ORIGINAL ARTICLE

NORTH BENGAL MEDICAL COLLEGE JOURNAL [2022], VOL.,8 , No.1 : 09-15

Nutritional Status of Adult Santhals in the Selected Region of the Northern part of Bangladesh

*Sumana Sutradhar

ARTICLE INFO

Article history:

Received: 25 July 2021

Accepted: 28 September 2021

Online:

www.nbmc.ac.bd

Keywords:

Body mass index (BMI), Santhal, Chronic energy deficiency (CED)

ABSTRACT

Introduction: *Santhals are the largest tribal in northern part of Bangladesh; those are at risk of under nutrition due to poverty and improper health seeking behavior. This study was conducted to assess the nutritional status based on Body Mass Index (BMI) and Chronic Energy Deficiency (CED) among the adult Santali of Northern region of Bangladesh.* ***Methods****: This cross-sectional study was carried out in the department of Anatomy, Dhaka Medical College, and Dhaka from July, 2013 to June, 2014. A total of 385 (193 male and 192 female) adult Santhal agricultural laborer, age ranging from 25 to 50 years were randomly selected from three Santhals villages named: Sundarpur and Joykrishnapur of Rajshahi districts and Bhabicha of Naogaon districts. Personal information and anthropometric measurements were recorded by a prepared questionnaire and on a data sheet following interview and examinations of the participants respectively. Body Mass Index was calculated from the anthropometric measurements of height and weight ratio. Nutritional status based on BMI was evaluated and Chronic Energy Deficiency was classified using the internationally accepted BMI standards. Statistical analysis was done by unpaired student's 't' test.* ***Results:*** *Results revealed that mean height, weight and BMI of Santhal male were 160.69±3.91 cm, 54.54±4.06 kg and 21.12±1.30kg/m²; whereas in female 148.22±6.53 cm, 44.82±5.30 kg and 20.43±2.37 kg/m² respectively. Normal BMI is observed for Santhal who have fixed income source like cultivation of own land (20, 10.36% male), share cropping and wage earning (60,31.08% male and 60,31.25% female), animal husbandry and wage earning (90, 46.87 %in female).The extent of under nutrition in the form of underweight (BMI<18.5) is more among landless (60,31.08% male and 42,21.87% female) Santhal who depend only on wage earning for livelihoods. The overall frequency of under nutrition was more in female (74,38.54%) than male (51, 26.42%) Santhal.* ***Conclusion:*** *There is an urgent need for intervention programmes for improving under nutrition among Santhal with special focus on female.*

[1.] *Assistant Professor, Department of Anatomy, Barind Medical College, Rajshahi, Bangladesh*

**Corresponding author:* ✉ sumanasutradhar81@gmail.com

INTRODUCTION

Tribal communities are isolated from general population and are socially and economically vulnerable.[1] Their geographical isolation, primitive agricultural practices, socio-cultural taboos, lack of formal education, poor infrastructure facilities, improper health seeking behavior, poverty etc., have always led them to

develop various morbidities and under nutrition. The dietary pattern and living condition of the tribal is different from the general population.[2] There are about 29 ethnic communities in Bangladesh, among them the Santhal is one of the largest communities.[3] Originally the Santhal were the inhabitants of Santhal Parganas of India. After Santhal rebellion in 1855, they migrated to different regions including Bangladesh in search of livelihood.[4] Now a days they are inhabitants of the greater districts of Dinajpur, Rangpur, Rajshahi, Naogaon and Chapainawabganj of Rajshahi and Rangpur divisions.

The Santhal belongs to the Proto-Australoid race and retains to an aboriginal language, known as Santhali. Primary occupation of the Santhal is agriculture but food gathering, hunting, fishing and animal husbandry are also their important subsidiary occupations. Both men and women take part in agricultural activities. The main food of the Santhal is boiled rice. Santhal village is the most important socio-economic and political unit. Every village has a 'Panchayet' to maintain law and order. The Santhal are divided into 12 totemic tribes. These are: 1) Hansda, 2) Marndi, 3) Soren, 4) Hembrom, 5) Tudu, 6) Kisku, 7) Murmu, 8) Baske, 9) Besra, 10) Pauria, 11) Chore and 12) Bedea. These tribes are hierarchically ordered on the basis of occupation, like: Klisku (raja), Marndi (wealthy/rich), Murmu (priest) or Soren (Warrior or Sipai). Among them Pauria, Chore and Bedeatribes are on the verge of extinction.[5]

Nutritional status of a population is an important tool to study health of any population.[6] World Health Organization (1995) has recommended that anthropometry could be used to assess the nutritional and health status of adults. One such measure now in widespread use is Quetelet's index, better known as body mass index (BMI). This measure was an attempt by the 19th century mathematician Lambert Adolphe Jacques Quetelet to describe the relation between body weight and stature in humans.[7]

Although adult nutritional status can be evaluated in many ways, the BMI is most widely used because it's use is simple, inexpensive, safe and suitable for large scale surveys.[8] A BMI<18.5 kg/m² is widely used as a practical measure of chronic energy or hunger deficiency (CED), i. e., a 'steady' underweight in which an individual is in energy balance irrespective of a loss in body weight or body energy store.[9] CED is caused by inadequate intake of energy accompanied by high level of physical activities and infection.[10]

Like other tribal population, livelihoods of Santhal also require high level of physical activity. Different study revealed that their dietary energy intake is not adequate to compensate their heavy physical workload. BMI is generally considered a good indicator of not only the nutritional status but also the socio-economic condition of a population, especially adult population of developing countries.[11]

A good number of researches were carried out on determination of nutritional status based on BMI of different tribal and non-tribal groups in different countries. Inadequate work is found in Bangladesh regarding nutritional status of tribals specially the Santhals. Considering the urgent need to evaluate nutritional status of Santhal tribes, the present study was aimed to determine BMI and the prevalence of Chronic Energy Deficiency (CED) and its effect on productivity of population.

METHODS

This cross-sectional study was carried out in the department of Anatomy, Dhaka Medical College, Dhaka from July, 2013 to June, 2014. The sample size was 385 adult Santhals (193 male and 192 non-pregnant and non-lactating female from villages: Sundarpur and Joykrishnapur of Godagari Thana of Rajshahi districts and Bhabicha of Neyamutpur Thana of Naogaon districts. The selection of study area is entirely on the basis of concentration of tribal population. The age group is selected 25-50 years purposively as our study is designed to evaluate nutritional status of productive group of Santhal tribal of Northern region of Bangladesh. This study covers two aspects: A. Some selected socio-economic characteristics of the study subjects and B. Assessment of nutritional status from anthropometric measurements.

Prior permission and informed written consent was taken from the headman of the respective

village Panchayet. According to their advice the measurements were taken in a closed door class room of respective village's primary school where enough space was available and proper privacy was maintained. Personal information and anthropometric measurements were recorded on prepared questionnaire and data sheet following interview and examinations of the participants respectively. With the help of stadiometer and weighing scale, height and body weight were measured following NHANES guideline.[12]

BMI was computed using the following standard equation: BMI= Weight (kg)/height(m^2)[7]

Nutritional status was evaluated using internationally accepted BMI guidelines (WHO, 1995).[13]

The following cuts off points were used:

Chronic energy deficiency (CED): BMI < 18.5, Normal: BMI = 18.5-24.9, Overweight: BMI ≥ 25.0.

We followed World Health Organization's classification (1995) of the public health problem of low BMI based on adult populations worldwide. This classification categories prevalence according to percentage (%) of a population with BMI<18.5.[14]

CED Grade-I /Mild: BMI<18.5-17.0

CED Grade-II/ Moderate: BMI <17.0-16.0

CED Grade-III/ Severe: BMI < 16.0

Data were analyzed with the help of SPSS version 19.0 and statistical analysis were done by unpaired student's 't' test.

RESULTS

Among 385 adult Santhals, most (230, 59.74%) of them were in 31 to 40 years age group. Majority (270, 70.13%) of them completedtheir primary school (Table I).

Table I: Socio-economic characteristics of the respondents (n-385)

Particulars	Male(193)	Female(192)	Total(n-385, 100%)
Age:			
≤30 years	33(17%)	52(27.08%)	85 (22.08%)
31-40 years	120(62.18%)	110(57.29%)	230 (59.74%)
40-50 years	40(20.73%)	30(15.62%)	70 (18.18%)
Educational status:			
Illiterate	40(20.72%)	47(23.96%)	86 (22.34%)
Primary school	130(67.35%)	140(72.91%)	270 (70.13%)
SSC	18(9.3%)	5(2.6%)	23 (05.97%)
HSC	5(2.59%)	1(.52%)	6 (01.56%)
Dietary pattern and food habit: *			
Three meal	53(27.46%)	45(23.43%)	98 (25.45%)
Two meal	120(62.17%)	115(59.89%)	235 (61.04%)
Often skipping meal	10(5.18%)	32(16.66%)	42 (10.91%)
Inter meal snacks and tea	190(98%)	185(96%)	375 (97.40%)
Other addicting substance	193(100%)	170(89%)	363 (94.29%)
Source of income:*			
Cultivate only own land	20(10.36%)	00	20 (05.19%)
Farming on own land and share cropping	53(27.46%)	00	53 (13.77%)
Share cropping and wage earning	60(31.08%)	60(31.25%)	120 (31.17%)
Only wage earning	60(31.08%)	42(21.87%)	102 (26.49%)
Wage earning and animal husbandry	00	90(46.87%)	90 (23.38%)

*Multiple Responses

Santhals have habits of taking meal twice (235, 61.04%) in a day with slight exception i.e. in morning or evening and all (193, 100%) males have bad habit of taking liquor whereas most (170, 89%) of the female chewed betel/tobacco leaf for refreshment. Regarding source of income, most of the Santhal (120, 31.17%) are used to share cropping and wage earning, a very few cultivate their own land (20,05.19 %) (Table I).

Table II: Mean Height, Weight and BMI of the study subject (n-385)

Sex	Height(cm) Mean±SD	Weight(kg) Mean±SD	Body mass index (kg/m^2)Mean±SD
Male	160.69±3.91 (144.00-170.00)	54.54±4.06 (44.00-65.00)	21.12±1.30 (15.82-25.88)
Female	148.22±6.53 (140.00-160.00)	44.82±5.30 (30.00-59.00)	20.43±2.37 (14.37-24.80)
P value	0.0001***	0.0001***	0.012*

Figures in the parentheses indicate range. Comparison between male and female was done by unpaired Student's 't' test, * =significant at p<0.05, ***=significant at p<0.001.

Significant difference was observed in height, weight and BMI between Santhal male and female (p<0.05). BMI of Santhal male and female were ranged from 15.82-25.88 kg/m² and 14.37-24.80 kg/m² respectively and the average value of BMI in male was 21.12±1.30 kg/m² and in female was 20.43±2.37 kg/m² (Table II).

Table III: Nutritional status based on Body Mass Index

Sex	Underweight BMI<18.5	Normal 18.5≤BMI<25	Overweight BMI≥ 25	Total
Male	51(26.42%)	132(68.39%)	10(5.18%)	193(100%)
Female	74(38.54%)	118(61.45%)	00	192(100%)
Total	**125(32.46%)**	**250(64.93%)**	**10(2.59%)**	**385(100%)**

Parenthesis given percentage.

About 32.46% of the respondents suffered from underweight. The overall frequency of underweight (<18.5kg/m²) was more in female (74, 38.54%) than male (51, 26.42%) Santhals (Table III).

Table IV: Percentage distribution of Chronic Energy Deficiency (n-125)

Thinness/ Grades	Male	Female	Total
Mild/CEDGrade-I 17.0-18.5	45(36%)	60(48%)	105(84%)
Moderate/CED Grade-II 16.0-17.0	6(4.8%)	12(9.6%)	18(14.4%)
Severe/CED Grade-III <16.0	00	2(1.6%)	2(1.6%)
Total	**51(40.8%)**	**74(59.2%)**	**125(100%)**

Parenthesis given percentage

Among CED (BMI<18.5), Maximum (105, 84%) was CED Grade-I. Severe form of CED Grade-III was found in 1.6% female (Table IV).

DISCUSSION

BMI is generally considered a good indicator of the nutritional status as well as socioeconomic condition of a population.[11] A good number of researches were carried out on determination of nutritional status based on BMI of different tribal and non-tribal groups in different countries.

Various demographic factors like age, education, food habit, living condition and occupation of participants have a positive influence in the nutritional status of the people.[2] So, different demographic characteristics have been included along with anthropometric measurements. Data obtained from the demographic characteristics in our present study revealed that 79.27% male and 75.52% female are literate and most of them (60%) from 31-40 years of age group. Each village selected in this study has its own primary school. So, most of the participants completed their primary education which may not reflect the actual picture. Very few of them completed SSC and HSC which reflects less higher education facility among them.

Data in the present study shows that daily diet of the Santhal contains watery rice or hot rice with leafy vegetables, pulses or sometimes a little amount of meat or fish which is usually taken twice in a day. A small group among the landless wage earner often skip their evening meals specially females. Besides main meal, they frequently used to take tea, muri or chira as snacks during work. This habit affects their appetite and hampered iron absorption from consumed food.[15] It is shocking to see that Santhal men are extremely addicted to liquor whereas the most of the women are addicted to betel/tobacco chewing for refreshment. These unhealthy practices hinder the health of Santhaltribe. These findings are consistent with the dietary habit found among tribals (Koyas, Lambadas and Kondareddies) of Andhra Pradesh,[1] Oraon, Sarak, Dhimal of eastern India,[11] Santhal of West Bengal,[16] Bathudis and Savartribals of Odisha.[17,18] Similar to my study, their daily diet lacks of protein and contains rice or wheat product or other cereals like joar, bazra with leafy vegetables and pulses. Almost all of the males are addicted to drinking tea or have regular habit of chewing betel or tobacco leaf and regular consumption of locally produced alcohol. These monotonous food habits, protein lacking carbohydrate rich diet, regular habit of liquor consumption, inadequate knowledge of food and health seeking behavior hinders their general health similar to our study.

Body Mass Index (BMI) is found to depend upon the income of the respondents and physical activities. Normal BMI is observed for Santhal have fixed income source like cultivation of own land, share cropping and animal husbandry. The extent of under nutrition in the form of underweight (BMI<18.5) is more among landless. In the present study, BMI of male is found higher than female. So, sex variation is highly significant (0.012*). According to Bose and Chakra-barty[17]mean BMI of adult Bathudis of Odisha were 18.4±1.9 kg/m^2 in male and 17.9±2.5 kg/m^2 in female. Similarly Roy and Choudhury[19] found mean BMI 18.21±1.45 in kg/m^2 and 17.93±1.35 kg/m^2 in adult Oraons male and female agricultural labourers respectively of Jalpaiguri district of West Bengal. Along with those studies, this present study revealed that usually tribals were malnourished and female suffered more.

Chronic Energy deficiency (CED) is caused by inadequate intake of diet accompanied by high level of physical activities and infection. It is associated with performance and productivity. In this study, it is revealed that both men and women took part in agricultural activities but females often lack proper diet in landless families. So, prevalence of malnutrition was comparatively higher in female than male. Although, the study was conducted on adult (25-50 years) Santhal agricultural labourers, most of them (60%) were found from 31-40 years of age group that was also the major reproductive age. Undernourished women are more prone to have low birth weight babies with adverse pregnancy outcome.[8] So, this study reveals an alarming picture of nutritional status of Santhal tribes of northern region of Bangladesh which needs immediate intervention programme. Besai and Bose[8] also reported severe form of under

nutrition or chronic energy deficiency among adult tribal of West Bengal, India. Finally they concluded the same implication about the undernourished tribal women.

Similar to Ghosh and Malik[5] present study revealed that out of 12 totemic tribes of Santhal only 8 were found among respondents excluding Besra, Pauria, Chore and Bedea. However, these tribes have no influence on nutritional status as the occupational hierarchy is not maintained now a days.

This study was carried out on only three hundred eighty five participants of age ranging from 25-50 years from the nearest Santhal villages of Northern region. So, the obtained data cannot be generalized for the whole Santhals population of Bangladesh. Further studies with larger sample size including all age group from a wide range of area were recommended to get the exact picture.

CONCLUSION

Tribal communities are relatively more vulnerable to food and nutrition insecurity compared to their non-tribal counterparts. Therefore, there is a need for effective implementation of health and nutritional programs among the study populations for improvement of under nutrition with special focus on female.

***Acknowledgements*:** I am thankful to respected teachers, colleagues of the department of Anatomy, Dhaka Medical College, Dhaka and the Santhal populations who participated in the study for their cordial support and co-operation.

Conflicts of Interest: None

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