

Nutritional Assessment of Adults Tharu Tribe of Bahraich District In Uttar Pradesh (India)

Dr. Jyoti Kumari

Assistant Professor, Department of Home Science, Dr. B. R. A. Government Girls PG College Fatehpur

Abstract: *The Tharu tribes are among the oldest indigenous communities residing in the Terai region of India and Nepal. Despite constitutional safeguards, they face persistent socio-economic and health-related challenges. As per the census of 2011 the tribal population consists of 8.6% while it was 8.2% according to the census of 2001. The Tharu is well known scheduled tribe of Uttar Pradesh. Tharus mostly live in the Terai belt of Uttar Pradesh. The Region covers five districts of Uttar Pradesh namely Lakhimpur Kheri, Balrampur, Bahraich, Shravasti and Maharajganj. Bahraich district was selected for the study. The objective of the study was to assess the nutritional status of the adult respondents. Looking to the nature of study descriptive research design was adopted. For the study of Nutritional status of adult Tharu tribes, there was 15 blocks in Bahraich district but its Nanpara tehsil has 4 blocks, in these 4 blocks only Mihinpurwa has Tharu population. Rampurwa, Vishnapur, Fakeerpuri and Bardiya villages were selected purposely. Random sampling has been adopted for the study. 356 sample (211 female and 145 male) were selected for the study. 89 respondents were selected from each village. Interview schedule was developed by self to assess the background information of the respondents. The findings of the study revealed that Majority of respondents were belonged to normal BMI category. 24.9 % respondents were suffering from CED (Chronic Energy Deficiency). Maximum respondents were suffering from clinical diseases. Pale conjunctiva, joint pain, skin disorder, common cold, gum problem and hypertension were common among the respondents. Food intake was assessed by the 24-recall method. Nutrient intake of respondents was lower than the recommended dietary intake. Therefore, it can be concluded that the nutritional status of adult Tharu tribes was low.*

Keywords: Tharu, Tribes, Nutritional Status, 24-Hours recall method, Chronic Energy Deficiency

1. Introduction

India is a country of multi-ethnic groups and Tharu tribe is one of them. They are largest and one of the oldest tribal communities in the region. They are generally cultivators and peddlers. They speak their own Tharu language known as "Tharuhati" and script is Devnagiri and for communication purpose they speak Hindi as well. Tharu people who lived in Terai dense forest areas for centuries infected with Malaria, developed an inborn resistance against malaria. The Tharus got the status of scheduled tribes with four other tribes (Buksa, Bhotia, Jaunsari and Raji) in Uttar Pradesh through the constitution (Scheduled Tribes) (Uttar Pradesh) order, 1967. Population wise, Tharus are most populous group among all existing five tribal groups in Uttar Pradesh. Most of the population of Tharu community exists in the Bhabhar Terai region at Indo-Nepal border (Srivastava, 1958). Tharus are mainly inhabited in Udham Singh Nagar District of Uttarakhand, Lakhimpur Kheri, Bahraich, Basti, Gonda, Balrampur, and Gorakhpur districts of Uttar Pradesh and Champaran District of Bihar. Total population of Tharu tribe in Uttarakhand is 91,342 and 1,05,291 in Uttar Pradesh. Tharu people worship various gods and Goddess as their local deities. They are adherents mainly of Hindu religion, but also hold Islamic, Animist and Buddhist beliefs. 6 Tharus in Nepal called their local deity 'Gor-Raja'. They also believe in animal sacrifices to pacify their traditional local god. The main occupations of this community are fishing, hunting and agriculture. Tharu people do not partake in the national level politics but they are active in local politics as 'Pradhan' and 'Guruwa' (head of the traditional Panchayat). Though they are practicing the patriarchal and patrilineal notion of the Hindu caste society, the status of women in the Tharu community is relatively better and they enjoy considerable amount of freedom. "Tharu women dominate in decision making and managing the affairs of the family" 8 although they are not educated. Nutrition status and health condition

of an individual indicates the socio-economic condition prevalent the society. Although, adult nutritional status can be evaluated in many ways (Lohman, 1988), it is established fact that Body Mass Index is useful anthropometric indicator of measuring nutritional status of the population (FAO, 1996). The prevalence of Chronic Energy Deficiency (CED) assessed by BMI. BMI is generally considered a good indicator of not only the nutritional status but also the socioeconomic condition of a population, especially adult populations in developing countries (Shetty and James, 1994; Khongsdier, 2002; Mosha, 2003; Pryer and Rogers, 2006). A BMI of less than 18.5 is widely used as a practical measure of chronic energy deficiency, i.e., a steady condition of underweight in which an individual is in energy balance irrespective of a loss in body weight or body energy stores (Subramanian and Smith, 2006). Such a steady condition of underweight is likely to be associated with morbidity or other physiological and functional impairments (WHO, 1995., James et al, 1988). Nutrition is an important factor determining the quality of human life. In India, Mal-nutrition is one of the most important health problems. In the country, the incidence of severe protein energy mal-nutrition in school children was 1per cent to 2per cent and mild to moderate mal-nutrition nearly 80per cent (Gopalan). At present nutritional disorders like protein calories mal-nutrition, anemia, angular stomatitis, petropalholnia, Goiter, Beriberi, Pellagra Rickets, etc. are the major problems. This is the main reason for very high percentage of infant, child, pregnant and nursing women mortality rates. In the tribal society mortality and morbidity rates are higher than in the non-tribal society. People live in very difficult ecological situation. They sometime get plentiful and good food while sometimes they starve. Numerous studies have shown a close relationship between the ecosystem and their nutritional status. Diet and nutrition studies of tribal society are more important than the non-tribals. They are much nearer to native than rural or urban population since their food needs are met from nearby 28

fields and forests. In most of the tribal areas food availability and consumption patterns depend on local or natural resources. Several studies were carried out all over India to find out the nutrient intake of different tribal communities. The nutritional problems of different tribal communities located at various stages of development are full of obscurities and very little scientific information on dietary habit and nutrition status are available due to lack of systematic and comprehensive research investigations. **Bose and Chakraborty (2005)** demonstrated that the prevalence of adult under nutrition was found to be very high among the Bathudis, a tribal population of Keonjhar District, Orissa, also found that the prevalence of under nutrition much higher in Bathudis tribes in comparison to other tribes who is residing other part of India. Therefore, immediate nutritional intervention programs were needed for implementation among Bathudis. Moreover, further research is needed not only among this ethnic group but also other tribal populations of India to fully understand the cause and consequences of adult under nutrition.

2. Methodology

2.1 Research Design

A "Descriptive research design" was adopted to conduct the present study. Descriptive studies are one in which information is collected without changing the environment i.e., nothing is manipulated. Descriptive research design was used as it is considered to be the best method for collecting information which demonstrates relationships and describes the world as it exists. Following a descriptive research design the researcher was able to seek information on the current status of the respondents with regard to their nutritional status.

Cross sectional survey was obtained to collect the data. A pre-tested and pre-structured schedule was applied to collect the information.

2.2 Sampling Procedure

2.2.1 Selection of state

The Tharu is well known scheduled tribe of Uttar Pradesh. It was declared as scheduled tribe in U.P. in the year 1967, along with four other tribes. After independence, for the first time in June, 1967 the President of India notified five tribes of U.P. viz Raji, Bhotia, Jaunsari, Tharu and Bhoksa as scheduled tribes four, out of these five tribes, namely Raji, Bhotia, Jaunsari and Bhoksa (Buxa) have now become a part of Uttarakhand, though some villages of the Bhoksas are still in district Bijnor of Uttar Pradesh. Hence, there were only two scheduled tribes left in Uttar Pradesh namely Tharu and Bhoksa after the division of the state in the year 2000. So the state Uttar Pradesh selected for the study.

2.2.2 Selection of district and blocks for the study

Tharus mostly live in the Tarai belt of Uttar Pradesh. The Region covers five districts of Uttar Pradesh namely Lakhimpur Kheri, Balrampur, Bahraich, Shravasti and Maharajganj close to the border of Nepal. So the Bahraich district selected for the study.

2.2.3 Selection of villages

For the study of Nutritional status of adult Tharu tribes, there are 15 blocks in Bahraich district but its Nanpara tehsil has 4 blocks, in these 4 blocks only Mihinpurwa has Tharu population. Mihinpurwa have 104 villages. Rampurwa, Vishnapur, Fakeerpuri and Bardiya villages were selected purposely.

2.2.4 Selection of sample:

A total number of 356 adult respondents (211 female and 145 male) were selected from tribal areas of district using simple random sampling technique.

2.2.5 Sample size calculation:

The sample size was determined by the use of Cochran's sample size formula and the estimation was based on the prevalence rate of nutritional status (BMI) among adults Tharu population, Uttarakhand, India. The data was taken on the basis of research conducted by **Mukherjee et al (2015)** on the adults Tharu population, Uttarakhand, India. The following formula was used for sample size estimation –

$$N = \frac{Z^2 \times p \times q}{e^2}$$

Where, N = sample size

Z = Standard value (level of confidence) for 95% confidence limit, Z = 1.96

p = Prevalence of appropriate feeding practices according to food groups based on previous studies

q = 1 – p

e = Permissible error = 0.05 (5%)

Step 1: Based on prevalence of malnutrition among Tharu population of Uttarakhand state, p is taken up as 36.4% (0.364), q is (1 - 0.364)
q = 1 - 0.364 = 0.636

$$N = \frac{3.8416 \times 0.364 \times 0.636}{0.0025}$$

$$N = \frac{3.8416 \times 0.231}{0.0025}$$

$$N = \frac{0.889}{0.0025}$$

$$N = 356$$

3. Nutritional Status Proforma:

The main objective of the present study was to assess the nutritional status of adult Tharu population of Bahraich district. In this study, these methods were used due to the ease with which these can be conducted in the field.

Nutritional Anthropometry:

Nutritional anthropometry is concerned with the measurement of the physical dimension and the gross composition of human body at different age levels and degrees of nutrition. The report of the committee on Nutritional anthropometry established by the National Research Council lists the number of measurements that would indicate skeletal build and the thickness of

subcutaneous fat. Body weights and heights reflect their state of health and growth rate (ICMR, 1989).

- a) **Height:** The height of an individual is made up of the sum of 4 components – legs, pelvis, spine and skull. For field nutritional anthropometry, usually only the total height for length is measured.

Method: In the present study, heights were measured using a metric measuring tape. The subjects were made to stand erect looking straight on a leveled surface with heels together and toes apart, without shoes. The moving head piece of the tape was lowered to rest flat on the top of the head and the reading was taken. Height was read to the nearest 0.5 cm. An average of three measurements was taken as the final measurement.

- b) **Weight:** The weight of an individual is the sum of fat and fat free mass (water + protein + glycogen + mineral). **Method:** For measuring body weight of subjects, weighing balance were used. Weights were taken with the individuals under basal conditions with minimum clothing and without shoes. The zero error of the weighing scale was checked before taking the weight and corrected as and when required.

Analysis of Anthropometric Measurements

Body mass index Body mass index is also known as Quetelet index. Using the height and body weight measurements, the Body Mass Index was calculated using the formula. **Body Mass Index (BMI) = weight in kilogram/ height in meter²** Nutritional status was evaluated according to internationally accepted World Health Organization (WHO) BMI guidelines. The following cutoff points were used:

Table 3.1: BMI classification

Status	BMI
CED III CED II CED I	16.0
	16.0-16.9
Normal Overweight	17.0-18.4
	18.5-24.9
Obese	≥25
	≥30

Sources: Adopted from WHO, 2004.

WHR (Waist-Hip Ratio):

WHR is the ratio of circumference of the waist to that of the hips. It was determined by using a measuring tape to measure the circumference of hips at the widest part of buttocks and waist at the smaller circumference of natural waist, usually just above the belly button. The ratio was determined by dividing waist measurement by hip measurement and the health risk was determined thereafter as given in below table.

Table 3.2: WHR Categories

Male	Female	Health risk based solely on WHR
0.95 or below	0.80 or below	Low risk
0.96 to 1.00	0.81 to 0.85	Moderate risk
1.0+	0.85+	High risk

a) Food Frequency questionnaire:

A dietary survey was conducted as described by (Swaminathan, 2004). The food consumption frequency was recorded in terms of cereals, pulses, milk and milk products, green leafy vegetables, root and tubers, fruit, meat and poultry, fat and oil and sugar. the average daily nutrient intake was

calculated with the help of the food composition tables of (Gopalan et al, 1995). The calculated daily nutrient intake in terms of energy, protein, fat, carbohydrate, vitamins and minerals will be compared against recommended dietary allowances for Indians (ICMR, 1988). The frequency of consumption and also the amounts of food products were collected on the basis of which nutrient consumption in a day was calculated for each sample. The data was analyzed to find out:

- The frequency of consumption of all the food products,
- The minimum, maximum and mean intake of all the food products and,
- The minimum, maximum and mean intake of the various macronutrients and micronutrients including energy, protein, carbohydrate, fat, iron, calcium, vitamin A, vitamin C, vitamin B-complex, crude fibre, etc.

b) Clinical Assessment:

Clinical examination plays a vital role in nutritional surveys. It consisted of a list of various commonly occurring health problem among respondents. A copy of medical history questionnaire is attached in appendix V. The eyes, nails, tongue, gums, teeth, hair, skin and general appearance of each subject were examined by the investigator, in order to find out the presence of any clinical sign and symptoms of malnutrition. The data related to the past three months of the medical history of the subject was collected and analyzed. The answer (present/absent) was recorded in the proforma prepared for the purpose.

c) Pilot Study

After the preparation of Interview schedule, a pilot study was undertaken with the 30 respondents in the non-sampled similar areas of same tribe (for avoiding the biasness in future from same respondent) to see the reliability and validity of questions.

d) Methods of enquiry and collection of data

Field data was collected by direct observation and personal interview method. The interview was conducted with the help of structured schedules. The schedules were prepared aiming at getting all over required information. It contained close-ended questions. The interview was conducted in local language with some epithet and phrases in local tribal language.

e) Statistical Analysis

The collected data were classified and tabulated in accordance with the objectives of the study. The data were coded, scored and compiled for analysis.

4. Result and discussion

4.1 Studies related to nutritional assessment

Table 4.1.1: Distribution of Respondents according to BMI (Body Mass Index)

Nutritional status	Frequency	Percentage	Mean + SD
Underweight	89	24.9	20.98±3.9
Normal	233	65.5	
Overweight	20	5.5	
Obese	14	4.1	
Total	356	100	

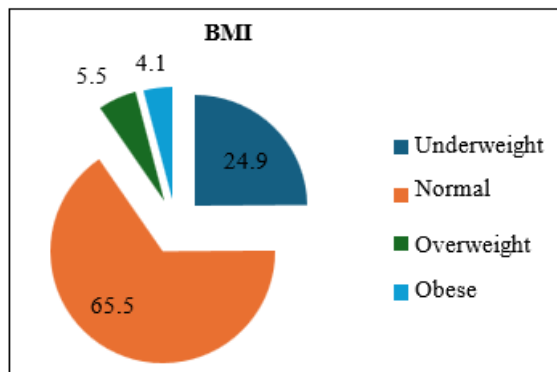


Figure 4.1.1: Distribution of Respondents according to BMI (Body Mass Index)

Table displays distribution of subjects according to nutritional status based on BMI. The mean BMI of the samples were found

20.98 (± 3.9). The data shown that more than 65% of the sample fell under normal BMI range i.e 18.5-24.99. 24.9% were underweight having BMI <18.5 and 5.5% respondents were overweight. Only 4.1% respondents were obese with BMI more than 30. **Chakma et al (2009)** conducted a study on Baiga Tribe of Madhya Pradesh, he concluded that prevalence of chronic energy deficiency (BMI <18.5) was about 76per cent among adult population. The present study revealed that malnutrition is widely prevalent among tribe which is mainly due to inadequate dietary intake. **Bose and**

Chakraborty (2005) carried out a cross-sectional study to determine anthropometric profile and nutritional status based on body mass index (BMI) of adult Bathudis, a tribal population of Orissa, India, were studied. In conclusion, this study demonstrated that the prevalence of adult under nutrition was found to be very high among the Bathudis, a tribal population of Keonjhar District, Orissa. These rates were much higher than those found in several tribal populations from other parts of India. Therefore, immediate nutritional intervention programs are needed for implementation among Bathudis. **Rajak (2016)** conducted a study on Saharia tribes in Madhya Pradesh and found that the health status of the tribal population is very poor and worst among the primitive tribes because of their isolation, remoteness and being largely unaffected by the developmental processes going on in the country. The tribal population is at a higher risk of under nutrition because of their dependence on primitive agricultural practices and irregularity of food supply.

Table 4.2.2: Distribution of Respondents on the basis of CED (Chronic Energy Deficiency)

Nutritional status	Frequency	Percentage
CED III	9	9.7
CED II	29	32.2
CED I	51	58.1
Total	89	100.00

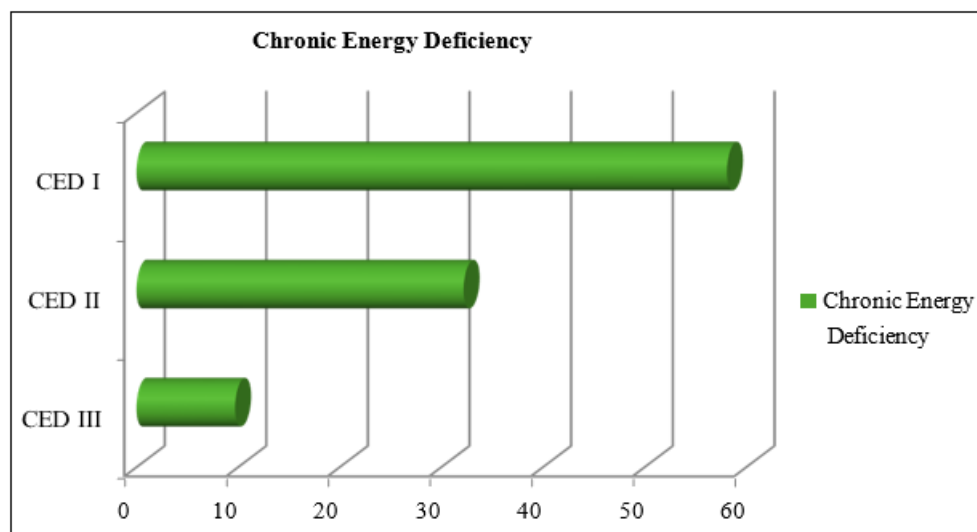


Figure 4.2.2: Distribution of Respondents on the basis of CED (Chronic Energy Deficiency)

Above table indicated the overall distribution of the respondents according to nutritional status based on Chronic Energy Deficiency. Out of 89 respondents who were underweight, 9.7% respondents having CED III, 32.2 % having CED II and most of the respondents (58.1) were suffer from CED I. Other findings observed by **Sudip (2009)** on the adult male populations, he revealed that highest prevalence of chronic energy deficiency or CED (BMI ≤ 18.49 Kg/m²) among the Oraons (53.10%). The frequencies of CED among the Saraks (27.85%) and the Dhimals (27.04%) are also very high.

Table 4.2.3: Distribution of Respondents according to WHR (Waist to Hip Ratio)

WHR	Frequency	Percentage
<0.8	90	25.28
0.81-0.85	232	65.16
>0.85	34	9.56
Total	356	100.00

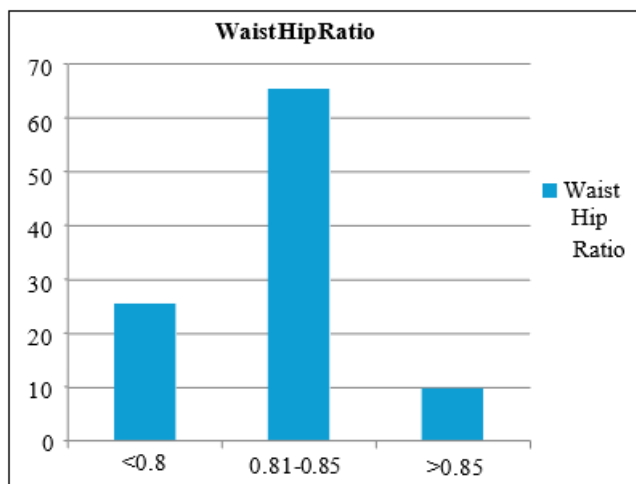


Figure 4.2.3: Distribution of Respondents according to WHR (Waist to Hip Ratio)

The ratio of samples with WHR, i.e. <0.8 was found to be 25.28% while 65.16% fell under 0.81-0.85 category and 9.56% were found to have >0.85. WHR indicating increased health risks for subjects due to excess fat in the abdominal region.

Table 4.5.4: Dietary intake (24 hours recall method)

Nutrient Intake	Mean $\pm$ SD (N=356)	RDA (ICMR)
Energy ((Kcal)	1736.51 $\pm$ 324.55	2425
Protein (g)	46.56 $\pm$ 6.86	60
Fat (g)	15.41 $\pm$ 5.41	20
Calcium (mg)	347.25 $\pm$ 63.49	400
Iron (mg)	17.73 $\pm$ 4.54	28
Carotene (μ g)	1466.92 $\pm$ 271.79	2400
Vitamin C (mg)	19.28 $\pm$ 4.58	40

Three hundred fifty-six respondents were assessed by dietary intake information. The mean intake of all nutrients including both macronutrients and micronutrients was shown in the following table along with their recommended dietary intake. Mean intake of energy protein and fat were lower than the recommended level i.e. 1736.51, 46.56 and 15.41 respectively. Intake of micronutrients were also lower than the recommended level. Another study conducted by **Jaiswal (2013)** on Bhumia tribes of Madhya Pradesh, he found that the intake of all nutrients except calcium was significantly lower than the recommended level. A study proposed by

Hamid and Vaida (2017) on schedule tribal women of Kashmir, they founded that 1421 ± 263.56 Kcal was found to be mean calorie intake, 40.18 ± 7.29 gms as mean protein intake, 7.9 ± 2.30 mg as mean iron intake and 277 ± 152.99 mgs as mean calcium intake among respondents. This shows that there was gross deficit in the nutrient intake among scheduled tribe women of Kashmir. **Chakma et al (2014)** conducted a study on Baiga tribes of Madhya Pradesh, they concluded that the consumption of all the food stuff except cereals and millets were lower than recommended dietary allowances. The intake of micronutrients was lower than recommended dietary allowances. Vitamin 'A' deficiency was a major nutritional deficiency disorder in this tribe. Lisbeth conducts a study on tribal adolescent in the Alaram grama panchayat Kannur, Kerala, she found that mean nutrient intake of the selected subjects shown a correlating result to biochemical and clinical examinations. Among all the category iron, vitamin C, B complex vitamins, and vitamin A intake was lower than that of RDA recommended by ICMR Intake of macronutrient was comparatively higher but can be improved.

Table 4.2.5: Distribution of Respondents according to medical history

Diseases	Frequency
Pale conjunctiva	71
Worms in stool	09
Skin disorder	56
Asthma	03
Diarrhoea	12
Gum problem	49
Goiter	02
Heart attack	01
Hypertension	44
Hypotension	12
Jaundice	18
Joint pain	66
Malaria	41
Chicken pox	21
Common cold	101
Dengue	08
Diabetes	26
Defective vision	32
Pneumonia	1
Tuberculosis	9
Typhoid	18

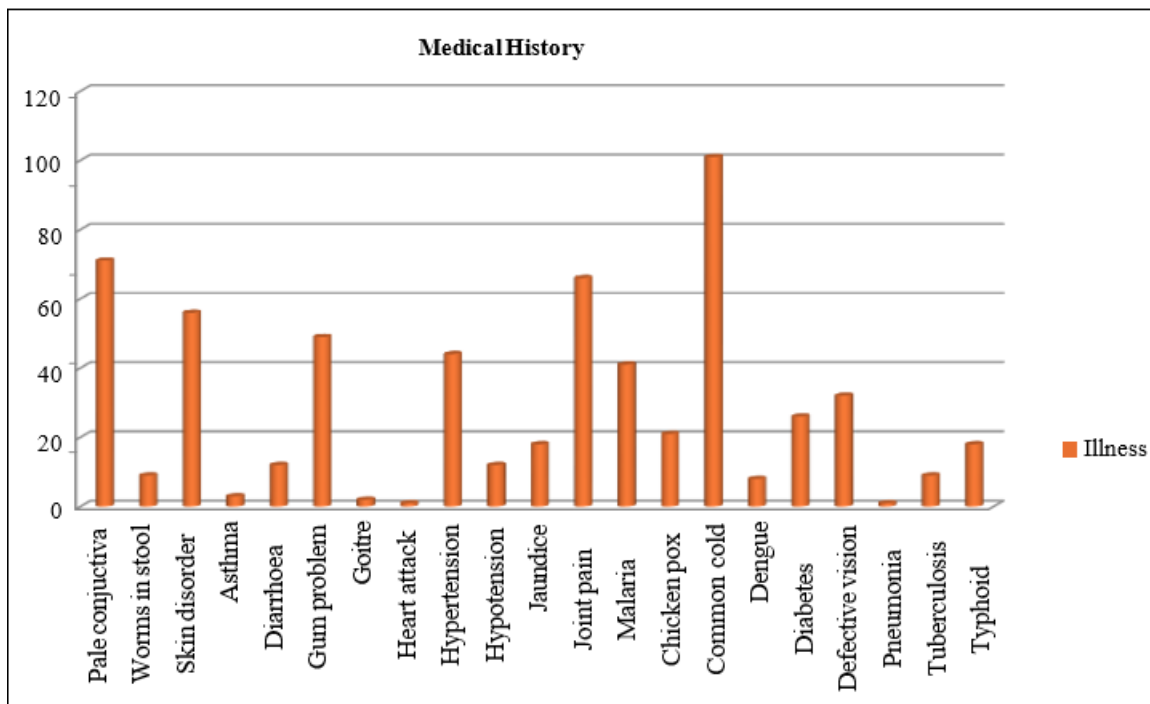


Figure 4.2.4: Distribution of Respondents according to Medical history

The data presented in table shows that the most prevalent diseases Tharu tribes were pale conjunctiva (71), joint pain (66), common cold (101), skin disorder (56), hypertension, gum problem (49) (44) and malaria (41%). The other common problems were defective vision, diabetes, jaundice, diarrhoea, chicken pox and hypotension with the frequencies 32%, 26%, 18%, 12%, 21% and 12%, respectively. Minimum respondents were suffering from some other problem such as worms in stool, asthma, goitre, heart attack, dengue, pneumonia and tuberculosis. A study of **Dondapati and Karimaddela (2016)** on schedule tribes of Velugodu, Andhra Pradesh, concluded Physical examination of the households with a history or signs and symptoms of illness revealed that majority (56.32%) of them are suffering with scabies. Scabies was present exclusively in children and women handling them but not in men. Anaemia was seen in 55.17% affecting all the age groups and both genders. Eruptive fevers were present in 14.8% of children. Less than 4% of the adult population had a history of Sexually Transmitted Infection with no HIV positives. Two cases of sputum positive tuberculosis under treatment were present. One case of Infantile Hemiparesis was present. Other insignificant findings were present in negligible number of populations.

Patrudu et al (2013) proposed a study on tribes of Vishakhapatnam district and observed that 52.67 per cent of the diseased persons are effected from fever while 36.64 per cent from malaria and 10.69 per cent from dengue. **Shankar and Manimaran (2013)** conducted a study on Pachamalai tribes and found As far as health problem is concerned, majority (60%) of the respondents were affected with typhoid, 16 percent of the respondents had chicken pox, 13 percent of the respondents were infected with malaria and 11 percent of the respondents had whopping cough. **Sarkar (2016)** conducted a study on tribal women of Darjeeling district and observed that almost all respondent (94 % of the respondents) have reported that there is no drainage facility in

their houses. All the respondents had health problems, the most common being diarrhoea (50%), cough and cold (50%) and dysentery (50%). Others included hypertension (8%), arthritis (6%) and vision problems (2%).

4. Conclusions

- Majority of respondents (65.5%) belonged to normal BMI category. 24.9 % respondents were suffer from CED (Chronic Energy Deficiency). Maximum respondents were suffer from clinical diseases. Pale conjunctiva, joint pain, skin disorder, common cold, gum problem and hypertension were common among the respondents..
- Food intake was assessed by the 24 recall method. Nutrient intake of respondents were lower than the recommended dietary intake.

On the basis of finding it can be concluded that the nutritional status and socio economic condition of adult Tharu tribes were low.

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