

Original Article

Assessment of Nutritional Status among Adolescent Garo in Sherpur District, Bangladesh

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Abstract:

Background: Garo is one of the largest indigenous communities of Bangladesh. Adolescence is a golden period of time for nutritional promotion. Adolescent nutrition did not receive adequate attention in Bangladesh. Tribal people like the Garo are even more unaware about the importance of adolescent nutrition. **Objectives:** To find out physical growth as well as nutritional status among adolescent Garo children in Sherpur district on the basis of anthropometric indices. **Methods and materials:** This cross sectional descriptive study was conducted among 384 adolescent Garo children (boys and girls) aged 10-18 years. A structured pre-tested questionnaire and a checklist were used to collect data through interview. Anthropometric survey of randomly selected adolescent was carried out and compared against the NCHS/WHO reference indicators such as BMI-for-age, Height-for-age and Weight-for-age. Standard methods were applied to measure the height and weight of the adolescent and BMI was calculated. Associations of nutritional status with socio-economic status, maternal working status, family type and family size were determined. **Results:** In most of the age groups it is notable that the mean height and weight of both boys and girls were lower than the WHO/NCHS standards. The prevalence of thinness, stunting and underweighting was 49.74%, 15.1% and 7.29% respectively. **Conclusions:** Significant association between malnutrition and socio-economic parameters was observed. So socio-economic status, maternal working status, family type and family size are important determinants of nutritional status of adolescent. Therefore, comprehensive programmes are required to be undertaken for the overall nutritional development of the Garo population with special focus on the adolescents.

Key words: Nutritional status, Adolescence, Anthropometry, Garo, Bangladesh.

Introduction:

Adolescents constitute a core resource of a nation for national rejuvenation and augmentation. They are a large and growing segment of the global population. Adolescence is a period in life when transition from childhood to adulthood takes place and behaviours and life styles are shaped¹. According to the World Health Organization people aged between 10-19 years are considered as adolescence². They form a distinct group in the society, which is clearly different from children and the

adults. They need a special support, care and require special health services³. Proper nutrition during adolescence period can be an important link in nutrition throughout lifespan. To invest in the health and development of the adolescents is to invest in the greater well-being of the country. United Nations estimated that about 1/5th of the total population of the world are adolescents⁴. Again, among the total adolescents of the world, about one-fifth (19%) live in Asia⁵. Bangladesh is one of the world's most densely populated coun-

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tries facing major health and economic challenges. Rates of malnutrition in Bangladesh are among the highest in the world⁶. Malnourished children are more probable to grow into malnourished adults who face heightened risks of diseases and death⁷. Dr Sohail Ally reported that the adolescent population in Bangladesh is 29.5 million⁸. Adolescent growth spurt is delayed, extended, and less intense in the Bangladeshi females than in their western counterparts⁸. Chronic energy deficiency, protein energy malnutrition, low birth weight, micronutrient deficiency are all serious problems in Bangladesh. Although it affects people of all ages, the children, women and the female adolescents are mostly affected⁹. Again chronic under-nutrition is considered to be the primary cause of ill health and premature mortality among children in developing countries¹⁰.

In Bangladesh there are indigenous groups, approximately 1.2 million and 1.13% of the total population^{9,11}. Among them the Garo is one of the largest indigenous communities. According to the historians of this continent, the Garo tribe colonized Bangladesh in the first century. They were refugees from Mongolia and came to this region through Tibet. Recent estimates suggest that in total there are 97,695 Garo people. They live in the north-eastern parts of the country especially in Gajipur, Mymensingh, Netrakona, Tangail, Sherpur, Jamalpur and some in Sylhet districts close to the Indian border¹². The Garo tribe, like every other indigenous community has its own culture. Their dresses, food habits and celebration styles can be easily distinguished from the native people and other tribes. Compared to the other tribal groups, the Garo tribe is little advanced in education and social activities. The problem of food security is common in all the ethnic groups. Being part of a developing country, the Garo community also suffers from poverty. Children belonging to socially rearward groups like scheduled castes¹³ and tribes¹⁴ are very much prone to malnutrition. In general, the tribal population is at a higher risk of malnutrition, because of the socio-cultural, socio-economic and environmental factors influencing the food intake and health seeking behaviour¹⁵. However, nutrition-related data of adolescents in the Region is very scarce¹⁶. This

area obviously needs more focus. To protect Garo adolescents from health risks and make healthy choices, complete and disaggregated data (by age and sex) must be collected. The objective of the present study is to evaluate the nutritional status of the Garo children aged 10-18 years using anthropometric indices. The subjects for the present cross-sectional study were selected from Jhenaigati Upazila in Sherpur District, a hilly district of Bangladesh that has a significant number (about 16232) of tribal people.

Methods and materials:

This cross sectional study was conducted among 384 adolescent Garo children in Sherpur district, Dhaka, Bangladesh. Among the 384 adolescent children 209 (54.43%) were males and 175 (45.57%) were females. The study subject was chosen following simple random sampling method. Samples were collected from the place of residence and schools.

The sample size (n) was calculated by the following formula¹⁷:-

$$N = z^2 pq/d^2 = 384$$

Where,

N= desired sample size

Z=normal standard deviation confidence level of set will be 95%, which corresponds to 1.96

P=the estimated prevalence (assume 0.5 or 0.05)

Q= 1-p=1-0.5=0.5

D=degree of accuracy desired usually set at 5 % (0.05)

A well structured questionnaire was developed to obtain relevant information on anthropometric and socioeconomic condition of the Garo adolescents. All questions were customized and resettled to obtain and record information easily. Nutritional status was assessed by anthropometric measurements such as height, weight, BMI using standardized methodology¹⁸. Age of the subjects under study was determined by interrogation and confirmed through probing if the birth certificate were unavailable. The weight was measured by using digital scale to the nearest 0.1 kg and height was measured using anthropometer to the nearest of 0.1cm. BMI was computed using the standard equation: BMI = Weight (kg) / height (m²). Two nutritional indices such as “weight for age z score” (WAZ), “height for age z score” (HAZ) were calculated using World Health Organization (WHO) standard (WHO, 2000). Z- Scores < -2 SD of the above indices were

considered as underweight (WAZ) and stunting (HAZ). Data were analyzed by using SPSS Version 14.0. P-values of less than 0.05 were considered to Local ethical approval was taken before study.

Results and Discussions:

Malnutrition continues to be a serious public health problem in Bangladesh. Consecutive national nutrition surveys reported high prevalence of malnutrition in our country^{19, 20}. The nutritional status of adolescent contributes significantly to the nutritional status of the community. As adolescent is a critical period of growth and development, any programme for a long-term effect on health should have a focus on this period of life. The present study was carried out among the Garo children aged 10-18 years in Sherpur district to find out their physical growth as well as nutritional status on the basis of anthropometric indices. Anthropometry is widely recognized as one of the useful techniques for nutritional assessment because it is highly sensitive to detect under-nutrition²¹. It can be used to verify the existence of nutritional problem in a population and to assess its magnitude. These types of measurements are non-

expensive, need minimal training and readings are reproducible.

Table I: Detail age and sex wise distribution of the study sample

Age in Years	Frequency		
	Male	Female	Total
10	21(48.8)	22(51.2)	43(100)
11	17(54.83)	14(45.17)	31(100)
12	48(50)	48(50)	96(100)
13	23(52.27)	21(47.73)	44(100)
14	29(51.79)	27(48.21)	56(100)
15	39(62.9)	23(37.1)	62(100)
16	21(72.41)	8(27.59)	29(100)
17	5(45.46)	6(54.54)	11(100)
18	6(50)	6(50)	12(100)
Total	209(54.43)	175(45.57)	384(100)

The age and sex distribution of the studied children are given in Table I. A total of 384 adolescent were studied. Among them 209 (54.43%) were male and 175 (45.57%) were female. Of them 11.19%, 8.07%, 25%, 11.46%, 14.58%, 16.14%, 7.55%, 2.86% and 3.12% children were in age group 10, 11, 12, 13, 14, 15, 16, 17 and 18 years respectively.

Table II: Comparison of mean weight of boys and girls

	Boys				Girls				p-value
	Number examined	Mean weight (kg)	SD	WHO/NCHS standard weight (kg)	Number examined	Mean weight (kg)	SD	WHO/NCHS standard weight (kg)	
	21	27.36	3.37	31.4	22	28.18	4.21	32.5	0.481
	17	29.70	6.07	32.2	14	30.71	6.37	33.7	0.658
	48	36.12	6.78	37.0	48	37.06	6.69	38.7	0.519
	23	46.0	7.05	40.9	21	42.81	5.06	44.0	0.091
	29	46.24	5.53	47.0	27	43.26	5.53	48.0	0.049
	39	50.74	6.34	52.6	23	47.43	3.75	51.5	0.027
	21	53.19	7.18	58.0	8	45.13	5.35	53.0	0.008
	5	57.4	6.06	62.7	6	45.00	3.16	54.0	0.002
	6	57.84	4.66	65.0	6	45.5	2.66	54.4	0.000

SD= Standard Deviation

Table II focused the mean weights of boys and girls of the study group. The mean weight of girls was more than the boys till twelve years of age, there after the boys weighed more. In age group 16 to 18 there was statistically significant difference in the mean weight of the boys and girls. On comparison with the WHO/NCHS standard the mean weight of boys and girls was found to be lower in most of the age groups. Only thirteen years old boys weighted more than the standard value. It is noticeable that the mean weight of girls was found to be much lower compared to WHO/NCHS standard.

Table III: Comparison of mean height of the study population

Age	Boys				Girls				p-value
	Number examined	Mean height (cm)	SD	WHO/NCHS standard height (cm)	Number examined	Mean height (cm)	SD	WHO/NCHS standard height (cm)	
10	21	132.14	7.82	137.5	22	132.32	6.05	138.3	0.79
11	17	135.24	9.56	140.0	14	137.29	6.71	142.0	0.49
12	48	143.94	8.87	147.0	48	140.16	6.68	148.0	0.64
13	23	155.57	8.08	153.0	21	148.61	5.74	150.0	0.002
14	29	154.62	5.77	160.0	27	149.19	5.91	155.0	0.001
15	39	158.05	6.36	166.0	23	152.17	4.83	161.0	0.000
16	21	161.76	5.88	171.0	8	149.13	4.73	162.0	0.000
17	5	164.20	2.58	175.0	6	151.5	4.13	163.0	0.000
18	6	163.67	1.96	177.0	6	149.67	3.07	164.0	0.000

Height may be considered most representative characteristic of overall growth and development. Table III represents the mean height of boys and girls. No significant mean height difference was found in 10, 11 and 12 aged adolescents but thereafter the boys were taller than the girls. In most of the age groups it was notable that the mean height of both boys and girls was lower than the WHO/NCHS standards. Only the boys aged thirteen years were taller than the standard height.

Table IV: Nutritional Status of Study population according to WHO International Classification of underweight, overweight and obesity based on BMI

Grade of Under nutrition	BMI Cut off Value Kg/m ²	No. of adolescent boys (%)	No. of adolescent girls (%)	No. of total adolescent (%)
Grade 3 Thinness	< 16	16(7.65)	27(7.03)	43(11.20)
Grade 2 Thinness	16.0-16.99	36(17.22)	28(16)	64(16.67)
Grade 1 Thinness	17-18.49	53(25.36)	31(17.71)	84(21.87)
Normal	18.5-24.99	103(49.28)	87(49.71)	190(49.47)
Overweight	25-29.99	1(0.47)	2(1.14)	3(0.79)
Obese	> 30	0	0	0

In the current study (presented in table IV) according to WHO reference standard 49.47% adolescents were normal (BMI 18.5-24.99), 49.74% adolescents were undernourished (BMI < 18.5) and rest 0.79% were overweight and none of the adolescent was found to be obese. Boys suffering from chronic energy deficiency grade I, II and III were 25.36%, 17.22% and 7.65 % respectively and for girls it was 71%, 16% and 7.03 % respectively. So girls were more undernourished than boys.

Table V: Prevalence of stunting and underweight in study group according to WHO/NCHS standards

	Stunted			Underweight		
	Severe (%)	Moderate (%)	Total (%)	Severe (%)	Moderate (%)	Total (%)
Boys (n=209)	3(1.43)	24(11.48)	27(12.91)	1(0.47)	8(3.83)	9(4.3)
Girls (n=175)	6(3.42)	25(14.28)	31(17.71)	5(2.85)	14(8)	19(10.86)
Total (n=384)	9(2.34)	49(12.76)	58(15.1)	6(1.56)	22(5.73)	28(7.29)

According to WHO/NCHS standards, 58 (15.1%) out of 384 adolescent were stunted, with 9 (2.34%) adolescent showing severe grade of stunting (Table V). Among them girls (17.71%) were more stunted compared to boys (12.91 %). However 28 (7.29%) adolescent were underweight with 1.56% showing severe grade of underweight. Among them girls (10.86%) were more underweight than boys (4.3%).

Table VI: Prevalence of stunting and underweight in study group according to mothers' working status

Maternal working status	N (%)	Stunted		Underweight	
		Stunted (%)	Normal (%)	Underweight (%)	Normal (%)
Working	53(100)	6(11.32)	47(88.68)	3(5.67)	50(94.33)
Housewives	331(100)	52(15.71)	279(84.29)	25(7.55)	306(92.45)
Total	384	58(15.10)	326 (84.9)	28(7.29)	356(92.71)

Table VI executed that the prevalence of stunting and underweight was higher among adolescent whose mothers were housewives than those who are involved in different types of working. Similar study carried out by Mukherjee et. al also found the parallel result.

Table VII: Prevalence of stunting and underweight with respect to socioeconomic status

Socioeconomic Status	N	Stunted		Underweight	
		Stunted (%)	Normal (%)	Underweight (%)	Normal (%)
Farmer	244	36(14.75)	208(85.25)	10(4.09)	234(95.91)
Day labour	61	15(24.59)	46(75.41)	13(21.31)	48(78.69)
Employee	47	2(4.25)	45(95.75)	1(2.13)	46(97.87)
Business	7	1(14.28)	(85.72)	1(14.28)	6(85.72)
Other	25	4(16)	21(84)	3(12)	22(88)
Total	384	58(15.10)	326(84.9)	28(7.29)	356(92.71)

Table VII represents that out of 384 study population 244 (63.54%) belongs to the family of farmer, 61 (15.89%) belong to day labourer, 47 (12.24%) belong to employee, 7 (1.82%) belong to small businessman and rest 25 (6.51%) from other category. Majority of the mothers 331(86.2%) were housewives and most of them were illiterate. From this table it is revealed that of the 384 adolescent whose father are day labour were more stunted (24.59%) and underweighted (21.31%) than those whose father are employee, while the lowest prevalence of stunting(4.25%) and underweight (2.13%) were observed in the adolescents whose father are employee. So, these figures suggest that socioeconomic conditions are closely associated with nutritional status of the adolescents.

Table VIII: Prevalence of stunting and underweight in study group according to family type

Type of family	N (%)	Stunted		Underweight	
		Stunted (%)	Normal (%)	Underweight (%)	Normal (%)
Nuclear family	347(100)	39(11.24)	308(88.76)	17(5.67)	330(94.33)
Joint family	37(100)	14(51.35)	23(48.65)	11(29.72)	26(70.28)
Total	384	58(15.10)	326 (84.9)	28(7.29)	356(92.71)

Significant association was also observed between stunting, underweight and socio economic indicators such as type of family (Table VIII). Prevalance of stunting and underweight was observed to be much higher in the joint families compared to the nuclear families.

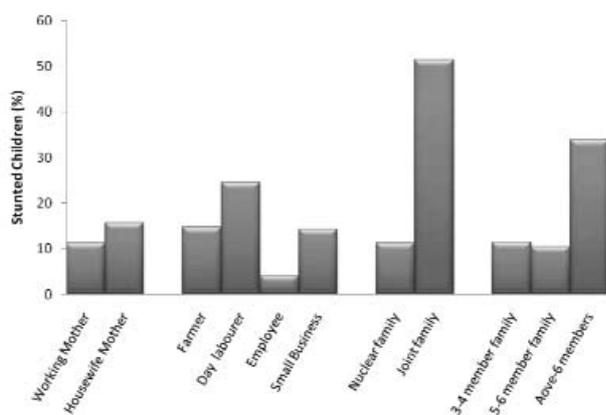
Table IX: Prevalence of stunting and underweight with respect to family size

Family size (members)	N	Stunted		Underweight	
		Stunted (%)	Normal (%)	Underweight (%)	Normal (%)
3-4 members	114	13(11.4)	101(88.6)	5(4.38)	109(95.62)
5-6 members	199	21(10.55)	178(89.45)	12(6.03)	187(93.97)
Aove-6 members	71	24(33.81)	47(66.19)	11(15.49)	60(84.51)
Total	384	58(15.1)	326(84.9)	28(7.29)	356(92.71)

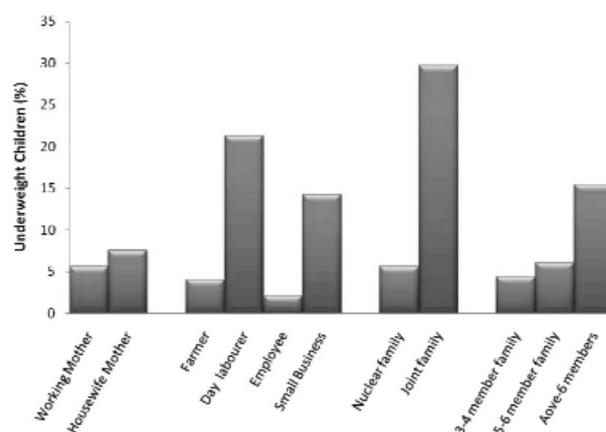
Table IX represents that 114 (29.68%) adolescent children came from families consisting three-four members, 199 (51.82%) were from families of five-six members and 71 (18.49%) were from families consisting more than six members. Higher prevalence of stunting and underweight was observed in the families having more than six members whereas lowest prevalence of stunting and underweight was seen in those families having three-four members. Thus the present study implies that family size is significantly associated with nutritional status. Similar results have been reported by Gopaldas et al and Mukherjee et al.^{22,23}

Figure I: Prevalence of stunted (a) and underweight (b) children with respect to different socioeconomic parameters.

a.



b.



In Figure I, we have tried to summarize the findings of the study with respect to the association of different socioeconomic parameters with adolescent nutrition of the subjected Garo tribe. From the figure, we can see that the joint families, families with more than 6 members and families of day labourers are the worst in maintaining adolescent

nutrition. So, in order to improve the adolescent health status we must give emphasis on these three types of families.

Conclusion:

Adolescence is a golden period of time for nutritional promotion as it is a vital phase of physical growth and development in the lifespan. Another proposition of adolescence in human life cycle lies in its immediacy to later life. Thus, health and nutritional status of adolescent children may have great impact on the quality of the next generations. According to UNICEF report there are 27.7 million adolescents aged 10-19 years in Bangladesh – 13.7 million girls and 14 million boys – making up about one fifth of the total population. Regardless of all these important considerations, adolescent nutrition did not receive adequate attention in Bangladesh. Tribal people like the Garo are even more unaware about the importance of adolescent nutrition. The aim of this study was to prepare an adolescent health profile for the adolescent Garo of Jhenaigati upazila. The results of the present study indicate that nutritional status of these children is not satisfactory as more than half of the adolescents are malnourished. This study also focuses on some other contributing factors which may affect adolescent nutrition like socio-economic status, maternal working status, family type and family size etc. There is much scope for the improvement of their nutritional status. The economic status of the parents must first be improved. Besides, the parents must be cautious about the child health and development. Children must be supplied with the balanced diet. Therefore valuable health and nutritional endorsement programs can be started based on the findings of this study with the eventual objective of decreasing under nutrition and to recover the health status of the adolescent.

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