An Evaluation of Dietary Patterns and Nutritional Status among the Elderly Santal Ethnic Community in Dinajpur District, Bangladesh

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Abstract

Objective: This study aims to explore the dietary intake and nutritional status of Santal tribal populations in Bangladesh.

Methods: A population-based cross-sectional study was conducted in Gopalpur, Ghoraghat thana in Dinajpur district, Bangladesh. A total of 113 samples were collected purposively to conduct this study. Data were collected through personal face-to-face interviews with a semi-structured questionnaire from the respondents. Before data collection informed consent was taken from each respondent and MS Excel and SPSS version 24.0 were used for data analysis and report presentation.

Results: The mean (± SD) age of the respondents was 65±2 years where 58.4% were male. The monthly dietary intake pattern of the respondents shows that the majority of the respondents take pulses, fish, meat, egg, milk, and fruits 1 to 3 times per month. A majority (85%) of the respondents take cereals 2 to 3 times per day. In the case of nutritional status, the majority (73.5%) have normal nutritional status where 14.63% are overweight, 12.4% are obese and nobody was suffering from being underweight. The study also shows that there is no relation between gender and the nutritional status of the respondents.

Conclusion: Finally, this study indicates that the overall dietary intake pattern of the tribal population in Bangladesh is poor. Further study should be needed on a larger scale to explore the real scenario of dietary patterns and nutritional status of the tribal population in Bangladesh.

Keywords: BMI, Nutritional Status, Underweight, Overweight, Feeding patterns

1.1 Background

Bangladesh is one of the most diversified countries in the world. Bangladesh's indigenous population is a vital component of the country's diverse culture. The Santals are one of the indigenous communities living in Dinajpur. In world, consideration of diet and nutrition has been a crucial matter.

Anything that provides the body nourishment is considered food. In any society, food is essentially a necessary means of subsistence, an essential component of our social structure, and an essential component of our everyday lives (1). Communities' dietary preferences are influenced by both their social and physical environments (1). Since many tribal groups' eating habits are primarily local and monotonous, tribal people's eating habits vary greatly from those of other regions of the nation (1).

In recent years, there has been an increased focus on the physical limits of the elderly, sickness morbidity, and nutrition-related health concerns (2). Those affected are primarily from developing countries (3). There are numerous tribal ethnic populations spread out throughout Bangladesh. The percentage of tribal people varies between the 64 districts by about 0.6%, or less than 1% of the overall population, with 18% of them being Santal people.

The majority of the tribes live in inaccessible places, such as hills or forested areas, where entry is usually challenging. Furthermore, many of these indigenous communities are malnourished and have lower growth rates in comparison to the general population (4). In these countries, almost one-third of the people, including many older people, suffer from malnutrition (5). The impact of malnutrition on society seems to be primarily determined by a sharp decline in both physical and mental health (6). Due to their increased vulnerability to chronic illnesses, which in turn promote further malnutrition and create a vicious cycle, elderly people's comorbidities and nutritional status are entwined (7). False beliefs and unhealthy eating practices are major causes of the widespread occurrence of malnutrition among the tribal community. The availability of local food and nutrition practices greatly influences the diets of populations worldwide (8). Having a balanced diet rich in calories, protein, vitamins, and minerals can satiate perceptible and secret hunger. Cereals, particularly rice, are Bangladesh’s staple diet. It is also said that Bangladesh’s typical rural diet lacks balance (9).

Indigenous people are those with a strong historical connection to their native place and profound knowledge of its food supplies. “Traditional foods” or foods that are gathered locally from the natural environment rather than purchased, are commonly a part of the diets of indigenous people.

They are harvested following traditional wisdom and knowledge and are mainly obtained through farming or wild harvesting (10). It is commonly known that dietary diversity and traditional foods are healthier for the environment since they are rich sources of nutrients (11). Ethno-botanical research indicates that several wild plant species have been utilized historically as food sources for humans (12, 13). Evidence of the utilization of a range of plant species, wild mushrooms, and edible insects has also been found (14). Diversity in wild animals broadens the range of family diets and could contribute to the security of food in the home (15).

2.1 Literature Review

The Santals who are largely concentrated in the districts of Rajshahi, Naogaon, Nawabganj, Dinajpur, and Rangpur are one of the oldest tribal groups in Bangladesh. The Santals have to face multidimensional changes in their economic, financial, religious, and cultural life due to the expansion of education, market penetration, technology, bad political culture, and increasing interaction with the mainstream population (16). Bengal's bountiful countryside has long drawn visitors. Over time, diverse groups of people from all over the world traveled to Bengal and established there. The Pre-Aryan population, of which Proto-Australoid is a subgroup, is the oldest. The proto-Australoid group includes Santals (17). It's impossible to draw any conclusions regarding the Santals' origins because numerous study studies agree that they don't have any written documents of their own (18).“The spoken word is better than the written word,” according to the Santals. This viewpoint is represented in their rich oral heritage of songs, stories, and histories, as it is with all the other communities in the Santali cluster (19). The Santals are the second-largest tribal community in Bangladesh, behind the Chakma. They are physically powerful and work hard. They are typically of medium height, with a dark complexion, a round face, high cheekbones, a huge mouth, sensuous lips, and a broad nose. The name Santal was derived from Saont, a region in West Bengal's Midnapur district where they lived. They also go along with the term 'Horhopon,' which means 'Sons of Man' (20). In supporting and maintaining good health over the life cycle, diet, and nutrition are significant factors. Income, costs,

individual desires and values, cultural norms, as well as geographical, environmental, social and economic variables all interact in a complex way to form dietary patterns for consumption and influence women's morbidity and clinical status. A balance diet from different food groups must be included in a typical healthy diet in adequate quantities to satisfy the needs of a person and to improve immunity. The current study found a negative illustration of the nutritional condition of women of reproductive age in Santal (21). More than half of Santal women, especially those from low-income and illiterate backgrounds, are underweight, and their typical diets consist mostly of rice, vegetables, and lentils with less frequent intake of milk, eggs, and meat (1). Nutritional deficiency disorders in tribal populations, especially in women and children, are caused by poor dietary habits (22) (23).

The Santals' staple meal is rice. They like vegetables, seafood, and meat. They adore jute spinach and tortoise eggs. Chicken, beef, duck, hog, and goat meat are among the foods they consume. In addition to squirrels, crabs, tortoises, rabbits, rats, snails, and red ants, they eat squirrels, crabs, tortoises, rabbits, rats, snails, and red ants. Sweets and pastries are also favorites of theirs. In addition, Santal consume a wide range of foods while suffering from different diseases. Such as when they have a cold or fever, they consume boiling rice together with both vegetable and non-vegetable curry. When they get diarrhea or dysentery, they consume torani and soft rice (1).

The Santal saying "Give me wine or death" reflects their strong drinking habits. Their favorite drink is Hariya, a rice beer. The Santals are said to have been taught how to make rice beer by the Supreme Spirit. They create beer out of rotting rice and occasionally palm juice. Both men and women smoke and consume alcohol (16).

2.2 Objective of the Study

The main objective of this study was to assess the nutritional status and dietary patterns of the Santal ethnic community. Specifically, daily food intake patterns along with their nutritional status that is undertaken amongst the specific elderly ethnic group of Dinajpur District was assessed.

3.1 Research Methodology

Methodology is a useful part of research that helps to draw meaningful inferences for the study. For the present study, a descriptive cross-sectional study design was selected. The target

population was 60 and above years old aged population of Santal Ethnic community of Dinajpur District. The study was carried out at Gopalpur, Ghoraghat for 6 months starting from January to June 2022 with 113 sample population. The inclusion criteria for the study population were followed by; 1) Both male and female participants of the Tribal community, 2) Participants aged 60 years and above, 3) Participants who willingly participated in the study. The exclusion criteria were followed by; 1) Participants aged less than 60 years, 2) Participants who were physically and mentally unfit, and 3) Participants who didn't participate willingly. For the study purpose, a purposive sampling technique was chosen and participants were selected accordingly. A semi-structured research questionnaire was used as a research tool containing questions about their socioeconomic information, food frequency, Body Mass Index (BMI), and more. A face-to-face interview was carried out among the participants for data collection. Before data collection, informed consent was achieved from each participant and their anonymity and confidentiality were confirmed. After data collection, missing and wrong data were adjusted. Data were entered, formatted, and analyzed by MS Excel and SPSS version 25.0 software. For quality control and quality assurance, a pilot study was conducted among randomly chosen another Santal ethnic community at Nobogram village of Rajshahi district, and questionnaire quality was assessed. In addition, the researchers visited the study site physically and data were collected. Data were compiled, interpreted, and verified for reliability by the researchers.

4.1 Results

4.2 Descriptive Statistics

4.2.1 Socio-demographic Characteristics of the Participants

Among the 113 respondents, the mean age (±SD) of the respondents (n=113) was 65 years old, where 58.4% (66, n=113) respondents were male and 41.6% (47, n=113) respondents were female. The majority of the respondents were Christian and 6.2% were Hindu. In the case of educational level, most respondents were illiterate 63.7%, whereas the highest was primary 29.2%. The majority of the respondent's occupations were day labor (55.8%), then housewife (15.9%), job holder (10.6%), business (7.1%), and unemployed (5.3%) respectively. The majority 66.4 % of the respondents lived in their own house and the rest 33.6 % lived in govt. house where 61.9% of respondents' housing condition was mud wall with tin room. The family type of them was mostly couple-centered 60.2% and joint family was 39.8%**.** About 74.3 % of

participants had family members up to 5 and 25.7 % had more than 6. 61.1 % of respondents' monthly income was between 1500 to 5000 BDT. In the case of fuel used in cooking, the majority of them used animal garbage (69.9%), 19.5 % used firewood, 9.7 % used straw, and only 0.9 % used gas. 74 % of respondents use slab and 26 % use sanitary as their toilet facility. Almost all the respondents used water for drinking or preparing from food tube well (See Table 1).

Table 1: Socio-demographic information of the respondents (N=113)

Variables	n (%)	Variables	n (%)
Age (in years)		**Individual Monthly Income**	
60-64 Years	32 (28.3)	Very Low Income	69 (61.1)
65-69 Years	51 (45.1)	Low Income	35 (31)
70-79 years	22 (19.5)	Average Income	8 (7.1)
80 and above	8 (7.1)	Higher-Income	1 (0.9)
Gender		**Housing Condition**	
Male	66 (58.4)	Tin wall with tin room	8 (7.1)
Female	47 (41.6)	Brick Wall with tin room	35 (31)
Religion		Mud wall with tin room	70 (61.9)
Christian	106 (93.8)	**Accommodation Type**	
Hindu	7 (6.2)	Own House	75 (66.4)
Educational Status		Govt. House	38 (33.6)
Illiterate	72 (63.7)	**No. of Family Member**	
Primary	33 (29.2)	Up to 5	84 (74.3)
Higher School	2 (1.8)	More than 6	29 (25.7)
SSC	6 (5.3)	**Source of Water**	
Occupation		Tube well	105 (93)
Self-employed	6 (5.3)	Tap	8 (7)
Business	8 (7.1)	**Toilet Condition**	
Job	12 (10.6)	Slab	84 (74)
Day Labor	63 (55.8)	Sanitary	29 (26)
Housewife	18 (15.9)	**Fuel Use for Cooking**	
Un-employed	6 (5.3)	Animal Garbage	79 (69.9)
Type of Family		Fire Wood	22 (19.5)
Couple Centered	68 (60.2)	Straw	11 (9.7)
Joint	45 (39.8)	Gas	1 (0.9)

4.2.2 Information about Food Hygiene Practice, and Nutritional Status.

4.2.2.1 Hygiene Practice

Among the 113 respondents, 76.1 % washed their hands with only water, 16.8% washed with soap and water whereas 7.1 % washed with ash only. Also, in the case of utensils was before

taking food majority (69.07%) washed with ash (69.07%), and 23 % washed with only water, respectively **(See Fig 1 Fig 2).**

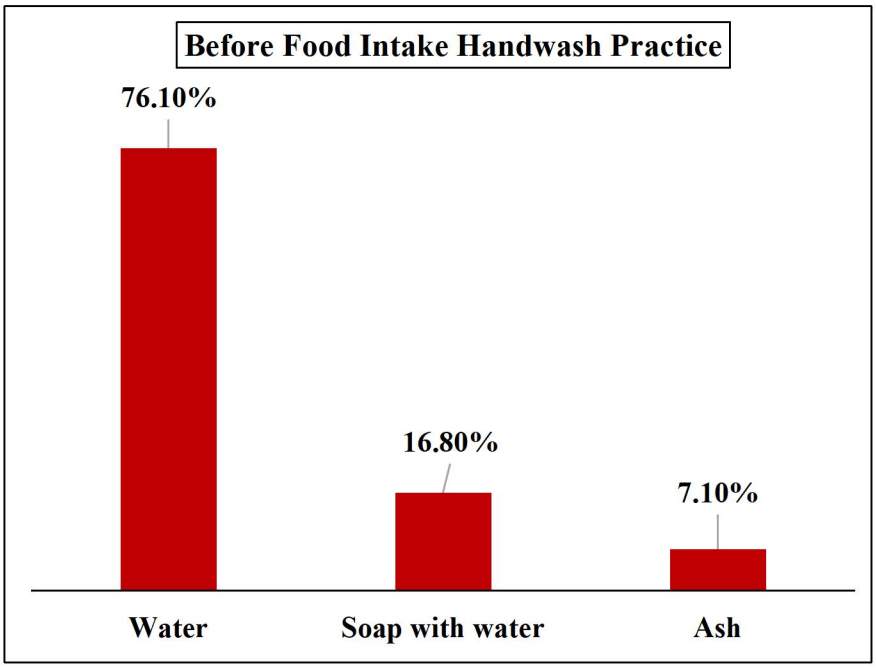

Figure 1: Handwash Practice Before Intaking Food

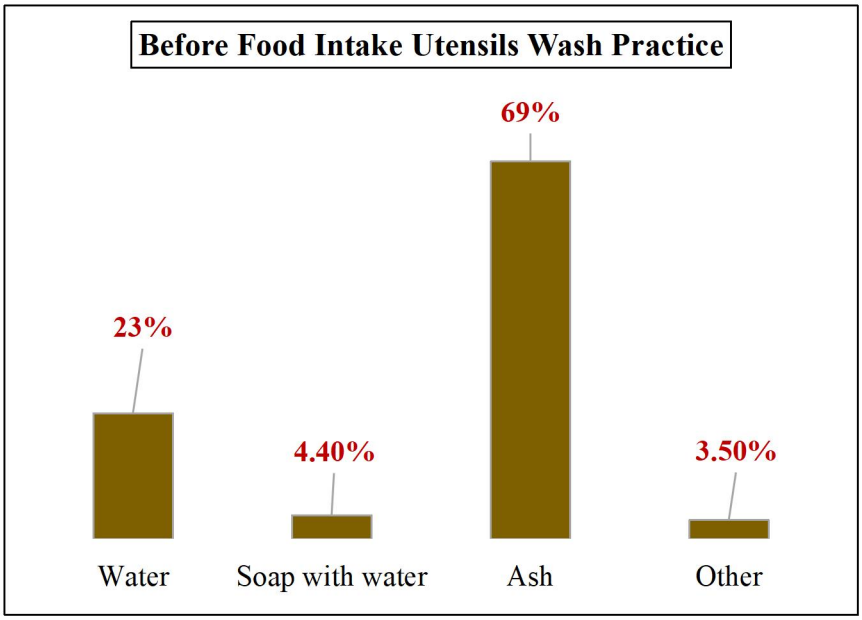

Figure 2: Utensils Wash Practice Before Intaking Food

4.2.2.2 Heard about Nutritional Status and Dietary Intake

Among the respondents, 58% heard about nutritional status and dietary intake and 42 % didn't heard before about it. From the yes response, 66% heard from other sources, whereas 25.5% heard through TV **(See Fig 3 & Fig 4)**

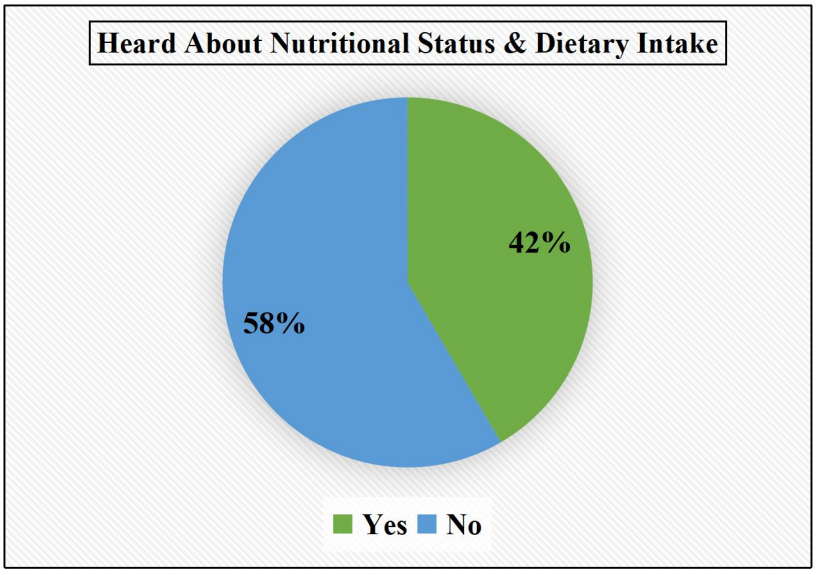

Figure 3: Information Heard About Nutritional Status and Dietary Intake.

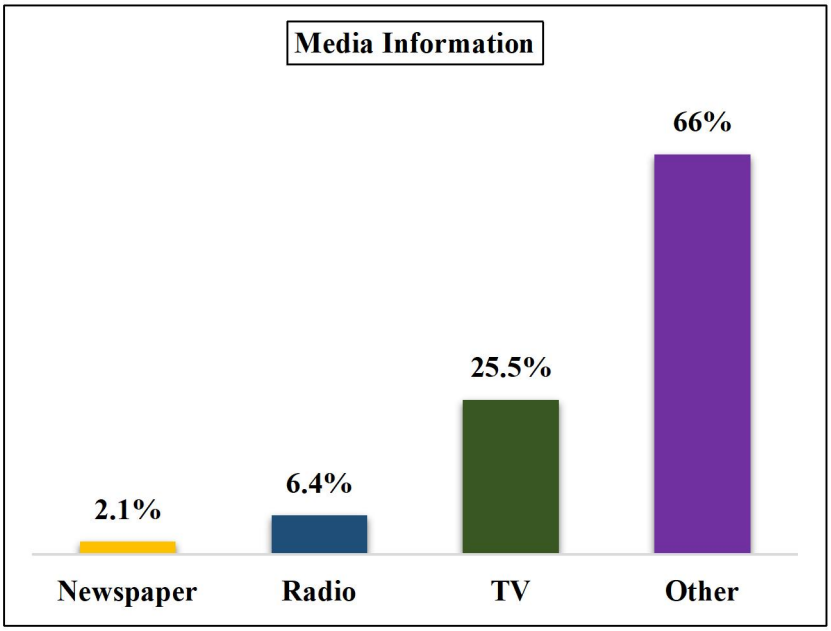

Figure 4: Media Information Regarding Nutritional Status and Dietary Intake.

4.2.3 Dietary Intake Pattern of the Study Subjects

In the case of cereal, 85% (96) took rice 2-3 times per day and 36.3% wheat and wheat products, and 20.4 % took muri (puffed rice), For pulses, 32.7% (37) took lentils 3-6 times per week. For fish intake, the majority 31% of the respondents took different sort of fishes 1-3 times monthly, For egg intake pattern, hen egg 5 (4.4%) respondents took 3-6 times per week and 69 (61.1%) never took chicken egg. Leafy vegetables were taken 2-3 times per day which is, 17.7%. The majority of the respondents 68.15% took potato 2-3 times per day and about 2.7% respondents took 1-3 times per month. Milk was taken by 57.5% respondents 1-3 times per month. For fruit intake, 49 % of respondents took 1-3 times per month, 4.5% of respondents took 3-6 times per week and the rest of them never took fruits. About tea; 21(18.6%) respondents took it 2-3 times per day and 1 time per day, 30 (26.5%) took it 3-6 times per week, 36 (31.9%) took 1-3 times per month and 5 (4.4%) never took tea. For snacks, 58.4 % of respondents took 1-3 times per month and the rest of them took 3-6 times per week. Almost all the respondents took oils; soya bean oil took 73(64.6%), Mastered oil 39(34.5%) took 2-3 times per day and Ghee 5(4.4%) took 1-3 times per month. 11.5 % of respondents in the study took sweets 1-3 times per month **(See Table 2).** The food frequency questionnaire also incorporates common food intake by the subjects as their most preferences. According to fig 5, 85% preferred rice and 36.6% took roti. The other most preferred food was potato 68.1%, soyabean oil 64.6%. However, other food items like vegetables, leafy vegetables, tea, snacks, milk, and puffed rice were least favorite **(See Fig 5).**

Table 2: Dietary Intake Patterns of the Study Subjects (N=113)

Food Items	2-3times/day n (%)	1 times/day n (%)	3-6 times/wk n (%)	1-3 times/month n (%)
Rice	96(85)	11(9.7)	6(5.3)	0(0)
Wheat and Wheat products	41(36.3)	23(20.4)	49(43.4)	59(52.2)
Puffed rice (muri)	23(20.4)	14(12.4)	20(17.7)	53(46.9)
Lentils	0(0)	1(.9)	37(32.7)	33(28.3)
Fish	0(0)	0(0)	7(6.2)	35(31)
Mutton	0(0)	0(0)	0(0)	1(0.9)
Chicken	0(0)	0(0)	0(0)	3(2.7)
Milk	1(.9)	1(.9)	6(35.4)	40(57.5)
Leafy vegetables	20(17.7)	93(82.3)	20(17.7)	8(7.1)
Potato	77(68.1)	16(14.2)	13(2.7)	3(2.7)
Vegetables	11(9.7)	12(10.6)	18(15.9)	64(56.6)
Tea	21(18.6)	21(18.6)	30(26.5)	36(31.9)
Snacks	2(1.8)	2(1.8)	21(18.6)	66(58.4)
Soft drinks	0(0)	0(0)	0(0)	6(5.3)
Soybean oil	73(64.6)	18(15.9)	16(14.2)	0(0)
Ghee	0(0)	0(0)	1(.9)	5(4.4)
Mustard oil	39(34.5)	39(34.5)	22(19.5)	0(0)
Sweets	0(0)	0(0)	0(0)	13(11.5)
Fruits	0 (0)	0 (0)	5 (4.5)	55 (49)

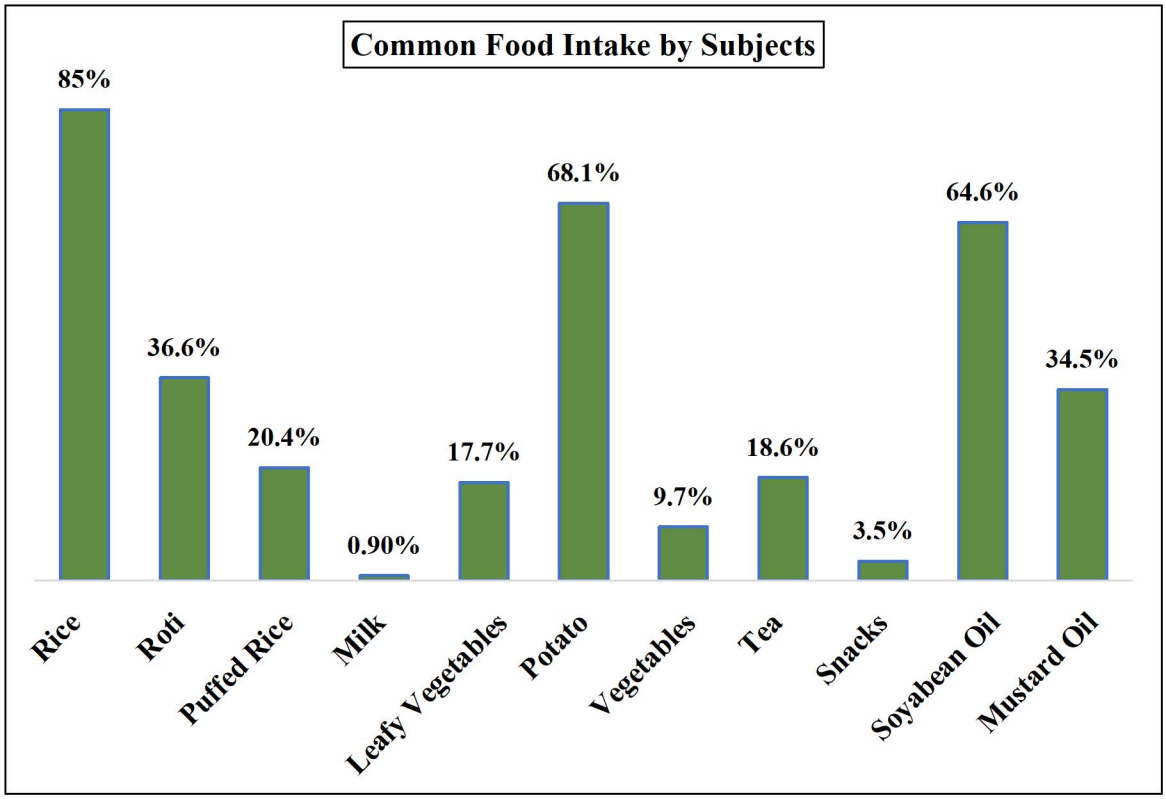

Figure 5: Common Food Intake Patterns by Ethnic Community.

4.2.4 Traditional Food Intake Patterns by the Subjects.

Traditional food intake patterns of the subjects were observed by the food frequency questionnaire. As per the responses, the consumption of Rabbits, Buffalo meat, Mushroom, Snail, Frog, rat, Guishap and Beji only consumed 1-3 times in a months by the respondents and the percentages were followed by, 5.3%, 2.7%, 54.9%, 71.7, 43.4, 39.8%, 16.8%, and 8.8% respectively, However, other traditional foods named as Kuccha, Crabs, and Bailla were seen to be consumed 3-6 times in a week and 1-3 times in a month by the study subjects **(See table 3)** .

Table 3: Traditional tribal food intake pattern of the study subjects (N=113)

Food Item	2-3times/day	1 times/day	3-6 times/week	1-3 times/month	Never
	n (%)	n (%)	n (%)	n (%)	n (%)
Rabbits	0(0)	0(0)	0(0)	9(5.3)	107(94.7)
Buffalo meat	0(0)	0(0)	0(0)	3(2.7)	110(97.3)
Mushroom	0(0)	0(0)	0(0)	62(54.9)	51(45.1)
Snail	0(0)	0(0)	0(0)	81(71.7)	31(28.3)
Frog	0(0)	0(0)	0(0)	49(43.4)	64(56.6)
Rat	0(0)	0(0)	0(0)	45(39.8)	68(60.2)
Kuccha	0(0)	0(0)	5(4.4)	78(69)	30(26.5)
Crabs	0(0)	0(0)	23(20.4)	69(61.1)	21(18.6)
Bailla	0(0)	0(0)	2(1.8)	16(14.2)	95(84.1)
Guishap	0(0)	0(0)	0(0)	19(16.8)	94(83.2)
Beji	0(0)	0(0)	0(0)	20(8.8)	103(91.2)

4.2.5 Association between Gender and Nutritional Status of the Study Subjects.

To observe association between gender and nutritional status, chi-square test was applied. Majority male and female were observed in normal BMI, whereas few were overweight and obese. However, no significant association was observed between gender and BMI ($p>0.05$) **(See Table 4).**

Table 4: Relationship between gender and nutritional status of the study subjects (N=113)

BMI Category	Male, n (%)	Female, n (%)	X^2 (p-value)
< 18.5 (Underweight)	0 (0)	0 (0)	
18.5-22.99 (Normal)	52 (62.65)	31 (37.35)	
23.0-26-99 (Overweight)	8 (50)	8 (50)	2.474 (p=0.64)
>27 (Obese)	6 (42.85)	8 (57.15)	

p<0.05 (Significant Value)

5.1 Discussion

This cross-sectional study intended to enhance our understanding about the Santal ethnic community's nutritional health and dietary habits, particularly with regard to their daily food intake patterns. The Santal Ethnic Community in the Dinajpur District served as the research site. The study used 113 members of the sample population and was conducted in Gopalpur, Ghoraghat. Following data analysis, the results were compared to those of the pertinent literature reviews.

The participants in this study were 60 years of age and older. With 58.4% (66, n = 113) of the respondents being male and 41.6% (47, n = 113) being female, the average age of the sample was 65 years. Another survey carried out in Modhupur Upazilla revealed that 72.4% of respondents were women and 27.6% of respondents were men (25).

It was reported here that day labor accounted for 55.8% of the respondent's occupations. Sixty-four percent of the respondents lived in their own home, while thirty-six percent lived in government housing, with mud walls and tin rooms making up sixty-nine percent of the living conditions. The respondents' monthly salary ranged from 1500 to 5000 BDT. However, the researchers also mentioned the monthly salary, which ranged from 5000 to 15000 BDT, in a different study (24)

Out of the 113 participants, 76.1% cleaned their hands using just water, 16.8% used soap and water, and 7.1% used ash alone. Additionally, when it came to utensils, the majority (69.07%) were cleaned with ash before eating, and 23% with just water. In contrast, another report found that 50% of the study's families washed their hands with soap or ash before eating and after using the restroom; 11.2% of families did not wash, and 38.8% of families had some members wash their hands but another did not (25)

The current study discovered that although the remaining respondents had snacks three to six times a week, 27.44 percent of them did so one to three times a month. However, another study reveals that 50% of households also consumed Chana Chur, fried rice, cake, chips, singara, puri, tea, coffee, and biscuits as snacks.In this study, 73.5% of participants had a normal BMI, whereas

12.4% and 14.63% of participants were obese or overweight. In contrast, a different paper found that 85.7% of respondents had a normal BMI and 6.1% had an overweight BMI (25)

According to this study, 85% (96) of the participants ate rice two to three times each day, compared to 20.4% who ate muri (puffed rice) and 36.3% who ate roti. 1.8% and 10.6% of the total were devoured by chira and khoi, respectively. Regarding fruit consumption, 49% of respondents said they ate it 1-3 times a month, 4% said they ate it 3-6 times a week, and the other respondents said they never ate fruit. This study has unequivocally demonstrated that the respondents' diet of fruits, fish, meat, eggs, and milk is quite low. Unlike other publications, this one find that even though they come from diverse communities and locations, they had similar daily intakes and dietary patterns (25)

6.1 Conclusion and Recommendation

It is concluded from the study that more than half of the tribal older age were normal body weight. Besides most of them were poor. Majority of them were illiterate too. Rice, was common food. Milk, egg, meat was seldom taken. Majority was more seen among illiterate, low income and day labor and it was statistically significant. Finally, we can say from this study that the overall dietary intake pattern of tribal people in Bangladesh is poor. Further study is needed in large scale and details way to find out specific dietary intake patterns and as well as their nutritional status of tribal people in Bangladesh. Maximum study subject's hygienic practice was good and their main source of drinking water was tube well. This study reveals that the senior citizens have one or more health problems, and they have also problems with dietary pattern. They don't have clear idea on dietary pattern.

Recommendation

- The findings of this study may be helpful for developing program for improving knowledge about tribal eating pattern.
- It will be strengthening the public health education campaign to promote health status.
- Building awareness to minimize health hazard during older age.
- Further large-scale study is also recommended.

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