
<td>132</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Dependent Variable: CS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Predictors: (Constant), Empathy, Reliability, Responsiveness, Assurance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The Model summary Table in Table 9 and the ANOVA Table, Table 10 include the R Square value, which serves as the proportions of the variation in the dependent variable (customer satisfaction) being explained by the variation in the independent variable (intangible service quality). In other words, this means that the R Square depicts how good the regression model is at explaining the variance in Customer Satisfaction. It can be observed that the coefficient of determination (R²) is 0.501.
representing 50% of customer satisfaction can be explained by reliability, responsiveness, assurance and empathy.

This is a useful finding, but to find out if it is significant, the Analysis of variance Table in Table 10 reveals a p-value less than the significance level 0.05. This indicates that the overall model is reasonable fit, and there is a statistically significant association between intangible service quality (reliability, responsiveness, assurance and empathy) and customer satisfaction.

### Table 11: Coefficients for Intangible Service Quality Coefficients

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstd Coefficients</th>
<th>Std Coefficients</th>
<th>t</th>
<th>Sig.</th>
<th>Correlations</th>
<th>Collinearity Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
<td>Zero-order</td>
<td>Partial</td>
</tr>
<tr>
<td>(Constant)</td>
<td>-2.698</td>
<td>.562</td>
<td>-4.805</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>Reliability</td>
<td>.305</td>
<td>.050</td>
<td>.390</td>
<td>6.152</td>
<td>.000</td>
<td>.425</td>
</tr>
<tr>
<td>Responsive...</td>
<td>.199</td>
<td>.075</td>
<td>.173</td>
<td>2.673</td>
<td>.009</td>
<td>.339</td>
</tr>
<tr>
<td>Assurance</td>
<td>.433</td>
<td>.080</td>
<td>.362</td>
<td>5.444</td>
<td>.000</td>
<td>.469</td>
</tr>
<tr>
<td>Empathy</td>
<td>.260</td>
<td>.066</td>
<td>.261</td>
<td>3.969</td>
<td>.000</td>
<td>.410</td>
</tr>
</tbody>
</table>

a. Dependent Variable: Customer Satisfaction

From the unstandardized coefficients value in Table 11, the regression equation was derived and the results are as follows:

\[ S = -2.698 + 0.305R_1 + 0.199R_2 + 0.433R_3 + 0.260E + e \]

\[ \text{(3)} \]

### 4.4 Discussion of findings

The findings identified reliability as a good predictor of customer satisfaction in the hotel industry in Akwa Ibom State. It shows reliability as having a positive significant impact on customer satisfaction such that, an increase in reliability would cause an increase in customer satisfaction. This finding is consistent with that of Theresia and Bangun (2017), Sulieman (2013), Markovic and Jankovic (2013) and Agarwal, Singh and Thakur (2013). It contradicts the works of Omar, Ariffin and Ahmad (2016), Idris (2014) and, Wong, Lau and Lau (2012) who see service providers as lacking in integrity and most times fails to fulfill their promises.

Responsiveness had a positive significant impact on customer satisfaction of hotels in Akwa Ibom State. Employees of hotels tend to welcome its consumers and give prompt response to its consumers. This finding is consistent with that of Sulieman (2013), Badara et al. (2013), Idris (2014), Omar et al. (2016) and Theresia and Bangun (2017) who found assurance as a favourable perception of service quality.

The findings also revealed that empathy positively impact on customers hotel satisfaction in Akwa Ibom State. Hotels in Akwa Ibom State tend to provide specific needs of its customers to portray that the customers best interest is their priority. This finding is consistent with the works of Agarwal et al. (2013), Idris (2014), Omar et al. (2016) and Theresia and Bangun (2017), although it contradicts the works of Badara et al. (2013) and Saghier (2015). They are of the view that customers derive satisfaction when employees show willingness to provide assistance and perform the promised service promptly.

### V. CONCLUSION

In line with the findings of the study, the following conclusions were reached; the study has established that intangible service quality has a positive and significant impact on customer satisfaction of hotels in Akwa Ibom State, Nigeria. The four intangible dimensions of service quality: assurance, reliability, empathy and responsiveness possess positive significant impact on customer satisfaction.

The study also revealed that assurance is the best predictor of hotel customer satisfaction in Akwa Ibom State followed by reliability while responsiveness is the least dimensions. The customers of 3 to 5-star hotels in Akwa Ibom State are moderately satisfied with the services rendered by the hotels. Although the customers are satisfied on a moderate basis, hotels still need to deliver more qualitative service continuously because a customer that feels satisfied with a service today may perceive that same service as unsatisfactory the next visit or demands more after receiving a more pleasant service in another hotel. This depicts that the perception of consumers changes with time and taste.

### REFERENCES


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Effect of Reciprocal Teaching Model against Social Studies Activities and Learning Outcomes of Class IV Elementary School Students

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Abstract: This study aims to determine the effect of the reciprocal teaching model on social studies learning outcomes and activities fourth grade students in elementary school. This research was conducted in SDN Sooko 2 Sooko Mojokerto in the school year 2018/2019. This study uses a quantitative approach. This type of research is experimental research with non equivalent pretest and posttest control group design. This study uses two classes namely the experimental class (IV A) and the control class (IV B). The research instrument used was the Instrument sheet activities and student learning outcomes test sheets. Data analysis techniques used include normality test, homogeneity test, and independent samples t-test. The research data shows: the results of the analysis of normality in the experimental class are 0.164 and in the control class 0.149. Both groups have significance > 0.05 so it can be concluded that the data for each group is normally distributed. The homogeneity test results obtained by the value of homogeneity of student learning outcomes produce a significant value of 0.661. Amount of significance > 0.05 So, it can be concluded that the sample variants are homogeneous. The average value of the experimental class is 84.00 and the control class is 59.75. Then by looking at the test results of the independent sample t-test it was found that (t-count) is 7.248 and (t-table) 1.686. If we do a t-count ratio of 7.248 > t-table 1.686 and the results of sig. 2 is 0.000 > 0.05 so Ho denies that means there is a significant difference. The results showed that there were differences in learning outcomes between the control class and the experimental class. The conclusions of this study are: 1) the reciprocal teaching model affects activity fourth grade students in elementary school; 2) the reciprocal teaching model affects social studies learning outcomes fourth grade students in elementary school.

Keywords: reciprocal teaching model, student activity, learning outcomes.

I. Preliminary

Education exists in every aspect of life and the results are reused for the benefit of society. A person can obtain education in various educational environments such as, at home, at school, and in the community. Based on Law Number 20 of 2003, the aim of national education is to develop the potential of students to become human beings who believe and devote to God Almighty, have good morals and knowledge, are creative and independent and become citizens of a democratic and responsible state. The legislation is supported by opinions stating that, the goal of education is that all children in competent and well-adjusted individuals, now and in the future, by creating an atmosphere that supports learning. To be effective, this goal must be shared by children, and they must have an essential part in developing it through communicating their interests. (Taylor and MacKenny (2008: p1)

The purpose of education is a conscious effort to make or determine the direction of students who excel in knowledge, attitudes, and skills. To realize this, an optimal and conducive learning process is needed. Has il learn a irakh purpose of learning is planned. The achievement of learning outcomes are consistent with the objectives pemeb e disable in can be achieved if teachers are able to create an interactive classroom atmosphere when inactive its students' progress. This is consistent with Astutik's (2012) statement that, the conducive atmosphere supports learning activities (p.144).

Subjects in Elementary School consist of seven types, which are di among them are Social Sciences (IPS). Social Studies in Elementary Schools is integrated with other subjects and follows the theme based on the 2013 curriculum, but IPS is still referred to as a subject (Trianto, 2017, p.171). Various parts included in the family of social studies subjects, such as History and Culture, have different characteristics and goals so that their parts are taught to achieve learning goals through an interdisciplinary approach. Social studies education aims to educate and provide basic skills to students to be developed in accordance with their talents, their interests are adjusted to the needs of the surrounding environment and students' interest in social life to continue their education to a higher level (Trianto, 2010 p. 174).
Astri (2009) states that social studies examines humans in relation to their social and physical environment (p. 2). IPS is a very important subject to be studied by students, because it examines things related to values, norms and manners that are different between each region in the human environment. Social studies aims to provide students with supplies in living in society. Students are expected to gain knowledge and insights about the basic concepts of social science, gain sensitivity and awareness of social problems in their environment, so that they are skilled in studying and solving these social problems.

Huda (2011) Well-designed learning can attract students' interest in the learning process. Curiosity (coriosity) and being challenged become the initial capital to focus students' attention on teaching materials. Students who have taken an interest in teaching materials are more dynamic and interactive in receiving and developing the information they obtain during the learning process (p.3). The teacher is the main character who controls the process of teaching and learning activities in the classroom. The direction of the educational goals to be achieved is very dependent on the teaching methods and strategies used by the teacher. Rusman (2012) states that the learning component that is directly involved and gives the main influence is the teacher. (p.58). All learning process controls are made by the teacher but the teacher does not dominate as an information center but opens the way for information. Shiva learns from the direction of the teacher and develops their potential.

The importance of these social studies subjects has not been fully realized by many parties. Most people assume that this charge only contains concepts and obliged to memorize it. The presumption that is still inherent in most of our society, also influences the ongoing teaching and learning activities taking place in the classroom. Many teachers are more focused on math and science lessons, and not a few students tend to be interested in exploring and understanding numeracy and science. This is because these lessons are considered more challenging and more prestigious.

Professionalism of teachers in teaching methods that are used to determine student achievement is the highest is the ideal learning conditions but in fact learning still use conventional learning models. Guru not use student-oriented method. Bain in Rustiyan, (2015, p 2) k ecenderungan towards learning teacher-centered to an approach that is centered student centered will provide opportunities for students to me developers of right / reflect on their own learning, me mperoleh experience added in the concept of science so that it will become a better critical thinker.

The problem now is that the material presented teachers to be memorized by students without estab ikiran who se k barrel with ondisiriel, students are less active search for resources other than teachers. Understanding like this results in children not understanding and interpreting social studies as a whole and can result in activities and learning outcomes a child.

In reality, there are still many students who lack interest and tend to avoid social studies. This happens because the facts and concepts to memorize too many dit awarkan in social studies. Facts in the field indicate that the achievement of learning objectives is still far from expectations. It also occurs in the implementation of social studies lesson in class IV Elementary School Sooko 2 Mojokerto, particularly in economic activity and related materials with a variety of occupations and keh i dupan social and cultural environment. Students still experience difficulties in the learning material.

Reaching in the field students are less active in participating in social studies learning activities and the teacher's role is very dominant. IPS learning implementation still apply a teacher-centered learning (teacher centered). Learning is carried out with the delivery of material by the teacher then students only listen to the teacher's explanation, accept concepts, take notes, and memorize material. Materials in learning, especially in the sub-themes of economic activity and their relationship with various fields of work and social and cultural life in the surrounding environment are often identified with memorizing material. Mastery of social studies material becomes verbalistic, so learning outcomes cannot last long.

The teacher becomes one of the parties responsible for improving education. Educational activities in schools in the sense of providing guidance and teaching to students are the responsibility of the teacher "according to Hamalik's opinion, (2011 p 44), Teachers are required to make an innovation regarding their duties as educators. These innovations are strives to improve student learning achievement. In the opinion of Uno (2008) "a teacher is very influential on learning students (p. 17)

Based on these problems, a solution is needed to improve the learning activities that have been carried out. Peneliti offer solutions to this research by using cooperative learning model reciprocal teaching. According to Oktavianti (2014: 97), cooperative learning has a positive impact on students who have low learning achievement and can help build self-confidence in one's thinking ability in understanding the IPS concept. P learning with the model is in accordance with the conditions, situation, and student learning environment. If this is achieved, the students are expected to be able, creative, interactive, and active in the learning process so that student learning outcomes will be good.

(Arends, 1997: 266) argue that Reciprocal Teaching is a constructivist approach designed to teach students about cognitive strategies in the hope that learning material can be helped to be well understood by students.

Reciprocal Teaching is style learning which was originally developed to train children to be independent. This is categorized as interactive learning. G aya teacher and students take turns sharing information and discussion is a notion interactive embelajaran p. The model shows students will cooperate professionally, study, and understand. S students are prepared to interact in the world outside of school is Reciprocal teaching.

On Reciprocal Teaching The opportunity to communicate and interact socially with friends is given to students to achieve learning objectives, while motivators and active facilitators of students are played by a teacher. That is, in the learning process, students build their own knowledge and take responsibility for learning. Reciprocal learning (reciprocal teaching) intended to assess student activity. A kitiv itas is meant is k e activities students during the students work in groups, namely (1) notice; (2) provide an explanation; (3) respond to explanations; (4) asking questions, (5) making resumes; (6) solving problems; (7) estimate; (8)
enthusiastic and happy with others. Therefore, the early learning implementers reciprocal (reciprocal teaching) perceived student activity can be improved.

As for in terms of learning outcomes using the reciprocal teaching model student learning outcomes can increase. This is evidenced by the increase in scores in the experimental class compared to the control class.

By paying attention to the translation / explanation above, maka researchers interested in formulating this research titled "The Effect of Reciprocal Teaching Model Against Activities and Learning Outcomes IPS Grade IV S ekolah Basic"

II. Research Methods

The approach used in this study is a quantitative approach. Based on the formulation of the problem, this study is categorized into experimental research, in which researchers want to manipulate variables freely or provide treatment (treatment).

The main characteristic of experimental research is the treatment (treatment) imposed on the object or object of research. In this case penelit want to know the effect of pelakuan (treatment) is. The treatment in question in this research is in social studies materials kegiatan dalam interoperasi, including production, distribution, and the consumers, in the experimental group. The form of experimental research used in this study is the quasi-experimental Nonequivalent Control Group Design.

The procedure of the research was carried out in three stages, namely: a) the preparation stage which consisted of observation, determining the sample, determining the experimental class and control, determining the material; b) the implementation phase by carrying out a pretest, apply learning in experimental class model Reciprocal Teaching, while the control class using conventional learning, doing post-test the experimental class and control class; c) stage of data analysis by collecting and analyzing data, concluding the results of data analysis.

The data collection technique in this study is by using observation and test methods. The data collection of this study uses the results of observations of activities & learning outcomes after the pretest and posttest. Data is taken using instruments in the form of written questions. The instrument or test questions used in this study were tested before students outside the sample. After being tested, the test questions themselves were tested to determine the feasibility of the instrument. Tests on questions include validity test, reliability test, difficulty level test and distinguishing test. Data analysis to measure student learning outcomes by using the achievement values of each individual, class average values, and classical learning completeness values. Students' initial abilities were measured using a pretest while students' final abilities were measured using posttest. Student measured test was used Independent Sample test (t test), which aims to determine the effect of model Reciprocal Teaching on the activity of learning outcomes IPS elementary school students. To help the analysis used analysis package SPSS for Windows version 22.00.

III. Discussion

1. Simple Regression

This study uses simple regression to find out and analyze the influence of variable X (reciprocal teaching model) on variable Y1 (student activity) and the effect of variable X (Activity reciprocal teaching model) on variable Y2 (learning outcomes). Data is processed statistically using SPSS version 22.00. The results of simple regression analysis on research variables can be seen in the following table:

<table>
<thead>
<tr>
<th>Coefficients</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>38.074</td>
<td>4.783</td>
<td>7.960</td>
</tr>
<tr>
<td>Student activities</td>
<td>.403</td>
<td>.149</td>
<td>.378</td>
</tr>
<tr>
<td>Learning outcomes</td>
<td>961</td>
<td>1.02</td>
<td>1.317</td>
</tr>
</tbody>
</table>

Decision Making Simple Regression Test

a. If the Sig value is > 0.05, then the variable X does not affect the variable Y
b. If the Sig value is < 0.05, then the variable X has an effect on the variable Y

The results of several regression tests in table 4.24 are explained as follows:

a. For the Effect of X (Reciprocal Teaching Model) at Y1 (Student Activity) at 0.011 > 0.05 so that it can be concluded that there is an influence of X (Reciprocal Teaching Model) at Y1 (Student Activity)

b. For the Effect of X (Reciprocal Teaching Model) at Y2 (Learning Outcomes) at 0.000 > 0.05 so it can be concluded that there is an influence of X (Reciprocal Teaching Model) at Y2 (Learning Outcomes)

2. Test F (Simultaneous)

The implementation of F or the simultaneous test is to find out what variable X is (Reciprocal Teaching Model) simultaneously or individually affects the variables Y1 (Student Activity) and Y2 (Learning Outcomes).
The results of the F or simultaneous tests on the research variables are in the following table:

Table 4.25 F Test Results (Simultaneous)

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>1884,821</td>
<td>2</td>
<td>942,410</td>
<td>219,202</td>
<td>.000</td>
</tr>
<tr>
<td>Residual</td>
<td>124,679</td>
<td>29</td>
<td>4,299</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>2009,500</td>
<td>31</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Dependent Variable: Posttest. Experiment  
b. Predictors: (Constant), Activities, Learning Outcomes

Test Decision Making F

a. If the Sig value is > 0.05, then the variable X simultaneously does not affect the variables Y1 and Y2  
b. If the Sig value is <0.05, then the X variable simultaneously affects the variables Y1 and Y2

Based on table 4.25 shows a significant value for the X direction (Reciprocal Teaching Model) simultaneously (simultaneous) against Y1 (student activities) and Y2 (Learning Outcomes) is 0,000 <0,05 so it can be concluded that there is influence X (Reciprocal Model Teaching) simultaneously (together) with Y1 (Student activity) and Y2 (Learning Outcomes).

Table 4.28 T Test Results

<table>
<thead>
<tr>
<th>Independent Samples Test</th>
<th>Levene's Test for Equality of Variances</th>
<th>t-test for Equality of Means</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F</td>
<td>Sig.</td>
<td>T</td>
</tr>
<tr>
<td>Pretest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equal variances assumed</td>
<td>.000</td>
<td>.994</td>
<td>.787</td>
</tr>
<tr>
<td>Equal variances not</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>assumed</td>
<td></td>
<td></td>
<td>.787</td>
</tr>
<tr>
<td>Posttest</td>
<td>.127</td>
<td>.674</td>
<td>4,808</td>
</tr>
<tr>
<td>Equal variances assumed</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Equal variances not</td>
<td></td>
<td></td>
<td>4,808</td>
</tr>
</tbody>
</table>

Table 4.28 shows the results of the analysis with the Independent T-test sample at the pretest obtained t count 0.787. The value of table at (df.62) and the real level of 0.05 is 1.670, if a comparison is made then t count < t table with the results of sig. 2 with a tail of 0.434> 0.05 and said to accept Ho which means there is no significant difference. Which means there is no difference in student learning outcomes between the control class and the experimental class at the time of the pretest. Whereas in Posttest there is t count 4.808. The value of t table at (df.62) and the real level of 0.05 is 1.670, if a comparison is made then t count> t table with the results of sig. 2 is tailed at 0,000 <0,05 and is said to accept Ha which means there is a significant difference. Which means that there are differences in student learning outcomes between the control class and the experimental class at the posttest.

IV. Discussion

Based on the results of a simple regression analysis, the test shows that the Sig value in the learning activity variable (Y1) gets 0.011 <0.05. From these results, it can be concluded that there is an influence of reciprocal teaching (X) model variables on learning activities (Y).

Based on the results of the analysis of normality tests, the learning outcomes variable obtained a significant value of 0.087> 0.05 or> 5%. It can be concluded that the learning outcomes data are normally distributed.

Based on the results of the research that has been analyzed in chapter IV, to find out and analyze the effect of variable X (Reciprocal Teaching Model) on variables Y1 (Learning Activity) and Y2 (Learning Outcomes) using the F test. significant value for the effect of X simultaneously (simultaneous) on Y1 (Learning Activity) and Y2 (Learning Outcomes) is 0,000 <0,05 so it is concluded that there is an influence of X (Reciprocal Teaching Model) simultaneously (together) against Y1 (Learning Activity) and Y2 (Learning Outcomes). The magnitude of the influence of the two variables using the Test TerminationCoefficient obtained by the R Square value of 0.938, can be interpreted that the effect of X (Reciprocal Teaching Model) simultaneously (together) at Y2 (Learning Outcomes) is 93.8%.
V. Conclusion

The conclusion of this study can be taken after all variables meet the requirements for normality test, homogeneity test, multicollinearity test and heterocedasticity test. The results of the normality and homogeneity test for all variables are normally distributed and homogeneous. The conclusions that can be taken are based on the description of the research discussion, namely:

1. There is an influence of the Reciprocal Teaching model on the activities of students in class IV of Sooko 2 Elementary School in Mojokerto. The mean value of learning activities in the control class was 66.23 and the experimental class was 84.52. Then by looking at the results of the Independent Sample T test in table 4.10 $t_{count} = 3.485 > t_{table} = 1.677$. Sig. 2. tail 0.001 <0.05 then $H_0$ is rejected and $H_1$ is accepted. This shows that there are differences in the results of learning activities of students who have been treated and without treatment. So it can be concluded that the reciprocal teaching learning model influences student learning activities.

2. There is an influence of the Reciprocal Teaching model on the learning outcomes of students in class IV of Sooko 2 Elementary School in Mojokerto. The results of the statistical test results of the study (pre-test) which shows that the value of $t_{count} = 0.015 < t_{table} = 1.677$. This shows that there were no differences in student learning outcomes in the past. After being treated (treatment), obtained posttest learning results between the control class and the experimental class showed that the value of $t_{count} = 3.485 > t_{table} = 1.677$. This shows that there are differences in learning outcomes of students who have been treated and without treatment. So that it can be concluded that the reciprocal teaching learning model affects student learning outcomes.

References

[33]. from the Concept of Student Academic Self

A Comprehensive Review on Enhancing Algal Biology to Reduce Production Costs

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Abstract- The energy crisis and global warming due to rapid increase in Industrialization are the issues which compelled the scientist and the environmentalist to think about the more environment friendly solution which will satisfy the current energy consumption. Biofuel which is a fuel made by contemporary biological process is one such solution which gives energy security and economic development to our motherland. The Microalgae are a diverse group of prokaryotic and eukaryotic photosynthetic microorganisms that grow rapidly due to their simple structure. They can potentially be employed for the production of biofuels in an economically effective and environmentally sustainable manner. The Developments in microalgal cultivation and downstream processing (e.g., harvesting, drying, and thermochemical processing) are expected to further enhance the cost effectiveness of the biofuel from microalgae strategy. Our review focuses on the research achievement of metabolic engineering of algae for the biofuel production. It is concluded that the Fourth generation biofuel (FGB) uses genetically modified (GM) algae to enhance biofuel production. This paper reviews on technologies for converting biomass in to liquid fuels, Economics of algae biodiesel production and also enhancing algal biology to reduce production costs.

Index Terms- Biodiesel, cost effectiveness, Fourth generation biofuel (FGB), Microalgae, Transesterification

I. INTRODUCTION

Due to the increase in the price of the petroleum and the environmental concerns about pollution coming from the car gases, the biodiesel is becoming a developing area of high concern. There are different ways of production, with different kinds of raw materials: refine, crude or frying oils. Figure 1 represents the first to the fourth generation biodiesel. There are different types of catalyst, basic ones such as sodium or potassium hydroxides, acids such as sulfuric acid, ion exchange resins, lipases and supercritical fluids.
commercial production of biodiesel from vegetable oils, fats is a base catalyzed transesterification process using KOH or NaOH as the homogeneous catalyst and MeOH as the lower alcohol.

II. TECHNOLOGIES FOR CONVERTING BIOMASS INTO LIQUID FUELS

It is possible to produce a variety of liquid biofuels from the cellululosic biomass (next generation feedstock), however its cost is not competitive with petro fuels, even with the recent price hikes. The Multiple steps are required for the conversion into a liquid fuel. Recent studies have indicated that 6:10% of the energy in biomass is utilized in feedstock preparation. The two primary conversion pathways are thermo chemical and biochemical process.

2.1. Thermo chemical conversion

These technologies typically use the high temperatures and pressure to depolymerize lignocelluloses into small molecular weight organic and inorganic compounds which can be transformed into hydrocarbons, alcohols, aromatics and other organics.

2.2. Gasification

The two major thermo chemical pathways for the converting biomass to gaseous and liquid fuels are the gasification and pyrolysis, the Gasification is the thermo chemical partial oxidation of hydrocarbons in the biomass at high temperature (800–1000°C) to a combustible gas mixture ((typically its containing H2, CH4, CO and C2H4)). In the gasification procedure, the biomass is thermally decayed at great temperature in O2 hungry environment to avoid the explosive gas from combustion. This synthesis gas a mixture of ((CO2, CO, CH4 and H2)) is transformed to a liquid fuel such as synthetic diesel using FischerTropsch technology [2].

2.3. Pyrolysis

The Pyrolysis method depends on using high temperature in the non-existence of O2 transforms the biomass into bio-oil. Pyrolysis can be classified as fast, conventional or flash according to the heating rate, particle size, operating condition of temperature and solid seat time. For instance, if bio-oil yield is to be maximized fast, this is required that the biomass is heated to (500°C) for around (10 second). The pyrolysis temperatures are approximately (475°C), where gasification is ready at temperatures fluctuating from (600 to 1100°C).

2.4. Biochemical conversion

In Biochemical conversion, the process is described as enzymatic hydrolysis in addition to the microbial digestion. It includes the decomposition of the biomass into hemic cellulose, cellulose and lignin and transforming, the hemic cellulose and cellulose into fermentable sugars, subsequently use of yeast and specific bacteria to transform the sugar to ethanol. This method needs a pre-treatment stage (steam, ammonia and acid) to decomposition of the biomass into fluid slurry. The Use of acid to destroy lingo cellulose fibers can be used also to destroy much of the hemic cellulose sugar earlier then can be fermented into ethanol, causing low incomes [3].

2.5. Anaerobic digestion

The natural process is called the anaerobic digestion and is the microbiological conversion of organic matter to CH4 in the deficiency of O2. The biochemical transformation of biomass is finished throughout alcoholic fermentation to yield liquid fuels, while the fermentation with anaerobic digestion produce biogas ((H2, NH3, CO2 and CH4)) generally by four stages that includes (hydrolysis, acidogenesis, acetogenesis and methanogenesis). The decomposition is caused by natural bacterial action in different stages and occurs in a variety of natural aerobic environments including water sediment, waterlogged soils, natural hot springs, ocean thermal vents and the stomachs of various animals.

2.6. Fermentation and hydrolysis

There is some methods permit biomass to be converted into gaseous fuel, for instance, (CH4 or H2). One genetic-modified procedure uses bacteria and algae to yield (H2) immediately instead of the usual biotic energy carriers. The second way uses agricultural remains in fermentation for produce biogas. This method is documented and used for waste treatment in a wide range. The high temperature in gasification supplies a crude gas for the production of hydrogen by a second reaction step. in biogas, there is the opportunity of using the compact byproduct as a biofuel. Traditional fermentation plants producing biogas are in routine use, ranging from farms to large municipal plants [4].

2.7. Transesterification

The Transesterification is a chemical combination of bio-oil with an alcohol (the methanol or ethanol) [5]. The resulting of biodiesel is an alkyl ester of the fatty acid, which contains an alcohol group attached to a single hydrocarbon chain comparable in length to that of diesel (C10H22–C18H32). The transesterification method means biodiesel production [5] in which glycerin is extracted from the fat or vegetable oil [6]. The Plants late two products are methyl esters and glycerin that is used in the soaps and other products. Transesterification of the triglycerides can be improved by using catalysts which are divided in to alkali, acid and enzyme. Alkali-catalyzed transesterification is the best and faster than acid-catalyzed transesterification, so it used commercially [7, 8].

Chemical composition

The Natural oils and fats are the esters of glycerol and fatty acids. They are called the glycerides or triglycerides. There are two kinds of fatty acids, saturated fatty acids are polarized and contain a single carbon bond, while unsaturated fatty acids include one or more carbon-to-carbon double bonds and are polarized. Figure 2 represent the Triglycerides transesterification reaction with methanol. Examples of the common fatty acids are stearic, oleic, linolenic and the palmitic [9].

Transesterification reaction

The Transesterification of vegetable oils with alcohol is the best method for biodiesel production. There are two transesterification methods, which are: (1) with catalyst, (2) without catalyst. The utilization of the different types of catalysts improves the rate and yield of biodiesel. The transesterification reaction is reversible and excess alcohol shifts the equilibrium to
the product side shows the general equation of transesterification reaction [fig.2.] [10]. Many different alcohols can be used in this reaction, including, the methanol, ethanol, propanol, and butanol. The methanol application is more feasible because of its lowest cost and physical as well as chemical advantages, such as being polar and having the shortest alcohol chain. According to R1, R2, and R3 are the long chains of hydrocarbons and carbon atoms is called fatty acid chains. The reaction is based on one mole of the triglyceride reacting with three moles of methanol to produce three moles methyl ester (biodiesel) and one mole glycerol. Generally, the transesterification reaction involves some critical parameters which significantly influence the final conversion and yield. The important variables are: the reaction temperature, free fatty acid content in the oil, water content in the oil, type of catalyst, amount of catalyst, reaction time, molar ratio of alcohol to oil, type or chemical stream of alcohol, use of co-solvent and mixing intensity.

\[
\text{Catalyst} \quad \text{RCOOR}^1 + \text{R}^2\text{OH} \leftrightarrow \text{RCOOR}^2 + \text{R}^1\text{OH}
\]

Triglyceride Alcohol Alkyl Ester Glycerol

**Fig. 2. General transesterification reaction equation.**

The Biodiesel is usually obtained by transesterification of the oils or fats by reacting a short chain alcohol, like methanol, in the presence of a homogeneous base-catalyst (typically NaOH). The most common raw materials for production of the biodiesel are vegetable oils from sunflower, soybean, oil palm and others. The transesterification reaction mainly depends on the nature of the feedstock, catalyst concentration, the molar ratio alcohol-oil, temperature, agitation rate, pressure and reaction time as well as moisture content and amount of free fatty acids. The commonly used catalyst for production of biodiesel is the homogeneous catalyst. The homogeneous catalysis used for the biodiesel production can be divided mainly in alkaline and acidic catalysts. The Heterogeneous catalysts (solid phase) is also used.

### III. CLASSIFICATION OF BIOFUELS

Biofuels are generally classified into 4 categories

**A. First Generation Biofuels**

The very first generation of biofuels began in the late 1990’s when corn farmers of the United States of America synthesized fuel out of corn to meet the need to run their machinery. The first Generation of Biofuel was derived from sugarcanes, feedstocks, corn, vegetable oils.

**B. Second Generation Biofuels**

The beginning of 21st century marked the entry of second generation of biofuels in the market. The second generation also marked the introduction of advanced biogenesis in this field. In second generation biofuels, the roots of certain sugar producing or sugar rich plants were cultured in a special way such that directly oil is extracted from the roots. This generation was almost Carbon free or Carbon negative in terms of CO\textsubscript{2} released in the whole process. Common second-generation biofuel sources include lignocellulosic feed stocks, grasses, Jatropha, seed crops, waste vegetable oil, and solid waste and forest residues.

**C. Third and fourth generation biofuel feedstock**

Recently, the algae have received a significant interest as alternative biofuel feedstock because of their higher photosynthesis and fast growth rate as compared to any terrestrial plant. The Algae may be contain up to (70\%) of lipid on a dry weight basis [11,12] and can grow in the liquid medium utilizing different wastewater streams ((saline/brackish water/coastal seawater)) resulting in reduced freshwater demand.

Recent researches activities have been focused on the search for the ideal combination of algal species with high lipid content and their optimum growth conditions. Several algal species such as Botryococcus braunii, Chaetoceros calcitrans, several Chlorella species, Isochrysis galbana, Nanochlorispsis, Schizochytrium limacincum and Scenedesmus species have been studied as a potential sources of biofuel . Among these, the highest average lipid content and the biomass was obtained in Chlorella but has low triglyceride content. Some algal species like Botryococcus braunii, Nanochlorispsis and Schizochytrium sp. Can be reproduce (25-75\%), (31-68\%) and (50-77\%) of the triglycerides on dry cell weight basis, respectively, though the yield of the biomass is low in each case[13,14].It remains a common observation that fast growing algae (such as Spirulina) have low oil content whereas high lipid containing algae are slow growing organisms. The identification of correct species with high biomass as well as high lipid content is necessary for commercialization of algal biofuel. Type of cultivation (phototrophic and heterotrophic) also affects the biomass and lipid yield in same microalgal strain .The Scientists are looking for proper cultivation method for these species which will lead to the maximization of lipid contents to make it more cost effective and sustainable source of biofuel . In this context the genetic modification, metabolic engineering could be promising alternative to increase the lipid content and biomass yield of the algae. The pathways for the lipid anabolism and catabolism are investigated to identify and modify key enzymes of these pathways. (TAG), suggesting that the shunting of photosynthetic carbon partitioning from starch to TAG synthesis may represent a more effective strategy than direct manipulation of the lipid synthesis pathway to overproduce TAG, the modification in CoA dependent 1-butanol production pathway into a cyanobacterium, Synechococcus elongatus can produce the butanol from CO\textsubscript{2} directly [15].

**D. Fourth generation biofuels–solar biofuels**

By synthetic biology technologies the Fourth generation biofuels take advantage of synthetic biology of algae and cyanobacteria [16,17] which is a young but strongly evolving research field. The Synthetic biology comprises the design and construction of new biological parts, devices and systems, and the re-design of the existing, natural biological systems for useful purposes. It is becoming possible to design a photosynthetic, non photosynthetic chassis, either the natural or the synthetic, to produce high quality biofuels with high PFCE. For the first, second and the third generation biofuels, the raw material is either biomass or a waste, both being results of (yesterday’s
photosynthesis), (yet not from fossil resources). While these biofuels often are very useful in a certain region or country, they are always limited by the availability of the corresponding organic raw material, i.e. the biomass, which limits their application on global scales.

The Fourth generation biofuels will be based on raw materials that are essentially inexhaustible, cheap and widely available. The Photosynthetic water splitting into its constituents by the solar energy can become a large contributor to fuel production on global scales, by artificial photosynthesis and by the direct solar biofuel production technologies. Not only the production of the hydrogen but also the production of reduced carbon based biofuels is possible by concomitant enhanced fixation of atmospheric CO$_2$ and the innovative design of the synthetic metabolic pathways for the fuel production. The generation of (designer bacteria) with new useful properties requires revolutionary scientific breakthroughs in several areas of the fundamental research. The European Union bioeconomy strategy highlights the importance of discovery research for the establishment of functional bioeconomy, and the synthetic biology is a foreseen as a key enabling technology for successful realization of bioeconomy in replacement of the fossil fuels. The Synthetic biology will have the capacity to make bioeconomy much broader by providing means to produce numerous different biological compounds, including an array of various biofuels. There is also a worry about the decrease in (EU’s) biocapacity. If there are no actions will be taken, it is forecasted that consumption of the bio resources will exceed their renewal capacity by 2030. It is considered extremely important to produce of the biofuels using the minimal raw material resources in their production.

IV. ENVIRONMENTAL IMPACT THROUGH DIFFERENT BIOFUEL

The Generations greenhouse gas (GHG) emission from the biofuel is not only dependent on the gas coming out from burning the fuel but also from the combinational effect of GHG emission at different supply stages such as production of feedstock biomass (the fuel used in agriculture, N$_2$O soil emission from N-fertilizer and the residues), transportation to the industrial conversion unit, the

general overview of GHG emissions from different biofuels.

GHGs mostly studied in the recent pastare CO$_2$, CH$_4$, and N$_2$O, which converted to CO$_2$ equivalent by the global warming potential (GWP) recommended by the Intergovernmental Panel on Climate Change (IPCC). The Life cycle of GHG emissions from different sources of biofuel is shown in [fig.3.]. For the fossil fuel, the net GHG emissions includes the emissions from mining, extraction, transport, conversion to primary energy carrier, distribution and end use.

V. OVERALL BIODIESEL PRODUCTION COST

In the world, there are more than (350) oil-bearing crops that identified as potential sources for the biodiesel production. The wide range of available feedstocks for biodiesel production represents one of the most significant factors of producing biodiesel. The feedstock should fulfill two main requirements: (low production costs and a large production scale).

The availability of feedstock for the producing biodiesel depends on the regional climate, geographical locations, local soil conditions and agricultural practices of any country. From the literature, it has been found that feedstock alone represents (75%) of the overall biodiesel production cost as shown in Fig.[4].

![Fig.3. Life cycle of GHG emission from different sources of biofuel.](http://dx.doi.org/10.29322/IJSRP.10.01.2020.p97106)

![Fig.4. overall biodiesel production cost](http://www.ijsrp.org)
almost anywhere, requiring the sunlight and some simple nutrients, although the growth rates can be accelerated by the addition of specific nutrients and sufficient aeration. The Different microalgae species can be adapted to live in a variety of environmental conditions. It is possible to find species best suited to local environments or specific growth characteristics, which is not possible to do with other current biodiesel feedstocks (e.g., soybean, rapeseed, sunflower, and palm oil). They have much higher growth rates and productivity when compared to the conventional forestry, agricultural crops, and other aquatic plants, requiring much less land area than other biodiesel feedstocks of agricultural origin, up to 132 times less when compared to rapeseed or soybean crops, for a 30% (w/w) of the oil content in algal biomass. The competition for arable soil with other crops, in particular for human consumption, is greatly reduced. The Microalgae can provide feedstock for several different types of renewable fuels such as biodiesel, methane, hydrogen, ethanol, among others. Algae biodiesel contains no sulfur and performs as well as petroleum diesel, while reducing emissions of the particulate matter, CO, hydrocarbons, and SOx. However, emissions of NOx may be higher in some engine types.

VII. ECONOMICS OF ALGAE BIODEisel PRODUCTION

There are small numbers of the economic feasibility studies on microalgae oil. Microalgae biofuel has not been deemed economically feasible compared to the conventional agricultural biomass. Critical and controversial issues are the potential biomass yield that can be obtained by the cultivating macro or microalgae, and the production costs of the biomass and derived products. The basis of the estimates is usually a discussion on three parameters: photosynthetic efficiency, assumptions on scaleup, and on long-term cultivation issues. For microalgae the productivity of raceway ponds and photo bioreactors is limited by a range of the interacting issues. Typical productivity for microalgae in open ponds is (30–50) tons/hectare/year. Several possible target areas to improve the productivity in largescale installations have been proposed. The Harvesting costs contribute (20–30%) to the total cost of algal cultivation with the majority of the cost contribute to cultivation expenses.

The Genetic engineering, development of the low cost harvesting processes, improvement on photobioreactor, and integration of co-production of highvalue products, processes are other alternatives in reducing algal oil production cost. The harvested algae next undergo the anaerobic digestion producing methane which could be used to produce electricity. In the commercial photobioreactors, higher productivities may be possible. Typical productivity for a microalgae (Chlorella vulgaris) in photobioreactors is (13–150), the Photobioreactors require (10) times capital investment than open pond systems. The estimated algal production cost for open pond systems ($10/kg) and photobioreactors ($30–$70/kg) are two order magnitudes higher and almost three order magnitudes higher than conventional agricultural biomass respectively. Assuming that the biomass contains (30%) oil by weight and carbon dioxide available at no cost (flue gas), estimated production cost for photo bioreactors and raceway ponds to be ($1.40 and $1.81) per liter of oil respectively. For the microalgal biodiesel to be competitive with petro diesel, algal oil price should be less than ($0.48/L). It is useful to compare the potential of microalgal biodiesel with bioethanol from sugarcane, because on an equal energy basis, sugarcane bioethanol can be produced at a price comparable to that of gasoline. Bioethanol is well established for use as a transport fuel and sugarcane is the most productive source of the bioethanol.

For example, in Brazil, the best bioethanol yield from sugarcaneis (7.5 m³) per hectare. Bioethanol has only (64%) of the energy content of biodiesel. Therefore, if all the energy associated with (0.53) billion m³ of biodiesel that the US needs annually was to be provided by bioethanol, nearly 828 million m³ of bioethanol would be needed. This would require planting sugarcane over an area of 111 M hectares or (61%) of the total available cropping area of the United States.

The Recovery of oil from the micro algal biomass and conversion of oil to biodiesel are not affected by whether the biomass is produced in raceways or photo bioreactors. Hence, the cost of producing the biomass is the only relevant factor for a comparative assessment of photo bioreactors and raceways for producing the microalgal biodiesel. If the annual biomass production capacity is increased to (10,000) tons, the cost of production per kilogram reduces to roughly ($0.47) and ($0.60) for photo bioreactors and raceways, respectively because of the economy of scale. Assuming that the biomass contains (30%) oil by weight, the cost of the biomass for providing a liter of oil would be something like ($1.40) and ($1.81) for photo bioreactors and raceways, respectively. The Biodiesel from palm oil costs roughly ($0.66/L), or (35%) more than the petro diesel. This suggests that the process of converting palm oil to biodiesel adds about ($0.14/L) to the price of oil. For palm oil sourced biodiesel to be competitive with the petro diesel, the price of palm oil should not exceed ($0.48/L), assuming an absence of the tax on biodiesel. Using the same analogy, a reasonable target price for microalgal oil is $0.48/L for algal diesel to be cost competitive with petro diesel.

The Algae are among the fastest-growing plants in the world, and about (50%) of their weight is oil. That lipid oil can be used to make biodiesel for the cars, trucks, and airplanes. The Algae will someday be competitive as a source for biofuel. The Only renewable biodiesel can potentially completely displace liquid fuels derived from the petroleum. The Economics of producing microalgal biodiesel need to improve substantially to make it competitive with the petro diesel, but the level of improvement necessary appears to be attainable.

VIII. ENHANCING ALGAL BIOLOGY TO REDUCE PRODUCTION COSTS

The biofuels made from the microalgae hold the potential to solve many of the sustainability challenges facing other biofuels today, the production of their biomass using the technology available is not economical and, the existing algal species could not be grown sufficiently cheaply and, at the same time, the produce oil usable as a source of the fatty acids for biodiesel. Based on conventional estimates, algal biofuels produced in large volumes with the current technology would cost more than ($8) per gallon (in contrast to ($4) per gallon for the soybean oil today)) [19,20].
Therefore, to producing low cost microalgal biodiesel requires either improvements of the algal biology through genetic and the metabolic engineering or modifying the culture conditions in some species or combination of both. Concomitant use of tailormade, rather than wild type, algal strains may help to reduce production cost to a level that could bring algal oil within the reach of economic feasibility [21]. To address these drawbacks, a number of research works have been made for decades. The last few years have witnessed significant progress in the genetic engineering of microalgae. The Transgenesis in the algae is a fastgrowing technology as selectable marker genes, promoters, reporter genes, transformation techniques, and other genetic tools and methods are already available for various species. The commercial application of the algal transgenics is beginning to be realized, and algal biotechnology companies are being established. The Microbial production of natural products has been achieved by transferring productspecific enzymes or entire metabolic pathways. Figure 5, is Schematic that representation of Photanol process.

![Fig. 5. Schematic representation of Photanol process](image)

From the rare or genetically intractable organisms to those that can be readily engineered, Production of special chemicals, bulk chemicals, and fuels has been made possible by combining enzymes or pathways from different hosts into a single microorganism and by engineering enzymes to have new function. The photanol approach, ((Light driven conversion of CO₂ and water into the biofuel)) can be achieved by combining the light reactions of photosynthesis and the Calvin Cycle with a fermentative pathway from a chemoheterotrophic microorganism in one single chimera ((an organism with at least two genetically different components resulting from mutation, the grafting of plants, or the insertion of the foreign cells into an embryo)). This would circumvent the need for converting CO₂ into the complex mixture of biopolymers ((protein, nucleic acids, cell walls, neutral and phospholipids, etc..)) and then applying a series of subsequent processing steps to convert this complex mixture into a specific biofuel with consequent increase in the overall efficiency of the biofuel production process. The Genetic and the metabolic engineering and transgenics offer the potential to increase the lipid productivity of microalgae and contribute to improving the economics of production of the microalgal diesel.

In this regard, many improvements have been realized, including the increased lipid and carbohydrate production, improved H₂ yields, and diversion of central metabolic intermediates into biofuels. Some of the achievements in genetic and metabolic engineering that involve Scenedesmusobliquus have been discussed, while some more with other microalgal species are presented here. The transgenic Chlamydomonas reinhardtii is now being developed for various biotechnological applications, including the production of biohydrogen. In this species, a mutant created by the genetic blockage of the starch synthase showed increased accumulation of lipids on a cellular basis during nitrogen deprivation. In an attempt to increase the algal productivity through downregulating expression of the lightharvesting antenna complexes in C. reinhardtii, the transgenic alga showed higher resistance to photo-oxidative damage with a concordant (30%) increase in photosynthetic efficiency [22]. Another fascinating finding in this scenario is an engineered blue green alga, the Synechococcusleopoliensis, equipped with the cloned bacterial cellulose synthase genes from Gluconobacterxylinus. This engineered alga produces extracellular deposits of the non crystalline cellulose, a polymer which is ideal as a feedstock for biofuel production of various alcohols.

The Outstanding achievements reported in enhancing the alcohol production via genetic engineering in two independent cyanobacterial strains ((Synechococcus sp.)) through the expression of pyruvate decarboxylase and alcohol dehydrogenase II genes. This was done through cloning the code sequences of pyruvate decarboxylase ((pdc)) and the alcohol dehydrogenase II ((adhII)) from the bacterium Zyromonasamobilisinto the shuttle vector ((referred as pCB4)) and then used to transform the cyanobacterium Synechococcus sp. (strain PCC 7942). The cloned and transformed cyanobacterium synthesized ethanol, which diffused from the cells into the culture medium. Another recent finding was that of Joule Unlimited, where the engineered, transformed strain was able to secrete ethanol at a rate of (1 mg/L.h.), which greatly outpaces rates reported previously (0.2 mg/L. day). Other important finding which involves the iso butanol production, as iso butanol possesses greater energy density, the valine synthesizing enzymes have been used to divert internal pyruvate stores to the precursor 2- ketoisovalerate, which is converted to the iso butyaldehyde a precursor of iso butanol at a rate of (6.23 mg/L.h) by co-expression of keto acid decarboxylase ((kivD)) within Synechococcus elongates [23].

The genetic approaches to construct the blue green alga strains with a higher and special photosynthetic efficiency could be used to improve product yields from several biochemical pathways. The photosynthetic productivity and light utilization efficiency of the algae, the achievements are also recorded, as these are the important factors in determining the production cost. At high photon flux densities, the rate of photon absorption by the chlorophyll antenna far exceeds the rate at which photons can be utilized for photosynthesis. Thus, the microalgal mass cultures growing under full sunlight have a low per chlorophyll productivity resulting in excess photons (up to 80%) dissipated as fluorescence or heat. This reduces the light conversion efficiencies and cellular productivity to fairly low levels. That this shortcoming could possibly be alleviated by the development of the microalgal strains with a limited number of chlorophyll molecules in the lightharvesting antenna of their photo
systems, (i.e. the strains that have a truncated chlorophyll antenna size), the truncated chlorophyll antenna size minimizes absorption and wasteful dissipation of sunlight by individual cells, the resulting in better light utilization efficiency and greater photosynthetic productivity by the green alga mass culture. In general, metabolic and molecular level engineering can be potentially useful to promote several desirable features of microalgae to increase photosynthetic efficiency to enable increased biomass yield, to enhance biomass growth rate, to increase oil content of biomass, to improve temperature tolerance to reduce the expense of cooling, to eliminate the light saturation phenomenon so that growth continues to increase in response to increasing the light level, to reduce the photo inhibition that actually reduces growth rate at midday light intensities that occur in the temperate and tropical zones, and to reduce susceptibility to photo oxidation that damages cells.

IX. CONCLUSIONS

The Biodiesel is gradually gaining acceptance in the market as an environmentally friendly alternative diesel fuel. However, for biodiesel to establish and continue to mature in the market, various aspects must be examined and overcome. Some of the key issues such as improving efficiency of the production process, using low cost feedstock, developing cost effective catalyst, and managing agricultural land, have been reviewed. As with any new technology or products, the biodiesel will require continuous improvement especially in producing cleaner emissions and having less impact on the environment. Further, the development on the use of the byproduct will enhance the economic viability of the overall biodiesel production process.

It can also be carried out with seawater as the medium, given that marine microalgal species are adopted, providing a feasible alternative for biofuel production to populous and dry coastal regions. Microalgae can produce a large variety of novel bioproducts with wide applications in medicine, food, and cosmetic industries.

Combining the microalgal farming and the production of biofuels using biorefinery strategy is expected to significantly enhance the overall cost-effectiveness of the biofuel from microalgae approach. Technological developments, including advances in photobioreactor design, microalgal biomass harvesting, drying, and other downstream processing technologies are important areas that may lead to enhanced cost-effectiveness and therefore, effective commercial implementation of the biofuel from microalgae strategy.

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Abstract- Waste management has become a global concern for both developed and developing countries. Food waste (FW) causes tremendous environmental, economic, and great social influence, thus studies on food waste are essential and meanwhile very complex according to Food and Agriculture Organization of the United Nation. Countries have adopted different methods and technologies for both treatment and disposal of food waste from landfilling, composting, incineration and anaerobic digestion (AD). However, recently the first three methods have been questioned in terms of their environmental sustainability. This paper attempts to study AD of FW as a sustainable technology for treatment of FW and resource recovery in China and its current status and achievements in terms of answering environmental and economic challenges. It also intends to explore FW status in Lesotho as one of the developing countries with waste management difficulties and how it can also adopt the use of this technology to manage environmental pollution and waste of resources. Recently, China has also been exploring Life Circle Assessment (LCA) of FW as an alternative and more sustainable tool for evaluating and assessing environmental, social and economic impacts of waste treatment technologies. It’s becoming more popular as it’s proven through research to capture the cause-effect relationships between resource consumption and the environmental impacts of a specific service or manufacturing procedure. Adopting FW treatment technologies that allows FW to be used as energy substitute could be beneficial to all. Sensitizing communities on the importance of waste separation from source and the possible derived benefits and the negative impacts of not sustainably managing and treating waste is of great importance.

Index Terms- Food Waste, Anaerobic Digestion, Life Circle Assessment, Lesotho

I. INTRODUCTION

FW is one of the largest and most important components of municipal solid waste. This includes household FW, food-processing waste, and canteen and restaurant waste which are being generated at an amazingly high rate. The mounting of FW has gradually become a global concern [1]. It is estimated that the amount of FW will dramatically increase from 2.78 to 4.16 billion tons in Asian countries by 2025 [2]. This is more evident in countries like China where the growth rate of FW has increased more than 10% with the acceleration of industrial development and urbanization processes [3]. Sustainable management of increasing amounts of this waste has therefore become a major social, economic and environmental concern. Improper FW management leads to substantial negative environmental impacts such as air, soil, water pollution, and health safety issues [4]. Landfill space is also becoming very scare and countries are therefore looking for more alternative methods of dealing with the ever increasing amounts of FW [5]. Food safety issues frequently occur due to incomplete FW management systems. Its disposal is attracting widespread attention in many countries and has become a major environmental concern and one of the major components of waste around the globe [6, 7].

Some define FW as a left-over organic matter from restaurants, hotels and households [8] which is a useful source of fertilizer and biofuel [9]. A nutrient with high levels of carbohydrates, lipids, proteins, and other organic molecules which can support abundant populations of microorganisms [10]. AD, landfill, incineration, and composting are the most commonly used treatment technologies for FW. However, high organic matter and the water content in FW [11] are the main causes for harmful elements in landfills. Currently, the need for alternative and energetically more efficient ways of treating FW seems to be a global goal. AD of FW has demonstrated to be one of the most advantageous technologies to maximize the substrate and energy recovery [11].

II. ANAEROBIC DIGESTION OF FOOD WASTE IN CHINA

Anaerobic treatment provides a method of reducing pollution from agricultural and industrial operations while at the same time it balances the operations usage of fossil fuels [5]. AD is considered one of the oldest and well-studied sustainable biological treatment technologies for stabilization and reduction of organic wastes, including fruit and vegetable processing wastes, packinghouse wastes, industrial organic wastes, and agricultural wastes, especially the sewage sludge [12]. It is one of the most efficient waste and waste-water treatment technologies. It has been widely used for the treatment of municipal sludge and limited application in the treatment of organic industrial wastes [5].
Anaerobic fermentation produces methane as the main product and fertilizers as the byproduct. However, the disadvantages of the technology include high cost, strict start-up condition and long time for fermentation [13, 14].

As a result of increased waste and a need for a more sustainable future, countries have revised and implemented frameworks for the appropriate management of such wastes and their possible future use. In July 2010, China issued a policy named Opinions on Strengthening Waste Cooking Oil and Food Waste Management”, which clearly specifies the enhancement of FW management generated from restaurants and hotels putting more focus on waste reduction at source, centralized recycling and treatment. Since 2011, 83 pilot projects have been implemented in 81 cities with a total treatment capacity of 20,930 ton/day. The project was highly supported by Ministry of Finance, Agriculture and Housing and Urban-Rural Development. Among which, the utilization of biogas produced by AD of FW is over 70% [15]. However, the AD process of food waste in China is still in initial stage with noticeable problems such as low gas production efficiency, effective disposal of biogas residues and slurry and undesirable environmental emissions.

AD offers numerous significant advantages, such as low energy requirement and possible energy recovery. Compared to mesophilic digestion, thermophilic AD has killed pathogens, and improved post-treatment de-water degree of waste stabilization thorough destruction of virus and bacteria [16,17]. AD is considered to be one of the most promising technologies for renewable energy production and even more efficient if there is pretreatment specifically adopted for FW. This will assist in adjusting the nutrient concentration of lipids resulting in higher biogas production and lower lipid limitation [18].

2.2 Life Circle Assessment of Food Waste in China

LCA is a technique used to assess environmental impacts with all the stages of a product’s life. The LCA is widely accepted international tool to transpose life cycle perspective principles into a quantitative framework [19, 20]. It seeks to quantify all relevant emissions, consumed/depleted resources, and the related environmental and health impacts associated with the full waste management cycle [21]. The LCA results in complement techno-economic measurements and help decision makers to determine which strategy to use to achieve a high level of sustainability and identify the weak points and main areas that needs potential improvements [22, 23].

LCA of food carbon emissions from several stages such as raw material, production, consumption and disposition was explored by Wang and Qi [24]. They looked at the general LCA framework and methods of calculating carbon emissions from food, especially meat. Hu et al. [25] used LCA approach to analyze the carbon emission characteristics of food in China from 1996-2010, using brief statistics for energy/resource reuse in different parts of food supply chain, and concluded that diet structure, high amount of fertilizer application, as well as food waste are the three main causes for increased Greenhouse Gases (GHG) from food industries. Food waste percentages in China was studied, and both rough resources together with environmental influence was calculated [26].

Global food waste studies were summarized by Cheng et al. [27], who concluded that studies on whole food supply chain are not enough. On the other hand, Hao et al. [28] studied FW and brought forward the importance of LCA application on FW along with a complete life cycle inventory for food. Five treatment methods such as landfill, compost, AD, smashing, and integrated treatment for kitchen waste were compared. [29] AD can be quite beneficial for energy generation and emission reduction, especially when kitchen waste is mixed with other waste such as sludge.

Recently, Gao et al. [30] studied LCA of food waste and its application in China. It was found that FW management in China can improve LCA application in different aspects if more focus is put on: a) the early stages of the food cycle rather than just the kitchen waste; b) other environmental influences besides global warming potentials; c) broader study of FW treatment by considering mixing it with other substrates using different methods; d) a local context with local data/inventory since the local context are substantially different, (for instance, rice from southern and northern parts of China requires different inputs/steps thus have different environmental profile); e) further more detailed studies to support an elevated food waste management, such as food waste profile can be developed.

III. FOOD WASTE MANAGEMENT IN LESOTHO

Located in Southern Africa and entirely landlocked by South Africa, with the total length of 909 km, this mountainous country covers an area of around 30,355 km² [31]. It is divided into four agro-ecological zones, namely the mountains, foot-hills, lowlands and Orange-River-Valley as shown in Figure 1.

Figure 1 Ecological zones of Lesotho [32]

Developing countries face problems of lacking effective waste management [33]. Lesotho is one of the developing countries that are unable to keep up with Municipal Solid Waste (MSW) generation rate, which results in unsustainable waste management [34]. The Nation is prone to air, land and water pollution due to unsustainable and illegal waste dumping [35]. Unmanaged organic waste emits large quantity of GHG [36]. Figure 2 shows organic waste being the major component of municipal solid waste in Lesotho with almost 60% generation. It implies that AD of FW could be a potential waste to energy treatment technology for the country. It is evident that FW management needs special and
immediate attention for both public health and environment protection.

![Image](image)

**Figure 2 Composition of municipal solid waste in Lesotho**

According to United Nations Development Program (UNDP), MSW generation rate is estimated at 0.5 kg per capita per day which makes it 115,000 ton per annum for the city of Maseru (capital town) alone and expected to increase to 0.8 kg/capita/day by the year 2025, making the total MSW generation of about 279,000 tons per annum. The current waste status and future projections could predict waste management disaster especially with the current poor waste management infrastructure in the country. However, the high percentage of organic waste (59%) may also indicate a promising waste to energy potential for the country. Therefore it could meet the need for balancing the energy environmental gap in the country. However, sustainable FW management is not practiced at all in Lesotho now. FW along with other wastes are disposed in dumping areas which cause both health and environmental issues. In Maseru, waste is being disposed in a dumping site at Ha-Ts’osane, a village in Maseru.

Through the years there has been a lot of environmental stress and community health risks caused by burning and unpleasant smell from the waste. Environmental, social and economic aspects of the various areas in Lesotho need to be considered for the introduction of AD technology for energy production. While rural areas in Lesotho may be compared with those in China and other Asian countries for application of this technology to generate energy from organic waste for lighting and cooking. China’s Ministry of Agriculture introduced new technologies to rural areas of the country, of which a domestic biogas plant forms the base, combined with other transformations that are dependent on local conditions, such as pig farming and the construction of solar-heated greenhouses. Lesotho not being self-sufficient in energy production, the adoption and application of this technology used in China could boost the country’s economy, assist those rural dwellers without access to electricity, decrease the demand for electricity and most importantly decrease the amounts of FW generated in the country. Figure 3 shows Access to electricity (% of population) in Lesotho. It was reported that only 29.73 % of the population had access to electricity in 2016 and 27.9% in the previous year according to the World Bank collection of development indicators.

![Image](image)

**Figure 3 Access to electricity in Lesotho (% of population)**

Lesotho Renewable Energy and Energy Access Project (LREEAP) which is funded by the World Bank, is one the project that the Government of Lesotho is preparing to scale up renewable energy-based off-grid electrification in order to increase access to electricity in rural and peri-urban areas of Lesotho. The project will be implemented over seven years under the Ministry of Energy and Meteorology (MEM). While electricity access is low in Lesotho, the country has potential to achieve universal access by 2030 using clean, renewable energy resources. By using of sustainable technologies such as AD for treating food waste and recovering energy from biogas production, this could benefit the country and push it towards achieving sustainable development goal 7 (affordable and clean energy) and 11 (sustainable cities and communities).

3.1 Major challenges of waste management in Lesotho

According to Thamae et al., poor waste management in the Lesotho is a result of lack of government attention on legislating efficient waste management guidelines leading to poor waste handlings. Greater portion of the waste therefore does not reach legal dumpsite and are largely and illegally deposited everywhere, along the roads and on illegal abandoned areas. Proper solid waste management should be given priority for waste reduction, decreasing indiscriminate waste dumping and recovering some waste material to be recycled and collection of valuable material for energy generation. Although, there are no formal waste treatments in Lesotho, there are waste recovery centers and some recycling private companies for waste exportation as well as individuals waste scavengers trying to earn a living. If all of these are brought together and recognized by the government this could enhance the waste management system. In an interview I had with one of the civil servant from Mafeteng Urban Council in Lesotho, she mentioned that one of the main challenges facing the council now when it comes to waste management is the inadequate and unsustainable disposal of soiled food which could be poisonous to scavengers. Oil deposited in nearby dams also kill species living in water and makes it difficult for the water department to purify water for drinking purposes. Lack of financial and political support is also known challenges.

IV. RECOMMENDATIONS

Uncontrolled disposal of FW is likely to cause environmental pollution and waste of resources, which are very
crucial issues in the world today [3]. The considerable contribution of food industry to the climate change cannot be ignored specially by the policy makers. According to Garnett, Hartmann and Ahring [45, 46], the GHG emissions from food supply chain are produced during all stages of the food production and consumption. Besides, for developed countries, food supply chain contributes between 15% and 28% to overall national emissions. All stakeholders within the food industry must responsibly consider this during the food supply chain. In recent years, this concern became a major driving force to reduce the volume of FW as well as evaluating it as a renewable feed-stock for the production of energy and chemicals.

FW involves a substantial amount of biomass material that makes it possible to use for the biofuels. As a result of high amount of organic material, the management of food wastes must focus on certain difficulties such as high water content, and fragile biological stability. Adopting FW treatment technologies that allows FW to be used as energy substitute could be beneficial to all. Sensitizing communities on the importance of waste separation from source and the possible derived benefits and the negative impacts of not sustainably managing and treating waste is of great importance. Millions of households in China are already using biogas. Livestock and poultry farm waste as well as household waste are the feed sources for the digesters. The biogas plants are mainly situated in farming communities where they serve a dual need: the reduction in organic waste and the supply of biogas as an energy source in areas where no energy was previously available. Lesotho being one of the African developing countries whose economy depends heavily on agriculture, theoretically, department of Agriculture can apply this example from rural China for improving farming communities in the rural areas for biogas and created fertilizer to supply nutrients and organics to the soil.

V. CONCLUSION

FW is considered a sustainable energy source due to its biomass features. Based on ongoing and previous literature, FW could be the answer to energy problems and not a problem on its own if well managed. Profoundly, it has been noted that the costs of managing waste are very high [47] but unsustainable management or no management at all can even be more costly. However, sustainable FW technologies should take center stage especially for countries like Lesotho where there are not even basic proper sanitary Landfills for general waste management regardless of the increasing amounts of municipal waste coupled with the low percentages of access to electricity. FW is an untapped resource and there are no LCA studies on FW reported with the low percentages of access to electricity. FW is an untapped resource and there are no LCA studies on FW reported.

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