

Evaluation of Knowledge, Attitude and Practices of TB Diagnosed Patients in Rwanda towards TB Infection. Case of TB Diagnosed Patients in Kigali Urban and Rural Health Facilities

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Abstract- A cross-sectional quantitative study carried out in Kigali within a one year period (July 2011 to June 2012). It evaluated knowledge, attitude and practices towards TB infection among TB diagnosed patients. Sample of 411 TB patients was randomly and proportionately drawn for the study. The validated and translated questionnaires comprised participants' socio-demographic characteristics, 11 items Knowledge questions, 13 item attitudes questions and 10 practices questions. Trained community health workers at health center, interviewed participants face to face during their routine daily treatment at the health Centre. Data from the field were sorted out, arranged and analysis with SPSS based on analysis plan.

Study result showed that 59.9% participants had good TB knowledge, while 40.1% participants had poor TB knowledge. The poor knowledge was most predominant on knowledge of who can be infected with TB infection, especially homelessness, People living with HIV/AIDS and people who has been to prison (8.3%, 23.4% and 6.3%) respectively. Also there were poor responses on some of the symptoms regards coughing up blood and shortness of breath (37.2% and 25.1). Diagnosis of TB led to increase anxiety / tension & participants also had worries on prolonged treatment, fear of spread, stigma, threatened self-esteem and quality of life. There were some stigmatization attitude and resentful behavior of the community members towards most of the participants, most people rejects him/her (53.8%) and most people are friendly but they generally try to avoid him / her (44.5%).

Practices of covering mouth and nose when coughing and sneezing, personal hygiene, immunization of family members were poor among study participants. The determinants of knowledge and practices were education, profession, residence. The knowledge effect on practices were significant with OR = 7.466, CI 4.766, 11.695. There's need to Strengthen TB awareness and have new interventions that contributes to stigma reduction.

Index Terms- Knowledge, Attitude, TB Diagnosed Patients, TB infection, Urban and Rural Health Facilities and Practices

I. INTRODUCTION

T1.1. Problem statement and study significant

Tuberculosis (TB) is a major public health problem in Rwanda and in the Kigali district. Assessment of knowledge,

attitude, and practices in this region is essential to plan, implement, and evaluate advocacy, communication, and social mobilization network. This may improve the case detection rate and loss to follow up. The proportion of people who get tuberculosis each year is stable or falling down worldwide but because of population growth, the absolute number of new cases is still increasing {^{3, 4}}. In 2007, there were an estimated 13.7 million chronic active cases, 9.3 million new cases, and 1.8 million deaths, mostly in developing countries and among HIV-negative patients with TB {¹}. Tuberculosis (TB) remains a major challenge to global public health in the 21st century.

During the last quarter 2010 in Rwanda, funds were received from the Global Fund, allowing the TB program to implement most activities planned in the Strategic Plan 2009-2012. In contrast, the detection rate remains weak for all categories of cases and the number of cases registered is showing a slow but sustained decline since 2007. Infection control was introduced in a number of hospitals and health centers but a low proportion of them already implemented the six measures of the minimum Information communication package {²⁷}. Tuberculosis Control Program can have an epidemiological impact only if the private sector and community are fully involved in TB case finding, treatment and the follow-up of the TB patients. To face the growing problem of multi-drug resistant TB (MDR-TB)

Many international studies explored knowledge, attitudes and practices regarding TB disease in different parts of the world, findings revealed misconception and limited Knowledge about TB. The persistent challenges of preventing and controlling TB present a clear example of a public health problem that requires a multidisciplinary approach – one that looks beyond the biomedical model of TB control. In this perspective, a study in Egypt revealed that the significant risk factor for treatment failure were non-compliance to treatment due to deficiency of health education and poor knowledge about the disease and poor practice of control / preventive measures which did not have a decrease effect of the disease {¹}. Also a cross sectional study conducted in different health settings in Tanzania, measuring Patients knowledge about TB and its treatment on 1000 randomly selected participants, revealed general un-awareness with disease and treatment {⁹}. A community based cross sectional survey was conducted in Ethiopia, in that study it was demonstrated that there was little knowledge about TB studied participants. There were also

inappropriate health seeking behavior and stigma towards TB patients {⁶}.

In Morocco, TB is highly prevalent; it affected more than 26,000 people in 2009, with an incidence of approximately 82 new cases per 100,000 populations (Health Ministry statistics). Despite the absence of fees to pay for treatment, a high number of new smear positive cases interrupt voluntarily their treatment before the end. Treatment default is a major obstacle in the fight against TB, and was estimated around 10% in 2009. However, the association between TB knowledge and attitude on treatment default has not yet received much attention {¹⁹}

1.1.2. REVIEW OF RELATED LITERATURE

Epidemiology of Tuberculosis (definition, distribution and risk factors, of Tuberculosis) Tuberculosis (TB) is a communicable disease caused by the bacteria *Mycobacterium tuberculosis* in humans; it affects several organs of the body. There are several *other* species of the genus *Mycobacterium* that are also human pathogens, but all of these organisms are of much lower virulence than *Mycobacterium tuberculosis*. However the primary site for active TB infection is the lungs. TB is spread through droplet nuclei that become aerosolized when an infected person coughs, speaks, sings or talks {²⁰}.

Although latent infection is possible, the bacteria are inactive in this form and the person is not contagious. There are variations from one individual to the next. The tubercle bacillus is well known for individual strains that vary, independently, in both virulence and antibiotic resistance. In general, the severity of disease caused by TB infection is dependent on three major factors- the virulence (and dose) of the particular strain of TB bacteria, the patients' level of immunity and strength of resistance and the lack of timely or inappropriate selection of drugs for the right duration {²²}

Major signs and symptoms of TB are chronic cough with blood-tinged sputum, fever, night sweats and weight loss. Diagnosis of TB relies on radiology via chest X-rays, tuberculin skin test, blood test for microscopic examinations and microbiological culture of sputum, also antibiotics resistance test is done in multi-drug-resistance tuberculosis. BCG vaccine is given for prevention of TB infection {²⁰}.

Risk factors: These are conditions that easily promote TB among susceptible individuals example includes people with silicosis have an approximately *30-fold* greater risk for developing TB. Silica particles irritate the respiratory system, causing immunogenic responses such as phagocytosis, which as a consequence, results in high lymphatic vessel deposits affecting the function of the body macrophages causing an easy susceptibility to tuberculosis infection. Persons with chronic renal failure and also on hemodialysis have an increased risk {¹²}.

Individuals with diabetes mellitus have greater risk for developing active TB especially among the insulin-dependent or poorly controlled diabetes and in some cases diabetics have a poorer response to TB treatment, possibly due to poorer drug absorption. Other clinical conditions that have been associated with active TB include people with increased weight loss following gastrectomy and mal-absorption, jejunum - ileac bypass, renal and cardiac transplantation, carcinoma of the head or neck, and other neoplasms (e.g., lung cancer, lymphoma, and

leukemia). Low body weight is associated with risk of tuberculosis as well (e.g. BMI below 18.5), increases the risk by 2-3 times. An increase in body weight lowers the risk, {^{15,20}}.

There is an increase risk among individuals that shares needles as seen among intravenous drug users; recently, there are TB infection or a history of inadequately treated TB; chest X-ray suggestive of previous TB, showing fibrotic lesions and nodules; prolonged corticosteroids' therapy and other immunosuppressive therapy. Susceptibility to TB was heritable following 1940 twin studies therefor If one of a pair of twins got TB, then the other was more likely to get TB if he was identical than if he was not. Specific gene polymorphisms in *IL12B* have been linked to tuberculosis susceptibility {²⁰}.

Some drugs used in the treatment of rheumatoid arthritis tends to act by blocking tumor necrosis factor -alpha and increases the risk of activating a latent TB infection due to the importance of this cytokine in the immune defense against TB. A person with active but untreated tuberculosis can infect 10-15 other people per year. Others people at risk include people who live in areas where TB infection is common, illicit IV drugs users. Also at risk are people living or working in high-risk congregate settings, medically under-served and low-income populations, as well as those in high-risk racial or ethnic minority populations. Children exposed to adults in high-risk categories and those who have low immune status due to the existence of other immune compromised disease conditions and are on prolonged immunosuppressant drugs, and health care workers serving these high-risk clients, {^{18,4}}.

Mechanism of Transmission: When people suffering from active pulmonary TB coughs, sneeze, speak, sing, or spit, they expel infectious aerosol TB bacteria droplet. A single sneeze can release up to 40,000 droplets. Each one of these droplets may transmit the disease, since the infectious dose of tuberculosis is very low and inhaling fewer than ten bacteria may cause an infection. People with prolonged, frequent, or intense contact are at particularly high risk of becoming infected, with an estimated 22% infection rate {^{3, 20}}. Transmission can only occur from people with active not latent TB. The probability of transmission from one person to another depends upon the number of infectious droplets expelled by a carrier; the effectiveness of ventilation, the duration of exposure, and the virulence of the organism are all involved.

The chain of TB transmission can be broken by isolating people with active TB disease and early commencement of treatment. After two weeks of such treatment and non-resistant situation, the TB infection generally becomes less contagious. So if someone does become infected, then it will take three to four weeks before the newly infected person can transmit the disease to others {^{26, 20}}.

TB Prevalence: The greatest prevalence of TB occurs in developing countries and their low socioeconomic populations. This is likely due to the limited availability of health care, poor nutrition, and overcrowding conditions like in prison custody these people face on a daily basis. Immunosuppressed individuals, such as people infected with HIV, are also more likely to contract tuberculosis. TB is also very hard to treat and many forms of the disease are resistant to antibiotics

Latent Tuberculosis

In most people, especially those who have a normal immune system, after becoming infected, the body controls the illness. They have no symptoms, and are not contagious. Signs of infection can be a positive TB test or typical changes on X-rays of the chest. In a small, but significant, percentage of people, latent TB can "reactivate" and make the person ill. Therefore, most people with latent TB are treated to eliminate the infection.

Prevention: TB prevention and control takes two parallel approaches. It starts first with identification and treatment of TB infected people and their contacts. Identification of infections often involves testing high-risk groups for TB. Secondly, children are given BCG promptly to protect them from TB, {^{20, 26} }.

Treatment: The problem facing most of the TB infected individuals are the long duration of therapy required for total cure. Just as in all bacterial infections, the antibiotic treatment affects the bacteria when they are actively reproducing; they are not combated easily because the bacteria can become dormant and reproduce very slowly. A person's immune system is also designed to kill the bacteria when they are dividing and is less able to eradicate a dormant infection than the same number of bacteria that are actively dividing. Therefore the necrotic and cavity tissue sequesters the bacteria from the circulating cells and antibodies of the immune system, and protects the bacteria from the patient's host defenses. If the bacteria are exposed to antibiotics that do not wipe them out, then resistant organisms may multiply and, through genetic factors, drug resistant strains can become the predominant ones in the infection. Latent TB: is usually treated fairly easily with one to two medications, depending on local resistance patterns. The treatment often lasts up to a year {^{3, 4} }.

Multidrug-resistant TB: Standard anti-TB drugs have been used for decades, and resistance to the medicines is growing due to inappropriate or wrong use of anti-TB drugs, or use of poor quality medicines. Disease strains that are resistant to a single anti-TB drug have been documented in every country surveyed. Multidrug-resistant tuberculosis (MDR-TB) does not respond to isoniazid and rifampicin. The extensive chemotherapy required (up to two years of treatment) is more costly and can produce severe adverse drug reactions in patients. In some cases more severe drug resistance can develop {²² }.

Modern surgical management: In modern times, the surgical treatment of tuberculosis is confined to the management of multi-drug resistant TB. A patient with MDR-TB and remains culture positive despite many months of treatment may be referred for lobectomy / pneumonectomy, with the aim of cutting out the infected tissue. Some complications of treated tuberculosis like recurrent hemoptysis, destroyed or bronchiectasis lungs and empyema are also amenable to surgical therapy {^{15, 18} }.

In extra pulmonary TB, surgery is often needed to make a diagnosis: surgical excision of lymph nodes, drainage of abscesses, tissue biopsy, etc. In spinal TB, surgery is indicated for spinal instability (when there is extensive bony destruction) or when the spinal cord is threatened. Therapeutic drainage of tubercles abscesses or collections is not routinely indicated and will resolve with adequate treatment. In TB meningitis, hydrocephalus is a potential complication and may necessitate the insertion of a ventricular shunt or drain {¹⁸ }.

People at risk for TB: Tuberculosis mostly affects young adults, in their most productive years. However, all age groups are at risk. Over 95% of cases and deaths are in developing countries. People who are co-infected with HIV and TB are 21 to 34 times more likely to become sick with TB (see TB and HIV section). Risk of active TB is also greater in persons suffering from other conditions that impair the immune system. About half a million children (0-14 years) fell ill with TB, and 64 000 (a range of 58 000 to 71 000) children died from the disease in 2010. Tobacco use greatly increases the risk of TB disease and death. More than 20% of TB cases worldwide are attributable to smoking {^{12, 17} }.

Epidemiology and Global impact of TB: People are thought to be infected with *M. tuberculosis* globally and new infections occur at a rate of about one per second. In 2007 there were an estimated 13.7 million chronic active cases, 9.3 million new cases, and 1.8 million deaths, mostly in developing countries. The distribution of tuberculosis is not uniform across the globe; about 80% of the population in many Asian and African countries test positive in tuberculin tests, while only 5–10% of the US population test positive {¹² }.

TB occurs in every part of the world. In 2010, the largest number of new TB cases occurred in Asia, accounting for 60% of new cases globally. However, Sub-Saharan Africa carried the greatest proportion of new cases per population with over 270 cases per 100 000 population in 2010. In 2010, about 80% of reported TB cases occurred in 22 countries. Some countries are experiencing a major decline in cases, while cases are dropping very slowly in others. Brazil and China for example, are among the 22 countries that showed a sustained decline in TB cases over the past 20 years. China, in particular, has made dramatic progress in TB control. Between 1990 and 2010, the TB death rate in the country fell by almost 80% and the total number of people ill with TB dropped by half {^{15, 26} }.

Since 1995, over 46 million people have been successfully treated and an estimated 7 million lives saved through use of DOTS and the Stop TB Strategy recommended by WHO and described below. At least one-third of the 34 million people living with HIV worldwide are infected with TB bacteria, although not yet ill with active TB. People living with HIV and infected with TB are 21 to 34 times more likely to develop active TB disease than people without HIV {^{15, 26} }.

HIV and TB form a lethal combination, each speeding the other's progress. Someone who is infected with HIV and TB is much more likely to become sick with active TB. In 2010 about 350 000 people died of HIV-associated TB. Almost 25% of deaths among people with HIV are due to TB. In 2010 there were an estimated 1.1 million new cases of HIV-positive new TB cases, 82% of whom were living in Africa {²⁶ }. As noted below, WHO recommends a 12-component approach to integrated TB-HIV services, including actions for prevention and treatment of infection and disease, to reduce deaths?

Key facts:

Tuberculosis (TB) is caused by bacteria (*Mycobacterium tuberculosis*) that most often affect the lungs. Tuberculosis is curable and preventable.

Tuberculosis (TB) is second only to HIV/AIDS as the greatest killer worldwide due to a single infectious agent. In 2010, 8.8 million people fell ill with TB and 1.4 million died from

TB. Over 95% of TB deaths occur in low- and middle-income countries, and it is among the top three causes of death for women aged 15 to 44.

In 2009, there were about 10 million orphan children as a result of TB deaths among parents.

TB is a leading killer of people living with HIV causing one quarter of all deaths.

Multi-drug resistant TB (MDR-TB) is present in virtually all countries surveyed.

The estimated number of people falling ill with tuberculosis each year is declining, although very slowly, which means that the world is on track to achieve the Millennium Development Goal to reverse the spread of TB by 2015.

The TB death rate dropped 40% between 1990 and 2010.

TB is spread from person to person through the air. When people with lung TB cough, sneeze or spit, they propel the TB germs into the air. A person needs to inhale only a few of these germs to become infected.

About one-third of the world's population has latent TB, which means people have been infected by TB bacteria but are not (yet) ill with disease and cannot transmit the disease.

People infected with TB bacteria have a lifetime risk of falling ill with TB of 10%. However persons with compromised immune systems, such as people living with HIV, malnutrition or diabetes, or people who use tobacco, have a much higher risk of falling ill.

When a person develops active TB (disease), the symptoms (cough, fever, night sweats, weight loss etc.) may be mild for many months. This can lead to delays in seeking care, and results in transmission of the bacteria to others. People ill with TB can infect up to 10-15 other people through close contact over the course of a year. Without proper treatment up to two thirds of people ill with TB will die.

1.1.3. Conceptual Framework

This paper outlines the conceptual basis for assessment and evaluation of knowledge, Attitude and Practices of TB diagnosed patients. It describes the framework, the potential strengths and weaknesses. This is an example of conceptual framework for national tuberculosis programs. Factors include those external to a program, such as demographic or socio-economic characteristics. It also includes factors related to the health system and to individuals.

Knowledge can be said to be person's familiarity with someone or something including [information](#), [facts](#), [descriptions](#), and/or [skills](#) acquired the person acquired through [experience](#) or

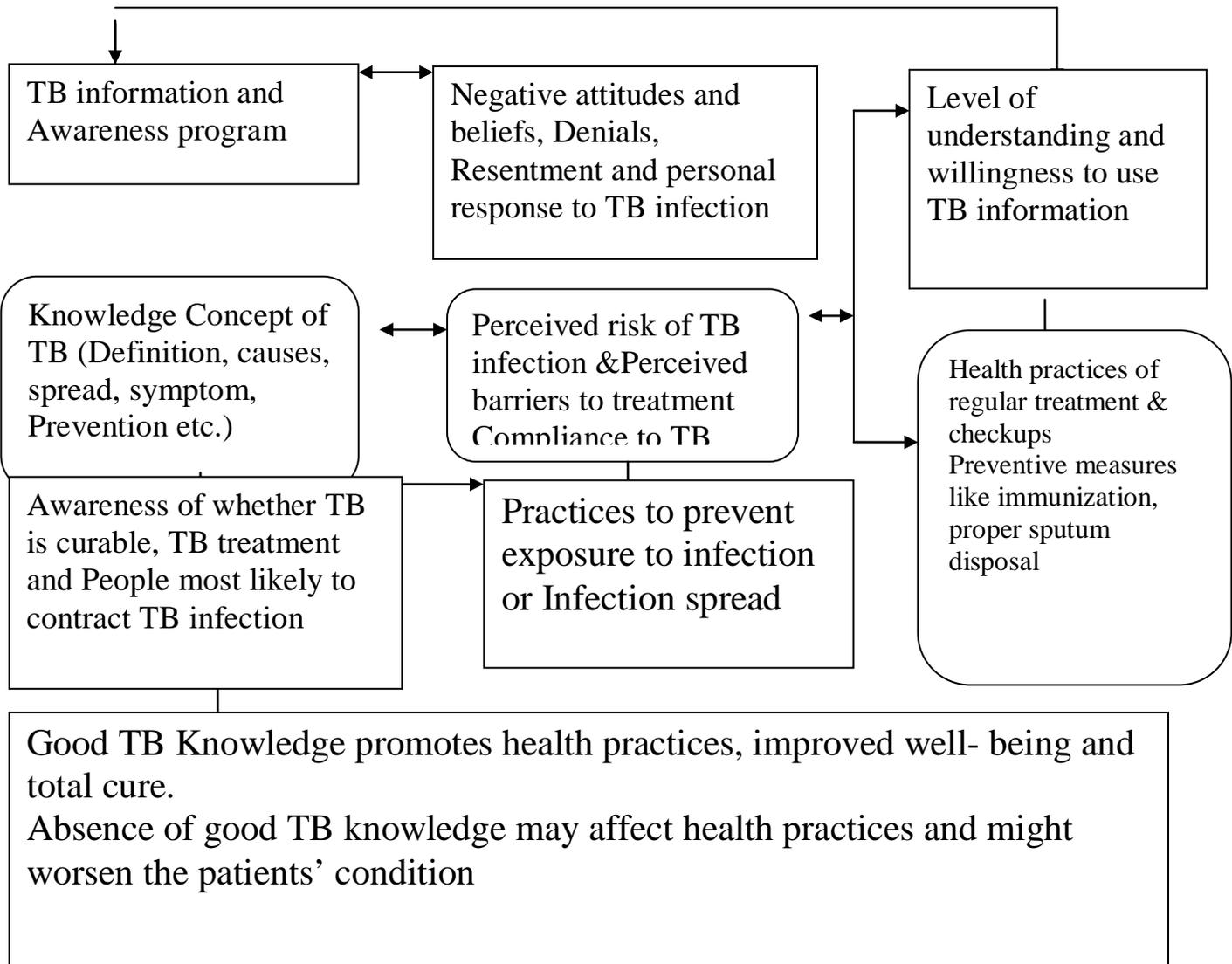
[education](#). It can also be referred to the theoretical or practical understanding of a subject (e.g. Biology, Chemistry). It can be implicit (as with practical skill or expertise) or explicit (as with the theoretical understanding of a subject) or less formal ("[justified true belief](#)"). There is however no single agreed upon definition of knowledge, and there are numerous theories to explain it.

The knowledge part in KAP is normally used only to assess the extent of participants' knowledge about TB concepts related to national and international concepts in public health standing. Investigation may equally be for culture-specific knowledge of TB illness notions and knowledge related to health systems.

The term attitude is usually used to refer to a person's general feelings about an issue, object, or person, attitudes are interlinked with the person's knowledge, beliefs, emotions, and values, and they are either positive or negative and have also described causal attitudes or erroneous attitudes. Attitudes is the second part of a standard KAP survey, most studies do not present results regarding attitudes, probably because of the substantial risk of falsely generalizing the opinions and attitudes of a particular group. People tend to give answers which they believe to be correct or in general acceptable and appreciated. Sensitive topics are particularly demanding. The survey interview context may influence the answer. Analysis of the results raises some concerns about the possibility of measuring attitudes through a questionnaire. One way to improve the reliability of measuring attitudes is to transform some of the attitude statements into direct questions in the other sections and to assess whether there is any discrepancy between the results or not.

Practices are the third and integral part of KAP surveys investigating health-related practices. Questions normally concern the use of different treatment and prevention options and are hypothetical. Findings are often used to plan activities aimed at changing behavior, based on the false assumption that there is a direct relationship between knowledge and behavior. Behavioral and social science research focuses largely on the major behavioral components influencing effective TB prevention and control -- issues including but not limited to treatment adherence, care-seeking behavior, patient-provider communication, perceptions of and ways to enhance the effectiveness of contact investigations, factors influencing acceptance of and adherence to LTBI treatment, and provider behaviors.

Figure 1: Conceptual Framework of Relationship between Patients TB Knowledge, Attitude and practices and Full recovery or Major complications outcome



The framework is all about the need for effective TB information on TB Patients. Understanding of the nature of TB infection (in terms of the meaning, causes, transmission, spread, features and prevention). Attitude / perception with regards to risks of infection, perceived increase susceptibility and perceived barriers to treatment. Understanding of the benefit of good TB knowledge and health practices. May likely help lighten the patients' worries and fear of the unknown outcome of the condition.

Practices especially on prevention of TB infection spread through proper sputum dispersal, covering mouth when coughing or sneezing and not eating together with others. Practices necessary to prevent complications like routine checkups, regular taking of drugs and eating healthy food to boost immunity. Poor and inadequate TB knowledge might make the patient adopt some practice that are not positive and might affect their

recovery. All this might hinder the TB control measures that are in place.

1.1.5. Justification for the study

It is of utmost importance that culturally adapted and acceptable TB control strategies are well identified and implemented. Therefore, in depth understanding of what the population knows about TB, what they think about people with TB, and what they actually do with regard to seeking care or taking other action related to TB are needed. Moreover, there's need to identify knowledge gaps, cultural beliefs, or behavioral patterns that may facilitate action, as well as pose problems or create barriers for TB control efforts. It can also help understanding communication processes that are key to defining effective activities and messages in TB prevention and control, dispelling myth and encouraging people with TB and their family members to be more actively involved in care and to support community approach. It can also help identifying problems and

barriers in program delivery, as well as solutions for improving quality and accessibility of services.

Previous study on perceptions and beliefs about cough and tuberculosis and implications for TB control in rural Rwanda [11] pointed out the beliefs and popular perceptions on cough and tuberculosis (TB) in rural Rwanda and determine how they shape health-seeking behavior. According to the data about [Tuberculosis found in the integrated TB and HIV care in Rwanda \[8\]](#), [Information](#) on Tuberculosis morbidity in Rwanda kept on increasing overtime since 1990 [13]. Myths have turned TB into a social stigma. Poor knowledge plays an important role in reluctance of patients in seeking treatment.

So far, no or very few studies have been conducted in Rwanda regarding awareness of TB attitude and practice to TB infection among TB patients on treatment. A program of TB control should be effective without erroneous beliefs amongst the patients on treatment. Thus, this study aims at assessing not only the knowledge but the attitude and practices that appear to influence the increase number of new cases and adherence of TB patients to TB control program in Rwanda. This study will be conducted in Kigali Rural and Urban health facilities.

Given this situation of TB trends in Rwanda, Education of patients and vulnerable communities is needed to improve early diagnosis and treatment adherence. The current study aims at investigating at what extent patients' knowledge and attitudes contribute this increase in cases of TB in Rwanda overtime. Local survey on Knowledge and attitude towards TB greatly benefits the planning, health education and implementation of TB control programs. Research has shown that several health interventions have failed because they were designed without ascertaining the knowledge and health behavior of the target population. Thus, this study aims at assessing not only the knowledge but the attitudes and practices.

This study will provide information on different factors in participants' knowledge and attitude that can be used to educate people on how to adopt a more positive behavior. It will contribute and reveal area of knowledge gap about TB infection which can be used to health educate the people of Rwanda in attempt to control TB infection in the country. The study would also supply information on barrier to effective utilization of TB services and some factors that contribute to treatment failure and loss to follow up from the Patients attitudes and practices. I hope this contribution will serve as useful information and provide the impetus for advancing efforts to control and eventually eliminate TB.

General research Objective:

The main objective of the study is to evaluate the knowledge, attitude and Practices of TB diagnosed patients in Rwanda towards TB infection?

Specific Research Objectives:

To identify the knowledge of TB patients enrolled in the TB program towards TB infection?

To identify the attitudes of TB patients enrolled in the TB program towards TB infection?

To identify the practices of TB patients enrolled in the TB program towards TB infection?

II. MATERIALS AND METHODS

3.1. STUDY DESIGN

This study is primarily a cross sectional quantitative analytic survey, on diagnosed Patients with TB while still on treatment and after the completion of TB treatment. These are patients from Kigali Rural and Urban health facilities enrolled from TB treatment from July 2011 to June 2012. Survey is a sample selected from a large population for the purpose of participating in a survey that can be used to generalize to the population frame.

Setting of the study: The study were carried out at the health facilities in the three districts of Kigali at both Urban and Rural level.

Study Population: The study Population frame comprised of (2205) TB patients' in the three districts in Kigali (Kicukiro (648), Nyarugenge (985), Gasabo (572). These are all patients enrolled for treatment for TB infection from July 2011 to June 2012. The health facilities in the three districts were stratified into urban and rural health facilities in each of the three district from where the 12 health facilities comprising 6 urban health facilities and 6 rural health facilities. The TB enrolled patients were 811 which were the target population used for the study.

3.2 Sample of the study:

A representative sample size of four hundred and eleven (411) of TB patients drawn from the TB enrolled patients in (Kicukiro, Nyarugenge, Gasabo districts) based on the calculate sample size. These patients were drawn using random sampling from the interest population (Appendix for detail)

Sample size calculation

Illustrative sample size calculation to estimate population proportion and be 95% certain that the survey estimates lies within 5% point of the true population proportion. Target Population size is **811**.

- $Z = 1.96$ (in a 2-tailed test with $\alpha = .05$)
- $D =$ level of desired accuracy 5% or 0.05
- $P =$ Current prevalence of the problem 0.50, this is the most conservative estimate
- $Q = 1 - P (1 - 0.5)$
- $n \geq Z^2 (P) (1-P) / D^2$
 $\geq (1.96)^2 (.5) (1-.5) / (.05)^2$
 $\geq (3.8416) (.25) / (.0025)$
- $n \geq 384.16$ i.e. 385 (non- response allowance is distributed as 10%) "n" for the study is **411**

Inclusion criteria:

Only patients who have been on treatment for more than one month were included in the current study. Children are not included in this study hence ages 18 and above were included.

3.3 Sampling Technique

It is important to determine who to be included in the sample and how many people from the study population is needed for the survey. Health Facilities in the three districts in Kigali were stratified into Urban and Rural from which samples were drawn. The 411 TB patients were randomly selected in the patients treatment register proportionately according to the size of the health facility.

3.4 Data collection Instrument

After extensive literature review and review of the standardized KAP questionnaire; a standardized and validated

TB KAP questionnaire was developed based on study objective. The questionnaire was first pilot tested, adjusted and fully certified for use. The instrument tries to explore questions about the knowledge, attitude and Practices of TB diagnosed patients towards TB infection. The questionnaire was designed in English and translated to local language (Kinyarwanda).

The instruments were subsequently administered to the participants. The structured questionnaire developed for this study have four parts comprising the socio-demographic characteristics of the participants, questions designed to explore the level of TB knowledge, the attitudes or perceptions of the participants towards TB infection and the practices exhibited by the participants towards TB infection.

The Knowledge part of the questionnaire have 25 correct questions (responses assigned 1 for correct and 0 for incorrect responses) the range is 1 to 25 (correct response options of 14 and above) are classified as good knowledge of TB. While correct responses of less than 14 were classified as poor knowledge of TB. The mean of the questions was 14.28.

Attitude and perception of participants towards TB have total of 13 questions, poor attitude were classified as those correct responses that are less than 4, while good attitude were classified correct responses above 4. The mean for the attitude section of the study instrument was 4.57.

Practices regarding TB infection, evaluation were based on responses options opted by the participants on the 10 points questions. Correct responses options of less than 5 were classified as poor practices; while correct responses of 5 and above were categorized as good practices. The study means score for the practices questions was 5.28.

3.5. Data collection

These randomly selected (411) participants were used for the study after accepting to participate. The community health workers at the health center were fully trained by the researcher and the assistant after getting their ethical approval of participation. The TB patients were interviewed face to face at the health Centre when the patients come to receive their daily TB drugs. This data collection processes was carried out under the supervision of the researcher, research assistant and District supervisors of the health facilities following approval from the health facility administrator. The process of data collection lasted for the period of two months

3.6 ETHICAL CONSIDERATIONS

The study took place at the 12 health facilities in Kigali at different times. The aim of the study and consent form were explained to the participants and the consent form given to them to sign their initials in agreement. The research used health facility ID and name code, while numbers were assigned to participants as identification. All information that the respondents provided was kept confidential and the data was used for research purposes only. Those who did not participate in the study went on with their TB treatment without any problem. There was no form of money or reward given for their participation, only the data collectors were given their transport fee and lunch.

3.7 Study Variables:

Dependent variables / Outcome Variables:

Participants' level of knowledge of TB infection and their attitudes and practices like acceptance of the condition, compliance to treatment, prevention of spread of infection and elimination of complications.

Independent variables / Exposure Variables:

The participants Age, gender, profession, marital status, level of education, health facility type and owners of the health facility, Patients level of knowledge, His attitude and practices towards TB infection, Etc.

3. 8. Definition of Different Study Variables

Knowledge: Is a familiarity with something, facts, information on something and description of skills acquired through experience or education. Knowledge relevant to patients are meaning of TB infection, transmission, treatment and control, knowing reason for treatment, duration of treatment and consequences of stopping treatment

There is however no single agreed upon definition of knowledge, and there are numerous theories to explain it. Knowledge acquisition involves mental reasoning involving the cognitive system: perception, learning, communication and association. In fact knowledge is related to the capacity of *acknowledgment* in human beings.

Altitude: It is an aggregate of the responses or reactions or movements made by an organism (man) in any situation. It can be an action or reaction of something under specified circumstances. Risk behaviors' are such like noncompliance to treatment, follow up care and disease control measures.

Behavioral and social science research focuses largely on the major behavioral components influencing effective TB prevention and control -- issues including but not limited to treatment adherence, care-seeking behavior, patient-provider communication, perceptions of and ways to enhance the effectiveness of contact investigations, factors influencing acceptance of and adherence to LTBI treatment, and provider behaviors. Much of the research includes or targets pertinent high-risk populations, such as minorities, foreign-born, and disenfranchised populations

Evaluation: Is a form of assessment or analysis of level of compliance to giving standard or system of operation of any task. How they adhere to treatment, follow up care and other disease control measures. The Patients' demonstration of sound knowledge of TB through informed choice positive health behavior.

MDR-TB: Multidrug Resistant Tuberculosis (**MDR-TB**) is defined as TB that is resistant at least to INH and RMP. Isolates that are multiply resistant to any other combination of anti-TB drugs but not to INH and RMP are not classed as MDR-TB.

Tuberculosis: Is an infectious or communicable airborne disease that affects the Lungs and other body parts, caused by Mycobacterium Tuberculosis. Tuberculosis infection places people at greater and can be target for intervention, prevention and control through knowledge and positive health behaviors.

Informed consent: This is a form of an agreement given by a person to allow something to happen, made with full knowledge of the risks involved and the alternatives.

Purposeful sampling: The process of selecting people to participate in a focus group that will be able to provide the most meaningful information on the topic.

Sample: The subset of the population from whom data are collected.

DOTs: The **DOTS** (Directly Observed Treatment Short-course) strategy of tuberculosis treatment recommended by WHO was based on clinical trials done in the 1970s by Tuberculosis Research Centre, Chennai, India. The country in which a person with TB lives can determine what treatment they receive. This is because multidrug-resistant tuberculosis is resistant to most first-line medications, the use of second-line anti-tuberculosis medications is necessary to cure the person. However, the price of these medications is high; thus poor people in the developing world have no or limited access to these treatments.

3.9 Data analysis

This study investigated the level of understanding of TB definition, causes, transmission, recognition of signs and symptoms, perceptions of risks, treatment-seeking patterns, preventive measures and practices among TB diagnosed patients in Kigali province in Rwanda. This is to be able to compare findings and to determine if there is real difference. The data returned from the field were sorted out, arranged and were made ready for data entry using Epi-data, version 3.1 (Lauritsen2000–2006). Data cleaning, management and analysis were carried out by using SPSS computer software version 13.0 (SPSS Inc. Chicago, IL, USA). Also plan of data analysis were developed and were used during data cleaning and data analysis.

Descriptive statistics such as frequency, percentages, mean, median and range were used to primarily summarize data to ease understanding. Spearman’s rho was used to analyze the strength and direction of the relationships between knowledge, attitude and practice score. Categorical independent variables were socio-demographic characteristics and dependent variables were knowledge, attitude and practices score categories, which were not normally distributed.

Statistical significant variables were used for regression analysis. Binary logistic regression analysis described those variables independently related to knowledge and practices about TB infection. Statistical significant was considered at P- values < or = .05.

III. RESULTS PRESENTATION

This section of the study report showed the results of the participants response based on their knowledge, attitude and practices towards tuberculosis infection based on the data collected from the rural and urban health facilities in Kigali. The total number of completed questionnaires was 411 and they were analyzed in the following manner. Descriptive statistics like frequency, percentages, range mean and scores interval were used to primarily summarize the data for ease of comprehension. The study variables are described initially as simple percentages, with the first part comprising of the demographic data. This is followed by the univariate analysis of the participants’ responses based on their knowledge; attitude and practices towards TB infection were then presented

Bivariate analyses using the spearman rho test were used to show relationships between the participants’ levels of knowledge, attitude and practices towards TB infection and their social demographic information’s.

Lastly, Binary logistic regressions analysis was used to determine variables independently related to knowledge and practices about TB infection.

4. 1. Socio- demographic characteristics of participants

The table below presents the demographic characteristics information of the study participants comprising the total of four hundred and eleven (411)

TABLE: 4.1 The participants’ background information.

Background Characteristics (n = 411)	Proportion	Percentage
Sex:		
- Male	253	61.56
- Female	153	38.44
Age group:		
- 18 - 39	278	67.6
- 40 – 59	111	27.6
- 60 – 79	20	4.9
- 80 +	2	.5
Education:		
- None	90	21.90
- Primary	163	39.66
- Secondary	125	30.41
- Diploma / Certificate	24	5.84
- Degrees / Master’s	9	2.19
Occupation:		
- Farming	107	26.03
- Civil servant	61	14.84
- Trading	35	8.52
- Unemployed	79	19.22
- Student	68	16.55
- Self-Employed	61	14.84
Residence:		
- Urban	351	85.40
- Rural	60	14.60
Patients’ Religion:		
Religion - Traditional	11	2.68
Religion - Christian	364	88.56
- Moslem	35	8.52
- Others	1	0.24
Patients’ Marital Status:		
- Married	207	50.36
- Single	159	38.69
- Widowed	21	5.11

- Separated	22	5.35
- Divorced	2	0.49

6.55% and Self-employed 14.60%. The proportion of participants from urban and rural health facility were 85.40% and 4.60%. About 50.36% of them were married, while 53.80% of participants attend faith based health facility for treatment.

Four hundred and eleven TB Patients were selected to Participate in this study; all of them completed their questionnaire. The proportion of men and women were 61.56% and 38.44% respectively. About 61.6% of the participants were in the age group of 10 to 39, while 88.56% were Christians. Educational status were between 39.66% and 30.41% for Primary and secondary level education. Predominantly 26.03 of the participants were farmers, 19.22% unemployed, Students

4. 2. 1 Participants’ knowledge of TB

The distribution of the participants’ TB knowledge based on responses to 21 TB questions on 10 items in TB concept.

Table 4. 2: TB infections’ Knowledge items responses

Knowledge Questions items	Frequency	Percent
1. TB infection is a disease that can spread to other person	282	68.6
2. TB infection easily spread while coughing or sneezing	371	90.3
3. It is lung disease that make people cough and infect others	403	98.1
4. TB infection spread easily when infected person coughs	375	88.8
5. Stopping TB treatment results in drug resistance and affect other organs	271	65.9
6. Stopping treatment worsens disease spread	252	61.3
7. TB infection is a very serious infection	361	87.8
8. Symptoms of cough that last longer than 3 weeks	330	80.3
9. Coughing up blood	153	37.2
10. Weight loss	330	80.3
11. Chest pain	206	50.1
12. Shortness of breath	264	64.2
13. Ongoing Fatigue	103	25.1
14. TB infection is got through the air from infected particles from sputum	357	86.9
15. Covering mouth and nose while coughing helps to prevent TB spread	298	72.5
16. Homeless people are easily susceptible to TB infection	34	8.3
17. Also People living with HIV/AIDS	96	23.4
18. History of being to prison	26	6.3
19. TB infection is curable	394	95.9
20. TB infection is treated with DOTS	376	91.5
21. Drugs given at health centers	84	20.4

The participants answered a total of 10 questions focusing on the meaning of TB, transmission of TB infection, severity of the infection, mode of spread, preventive measures, people mostly affected, signs and symptoms, curability of the diseases, TB treatment, etc. The table above represents the distribution of participants’ response’s and percentages on TB knowledge questions.

The participants’ responses on whether TB infection can be cured were strongly positive (95.9% (394) of the 411 believed there is total cure for the condition. This is very good, because it will help them to accept the condition and comply on treatment regime. Also on how a person can avoid spreading TB infection to others 72.5% (298) were covering the mouth and nose when coughing or sneezing. These responses if properly carried out will help to control the spread of TB infection.

Meanwhile the participants’ responses on the meaning (68.6% and 90.3%), transmissions (88.8%), all demonstrated fair level of understanding which equally empowers them to perceive the condition well and comply with the treatment and other TB

control measures. But there were poor responses on symptoms regards coughing up blood and shortness of breath (37.2% and 25.1%). Also regards to questions on who can be more likely to be infected with TB infection? With regards to homelessness, People living with HIV/AIDS and people who has been to prison (8.3%, 23.4% and 6.3%) respectively.

When we categorize the study participants to be able to assess the grades of knowledge (based on good and poor knowledge). We have the following distribution of the participants as in the table below

Table 4.3. Knowledge score categories

Knowledge categories	frequency	percent
Good knowledge (Right options that are 13 and above)	246	59.9
Poor knowledge (Right options < or = to 12)	165	40.1
Total	411	100

Mean = 13.03, Range = 16, Percentile 25th =11, 50th = 13, 75th = 15

The general level of the participants' knowledge of TB infections showed that 40.1% (165) of the participants had poor level of knowledge which is a strong indication for improved awareness program to help in total TB eradication. That 59.9% (246) good knowledge, it is good that majority of the participants have good knowledge, but it would be most desired that the whole participants have good knowledge so that poor knowledge does not exist. If we are able to have good knowledge, we can be sure of having a good impact and breakthrough in the TB control program.

4. 2.2: Participants' TB Knowledge according to socio-demographic characteristics.

The participant's knowledge categories of good and poor were used to test their association with the socio- demographic characteristics. This would enable us know the socio-demographic characteristics test results that are significant with knowledge (at 0.05 alpha level statistical significance).

Table 4. 4: TB knowledge relationship with Participants' socio- demographic characteristics

Independent Variables	Variable Categories	Percent of Good knowledge	Percent of Poor Knowledge	P- Value
Age group	18 to 39years	62.2	37.8	.354
	40 to 69 years	54.7	45.3	
	70 and above	60.0	40.0	
Gender	Male	59.4	40.6	.831
	Female	60.5	39.5	
Educational Group	Not educated	46.7	53.3	.002
	Secondary Education	58.3	41.7	
	Higher Education	69.0	31.0	
Professional group	Farming	49.5	50.5	.031
	Civil Servants	68.9	31.1	
	Self Employed	57.3	42.7	
	Un Employed	65.3	34.7	
Religious Group	Traditional Religion	54.5	45.5	.826
	Christians	59.6	40.4	
	Muslims	63.9	36.1	
Marital Status	Married	55.1	44.9	.046
	Single	64.7	35.3	
Residence	Urban	58.2	41.8	.103

	Rural	69.5	30.5	
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Table 4.4 presented the results of the spearman rho test on the relationships between the socio-demographic characteristics and the knowledge scores of the participants.

Among them were three that were statistically significant with the TB knowledge at the 0.05 significant levels. They include the participants' professional categories with P value of 0.031, Educational categories with P- value of 0.002, marital group P-value .046.

4.2.3 The Determinants of Knowledge Variables in the study Participants

In order to find the variables that are the real determinant of participants TB knowledge, we use the binary logistic regression.

Table 4. 5: Regression analysis of association of variable with Knowledge scores as independent variable

Variables	B	Sig.	Exp.(B)	95% Lower CI	Upper CI
Stopping treatment worsens TB disease spread					
Not educated Reference			1		
Higher education	-.871	.007	2.389	1.270	4.497
TB infection is lung disease that make people cough and infect others					
Not educated Reference			1		
Higher education	2.687	.043	14.681	1.089	197.833
Symptoms of cough that last longer than 3 weeks					
Not educated Reference			1		
Secondary Education	.697	.029	2.007	1.075	3.747
Higher education	1.096	.005	2.992	1.075	3.747
Symptom of weight loss					
Not educated Reference			1		
Secondary Education	-.716	.028	2.045	1.081	3.870
Symptom of Ongoing Fatigue					
Not educated Reference			1		
Secondary Education	.665	.021	1.926	1.103	3.361
TB infection is got through the air from infected particles from sputum					
Not educated Reference			1		
Higher	-1.057	.025	2.878	1.140	7.267

education					
Covering mouth and nose while coughing helps to prevent TB spread					
Farming Reference			1		
Civil Servants	1.319	.005	3.739	1.488	9.395
TB infection is treated with DOTS					
Farming Reference			1		
Self Employed	-1.386	.011	.250	.086	.723

Findings from the regression analysis in table above showed that participants' in higher education are 2.3 times knowledgeable (OR = 2.389, C I 1.270, 4.497) than the not educated reference group on what happens when TB treatment is stopped. Also participants in the higher education group had 14.6 times higher knowledge (OR =14.681, C I 1.089, 197.833) of definition of TB infection than the not educated reference group. Participants in the Higher education group had 2.9 times higher knowledge (OR = 2.992, C I 1.396, 6.411) than participants with

secondary education and the not educated on symptoms of cough that last longer than 3 weeks. Concerning symptoms of weight loss and ongoing fatigue, participants with secondary education had 2.04 and 1.926 higher knowledge (OR = 2.045, C I 1.081, 3.870 & OR = 1.926, C I 1.103, 3.361) than the reference not educated group.

Participants' in higher education group are 2.8 times higher in knowledge (OR =2.878, C I 1.140, 7.267) that TB infection is got through the air from infected particles from sputum than the reference group. Regards to covering mouth and nose while coughing to help prevent TB spread, the civil servants are 3.7 times higher (OR = 3.739, C I 1.488, 9.395) than the farming reference group.

4. 3. 1 Participants' Attitudes towards TB infection

The distribution of the participants' attitudes towards TB infection based on responses to 13 attitude questions on 4 items on TB attitude.

Table 4. 6: Participants responses on attitudes towards TB infection

Attitudes Questions	Frequency	Percent
How do you when diagnosis of TB infection		
Fear	162	39.4
Surprise	58	14.1
Sadness or hopelessness	170	41.4
Who would you talk to about TB infection?		
Dr. or other medical workers	276	67.2
Other family members	123	29.9
No one	9	2.2
Which statement is closet to how you feel about people with TB disease?		
" I feel compassionate and have desire to help them"	226	55
" I feel compassionate, but tends to stays away from them "	152	37
" It is there problem, I cannot get TB"	12	2.9
" I f ear them because they may infect me"	66	16.1
" I have no particular feeling"	16	3.9
In your community, how is a person who has TB, usually regarded or treated?		
Most people rejects him or her	221	53.8
Most people are friendly, but they still avoid him or her	183	44.5
The community mostly supports and helps him or her	65	15.8

The participants' responses on attitude towards TB infection showed that 39.4% (162) were afraid when they learnt they had TB infection. Also 41.4% (170) participants felt sad and hopelessness with the news of the condition. It was however observed that a good number of them 67.2% (276) opted that they would discuss the condition with the Dr. or other health worker, this is good because it will enable them get quicker medical assistance. But there are 2.2% (9) of the participants that maintained that it is best for them to keep the condition and their perception to themselves. This is not healthy because problem shared are half solved.

Half of the participants' 55% (226) expresses that they have compassionate feeling and desire to help TB infected people. It is very helpful because sick people need support and love. It was

observed that stigmatization is still playing predominant role, because 53% (221) of the participants responses were that most people in the community rejects TB infected people. Also it was noted that 44.5% (183) of the participants' responses showed that though some community members appear friendly, but they still distance themselves from TB infected people. These attitudes of resentment, isolation, and stigmatization are most unwelcomed and affect the TB infected population.

The participants' were further categorized into two groups of good and poor attitudes. These two groups were used to test their association with the socio- demographic characteristics. This would enable us know the socio- demographic characteristics test results that are significant with the attitude (at 0.05 alpha level statistical significance).

Table 4 .7: Categories of Participants’ attitude scores

Categories of Participants’ responses on attitudes towards TB infection	Frequency	Percent
Good Attitude (4 and above right options)	273	66.4
Poor Attitude (0 to 3 right options)	138	33.6
Total	411	100.0

Mean= 4.57, Range 9 (0 to 13), Minimum = 2. Maximum = 11

The participants’ attitudes and perceptions towards TB infections and how they are perceived in the community showed that 66.4% (272) of the participants had fair attitude towards TB infection. Though there are about 33.6% (114) with poor attitudes.

4. 3. 2. Attitude according to the participants’ socio-demographic characteristics

The attitude scores were analyzed along with the variables in the participant’s socio-demographic characteristics to determine the variable that is statistically significant.

Table 4. 8: Participant’s attitudes response relationship with the socio- demographic characteristics

Independent Variables	Variable Categories	Percent of Good knowledge	Percent of Poor Knowledge	P- Value
Age group	18 to 39years	67.3	32.7	.663.
	40 to 69 years	64.1	35.9	
	70 and above	80.0	20.0	
Gender	Male	66.2	33.5	.951
	Female	71.0	29.0	
Educational Group	Not educated	68.9	31.1	.648.
	Secondary Education	63.8	36.2	

	Higher Education	67.7	32.3	
Professional group	Farming	71.0	29.0	.384.
	Civil Servants	67.2	32.8	
	Self Employed	68.8	31.2	
	Un Employed	61.2	38.2	
Religious Group	Traditional Religion	63.6	36.4	.923
	Christians	66.8	33.2	
	Muslims			
Marital Status	Married	68.6	31.4	.
	Single	64.2	35.8	
Residence	Urban	65.8	34.2	.526
	Rural	70.0	30.0	

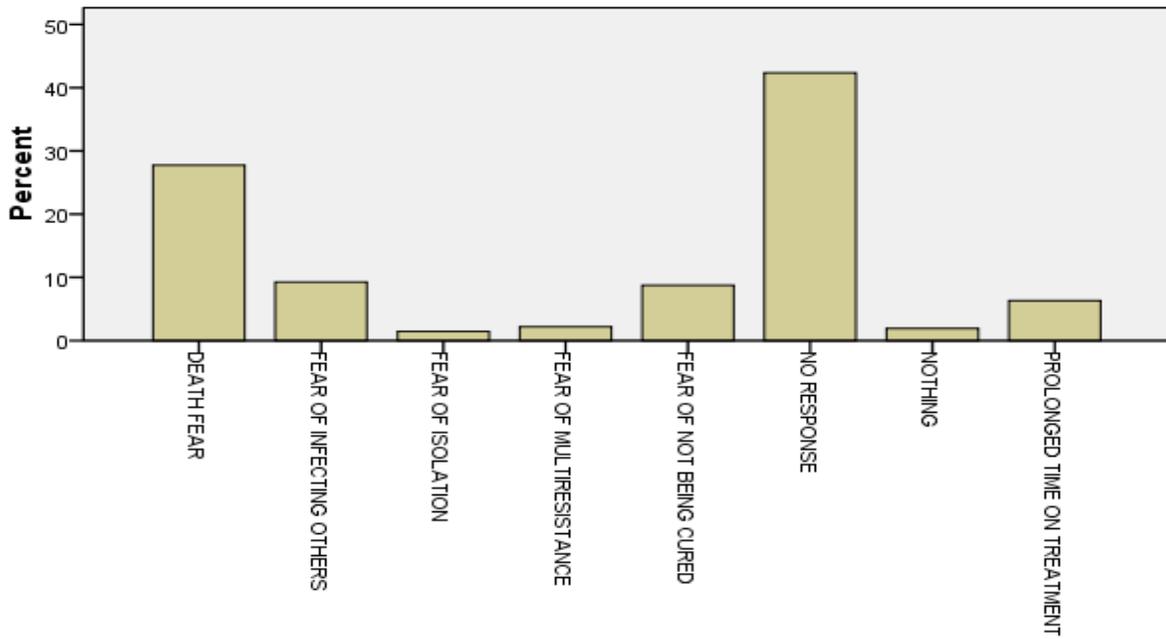
The result above showed that none was significant on spearman rho test on the relationships between the socio-demographic characteristics and the attitudes scores of the participants at the **0.05**.

In order to further explore more on the attitude of the participants to know how they feel or perceive the TB infection and identify what worries them most about TB infection. Below is the distribution of the participants’ responses on this question.

Figure 2: What worries you most about TB infection?

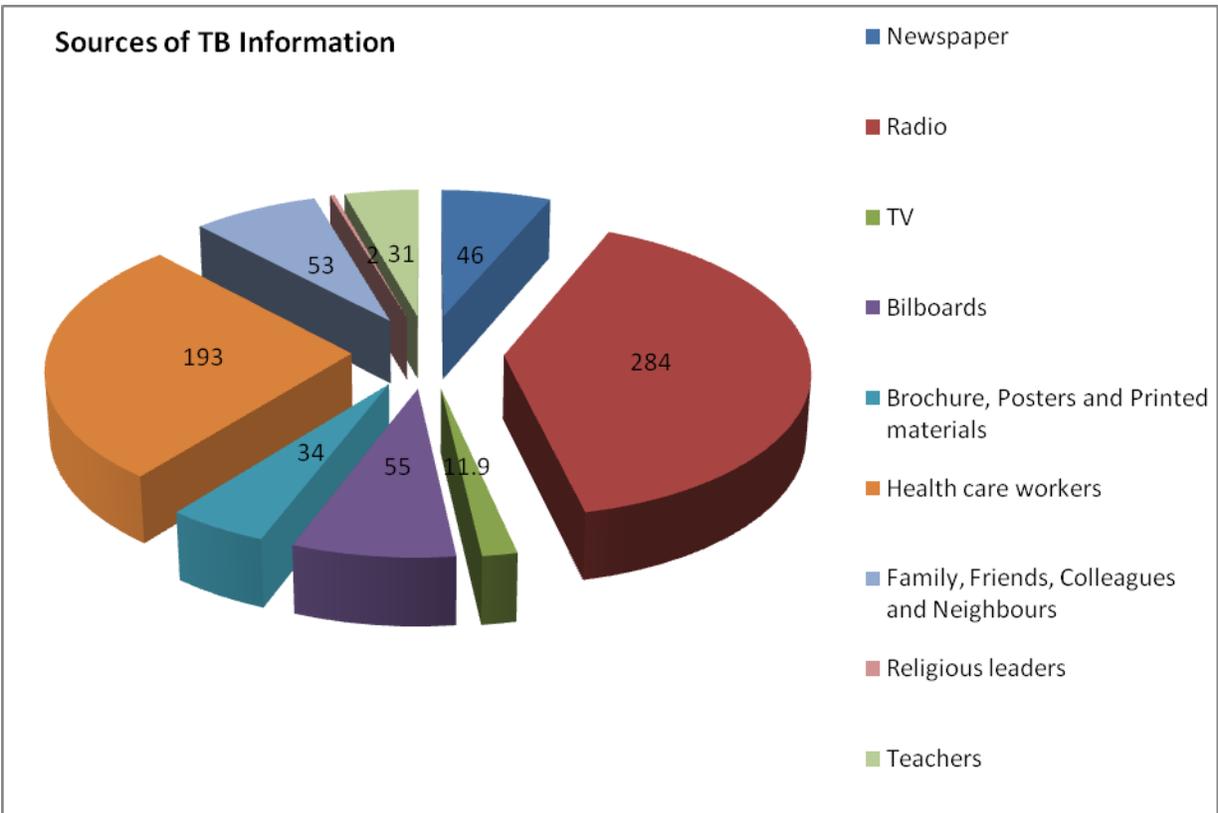
The responses from the participants showed that death fear account for 27.7% (144), while majority of them 42.3% (174) gave no response to the question. However, the responses showed that the participants have fear of infecting others 38 (9.2%), also fear of not being cured 36(8.8%) and concern about the prolonged time on treatment 26 (6.3%).

s :What worries you most about TB infection



s :What worries you most about TB infection

Figure 3: Sources of TB information



The study participants main source of TB information are the radio, TV, Health workers and from Brochure, Posters and Printed materials

4.4.1. Participants’ practices towards TB infection

The distribution of the participants’ practices towards TB infection based on responses to 10 practices questions on 2 items on TB practices.

Table 4.9: Participants' Practices responses on questions about health practices towards TB infection

Practices Questions	Frequency	Percent
A. Things done to prevent TB disease getting worse?		
1. Covering mouth while coughing or sneezing	112	27.3
2. Eating with separate utensil	112	27.3
3. Ensure to regularly eat healthy food to boost immunity	230	56
4. Regular taking of drugs as prescribed	345	83.9
5. Attendance to check- ups regularly	263	65.2
B. Prevention of TB spread to others		
6. Not spitting around indiscriminately	325	79.1
7. Using separate plates to serve food to other family members	283	64
8. Immunization of other family members	105	25.5
9. Improving personal hygiene	150	36.5
10. Disposing sputum regularly	260	63.3

Mean: 5.28, Range: 8 (0 to 10), Maximum: 10, Minimum: 2

Regarding practices by participants taking of drugs regularly and going for checkup (83.9%, (345), 65.2% (263), were among strong indication of their determination to recover. Other strong practices observed were not spitting indiscriminately (79.1% (325), Using separate plates to serve food to other family members 64% (283) and disposing sputum regularly 63.3% (260). These responses if effectively and efficiently carried out by these patients will go a long way in the prevention and control of TB infection.

The participants’ were further categorized into two groups of good and poor Practices. These two groups were used to test their association with the socio- demographic characteristics. This would enable us know the socio- demographic characteristics test results that are significant with the attitude (at 0.05 alpha level statistical significance).

Table 4. 10: Participants Practices response scores categories

Practice responses on preventive measures and treatment compliances (based on 10 questions)	Frequency	Percent
Good Practices (5 and above right options)	257	62.5
Poor Practices (0 to 4 right options)	154	37.5
Total	411	100.0

Mean: 5.28 Range: 8 (0 to 10), Maximum: 10, Minimum: 2

Majority of the participants (62.5% (257) have fair and good level of practice of preventive measures and treatment compliances. This will help them to recover fully and will not spread the disease easily. Though it is really worrisome that up to 37.5% (154) of the participants had poor practices, so a lot still need to be done to enhance more positive practices from them

4. 4. 2. Practices according to socio-demographic characteristics of the participants.

The distribution of the participants’ practices towards TB infection based socio- demographic characteristics of the participants and their levels of significant.

Table 4. 11: Participant’s practices relationship with socio-demographic characteristics.

Independent Variables	Variable Categories	Percent of Good knowledge	Percent of Poor Knowledge	P- Value
Age group	18 to 39years	60.8	39.2	.465
	40 to 69 years	65.6	34.4	
	70 and above	80.0	20.0	
Gender	Male	63.0	37.0	.806
	Female	61.8	38.2	
Educational Group	Not educated	51.1	48.9	.031
	Fairly Educated	63.8	36.2	
	Well Educated	67.7	32.3	
Professional group	Farming	55.1	44.9	.181
	Civil Servants	60.7	39.3	
	Self Employed	69.8	30.2	
Religious Group	Un Employed	63.9	36.1	.026
	Traditional Religion	27.3	72.7	
	Christians	62.6	37.4	
Marital Status	Muslims	72.2	27.8	.257
	Married	65.2	34.8	
Residence	Single	59.2	40.2	.006
	Urban	59.8	40.2	
	Rural	78.3	21.7	

Table 11 presented the results of the spearman rho test on the relationships between the socio-demographic characteristics and the practices scores of the participants.

Among them were three that were statistically significant with health practice at the 0.05 significant levels. They include educational level P-value of 0.031, the owners of health facilities with P value of < 0.001 and the religious group 0.026 respectively. And lastly the location of the health facilities is with P- value of 0.006.

4.4.3. The Determinants of Practice Variables in the study Participants

In order to find the variables that are the real determinant of participants’ health Practices, we use the binary logistic regression

Table 4.12: Regression analysis of Practices and association with independent variable

Independent Variables	B	Sig.	Exp.(B)	95% C I Upper	Lower
Practices of covering mouth and nose while coughing & sneezing					
Not Educated Reference			1		
Secondary Education	-.547	.058	.579	.328	1.019
Rural Residence Reference			1		
Urban Residence	.604	.039	1.830	1.031	3.247
Practice of eating with Separate utensil					
Rural Residence Reference			1		
Urban residence (1)	.774	.008	2.167	1.229	3.823
Ensure to regularly eat healthy food to boost immunity					
Not Educated Reference			1		
Higher education (2)	.526	.048	1.682	1.004	2.854
Farming Reference			1		
Civil Servant (1)	.927	.005	2.526	1.316	4.849
Self Employed (2)	.576	.043	1.779	1.019	1.104
Unemployed (3)	.710	.006	2.035	1.227	3.375
Regular taking of drugs as prescribed					
Not Educated Reference			1		
Higher education (2)	.926	.010	2.524	1.252	5.090
Traditional Religion Reference			1		
Christian Religion (1)	1.522	.014	4.583	1.352	15.532
Moslem (2)	1.642	.034	5.167	1.134	23.548
Rural Residence Reference			1		
Urban Residence (1)	- 1.867	.011	6.467	1.539	27.170
Attendance to checkups regularly					
Farming Reference			1		
Unemployed (3)	.524	.050	1.689	1.000	2.853
Not Educated Reference			1		
Secondary education (1)	.686	.011	1.985	1.171	3.364
Higher education	.845	.002	2.329	1.361	3.985

from person to person (88.8%). Also they fairly understand the consequences of non-compliance to TB treatment (65.9% and 61.3%).

Moreover a good number of them (91.5%) knew about TB treatment through DOTS and understand that TB can be cured (95.9%). This is in line with [34]

The poor knowledge was most evident on the knowledge of who can be infected with TB infection With regards to homelessness, People living with HIV/AIDS and people who has been to prison (8.3%, 23.4% and 6.3%) respectively.

Studies show prolonged cough, at times chest pain, loss of weight, fever, difficulty in breathing, and coughing up blood are perceived to be associated with TB by the people [9, 30, 35]. In the present study the symptoms of TB reported by the patients indicated a fair level of knowledge. There were poor responses on some of the key symptoms regards coughing up blood and shortness of breath (37.2% and 25.1%).

The health care workers (48.2%), the radio (69.1%) and brochure, posters and other printed materials (8.3%) were their main sources of information about TB infection. In India doctors and health care workers were stated to be the source of the information regarding tuberculosis by 50.2% followed by mass media (33.8%), and (34.7%) mentioned interaction with others in the community [36]. These sources has poor response outcome which is a strong indication that a lot still need be done to improve the TB general information media. Mass media could play a vital role in success for passive case finding and treatment [28].

5.2 Attitudes towards TB infection

Majority of the respondents indicated that they would be afraid. Surprise, sad and feel hopeless, embarrassed and ashamed if they learned they had TB. Similar feelings have long been associated with TB [38]. Majority of the participants (67.2%) would talk to the Doctor or other medical worker about the TB illness. Others (29.9%) would talk to other family members about the illness, there were about (2.2%) who would not tell no one about the illness. This result was consistence with [9] which found that almost all of the respondents would talk to the health workers and family members about the illness.

The social concept of TB in the community plays an important role and negative attitudes like isolation or stigmatization may add burden to the patients. Community stigma stems from a perceived risk of infection and perceived link between TB and poverty, where a TB patient has long been condemned, disgraced and marginalized by the society. Social stigma with a lack of understanding of TB leads to delays in seeking treatment and poor adherence to therapy. Stigma is serious barrier to proper and timely health seeking behavior [36]. Findings in this study equally disclosed that the negative attitude in this study may add to illness burden in many ways. This is preventable hence if people are educated in the community, with better understanding, they would be more willing to cooperate and enhance a more social acceptable environment.

5.3 Practices towards TB infection

In the area of practice, study findings were not really good. Majority of the respondents in that study had a good practice of

going for checkups, ensured regularly eating of healthy food to boost immunity and regular taking of drugs (56%, 83%, 65%) respectively. As measures taken to ensure the disease did not get worse. Regular attendance to checkups was in consistent with [9] study that find most of the participants (75.8%) coming for regular checkups. Study findings also show that (27.3%) of the participants are the few that are practicing covering of mouth while coughing. There were (25.5%) who were the very few admits to the practice of immunization of family members against TB infection; this is among the preventive measures to limit the disease spread. This is in contrast with [9] which showed good result (52%) on household immunization screening adherence.

5.4 The relationship between the knowledge scores and practice score

The knowledge and practice score distribution were strongly significant and is as represented above with P -value < 0.001, OR = 7.466, CI 4.766, 11.695. This means that participants' educational level has strong influence on the level of health practices. Participants who are well educated had greater level of health practices compared the reference that is not educated. Same is in line with [9] KAP study among TB children in Sirindhorn Hospital Bangkok in which the study showed a good correlation between knowledge and practices with a P- value of 0.001.

5.5 Conclusion

This study shed light to the awareness of TB disease and practices by the TB patients in Kigali, despite good TB control programs designed in the Rwanda health institutions. Knowledge about tuberculosis among TB patients was not good; however, there are poor understanding of some symptoms and the people most susceptible to TB infection. Diagnosis of TB is associated with increase anxiety/tension concerning prolonged time on treatment, fear of infecting others and stigma, along with threatened self-esteem and quality of life. There are still some problems with practices based on health promotional and TB prevention guidelines, that still need to be addressed. Mass media can be better utilized to remove misconceptions that still exist among some of the participants. Psychosocial reactions towards TB as revealed in this study should be addressed through counseling and communication during treatment in the DOTS Centre. This may contribute to success of the national TB control program.

Loss to follow up to optimal care of TB patients is an important challenge in the national TB control program. Completion of treatment is the necessary condition for the patient's cure and the prevention of multi-resistant TB strains. Measures such as reinforcing quality communication between patients and providers, strengthening existing implementing programs and making sure the existing control measures are sustained at grass root level. Such measures are likely to increase the therapeutic success rate, impacting on global disease burden attributable to TB in Rwanda. There was lots of room for improvement of KAP of TB among TB diagnosed patients surveyed. Given the complexity of factors that have an effect on their knowledge and practices in compliance with the TB national guide lines for prevention and control of TB, findings of

this kind should be a measure to improve the effectiveness of such strategies.

5.6 Limitations in this study

However, some limitations need to be pointed out. First, interviews were carried out by the community health workers working in the health centers. Consequently, all questions that tried to evaluate relations and interaction with the healthcare workers might have led to interview bias. There are possibility of some leading questions and respondents wishing to evade or lie to some questions. Another limitation is the retrospective nature of the data collection. Some of the participants have completed their treatment for more than 3 months ago and might have been subject to recall bias. However, some information lost due to recall was completed to a certain extent by the review of the medical records. Also there were questions that were not included in the questionnaire which is deemed relevant to the study, questions on socio economic status of participants and the distance between the participants' house to health facility. Also there were no response to vital questions which did not allow us to fully evaluate the true state compared to public health and biomedical knowledge. This study was conducted in the Kigali city and is not generalizable to the whole country.

5.7 Further Study

There's need for the study to be extended to other province in Rwanda in other to have a better understanding about the factors associated to practices regarding TB so as to help address the issues surrounding loss to follow up, non-compliance to treatment and factors which enhances drug resistance. Further area of research should be concerned about the effectiveness of the education program on the knowledge, perception and practice of childhood TB infection. Ideally, in order to receive the maximum benefit of KAP surveys and to increase the validity of information obtained, they should be repeated over time and also triangulated with other mechanisms, particularly qualitative methods that can provide more in-depth understanding of behavior.

5.8 Policy Implication

This finding is interesting and justifies the need for improved TB information and implementation of TB control programs. A long with other research, the result of this study can be very helpful for health care providers, a veritable tool for improvement considering the strength and weaknesses. This study therefor provide an opportunity to explore the extent of understanding of TB information and compliance with TB control guidelines among TB diagnosed patients in epidemiological context of low incidence for which there is limited data available and existing economic and cultural context. The result highlight specific strength and weakness that can be used to guide the development of target intervention that would further enhance TB control program in Rwanda

5.9 General recommendations

The state and local authorities should organize health education programs to the communities; ensure increasing collaboration with relevant community leaders while developing social mobilization and sensitization models in disseminating TB

information. Implementation of community mass media health education programs via the use of churches and business organization to raise the TB awareness and gain cooperation, Additional training in interpersonal communication and counseling to help improve communication between health care provider and the patients.

TB patients' experiences are helpful at organizational / institutional and community level in developing training programs and new interventions that should contribute to stigma reduction rather than unintentionally enhance stigmatization. Patients should be informed about the side-effects of the drugs, the duration of DOTS and the consequences of interrupting treatment.

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