

## Original Article

# Anthropometric Status between Tribal and Non Tribal School Children

AK Das<sup>1</sup>, MK Biswas<sup>2</sup>, S Pal<sup>3</sup>, G Biswas<sup>4</sup>

### Abstract :

A descriptive cross sectional study named "Anthropometric status between tribal and non tribal school children" was conducted on Guimara primary school, Matiranga, Kharagrachari and Thana primary school, Sitakund, Chittagong to assess the difference in nutritional status between tribal and non tribal school children aged 6 to 10 years in terms of selected indicators. The indicators were height for age Z score, weight for height Z score, and weight for age Z score. Data were collected by interview from mother of the child through semi-structured questionnaire and measuring height and weight of 128 children. Among them 63 were selected from tribal community and 65 from non tribal area. The study revealed that 9.2% non tribal and 7.9% tribal children were severely stunted, 12.3% non tribal and 1.6% tribal were moderately wasted and 9.2% non tribal and 1.6% tribal children were moderately underweight. In relation to sex among tribal children 12.9% tribal boys and 3.1% tribal girls were severely stunted, only 3.2% tribal boys were both moderately wasted and underweight. In case of non tribal children 17.9% boys and 2.7% girls were severely stunted, 17.9% boys and 8.1% girls were moderately wasted and 17.9% boys and 2.7% girls were moderately underweight. According to the age group of 6 to 7 years it was found that, only 4.2% non tribal children were severely stunted and 29.2% were moderately stunted where as 12% tribal children were moderately stunted. In both case of moderately wasting and underweight non tribal were 8.5% more than tribal children and among 8 to 10 years age group it was 12.2% and 7.3% more respectively and in case of severely stunted tribal children were 1% more than non tribal. Improper dietary practice was also found among the two group of study population. Information and health education should be provided to the parents of the children by community participation regarding proper use of sanitary latrine, provision of safe drinking water and proper dietary practice.

**Key words :** Anthropometric, Tribal, Non Tribal, School Children.

### Introduction :

The fundamental requirement of human life is health and to attain health maintenance of proper nutrition should be ensured throughout the life cycle from birth onwards. Malnourished children are physically weak, lacking resistance to disease, especially in case of growing children who need more calories than adult. They do less well at school; they are less productive as adults and they remain vulnerable for the rest of their

lives. Deprived nutrition leads to ill health and reduces physical and mental performance causing loss of productivity; and imposes a barrier to socioeconomic and national development. Adequate and proper nutrition is the utmost necessity from the very beginning of life and at every stage. Infancy is the vital period of human life which makes the foundation of the future. Any insult to nutritional status and health at this stage results in lifelong ill health and consequences<sup>1</sup>. Undernutrition is one of the most important contributors of infant and child morbidity and mortality throughout the world<sup>1</sup>. Unfortunately Bangladesh, a densely populated country with 123.1 million people giving 834 person/sq. km density<sup>1</sup>.

Worldwide, more than one-third of under five children are malnourished, whether stunted, wasted or deficient in iodine, vitamin A or iron. These often irreversible and life-threatening forms of malnutrition are thoroughly rooted in poverty and under development. However, in the world more than quarter of the children are malnourished in which 26.7% (150 million) are underweight, and 32.5% (182 million) are stunted and

1. Dr. Anup Kanti Das, MBBS, MPH, Migration Health Physician, International Organization for Migration (IOM), House 13 A, Road 136, Gulshan-1, Dhaka.
2. Manaj Kumar Biswas, MPH, Bangladesh Country Coordinating Mechanism/GFATM (BCCM) Coordinator, Ministry of Health and Family Welfare, 14/2 Topkhana Road, Ansai Bhaban, Dhaka-1000.
3. Dr. Suparna Pal, MBBS, MPH, Medical officer (OSD), DGHS, Mohakhali, Dhaka. Post-Graduate student, MD (Microbiology), BSMMU, Dhaka.
4. Dr. Gonopati Biswas. BDS, DDS. Associate Professor. Department of Dental Surgery, Faridpur Medical College Hospital, Faridpur.

### Address of correspondence :

Dr. Anup Kanti Das, MPH, Migration Health Physician, International Organization for Migration (IOM), House 13 A, Road 136, Gulshan-1, Dhaka. Phone: +88-01912-106546. Email: dranup@hotmail.com

among these children 70% are in Asia. A regional review of the children's nutritional status in SAARC countries has shown the prevalence of malnutrition by underweight 19%-48%; wasting 3-16% and stunting 25%-51% and in Bangladesh the prevalence were 8.6%-61%, 8%-18.4% and 11.2%-54.1% respectively<sup>2</sup>.

According to the UNICEF<sup>3</sup>, Bangladesh has made substantial progress in reducing malnutrition between 1990 and 2000, with the proportion of underweight children falling from 66.6 per cent to 51.1 per cent, and the level of child stunting falling from 65.5 per cent to 48.8 per cent. If this current rate of improvement continues, the percentage of underweight and stunted children will be halved by 2015.

The infant mortality rate (IMR) declined from 87 per 1,000 live births in 1989 to 52 per 1,000 live births in 2007. The under-five mortality rate (U5MR) also dropped from 133 to 65 per 1,000 live births over the same period which is a good prognostic sign for the country. While these findings are encouraging they mask the fact that infants and children continue to consume diets that are grossly inadequate in vitamin A, iron and other micronutrients. In Bangladesh, malnutrition is caused by multiple factors. The immediate causes are diseases and inadequate intake of food. The underlying causes of malnutrition include the inability of households to grow and/or purchase sufficient food for their needs; poor maternal and child-care practices, including inadequate breastfeeding and complementary feeding for infants and young children and inadequate provision of food for adolescent girls, pregnant and lactating women. Malnutrition has been steadily declining by 1-2 percent each year, though the level remains high.

According to the "Ministry of Health and Family Welfare"<sup>4</sup>, there are more than 45 distinct tribal groups in Bangladesh spread across all the districts with varying proportions. Many of these tribal groups are also characterized by slow/low growth rate compared to mainstream population. There are three predominantly tribal districts (Rangamati, Khagrachari and Bandarban) & in about 14 districts there are more than 1 per cent of tribal populations in Bangladesh. In 1991 there was about 1.2 million which is about 1.13 per cent of the country's total Population. Tribal forums claim about 2.5 million as the current population size. Tribal groups in CHT include the Chakma, Marma, Tanchangya, Tripura, Murong, Bawm, Khyang, Pankhu, Khumi, Lushai, and Chak. They also live in sparsely populated and difficult to access terrains such as forests and hilly regions. There is a lack of information on the current health and nutrition situation of these tribal people.

Access to nearest health facility, attitude of providers, language difficulties, and health seeking behavior of tribal people largely limits effective utilization of Health Nutrition Population Plan services. For this purpose a Tribal HNP Plan (THNPP) is suggested here to provide the interface for effective implementation of HNP programme in tribal areas for tribal people<sup>4</sup>.

There are several indicators or various measurements for assessment of nutritional status which can be divided into direct and indirect methods. Dietary assessment at national level done by food balance sheet and at household level by Recall method, weighing method and duplicate portion analysis method. At individual level 24-hour recall method, food frequency questionnaire, duplicate portion analysis and weighing methods are usually applicable. Among all types measurements anthropometry is a direct indicator for assessment of nutritional status. Characteristics of anthropometry of individuals and populations are simple & strong predictor of future and present ill health, functional impairment, morbidity and mortality. Anthropometric measurement uses measurements of the physical dimensions and the gross composition of the body and also provides information on chronic protein and energy imbalances. There are many advantages of anthropometry, it is a simple, safe and non-invasive procedure which can be applicable to large sample size and require inexpensive, portable, and durable equipment, which can be made or purchased locally. Another most important grading of mild, moderate or severe malnutrition and identification of individual at high risk to malnutrition can also be obtained by anthropometry. Measurement of growth includes measurement of height, weight and head circumference (HC). For body fat composition Biceps, Triceps, Subscapular skinfold thickness and Weight/Height ratio (BMI) usually done. Mid upper arm circumference (MUAC), mid upper arm muscle circumference (MUAMC) etc, usually done for measurement of fat free mass.

#### **Methods and materials :**

A cross-sectional study carried out among the tribal and non-tribal children aged 6 to 10 years of class one to class five in Matiranga, Khagrachari and Sitakund, Chittagong. A sample of 63 tribal and 65 non-tribal school children were selected by systematic sampling technique. Mothers of the children were included as respondents. A part from the anthropometric measurement of the children information on various factors that affect directly or

indirectly the nutritional outcome were also obtained. A semi structured questionnaire was developed which included some baseline information of the parents and the children in regards to nutrition. The questionnaire was finalized by pretest and consultation prior to beginning of the study. For data collection an interview schedule, measuring tape Weighing machine and Length/ Height measuring table were used as tools. A small portion of the questionnaire was kept open where there was no other alternative.

Anthropometric measurements such as weight, height provide objective information on the nutritional status of individuals. It helps in identification of mild, moderate and severe degree of malnutrition. To overcome the time constrain it was decided to examine 128 primary school going children to assess their nutritional status by selected anthropometric measurement. Data were collected by asking questions to the respondents and anthropometric measurement of weight, height of the study population during the period of May-2007 to August-2007. Before data analysis, all the collected data were checked for any omissions, logical inconsistencies, and errors. Data were processed according to the conventional statistical methods and technique. Finally computer technology (SPSS version 11.5) was used for classification, presentation and analysis of the data. Data were collected from 128 children along with their mother in which were 63 from tribal and 65 were from non tribal group. A pre-coded questionnaire was used to collect socio-demographic information and dietary habit of the respondents and a checklist to record height and weight.

**Results :**

Among the respondent the mean age of tribal children is 8.13±1.36 years and of non-tribal children is 8.17±1.64 years. Data also showed that among the tribal population 24.21% are male children and 25% are female children and in the non tribal population 21.87% were male children 28.91% were female children. Data showed that the gross monthly income of tribal family was 4133.33 taka and of non-tribal family was 7804.62 taka (Table-I).

Among the study population moderate and sufficient duration of consumption of various types of fishes by the non tribal families were higher than tribal families. But minimum duration of fish intake were 50.18% more in tribal families and families with no intake of fishes were almost similar among the two types of families.

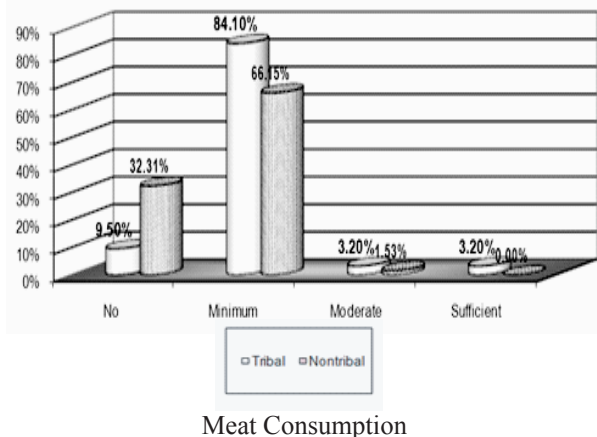
**Table I :** Distribution of the respondents by socio demographic Characteristics (age, sex, religion etc) (n= 128)

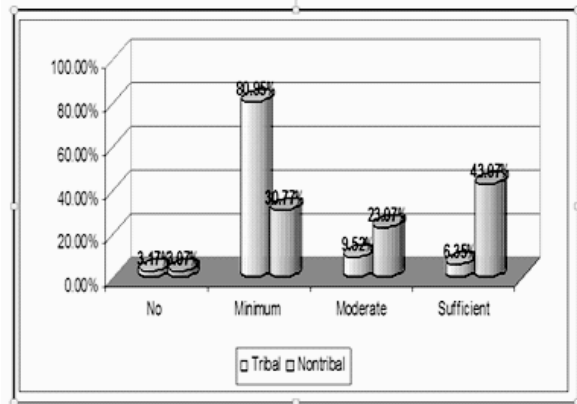
Socio - economic variable	Particulars	Tribal (%)	Non tribal (%)
Age Group	6 years	6.25	14.84
	7 years	13.00	8.90
	8 years	7.81	5.47
	9 years	11.72	10.94
	10 years	10.16	15.62
	Total	50.21	49.79
Sex	Male	24.21	24.87
	Female	26.00	28.01
	Total	50.21	49.79
Monthly family income in BDT	<2000	11.70	2.30
Income in BDT	2001-5000	30.50	17.20
	5001-8000	04.70	16.40
	8001-10000	01.60	05.50
	>10000	00.80	09.48
	Total	50.21	49.79

Mean age = 8.13, SD=±1.36 years (for tribal), and mean age = 8.17, SD= ±1.64 years (non tribal).

Among the study population moderate and sufficient duration of consumption of various types of fishes by the non tribal families were higher than tribal families. But minimum duration of fish intake were 50.18% more in tribal families and families with no intake of fishes were almost similar among the two types of families.

In both tribal and non tribal families duration of meat consumption was very low which were 84.10% and 66.15% respectively. It also assumed that meat consumption in tribal families' comparatively more than non tribal (Figure-1).





Fish Consumption

**Figure 1 :** Distribution of the families by the duration of fish and meat consumption in a week.

Data shown that, in case of severe and moderate stunting tribal children are nutritionally better than non tribal children. But, proportion of mild stunting in tribal children was more than non tribal children. Data also shown that, there was no proportion of severe wasting among the both groups of children. It also shown that there was no severely underweight children and the proportion of moderately underweight (WAZ  $\leq$  -2 SD score) non tribal children was 5.75 times more than tribal children which was 9.2% to 1.6% respectively (Table-II).

**Table II :** Distribution of tribal and non tribal children by Height for age Z score, Weight for Height Z score and Weight for age Z score (n=128).

Grading		Tribal	Non tribal
Height for age Z score	Normal	28.6%	26.2%
	Mild stunting	42.9%	27.7%
	Moderate stunting	20.6%	36.9%
	Severe stunting	7.9%	9.2%
	Total	100%	100%
Weight for Height Z score	Normal	57.1%	32.3%
	Mild wasting	41.3%	55.4%
	Moderate wasting	1.6%	12.3%
	Severe wasting	100%	100%
	Total	100%	100%
Weight for age Z score	Normal	41.3%	12.3%
	Mild underweight	57.1%	78.5%
	Moderately underweight	1.6%	9.2%
	Severely underweight	-	-
	Total	100%	100%

Among the respondents proportions of severely stunted (HAZ  $\leq$  -3 SD score) tribal male children were very high to tribal female children which was 12.9% to 3.1% respectively and the proportion of moderate stunting were 25.8% to 15.6% respectively. According to the Gomez classification data shown that there were no severely underweight tribal children. (Table-III).

**Table-III :** Distribution of the tribal children by height for age Z score , weight for height Z score and weight for age Z score (n=63)

Grading		Tribal boys	Tribal girls
Height for age Z score	Normal	29%	28.1%
	Mild stunting	32.3%	53.1%
	Moderate stunting	25.8%	15.6%
	Severe stunting	12.9%	3.1%
	Total	100%	100%
weight for height Z score	Normal	61.3%	53.1%
	Mild wasting	31.5%	46.9%
	Moderate wasting	3.2%	-
	Severe wasting	100%	100%
	Total	100%	100%
weight for age Z score	Normal	45.2%	37.5%
	Mild underweight	51.6%	62.5%
	Moderately underweight	3.2%	-
	Severely underweight	-	-
	Total	100%	100%

Data showed that, proportion of severely stunted (HAZ  $\leq$  -3 SD score) non tribal male children were very high (more than 6 times) to tribal female children which was 17.9% to 2.7% respectively. Data also showed that, there is no severely wasting children were found and non tribal male children. No severely underweight boys or girls were found (Table-IV).

Data showed that, tribal children of age 6-7 years were nutritionally better than non tribal children. 75% of the non tribal children were in compare to 60% of the tribal children were found wasted. Data showed that, Proportion of non tribal children suffering from severe stunting was more than tribal. Data showed that no severely underweight boys or girls were found (Table-V)

**Table IV:** Distribution of the non tribal children by height for age Z score, Weight for height Z score and Weight for age Z score (n=65)

Grading		Non tribal	
		boys	girls
Height for age Z score	Normal	21.4%	29.7%
	Mild stunting	28.6%	27.0%
	Moderate stunting	32.1%	40.5%
	Severe stunting	17.9%	2.7%
Total		100%	100%
Weight for height Z score	Normal	28.6%	35.1%
	Mild wasting	53.6%	56.8%
	Moderate wasting	17.9%	8.1%
	Severe wasting	-	-
Total		100%	100%
Weight for age Z score	Normal	10.7%	13.5%
	Mild underweight	71.4%	83.8%
	Moderately underweight	17.9%	2.7%
	Severely underweight	-	-
Total		100%	100%

**Table V:** Distribution of the respondent by age group (6-7 years) with weight for Height Z score, Height for age Z score and Weight for age Z score (n128)

Age group (6-7 years)		Non tribal		Tribal	
		Frequ-ency	Perce-ntage	Frequ-ency	Perce-ntage
Weight for height Z score	Normal	6	25.0%	10	40.0%
	Mild wasting	15	62.5%	14	56.0%
	Moderate wasting	3	12.5%	1	4.0%
	Severe wasting	-	-	-	-
Total		24	100.0%	25	100.0%
Height for age Z score	Normal	09	37.5%	08	32.0%
	Mild stunting	07	29.2%	14	56.0%
	Moderate stunting	07	29.2%	03	12.0%
	Severe stunting	01	4.2%	00	0%
Total		24	100.0%	25	100.0%
Weight for age Z score	Normal	2	8.3%	11	44.0%
	Mild underweight	19	79.2%	13	52.0%
	Moderate underweight	3	12.5%	1	4.0%
	Severely underweight	-	-	-	-
Total		24	100.0%	25	100.0%

Data showed that, 63.4% of the non-tribal children were wasted in compare to 31.6% of the tribal children who were found only mild wasted. Data also showed that, 12.2% of non tribal children were severely stunted where as the tribal children 13.2% were severely stunted (Table-VI).

**Table-VI :** Distribution of the respondent by age group (8-10 years) with weight for Height Z score, Height for age Z score and Weight for age (n=128) Z score

Age group (8-10 years)		Non tribal		Tribal	
		Freq	%	Freq	%
Weight for height Z score	Normal	15	36.6%	26	68.4%
	Mild wasting	21	51.2%	12	31.6%
	Moderate wasting	5	12.2%	00	0%
	Severe wasting	-	-	-	-
Total		41	100.0%	38	100%
Height for age Z score	Normal	8	19.5%	10	26.3%
	Mild stunting	11	26.8%	13	34.2%
	Moderate stunting	17	41.5%	10	26.3%
	Severe stunting	5	12.2%	5	13.2%
Total		41	100.0%	38	100.0%
Weight for age Z score	Normal	6	14.6%	15	39.5%
	Mild underweight	32	78.0%	23	60.5%
	Moderate underweight	3	7.3%	00	0%
	Severely underweight	-	-	-	-
Total		41	100.0%	38	100.0%

**Discussion :**

The study was done to determine the nutritional status of the six to ten years tribal school children who were in one to five school years of Guimara primary school at Matiranga thana under Khagrachari district and non tribal school children of Thana primary school at Sitakund thana under Chittagong district. Apart from the anthropometric measurement of the children, information on various factors such as demographic, environmental and sanitary conditions and pattern of dietary habit in both groups that affect the nutritional status were also obtained.

An overview of the respondent of the study showed that there was no gender discrimination among the tribal community in case of primary education whereas in among the non tribal community female group (28.91%) was predominant. It partially support the recent national policy adopted by Government of Bangladesh in education sector where female children are more encouraged to go to school<sup>5</sup>.

Majority portion of tribal community earn 4133.33 ± 2055.75 taka in average where as non tribal group earn 7804.62 ± 4312.20 taka in average. The difference is due to lack of job opportunity in tribal group. Most of the families were below the poverty level due to their low income which had negative impact on the nourishment of their offspring<sup>6</sup>.

In the study though most of the respondents were from low and middle income group in both of the tribal and non tribal areas it has been observed that the nutritional status of the tribal children is somewhat better than the non tribal children which may be due to the fact that mean intake of different types of foodstuffs especially meat, vegetables and fruits were better in tribal children than non tribal. In the hilly areas vegetables, different types of fruits are cheap and available and due to flexibility of the religious barrier they can take different types of meat which are also available in that area.

Though, non tribal are comparatively better in socioeconomic condition than tribal, different foodstuffs are not cheap at the market in comparison to the tribal area due to excessive demand and less production. As a result in spite of better economic condition they cannot avail themselves to the all food stuffs in sufficient quantities.

The study findings showed that fish and meat consumption per week were also minimum. That's mean the different protein intake was at minimum level which is related to their income and education level of both community.

The finding of the study shows that as per the Z-score NCHS reference classification in terms of height for age tribal children are nutritionally better than non tribal children though in case of mild stunting tribal children (42.9%) were suffering more than non tribal (27.7%).

It also shows that the proportion of moderate stunting is 11.9% less than the findings of child nutrition survey (2003) conducted by Bangladesh Bureau of Statistics (BBS)<sup>7</sup>. At the same time table 09 showed that 55.4% non tribal children were mild wasted in comparison to tribal children (41.3%) and in case of underweight the same scenario was found 87.7% in non tribal vs. 58.7% in tribal which were 9% less than the finding of child nutrition survey<sup>8</sup> (2003) conducted by Bangladesh Bureau of Statistics (BBS).

In this study among the respondents of tribal community that gross stunting was more visible among the tribal boys (38.7%) than girls (18.7%). But, wasting and underweight were observed more prominent among girls (46.9%

and 62.5% respectively) than boys (33.7% and 54.8% respectively).

Among the non tribal children have been seen that 78.6% non tribal boys had been suffering from various grade of stunting where as 70.3% girls had been suffering from the same issue. It was also noticeable that, proportion of boys (17.9%) suffering from severe stunting were more than girls (2.7%).

The comparison of nutritional status the study population was clearly defined according to the age group categories. According to the age group between 6 to 7 years 75% tribal children and 60% tribal children were suffering from wasting and in case of underweight the scenario also same, but in case of stunting proportion of tribal children (68%) were more than non tribal (58.4%). On the other hand in the age group of 8- 10 years proportion of non tribal children was more than tribal children in all categories of wasting, stunting and underweight.

The above findings of nutritional status were found better in severe cases than the overall nutrition situation of the country shown by many surveys but it has also been observed that the prevalence of mild and moderate malnutrition situation especially in child stunting and underweight were not satisfactory which is also observed by WHO<sup>9</sup>. This may be due to extensive programs taken to control severe malnutrition by the government and partly due to their increasing educational background but still now most of the people in rural areas is not fully concern about the nutritional status of their children.

This study shows that tribal children are nutritionally better than non tribal but in most of the study the prevalence of malnutrition among the non tribal are better than tribal children. The reason may be due to the fact that, those studies were conducted among large sample size, whereas the present study was limited within the 128 children of two selected primary school.

### Conclusion :

Children are the assets of a nation. National productivity and future performance depends on proper growth and development of the children. Unless, the children are properly grown and developed they will be future burden of the nation. Lack of food is not the only cause of malnutrition; peoples take poor foods when good ones are available. As per the findings of the child nutrition survey of Bangladesh, 2000 BBS, only 11.5% of the

children of both sexes were found to be normal which is somehow rather alike in all developing countries. In spite of various difficulties such as poor socioeconomic condition, poor transport facilities, lack of adequate educational resources, language problem, etc. the literacy rate among the tribal especially in case of paternal education the rate was satisfactory which was 36.7% for tribal and 39.9% for non tribal though in case of maternal education the proportion of illiterate was very high in tribal comparison to non tribal mother which was 21.09% for non tribal to 7.80% for tribal. Though average height of tribal and nontribal children were almost similar which was 119.66 for tribal and 119.58 for non tribal, tribal boys on average 2.27 cm taller than nontribal boys. The average weight of tribal children was also 1.43 kg more than nontribal children. The most important fact is that in spite of comparatively better socioeconomic condition, good sanitation, adequate educational resources with better educational level and good communication level, etc. 9.2% non tribal were severely stunted and 36.9% were moderately stunted which were 7.9% and 20.6% respectively in tribal children. Moreover 67.7% non tribal children were wasted where as 42.9% tribal children were wasted. In case of underweight the scenario was same which was 87.7% and 58.7% for non tribal and tribal respectively. Children have the right which is recognized in international law to have good nutrition. All of the countries of the world have the obligation to protect that right, building on both the experience gained and the scientific knowledge achieved. For proper implementation of these rights both positive and imperative action need to be taken as early as possible.

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