Assessment of Nutritional Health Status of the Nyishi Adults of Papumpare District Arunachal Pradesh, India

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ABSTRACT

Nutritional status or nutritional health status refers to the state of health of an individual as it is affected by the intake and utilization of nutrients. The main purpose of this nutritional assessment was to find out the facts about nutrition and health status of Nyishi adults of Papumpare district of Arunachal Pradesh, India. The various parameters that were selected to assess nutritional health were socio-economic status, dietary habit and anthropometric parameters which were implemented with the help of food and health frequency questionnaire and other anthropometric tools. The study also showed that education, occupation as well as family pattern directly affects the food budgeting of the people that ultimately shades impact on health. The anthropometric measurement was done among 100 adults of both sex of the rural and urban area and BMI were calculated. Results showed prevalence of 14% chronic energy deficiency in rural adults whereas it was only 4% in urban. Likewise, 60% people were found to be as normal in rural against 52% in the urban. On the other hand, 14% rural adult found to be normal (optimal) and 26% adult found to be in prehypertension (normal) against 8% urban adult found to be normal (optimal) and 24% adult found to be in prehypertension (normal) condition. So, it may be concluded that the results of the epidemiological study with basic comparison of socio-economic, dietary and anthropometric parameters of the adult of same tribe of different conditions with a hope to have further exploration of this topic using other parameters and different age group.

Index Terms: Nutritional assessment, Nyishi adult, Epidemiological study, Body Mass Index (BMI).

INTRODUCTION

Indigenous and local foods always play an important role in the health status of the various tribes present in different regions of the world. The purpose of nutritional assessment of a particular tribe or community is to discover facts about nutrition and health. Each tribal population has its unique food habits [1]. The Nyishi tribe is one of the principal inhabitants of Arunachal Pradesh in north-eastern India. *Nyi* refers to "a man" and the word *shi* denotes "a being", which collectively means a civilized human being [16]. There are many factors that affect nutritional health status of people. Factors such as employment, income, education, cultural influences and lifestyle, sex and other genetic differences, isolation (geographic, social or cultural), age and disability, the security and standard of accommodation, and the availability of services and facilities all interact with diet, health and nutritional status. Also, the food consumption practices may differ within the same tribe or a community living in rural and urban area. That is why there is a need to assess the nutritional health status of both the areas. Nutritional status is determined from a nutritional assessment of anthropometric, biochemical, clinical, dietary, socioeconomic, and drug-nutrient interaction effects [2]. Nutritional status is the condition of health of an individual as influenced by nutrient intake and utilization in the body. In developing countries like India various forms of malnutrition affect a large segment of population and both macro and micronutrient deficiencies are of major concerns [3]. Vital signs that represent the health status of an individual are the body's most basic functions. There is an established link between heart rate (HR) and cardiovascular health [4]. It has been recently suggested that there is urgent need to evaluate the nutritional status of various tribes of Indian [5]. Patterns of adult malnutrition show extremely poor nutritional status in the states of Gujarat, Odisha, Arunachal Pradesh, Karnataka, Maharashtra, Madhya Pradesh and Andhra Pradesh (FAO 2010) [6]. Hence, this present study was an attempt to investigate and compare the overall nutritional status and its determinants in respect of age (i.e. adult), sex (male and female) and place (rural and urban area) of the said tribe.

Hypothesis: The nutritional health status of the tribal people residing in rural areas is found to be more satisfactory than that of the urban one.

Objectives:

i.   To determine socio economic status and food consumption practices of target group people.
ii.   To investigate differences in food consumption practices of Nyishi tribe at different place i.e. rural and urban.
iii.   To determine vital health status and impact of their food pattern on health.
iv.   To compare all above aspect in terms of sex and place.

RESEARCH ELABORATIONS

Materials and Methods

Papumpare district of Arunachal Pradesh, India was selected for the Epidemiological study area with Nyishi tribe of rural and urban area as the target population/group. During the entire study, the age group was restricted only to the adult population of the said tribe. Epidemiological studies were conducted in the randomly selected areas of Papumpare district of Arunachal Pradesh. First of all, two Nyishi tribe inhabitant target areas depicting rural and urban population since many years were selected. Under the rural area, the villages choosen are Bogoli, Denka, Gumto, Rono village and Balijan. Likewise, in the urban area, some sectors of the towns and cities like Nirjuli, Naharlagun and Itanagar were selected accordingly. The study design and methodology that was followed in the present work summarized as below.

Research Design

Developing a questionnaire

A food frequency questionnaire was developed at the beginning of the epidemiological survey [7]. The questionnaire consists of three parts viz. identification particulars, socio-economic status of family and dietary pattern of the family. Along with this questionnaire, also a health frequency questionnaire for the age group of 20-39 years i.e. for adults was developed. Here, two anthropometric measures-height and weight were included, which helps us to calculate BMI of the adults. Other measures like age, habitat etc. was also included in the process. The interesting thing is that the single questionnaire was sufficient enough to question about the overall medical condition in which we include various parameters like disease, illness and disorders. Further, two vital signs of measurement i.e. BP and pulse rate were also calculated in order to investigate the body's basic functions are normal or not.

Subjects

The subjects were selected from two target population i.e. rural and urban population of Nyishi tribe of Papumpare district of Arunachal Pradesh, India. The study was conducted taking100 numbers of samples (family) and 100 numbers of adult individual samples of both sexes from both the target area (50 nos. rural+50 nos. urban).

Tools and Procedures

There were many tools that have been used in our epidemiological survey. For the anthropometric purpose measuring tape and weight balance were used. With the help of body height and body weight of adult persons, the Body Mass Index (BMI) was calculated separately for males and females. The ratio of *weight (in kg)/ Height (m)^2* referred to as BMI. The BMI has a good correlation with fatness (over weight or obesity). The use of BMI as an anthropometric indicator of nutritional status can be more appropriate in a country with diverse ethnic groups, such as India [14]. In case of adults, the following classification suggested by *James and coworkers* as given in Table I is extensively used at present [8, 9].

Table I: BMI for Adult

BMI class	Presumptive diagnosis
< 18.5	Chronic energy deficiency
18.5-20.0	Low normal weight
20.0-25.0	Normal
25.0-30.0	Obese grade I
>30.0	Obese grade II

The measurement of basic vital signs of body was taken via an automatic blood pressure monitor (Make - Omron, Model no- HEM-8712) that could measure both BP and pulse rate.

To understand hypertension we must have an idea about normal and high blood pressure range. Table II presents the classification given by JNC, USA for the detection, evaluation and treatment of high blood pressure. [7, 8]

Table II: Classification of BP and stages of hypertension in adults

Blood pressure range SBP/DBP	Classification
120/80	Normal (optimal)
120-129/80-84	Prehypertension(normal)
130-139/85-89	Prehypertension (Borderline HT)
>140/90	Hypertension
Stage I 140-159/90-99	Hypertension (stage I)
Stage II 160-179/100-109	Hypertension (stage II)

Stage III>180/110	Hypertension (Stage III)

Source: Joint National Committee on Hypertension (2003)

According to the National Institute of Health, USA, the average resting heart rate:

    (a) For children 10 years and older, and adults (including seniors) is 60 - 100 beats per minute

    (b) For well-trained athletes is 40 - 60 beats per minute.
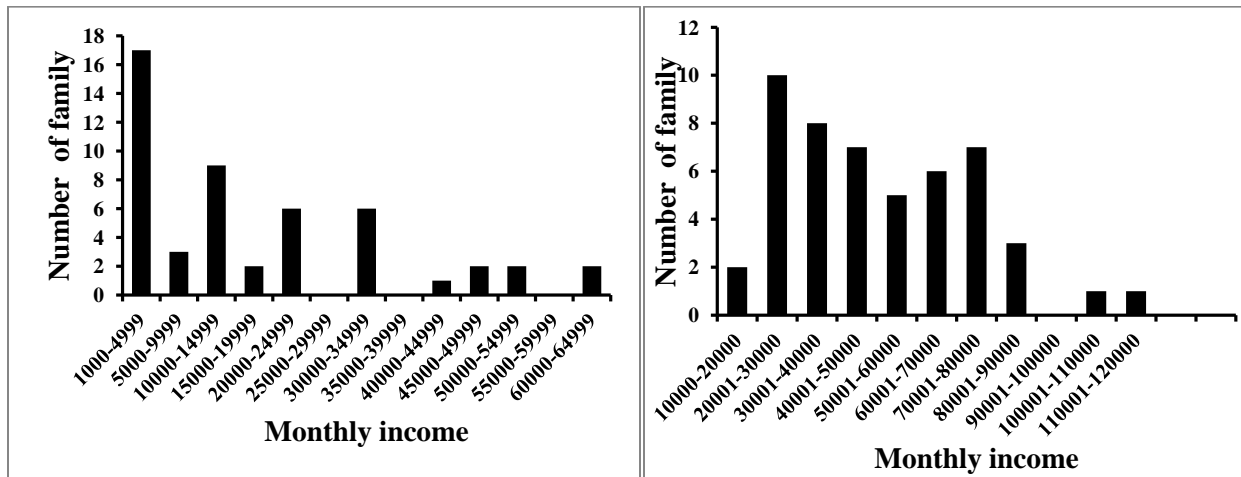
RESULTS

Socio Economic Status

Monthly income

Fig I:Monthly income of families (Rural)   Fig II:Monthly income of families (Urban)

A large gap was found to be present between rural and urban income level. But the minimum requirement for a healthy and peaceful lifestyle was seen to be same for all individuals. Therefore, in order to fill up the gaps between the two societies by strengthening the economic status needs further research.
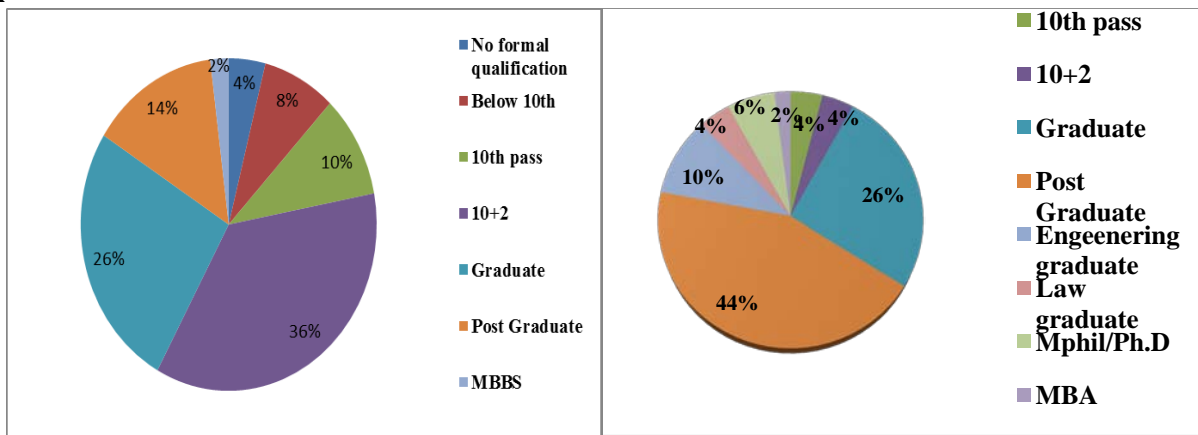
Education

Fig III: Highest educational qualification(Rural)Fig IV: Highest educational qualification(Urban)

In case of level of education, there were 4% families in the rural areas, who had not taken any formal education. In this era of scientific development, universalization of primary and all classes of higher education should be the major concern of a country like

India. Education is the most crucial factor which interferes with all aspects of our life. Increasing job opportunities or employment is also a sign of development. The scope of agriculture is reducing day by day in the North East India. As the impact of the development of science and technology has also touched this part of the region to a great extent, in the present scenario, opportunities are more in the field of agricultural extension rather than agriculture.
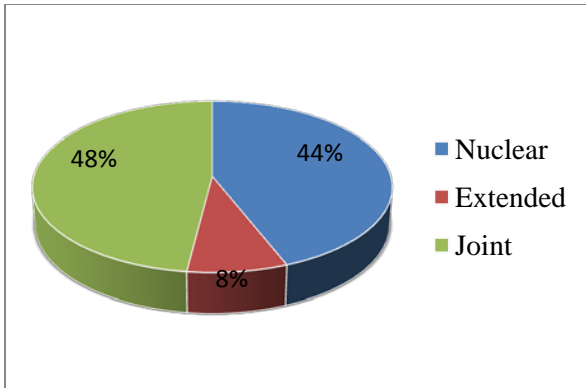
Types of family

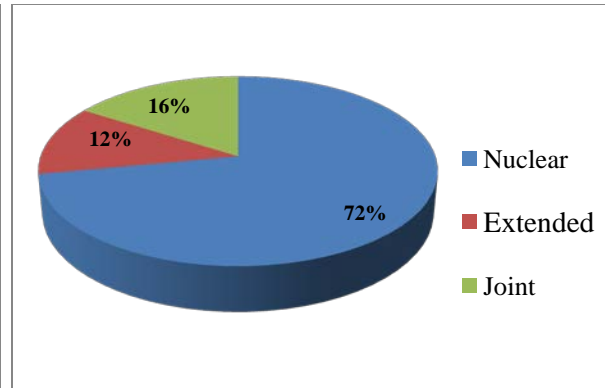Fig V: Types of family (Rural)   Fig VI: Types of family (Rural)

Types of families are also a major concern for health and education. As the number of joint families were found to be present more in the rural area.
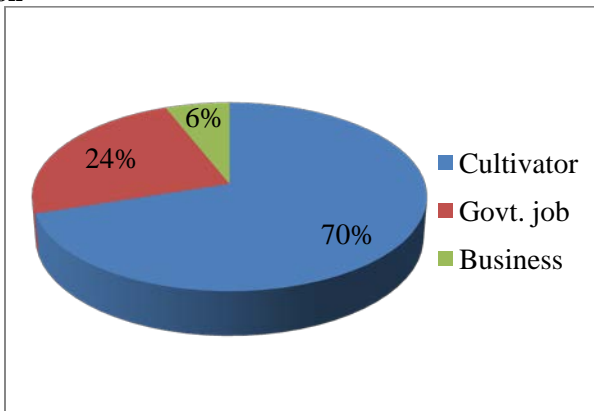
Occupation

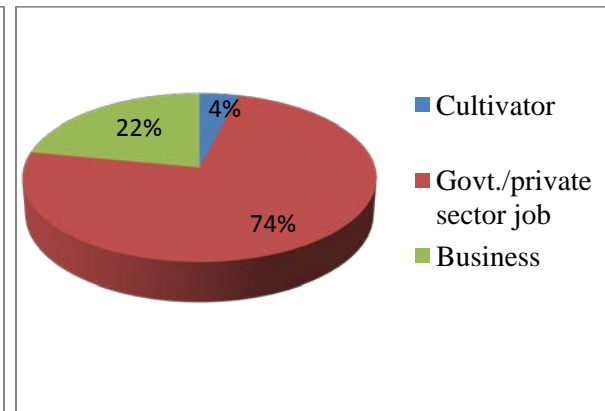Fig VII: Occupation (Rural)   Fig VIII: Occupation (Rural)

From the survey, it was observed that among the selected area, one or two family member only represents as an income source of a joint family and rest of them act as followers, which results in an abnormality in the whole family budgeting. This further impacts a lot in the dietary habit as well as in the education system of that particular family. This has been seen in most joint families of the rural population.

 Dietary pattern of the family
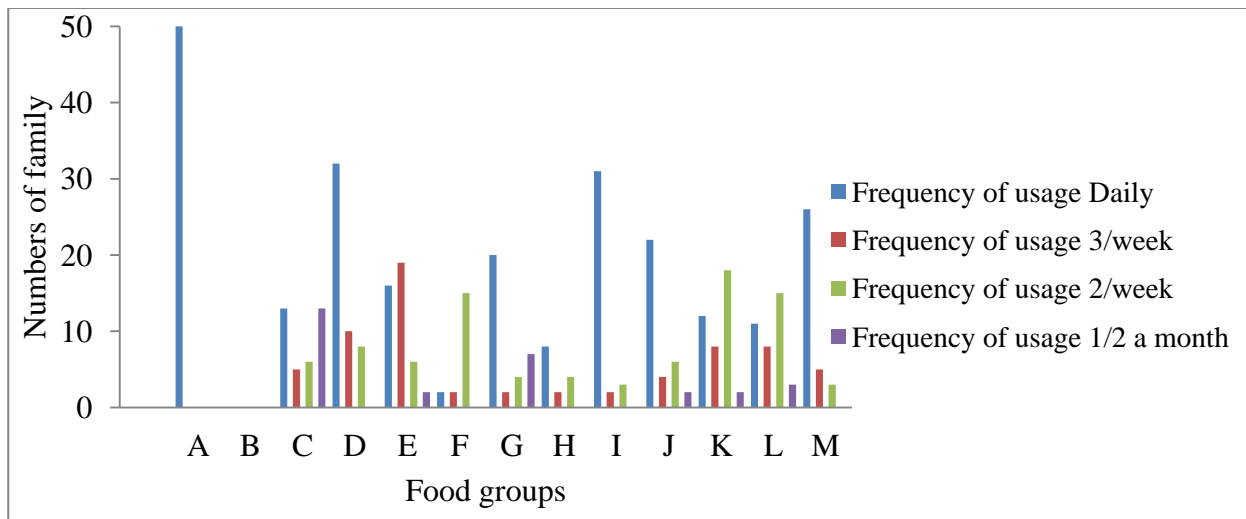
(A: Rice, B: Wheat, C: Pulses/legumes, D: Green leafy vegetables, E: Roots & tubers, F: Other vegetables, G: Fruits, H: Milk & milk products, I: Sugar & jiggery, J: Oils & fats, K: Flesh foods, L: Carbonated beverages, M: Tobacco/alcohol)

Fig IX: Frequency of usage of foodstuffs (Rural)
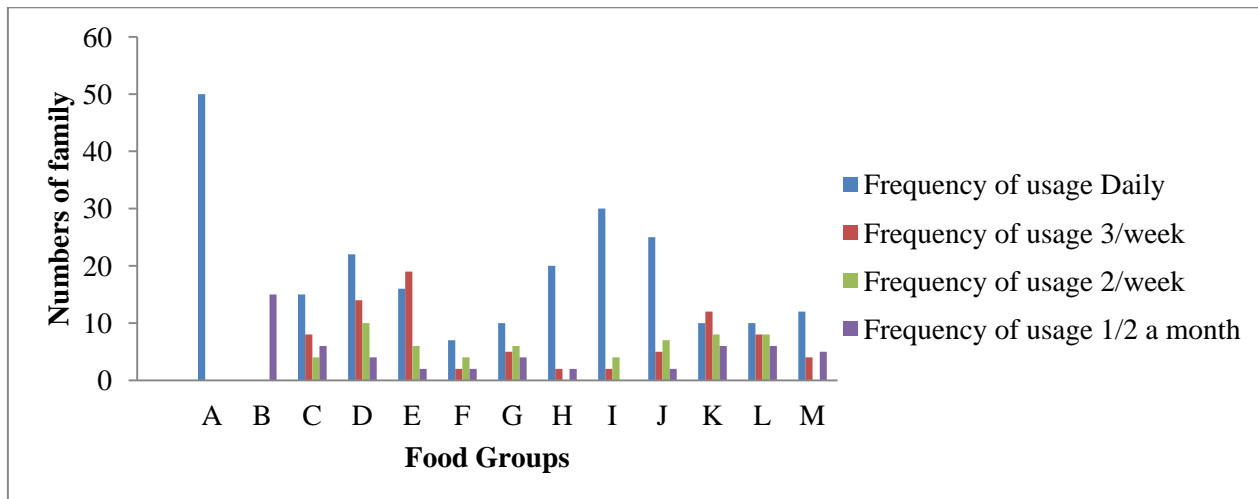
(A: Rice, B: Wheat, C: Pulses/legumes, D: Green leafy vegetables, E: Roots & tubers, F: Other vegetables, G: Fruits, H: Milk & milk products, I: Sugar & jiggery, J: Oils & fats, K: Flesh foods, L: Carbonated beverages, M: Tobacco/alcohol)

Fig X: Frequency of usage of foodstuffs (Urban)

Income, level of education and types of family are all proportionally equivalent to the dietary pattern of a family. Food without dal, wheat, potato, oil and spice are the main characteristic features of the indigenous food system in Arunachal Pradesh, it is an interesting researchable domain [10]. Rice is used as staple food by 100% families in the rural area where consumption of wheat only shown by in minimum numbers only at rural area. Green leafy vegetables used extensively by the people of both areas. There are numerous plants that have been used as food, as well as medicine by the tribal people since time immemorial. The intake of 350-400 g vegetables per caput per day is associated with reduced incidence of many common forms of cancer, and diets rich in plant foods are also associated with a reduced risk of heart disease and many chronic diseases of ageing. Vegetables contain phytochemicals that have anti-cancer and anti-inflammatory properties which confer many health benefits [11]. Here, development of healthy food habit of oneself and of the child is the major and utmost thing to do for each and every family member. This is because; healthy food habits are not only for present health but for the long term complete health.

The adult age group was taken for further study and some anthropometric measurement were taken like height and weight to calculate BMI. It has been observed that various tribal populations have high to very high rates of chronic energy deficiency (CED) based on their body mass index (BMI) values [6]. For the measurement of vital body sign, blood pressure and pulse rate were taken from adult male and female of both rural and urban areas. With the help of health frequency questionnaire the overall medical conditions of the adult(s) were measured. Finally, the calculation was done and compares all such parameters in terms of sex and place. The comparison is shown below-

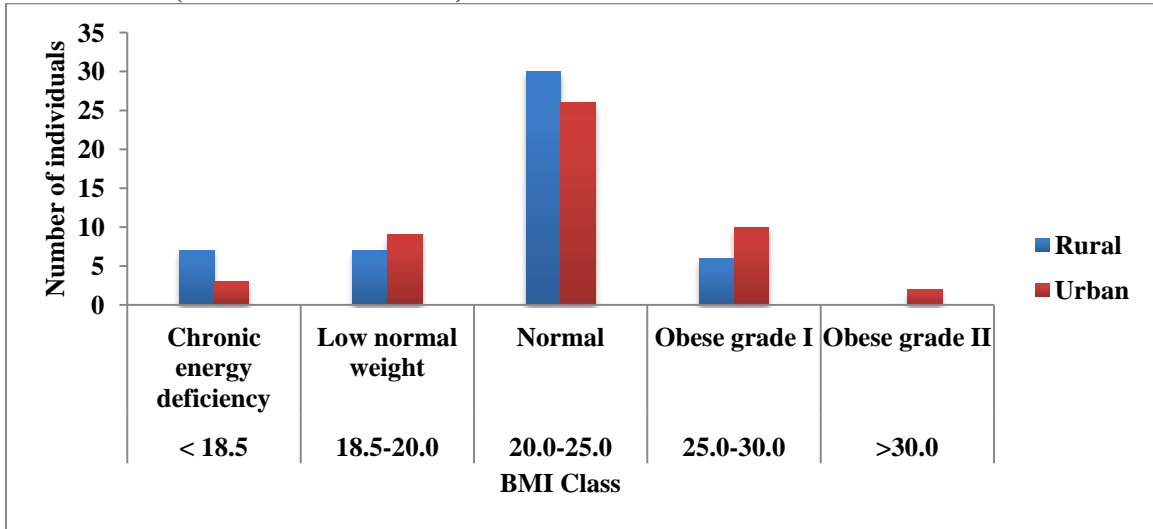**Comparison of BMI status (Rural and Urban adults)**

Fig XI: Comparison of BMI status of rural and urban adults

Results showed 60% normal BMI in rural adults against 52% in urban. This indicates that almost 50% of the adults are below and above normal BMI in case of urban. Low Body Mass Index (BMI) and high levels of undernutrition (based on BMI) are the major public health problems especially among rural underprivileged adults of developing countries [12].

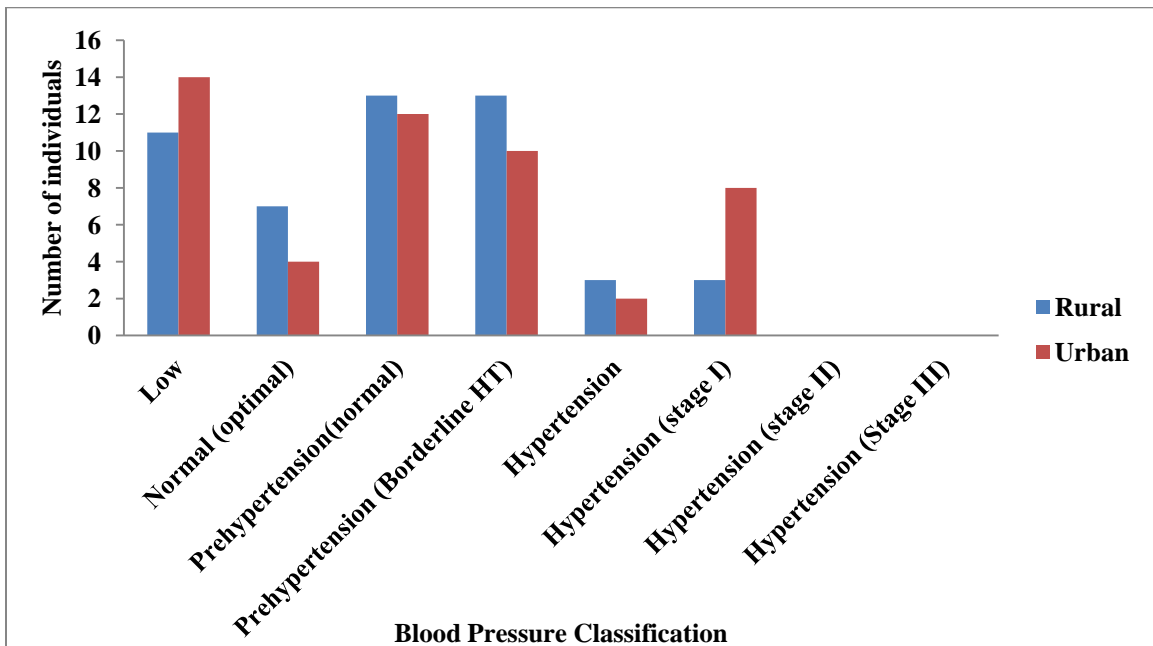**Comparison of Hypertension status (Rural and urban adults)**

Fig XII: Comparison of hypertension status of rural and urban adults

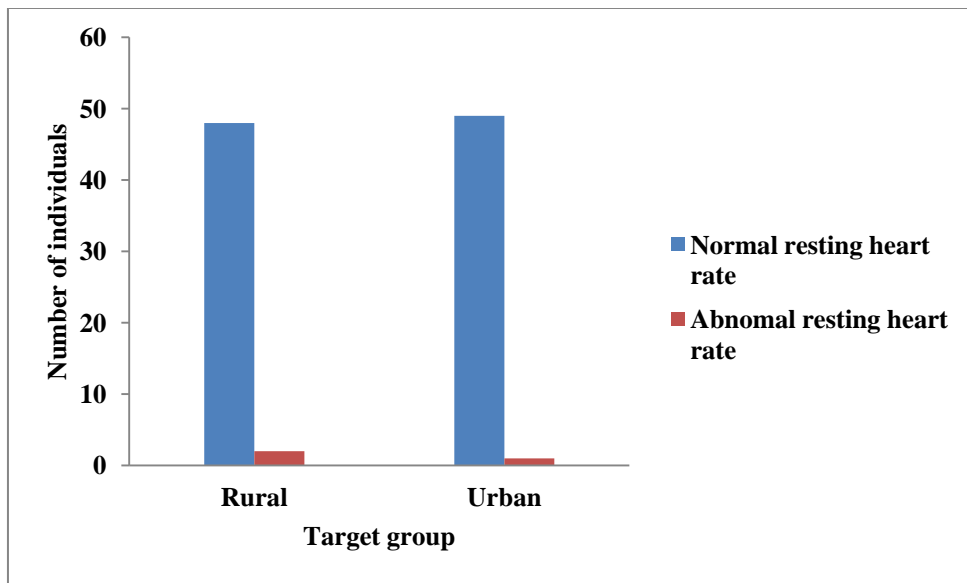**Comparison of Heart rate/pulse rate status (Rural and urban adults)**

Fig XIII: Comparison of heart rate/pulse rate status of rural and urban adults

In case of urban adults, 20% and 4% of population were under obese grade I and grade II respectively. Poor dietary habits combined with decreased physical activity have led to an increase in overweight and obesity among adults and children [13]. In case of hypertension status, 6% rural adult found to be in stage-I and 16% adult in urban. There is a need for change in the daily lifestyle as well restriction of salty foods in diet in both areas, but, especially in urban.
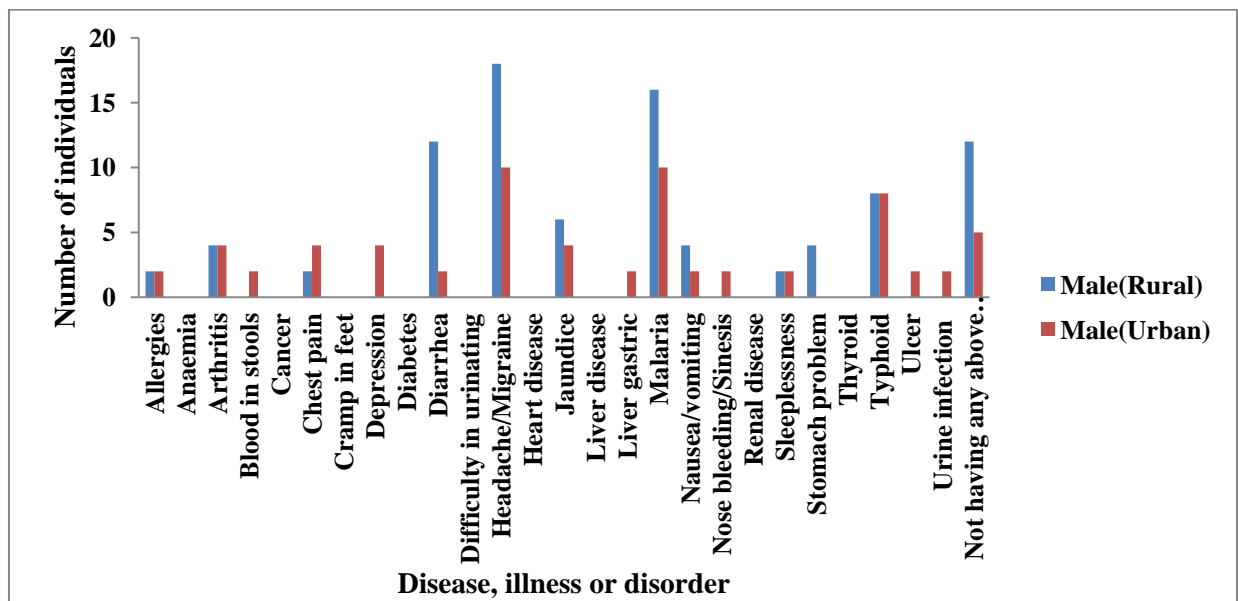
Comparison of health status (Male)

Fig XIV: Comparison of health status of rural and urban male
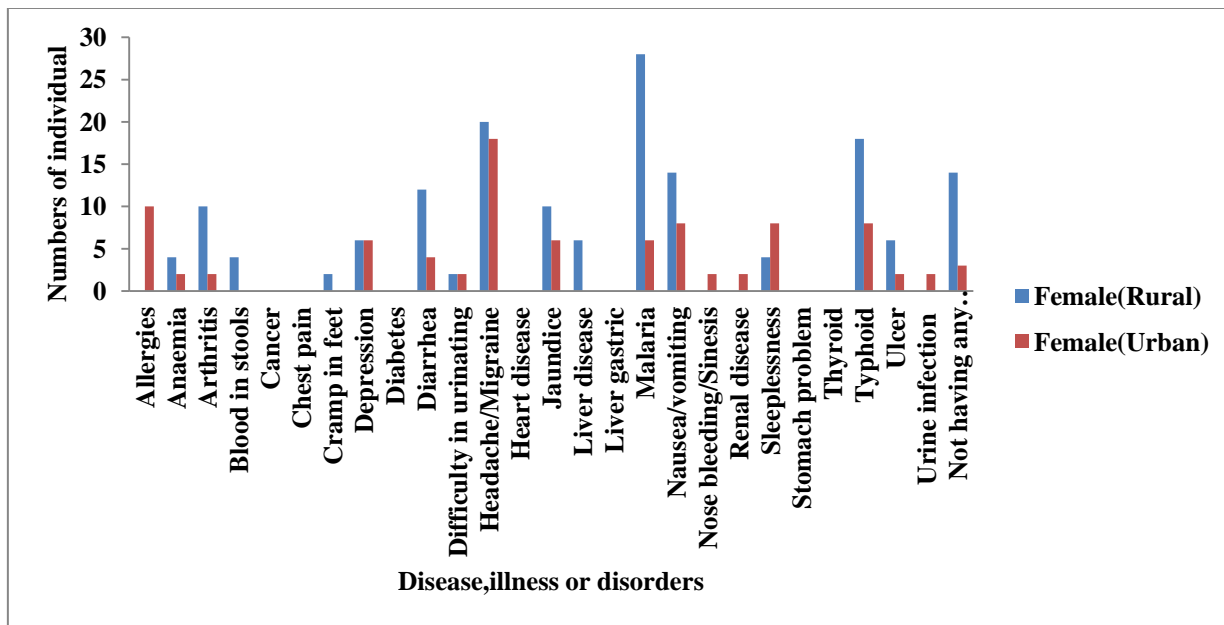**Comparison of health status (Female)**

Fig XV: Comparison of health status of rural and urban female

The overall medical condition of both area showed that there was a higher prevalence of water borne and infectious diseases in the rural area and some critical diseases in urban. It is to be noted that cardiovascular and cancers like diseases were not found among rural and urban adults, which indicate a better health condition of them.

CONCLUSION

In the conclusion, it can be said that the nutritional health status of rural people was comparatively well than urban people. The hypothesis that has been generated was achieved after a few steps of success from analyzing and comparing data of nutritional health condition of both targeted area. But the parameters of socio economic status, dietary and health condition shows vast differences among rural and urban population. A low socio-economic status (SES) is related to unhealthy dietary habits; less educated people with a low income tend to consume more energy-dense food whereas their higher SES counterparts have a higher fruit and vegetable intake. The association between SES and the healthiness of the diet was not fully understood yet but the investigating the motives underlying the food choices might provide more insight.

People with lower levels of education and income were seen to have less healthy dietary habits, partly because of their higher priority for price and familiarity, and their lower priority for health as a motive for food purchase. Price reduction of foods such as fruits and vegetables might therefore be an effective strategy for diet improvement, but the potential of different pricing strategies needs further research.

Sometimes availability of market condition surrounding also affect the dietary habit and ultimately on the health pattern of an individual. On the other hand, improper sanitation and hygiene are always responsible for many types of diseases like diarrhea, malaria, typhoid, dysentery etc. Lack of proper knowledge about healthy hygienic practices such as washing of hands before eating, water purification issues (boiling, filtering by sand or by water filter), washing and sun drying of utensils etc. are also responsible for many diseases or health abnormalities. Here, habit is a prime issue since it is the guardian, who helps to develop healthy eating routine and hygienic practices of an individual.

APPENDIX

Appendix A: Food Frequency Questionnaire

1. **Identification particulars:**
   Name of the village: Dist: State:
   Area (Urban/Rural):
   Name of the respondent:
   Address:
2. **Socio-economic status of family:**
   Occupation of the head of the family:

Family size & Composition	Age groups(yrs)							
	0-1	1-5	5-12	Adults	Elders	Total	No. of earning members	Total family income Rs./ p.m
Sex: Males								
Females								
Total								
Educational level:								

Type of family: Nuclear/Extended/Joint

Physiological status of woman: Pregnant/Lactating/Non-pregnant & Non-lactating

Types of feeding child: breast feeding/formula feeding

Number of absentees/guests/servants/pots in the family:

3. **Dietary pattern of the family:**

SI. No		Dietary Information									
		Frequency of usage of foodstuffs						Sources of getting foodstuffs (cultivated by own/ from market)	Cost Kg. Rs. Ps.	Method of preparation
		Daily	3/wk	2/wk	1/wk	1/mth	Season in which used			
1	CEREALS Rice Wheat Jowar Ragi Others									
2	PULSES/ LEGUMES									
3	GREEN LEAFY VEGITABLES Spinach									

	Amaranth Cabbage Oyin Oyik Oyngor Marsa Others								
4	ROOTS & TUBERS Potato Sweet potato Kath Alu Others								
5	OTHER VEGITA BLES Bak/Kope Tir								
6	FRUITS								
7	MILK & MILK PRODUC TS								
8	SUGAR & JAGGER Y								
9	OILS & FATS								
10	FLESH FOODS Mutton Beef Mithun Pork Chicken Fish Eggs								
11	MISCELL ANEOUS FOODS								
12	LESS FAMILIA R FOODS								
13	TOBACO O								
14	ALCOHO L (TRADIT								

	IONAL/C OMMER CIAL)									
15	FRUIT JUICES(HOME MADE/C OMMER CIAL)									
16	CARBON ATED BEVERA GES									

(Source: MFN 006. Public Nutrition. ISBN 31-266-2300-4)

Appendix B: Health Frequency Questionnaire
   (For Adult Male/Female)
   (Age groups: 20-39yrs)
   1. **Height:**
   2. **Weight:**
   3. **Age:**
   4. **Habitat:** Rural/Urban
   5. **Overall medical condition(disease/illness/disorder)**
      I.   Blood pressure: Low / Normal /High
      II.   Diabetes: Type 1/Type 2
      III.   Heart disease: Yes/No
      IV.   Diarrhea: Yes/No
      V.   Nausea/ Vomiting: Yes/No (if yes, then less frequently/more frequently)
      VI.   Blood in stools: Yes/No
      VII.   Difficulty in urinating: Yes/No
      VIII. Anemia: Yes/No
      IX.   GOUT(Arthritis): Yes/No
      X.   Depression: Yes/No (if yes, then state the reason……………………………)
      XI.   Thyroid disease : Yes/No
      XII.   Ulcer disease: Yes/No
      XIII. Cancer: Yes/No (if yes, then state the type of cancer ……………………….)
      XIV.   Headaches or Migraines: Yes/No
      XV.   Typhoid: Yes/No (if yes then, once/twice a year/ one or two year ago)
      XVI.   Jaundice: Yes/No (if yes then, once/twice a year/one or two year ago)
      XVII. Malaria: Yes/No (if yes then, once/twice a year)
      XVIII. Allergies: Yes/No (if yes then, state the body part/location………………….)
      XIX.   Sleeplessness: Yes/No
      XX.   Renal disease: Yes/No
      XXI.   Liver disease: Yes/No
      XXII. Any Others:

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ACKNOWLEDGEMENT

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