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Socio-Economic Condition, Dietary Pattern and Nutritional Status of Pre-School Children among Settlers and Ethnic Communities in Bandarban District of Bangladesh

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Abstract

Nutrition is a foundation to ensure good health. The geographic and demographic factors affect food and nutrition. Life of the tribal people is diverse and distinct. This study focuses socio-economic condition, dietary pattern and nutritional profile of preschool children among ethnic minorities and settlers at a single point in a specified time in sadar upazila of Bandarban district. This area was conveniently selected to collect sample because both settlers and ethnic groups reside here concurrently. Each union/ward was one cluster and from each cluster sample was collected by visiting door to door. The dietary energy intake was determined by three days 24 hours recall method. Statistical Package for Social Sciences 22.0 version was used for data analysis. Nutritional status was determined by ENA for SMART - Software. Mean age of the children was 4.21±0.80 (ethnic) and 4.10±0.84 (settler). Most of the parents completed primary education. Father of the children was day labor and mother was housewife. Average monthly family income among ethnic and settler was 10316.53±10013.97 and 17515.50±10128.11 BDT. Average weight and height of ethnic children was 16.18 kg and 97.45 cm whereas settler children carried 14.01 kg weight and 94.73 cm height and this difference was statistically significant. Normal and underweight ethnic children were 84.80% and 15.20% whereas 67% and 33% among settler group. Distribution of normal and stunted ethnic children was 62.80% and 37.20% and among settler it was 55.0% and 45.0%. About 8.60% and 15% children were wasted among ethnic and settler. Statistically significant association was found between condition of latrine and ethnic child nutritional status (HAZ). Source of drinking water was significantly associated with ethnic children nutritional status (WAZ) as like immunization and de-worming status. Average calorie intake of ethnic children was 1037.33 per day whereas settler children took 986.86. Mean protein, carbohydrate and fat intake of ethnic children was higher than settler children and it was statistically significant. Monthly family income, condition of latrine, housing status and group (ethnic/settler) influence significantly nutritional status of children. It is concluded that nutritional status of pre-school ethnic children was comparatively better in terms of weight, height, calorie intake, protein, fat and carbohydrate consumption and immunization coverage. This research finding will be helpful for policy maker and planner to develop new plan and strategy to combat under nutrition.

Keywords: *Socio-economic condition, dietary pattern, nutritional status, pre-school children, settler, ethnic community.*

Background

Children are future of a nation. Nutrition is a pre-requisite of sound health of children. Child malnutrition is a wide spread and burning public health problem in the globe and in South-East Asia it is more devastating and highly prevalent.[1] Pre-school children are vulnerable and tend to break due to slightest stimulus and demand special care. Malnutrition in this age group will affect performance in school. Child

mortality is an indicator of health and child under nutrition contribute a lot.[2] In Asia about 70% (120 million out of 182 million) stunted under five children live.[3] Infants and preschool children in India (15 % of the total population) are vulnerable indeed and suffer highest rates of mortality and morbidity.[4] According to Bangladesh Demographic and Health Survey 2014, about 36% of children under five are stunted (low height for age), 33% are underweight (low weight for age) and 14% are wasted (low weight for height). Evidence shows that rural children are more likely to be stunted (48 percent) than urban children (41 percent).[5] Bangladesh has a number of ethnic minor group population and they lead their life in great ethnic diverse fashion.[6] Ethnic people are distinct from Bengali people by their ethnic origin, culture, feeding practice, literacy rate and profession.[7] As these are very important determinants for nutrition, it is expected that there will be an obvious difference in the nutritional status of 3 to 5 years children of Marma, Tripura, Tanchyanga, Bawm, Chakma ethnic group from that of Bengali children.[8] We know that Bandarban is the remotest hilly district of Bangladesh. Internally migrated people are gradually settling there from nearby districts. Geographical variation may affect their social status, dietary intake and anthropometry as well. Findings of this research will be helpful for policy maker and planner to design and implement public health programme specifically designed for them by using local resources.

Materials and Methods

This study focuses socio-economic condition, dietary pattern and nutritional status of preschool children at a single point in a specified time. Considering time period and resource availability, cross-sectional analytical study design was most feasible for this study. Apart from socio-economic condition, anthropometric measurement and food intake pattern of study population, information on various factors that affect the nutritional outcome were also obtained in a cross-cut way. Study duration was three years. This study was conducted at Bandarban sadar upazila. This area is purposively selected for data collection and to get adequate sample of study population. This study was carried out among pre-school children through household survey in Bandarban district. All pre-school children (age 3 to 5) years with a mother or caregiver present that signed the informed consent and children in both sexes were included. Those who refused to participate in interview and physically disable were excluded. Sample was taken by using this formula

$$n = \frac{P_1(1-P_1) + P_2(1-P_2)}{(P_1-P_2)^2} * (Z_{\alpha/2} + Z_\beta)^2$$

Where,

n=required minimum sample size per survey round or comparison group

P_1=25.6%=0.256 (Moderate to severe stunted pre-school children among Chakma ethnic community was 25.6%)[7]

P_2= 35.6%=0.356 (10% difference is expected)

$Z_{\alpha/2}$= 1.96 (value of 95% CI)

Z_β=1.24

$$\text{So } n = \frac{0.256(1-0.256)+0.356(1-0.356)\times(19.6+1.24)2}{(0.256-0.356)2}$$

$$= 429.801472 \times 1.5 \text{ (Cluster sampling, design effect=1.5)}$$

$$= 644.7021$$

According to population projection 2017 for ADB by Prof Dr. Syed Shahadat Hossain in Bandarban district, number of 3 to 5 years children in Bandarban Sadar are 1160 (3 yrs), 1182 (4 yrs) and 1195 (5 yrs); total 3437.

Continuity adjustment for the finite population

$$n_{adj} = \frac{n}{1+\frac{n}{N}}$$

$$= \frac{1000}{1+\frac{1000}{3437}}$$

$$= 774$$

We know Bandarban sadar has 5 unions and 9 wards. Settlers usually live in wards but ethnic groups live in both wards and unions concurrently. Among 9 wards i took 43 settler pre-school children from each ward (9*43=387; half of 774) and 194 pre-school ethnic children (22 children from each ward) and rest 193 children from 5 unions (39 children from each union). Each union/ward was one cluster and from each cluster sample was collected by visiting door to door and asking people which house 3 to 5 years children until desired number has gathered. Simple random was not possible due to absence of sampling frame. Face to face interview of mother/caregiver was carried out by using pre-tested structure questionnaire. Questionnaire was validated by pre-testing and consulted several times with research guide. Before initiation of interview verbal and/or written consent was obtained from respondents as well as Councilor of ward. Detail procedure of the study and significance of

the study were explained followed by rapport building with the respondents. The dietary energy intake of the study subjects was determined by three days 24 hr recall method questionnaire. Two consecutive days and weekend were considered. The nutrient value of Bangladeshi food was calculated by using food composition data published by Institute of Nutrition & Food Science (INFS).The standing height was measured with a standiometer with minimal cloths. Three measurements were taken three times and if the difference among reading is less than 1 cm, the mean measurement was taken and recorded to the nearest 0.1 cm. If the reading will fall between two values, the lower reading was recorded. The body weight was measured using a platform beam scale. Weight was recorded to the nearest 0.1 kg. After collection, data were checked and rechecked thoroughly for consistency and completeness. Individual questionnaire was checked and cleaned to avoid any possible mistakes. Data were initially checked on the day of collection to exclude any error or inconsistency or incompleteness. Data were categorized and coded during entry into the SPSS software. After every two weeks interval data were submitted to supervisor for check. It was started by the participant identification number and other properties of the variables. Then specific value was entered into each variable for each independent source of data. Data were cleaned by detection and correction of data set. Errors were detected by descriptive statistic, scatter plots and histograms for checking any missing data, normality and after removal of outliers again normality was checked. Data were analyzed by computer technology SPSS version 22.0. ENA for SMART - Software for Emergency Nutrition Assessment was used to find out WAZ (Weight for age Z-score), HAZ (Height for age Z-score) and WHZ (Weight for height Z-score). WHO child growth standard 2005 was used as reference for Z-score value. Obtained information was presented in the form of tables (univariate, bivariate and multivariate) and graphs (pie chart, histogram, multiple bar diagram). Both descriptive statistics (mean, SD, frequency, percentage) and inferential statistics (correlation, Chi-square, independent t test, regression) were done. Before parametric test i had to do normality test like histogram with normal curve, skewness and kurtosis to see whether data were normally distributed or not.

Results

Table 1. *Age distribution of the study subjects (n=774)*

Average age of the study subjects was 4.16±0.82 years. Highest portion (43%) of children belonged to 5 years followed by 29.5% from 4 years and 27.5% from 3 years.

Age in year	Frequency	Percentage
Mean±SD	4.16±0.82	
3	213	27.5
4	228	29.5
5	333	43.0
Total	774(100.0)	

Table 2. *Education of father and mother of the study subjects (n=774)*

Most of the father and mother (31.9% and 33.2%) of the children completed primary education followed by under SSC (19.3% and 19.8%), can sign only (17.8% and 17.7%), illiterate (9.8% and 9.8%), SSC (8.9% and 8.1%) and HSC (5.0% and 5.6%).

Education	Father	Mother
Illiterate	76(9.8)	76(9.8)
Can read only	5(0.6)	11(1.4)
Can sign only	138(17.8)	137(17.7)
Can read and write	11(1.4)	13(1.7)
Primary	247(31.9)	257(33.2)
Under SSC	149(19.3)	153(19.8)
SSC	69(8.9)	63(8.1)
HSC	39(5.0)	43(5.6)
Bachelor	20(2.6)	12(1.6)
Masters	20(2.6)	9(1.2)
Total	774(100.0)	774(100.0)

Results were expressed as number (percentage)

Table 3. *Occupation of father and mother of the study subjects (n=774)*

More than half (56.3%) father was day labor followed by service holder 17.2%, businessman 16% and farmer 10.5%. About 91.3% mothers were housewife and 4.4% did service and 2.8% engaged themselves in agricultural activity.

Occupation	Father	Mother
Day labor	436(56.3)	3(0.4)
Agriculture	81(10.5)	22(2.8)
Business	124(16.0)	8(1.0)
Service	133(17.2)	34(4.4)
Housewife	0(0.0)	707(91.3)
Total	774(100.0)	774(100.0)

Results were expressed as number (percentage)

Table 4. *Monthly family income of the study subjects (n=774)*

Average monthly family income of the study subjects was 13916.02±10689.76 BDT whereas median income was 13000 BDT. Minimum and maximum income was 2000 BDT and 70000 BDT. Lower middle-income, low income and upper middle-income family were 52.3%, 30.4% and 17.2%.

Family income	Study subjects
Mean±SD	13916.02±10689.76
Median	13000.00
Minimum	2000.00
Maximum	70000.00
Low-income (≤$75.41 or BDT ≤5360)	235(30.4)
Lower middle-income ($75.5 - $299.58 or BDT 5361-21270)	405(52.3)
Upper middle-income ($299.68 - $926.25 or BDT 21271-65761)	133(17.2)
High-income (≥$926.33 or BDT ≥ 65762).	1(0.1)
Total	774(100.0)

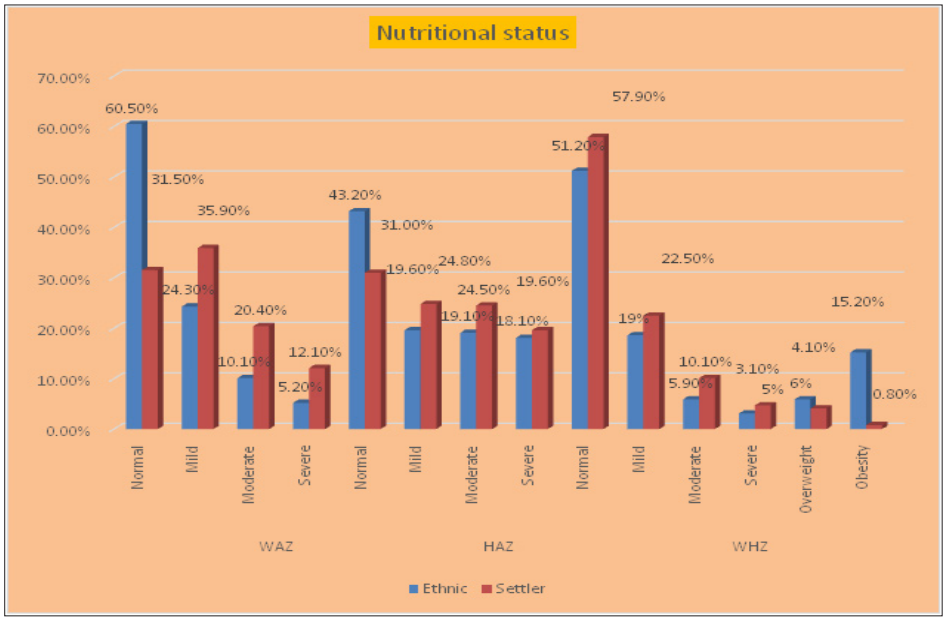

Fig 1. *Nutritional status of children (n=774)*

Among ethnic and settler children normal, mild, moderate and severe underweight were 60.50% vs 31.50%, 24.30% vs 35.90%, 10.10% vs 20.40% and 5.20% vs 12.10%. Regarding stunting children normal, mild, moderate, severe were 43.20% vs 31%, 19.60% vs 24.80%, 19.10% vs 24.50% and 18.10% vs 19.60%. In case of wasting normal, mild, moderate, severe wasted children were 51.20% vs 57.90%, 19% vs 22.50%, 5.90% vs 10.10% and 3.10% vs 5%. Overweight and obesity distribution among ethnic and settler children were 6% vs 4.10%; 15.20% vs 0.80%.

Table 5. *Association between nutritional status (WAZ<2Z, HAZ<2Z, WHZ<2Z) of ethnic children and condition of latrine (n=387)*

The table showed association between nutritional status of ethnic children and condition of latrine. Statistically no significant association was found between condition of latrine and child nutritional status (WAZ) (p=0.170>0.05). Statistically significant association was found between condition of latrine and child nutritional status (HAZ) (p=0.010<0.05). In case of WHZ condition of latrine was not significantly associated with nutritional status of children (p=0.636>0.05).

Condition of latrine	Nutritional status (WAZ<2Z, HAZ<2Z, WHZ<2Z)		Total	χ2	p-value
	Normal	Underweight			
Sanitary	196(50.6)	44(11.4)	240(62.0)	5.030	0.170
Partial sanitary	38(9.8)	3(0.8)	41(10.6)		
Non-sanitary	23(5.9)	3(0.8)	26(6.7)		
Open	71(18.3)	9(2.3)	80(20.7)		
Total	328(84.8)	59(15.2)	387(100.0)		
	Normal	Stunting			
Sanitary	158(40.8)	82(21.2)	240(62.0)	11.344	0.010
Partial sanitary	27(7.0)	14(3.6)	41(10.6)		
Non-sanitary	20(5.2)	6(1.6)	26(6.7)		
Open	38(9.8)	42(10.9)	80(20.7)		
Total	243(62.8)	144(37.2)	387(100.0)		
	Normal	Wasting			
Sanitary	215(55.6)	25(6.5)	240(62.0)	1.704	0.636
Partial sanitary	39(10.1)	2(0.5)	41(10.6)		
Non-sanitary	24(6.2)	2(0.5)	26(6.7)		
Open	74(19.1)	6(1.6)	80(20.7)		
Total	352(91.0)	35(9.0)	387(100.0)		

Results were published as number ***(%)****, χ2 test was performed and p<0.05 was level of significance*

Table 6. *Association between nutritional status (WAZ<2Z, HAZ<2Z, WHZ<2Z) of ethnic children and source of drinking water (n=387)*

The table showed association between nutritional status of ethnic children and source of drinking water. Statistically significant association was found between source of drinking water and ethnic children nutritional status (WAZ) (p=0.045<0.05). There was no statistically significant association was found between source of drinking water and child nutritional status (HAZ, WHZ) (p=0.130>0.05, p=1.139>0.05).

Source of drinking water	Nutritional status (WAZ<2Z, HAZ<2Z, WHZ<2Z)		Total	$\chi 2$	p-value
	Normal	Underweight			
Tube well	228(58.9)	35(9.0)	263(68.0)	8.062	0.045
Tap	49(12.7)	17(4.4)	66(17.1)		
Lake	9(2.3)	0(0.0)	9(2.3)		
Ghiri	42(10.9)	7(1.8)	49(12.7)		
Total	328(84.8)	59(15.2)	387(100.0)		
	Normal	Stunting			
Tube well	165(42.6)	98(25.3)	263(68.0)	0.130	0.988
Tap	42(10.9)	24(6.2)	66(17.1)		
Lake	6(1.6)	3(0.8)	9(2.3)		
Ghiri	30(7.8)	19(4.9)	49(12.7)		
Total	243(62.8)	144(37.2)	387(100.0)		
	Normal	Wasting			
Tube well	239(61.8)	24(6.2)	263(68.0)	1.139	0.768
Tap	59(15.2)	7(1.8)	66(17.1)		
Lake	9(2.3)	0(0.0)	9(2.3)		
Ghiri	45(11.6)	4(1.0)	49(12.7)		
Total	352(91.0)	35(9.0)	387(100.0)		

Results were published as number ***(%),*** *$\chi 2$ test was performed and p<0.05 was level of significance*

Table 7. *Relation between nutritional status (HAZ) of ethnic children and monthly family income (n=387)*

Table shows positive correlation between nutritional status (HAZ) of ethnic children and monthly family income and it is statistically significant (p=0.024<0.05). So we can say that monthly family income influences ethnic children nutritional status (HAZ).

Correlation			
		Monthly family income	HAZ
Monthly family income	Pearson Correlation	1	0.117*
	Sig. (2-tailed)		0.021
	N	387	387
HAZ	Pearson Correlation	0.117*	1
	Sig. (2-tailed)	0.021	
	N	387	387
*. Correlation is significant at the 0.05 level (2-tailed).			

Table 8. *Relation between nutritional status (WAZ, WHZ) of settler children and monthly family income (n=387)*

Table shows positive correlation between nutritional status (WAZ,WHZ) of settler children and monthly family income. Statistically significant correlation was found between nutritional status (WHZ) of settler children and monthly family income (p=0.019<0.05) So we can say that monthly family income influences settler children nutritional status (WHZ).

Correlation			
		WHZ	Monthly family income
WHZ	Pearson Correlation	1	0.119*
	Sig. (2-tailed)		0.019
	N	387	387
Monthly family income	Pearson Correlation	0.119*	1
	Sig. (2-tailed)	0.019	
	N	387	387
*. Correlation is significant at the 0.05 level (2-tailed).			

Correlation			
		Monthly family income	WAZ
Monthly family income	Pearson Correlation	1	0.059
	Sig. (2-tailed)		0.245
	N	387	387
WAZ	Pearson Correlation	0.059	1
	Sig. (2-tailed)	0.245	
	N	387	387
*. Correlation is significant at the 0.05 level (2-tailed).			

Table 9. *Relation between nutritional status (WAZ) of the ethnic children and protein intake per day (n=387)*

Table shows positive correlation between nutritional status (WAZ) of the ethnic children and per day protein consumption. Statistically significant correlation was found between nutritional status (WAZ) and daily protein intake of the ethnic children (p=0.005<0.05).

Correlation			
		WAZ	Protein consumption per day
WAZ	Pearson Correlation	1	0.143**
	Sig. (2-tailed)		0.005
	N	387	387
Protein consumption per day	Pearson Correlation	0.143**	1
	Sig. (2-tailed)	0.005	
	N	387	387
**. Correlation is significant at the 0.01 level (2-tailed).			

Table 10. *Relation between nutritional status (WAZ) of the settler children and protein intake per day (n=387)*

Table shows positive correlation between nutritional status (WAZ) of the settler children and per day protein consumption. Statistically no significant correlation was found between nutritional status (WAZ) and daily protein intake of the settler children (p=0.109>0.05).

Correlation			
		WAZ	Protein consumption per day
WAZ	Pearson Correlation	1	0.081
	Sig. (2-tailed)		0.109
	N	387	387
Protein consumption per day	Pearson Correlation	0.081	1
	Sig. (2-tailed)	0.109	
	N	387	387
**. Correlation is significant at the 0.01 level (2-tailed).			

Table 11. *Mean calorie intake difference between ethnic and settler children*

Average calorie intake of ethnic children was 1037.33 per day whereas settler children took 986.86. As F value was not high enough i.e. 0.416 so it indicated that variations were equal and this variation was not statistically significant (p=0.519) where t value was 4.350. Average calorie intake of ethnic children was higher than that of settler children. Here null hypothesis was average calorie intake of ethnic children = Average calorie intake of settler children. From above findings we can say that probability of committing type-I error was zero i.e. null hypothesis was rejected and alternative hypothesis i.e. average calorie intake of ethnic children>average calorie intake of settler children was accepted.

Group Statistics					
	Group	N	Mean	Std. Deviation	Std. Error Mean
Energy kcal per day	Ethnic	387	1037.3333	231.85053	11.78562
	Settler	387	986.8656	228.46623	11.61359

Independent Samples Test										
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
									Lower	Upper
Energy kcal per day	Equal variances assumed	0.416	0.519	3.050	772	0.002	50.46770	16.54619	17.98684	82.94856
	Equal variances not assumed			3.050	771.833	0.002	50.46770	16.54619	17.98683	82.94857

Discussion

Child nutrition is talkative issue all over the world. Prevalence of underweight, stunting and wasting was 15.20% and 33%, 37.20% and 45%, 8.6% and 15% among ethnic and settler group though report showed that prevalence of underweight children in Chittagong Hill Tract is 43% and nutritional scenario was worst in Bandarban district among three districts of CHT. In addition to this, children living in the coastal and wetland regions in Bangladesh are 1.5 times more likely to be stunted. It is assuming that poverty, insufficient nutritional knowledge or inadequate health facility or poor sanitary practice may be responsible for this vulnerable situation. The present study found that on an average child took 1000 kcal per day though ethnic children consumed higher than settler children and it was statistically significant but still it was well below than recommended value. Actually, ethnic children prefer natural foods than processed foods but opposite scenario were observed in case of settler children. It is known that food security status has strong association with nutritional status of any population. This is why food should be distributed on equity based and we have to ensure availability of food all the year round in national as well as local level. Recent report suggests that underweight children in Chittagong Hill Tract is 43%[9] though this survey was done among 0 to 23 months children but this figure is much higher than national data. This report also mentioned that children nutritional scenario is worst in Bandarban district among three districts of CHT. Considering all parameters nutritional status of settler children was alarming. Stunting and wasting are the real threat for their health condition. Nationally stunting scenario is not improving and more or less remains static. Environmental factors may contribute high rates of stunting. Actually, stunting is a chronic condition resulting from under nutrition. Stunting scenario is not improving along with speed of underweight and wasting. Large scale or depth study both quantitative as well as qualitative nature can be conducted to find out root causes, underlying causes and immediate causes of stunting. Children living in the coastal and wetland (haor) regions in Bangladesh are 1.5 times more likely to be stunted – one of the findings from a study conducted by LANSA, led by BRAC (https://newshour.online/2018/07/26). The study explores agricultural

innovations to fight malnutrition in Bangladesh. The study identified haors and the coastal belt in Bangladesh, which are geographically distinct from other parts (waterlogged and salinity affected areas, respectively), as pockets of under nutrition. Analysis showed that overall prevalence of stunting ranged from 46.6% in the haor basin to 30.9% in other parts of Bangladesh, whereas the prevalence of underweight ranged from 44.5% in the haor basin to 34.1% in other areas (https://newshour.online/2018/07/26). This is a serious cause of concern for the country. Research revealed there is a strong interrelation between crop diversity, diet diversity and nutritional outcomes. It was found that the number of people with malnutrition will decrease if we increase production of diet-diverse and nutrition-rich food items (https://newshour.online/2018/07/26). Just couple of months back honorable health minister of GoB stated in National Nutrition Week 2018 that prevalence of underweight, stunting and wasting of under five children were 32.4%, 36.1% and 14.33%. This is a big ask for policy planners. Kabir, et al (2008) surveyed 9000 households in CHT and found that 27% mother suffer from under nutrition and 47% of their children were stunted that means nearly half of the children belonged to low weight for age.[10] Rahman et al (2008) got 63.83% under-nourished children which were too much high and require urgent public health intervention.[11] Bhattacharyya & Sarkar (2010) found quite similar findings in the Babina block of the Jhansi district (UP).[12] Chakraborty et al (2006) implemented a study among pre-school children in slum area of Udaipur and found highest prevalence (73%) of under nutrition as like Tripathi & Sharma (2006) in ethnic areas of Maharashtra (71.6%).[13-14] Chirmulay & Nisal (1993) found two-third of the study subjects were thin.[15] From above findings it is observing that under nutrition is high enough in ethnic as well as slum or disadvantaged area or remote area. Poverty, lack of nutritional knowledge or inadequate health facility or combination of these may be responsible for this vulnerable situation. Number of ethnic groups resides in different part of India. As a neighboring country of Bangladesh and close geographical attachment it is convenient or wise to compare or find similarity or dissimilarity of the findings of the present study with Indian studies. Sanitary status of latrine was significantly associated with ethnic children nutritional status but insignificant in case of settler children. Most of the settler children lived in rented house and in urban or peri-urban area. This is why their latrine was built maintaining sanitary status. On the other hand, ethnic group were not aware about sanitary latrine even in union level they were habituate to use open area for defecation. Source of drinking water and ethnic children nutritional status are significantly related and again that was absent among settler children. Actually, majority of the settler consumed tap water and tube well water but ethnic group used lake, ghiri water along with tube well water. Quality of lake and ghiri water need to be checked and scope of another area of research. Mean protein, carbohydrate as well as fat intake of ethnic children was higher than settler children and it was statistically significant. These factors definitely determine nutritional status of settler children. Actually, ethnic children prefer natural foods than processed foods but opposite scenario were observed in case of settler children. Monthly family income, condition of latrine, housing status and group (ethnic/settler) influence significantly nutritional status of children. Food security is associated with nutritional status of any population and food should be distributed on equity based and to achieve food security we have to ensure availability of food all the year round and emphasize on purchasing power. Though in recent years purchasing power of Bangladeshi people has increased. The literature on the tribal nutrition is scarce particularly in Chittagong Hill Tracts.[16] Diet is a strong determinant of nutritional status of the body because it contains nutrients which are responsible for metabolic integrity of body but problem creates when diet provides less or more nutrients than recommended value. If this condition sustains it may bring mild to severe health problem and welcome non-communicable diseases in own door. Chakrabarty & Bharati (2010) rightly said that young children, pregnant women and lactating mothers usually suffer from various health problems arising due to inadequate and imbalance nutrition which ultimately spreads to inter generation cycle and impact on whole country.[13] Chittagong Hill Tract is a hilly terrain and hard-to-reach area with forest density. A door to door comprehensive food and nutrition survey along with socio-demographic characteristics was carried out by United Nations Development Programme (UNDP) in 2008 with the help of Helen Keller International among ethnic communities residing in the Chittagong

Hill Tracts and they found that 30% under-5 children was underweight and >7% of these children suffered from severe malnutrition. They also alarmed on food insecurity because ethnic people depends on jhum cultivation or shifting cultivation. Food deposition tendency among tribal people was scanty. There is a chance of moderately undernourished children and mothers fall into categories of more severe malnutrition if this food insecurity continues or worsen with seasonal fluctuations.[17] A comprehensive survey was carried out to assess the nutritional status of 150 pre-school children of 1 to 6 years from low income families of Jabalpur district. Chakma et al (2009) found that Baiga ethnic group consumed cereal based diet whereas other foodstuff was lower than the Recommended Dietary Allowance (RDA).[18] As a result, malnutrition was widely prevalent among them. Inadequate dietary intake was main culprit. Document indicates that 3 years, 4 years and 5 years children recommended to consume 1410 calorie (boy), 1140 calorie (girl); 1560 calorie (boy), 1310 calorie girl); 1690 calorie (boy), 1540 calorie (girl) respectively. Both settler and ethnic children consumed well below than the recommended allowance. Due to inadequate dietary intake than the recommended level may be responsible for wide prevalence of under-nourished children. Not only dietary but also environmental factors are contributing in growth pattern variation between children of both developed and developing countries.[19-21] Socio-economic profile is considered as strong determinant of nutritional status. Poverty is the root cause of all types of under nutrition. Poverty and under nutrition is interlinked. This study found that most of the parents passed primary level education. Father of the children was day labor and mothers were housewife. Average monthly family income among ethnic and settler was 10316.53± 10013.97 and 17515.50±10128.11 BDT. Regression analysis showed family income had strong influence on child nutrition. Socio-economic characteristics mainly parental education, occupation and household economic status were statistically associated with child nutritional status.[22-24] Children of illiterate mothers had a higher risk of severe malnutrition and this inference is consistent with other studies.[25-27] It is evidence based that poor drinking water facilities, inadequate sanitary facilities and poor hygiene particularly during food preparation are the main causes of many infections among the young children.[28] Literature has proved disparities in child mortality and nutritional status have association with socioeconomic factors in many different contexts.[29-30] Document confirm that birth spacing, skilled birth attendants, economic development and greater per capita health expenditures are beneficial for the children of disadvantaged mothers, but the wealthy benefit is greater in case of skilled birth attendant and from higher per capita expenditure on health.[31] Zanver (2007) carried out a study for assessing the somatic status of tribal children with special reference to Gomez classification.[32] Out of 200 children studied 90.5% children suffered from various grades of malnutrition. Grade I and grade III malnutrition were more in early age (3-4 years) while grade II malnutrition was prevalent more during later age (4-5 years). More percent of (47%) male subjects suffered from different grades of malnutrition than female subjects (43%). The influence of socio-economic factors occupation, paternal literacy level and monthly family income showed that children from farmer's families having educated parents and from families with comparatively more family income suffered less from various grades of malnutrition. Bhattacharyya & Sarkar (2010) found that maximum and minimum under-nourished children was found among those fathers were agricultural laborers and service holder.[33] Service holders are usually educated and conscious about health of children. In our culture illiterate or less educated people are commonly engaged in day labor or agricultural activities. I had to face challenges during data collection like heavy rainfall, hill destruction, no transport/communication system except walking and diverse and distant location or distribution of ethnic houses.

Conclusion

This study concludes that prevalence of under nutrition among ethnic and settler pre-school children in sadar upazila, Bandarban of Bangladesh was high. Nutritional status of children was influenced by income and sanitation. Finally variation exists among pre-school children of settlers and ethnic communities in terms of their nutritional status.

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