

# **Nutrition Education Exposure and Nutritional Status of Selected Household Members in Three Agro-ecological Locations of Bangladesh**

**Md. Aminul Haque Bhuyan<sup>1</sup>, Md. Abdullah-Al-Mahmud<sup>1</sup>, Shah Md. Mahfuzur Rahman<sup>1</sup>, Md. Khalilur Rahman<sup>2</sup> And Nazma Shaheen<sup>1\*</sup>**

<sup>1</sup>Institute of Nutrition and Food Science, University of Dhaka, Dhaka-1000.

<sup>2</sup>Department of Soil, Water and Environment, University of Dhaka, Dhaka-1000.

## **Abstract**

A comparative study was conducted in three different agro-ecological locations of Bangladesh. Among the respondent households 26.7% in Dhaka and Brahmanbaria, 32.6% in Bagerhat were Muslims and rest of the households were Hindu and Christian. Most of the households that is 17.3% in Dhaka, 8.7% in Brahmanbaria and 15.3% in Bagerhat were farmers. In terms of occupational sides the most striking findings was 12% business population are residing in Brahmanbaria. Most of the household's (12.7% in Dhaka, 10.7% in Brahmanbaria & 14.6% in Bagerhat) monthly income were between 1500-3000 taka. Half (50%) of the respondents of Dhaka had previous exposure to nutrition education where as in Brahmanbaria two third and in Bagerhat one third of the respondents had exposure to nutrition education. Mean per capita calorie intake of the respondent household members was 2157 Kcal where as about 53% children were malnourished according to weight for age using Z score. Of them, 40% children in Dhaka, 48 % in Brahmanbaria and 72% in Bagerhat were underweight. Different agro-ecological locations have significant association with under weight children of 2-5 years.

*Key Words* : Nutrition Education, Nutritional Status, Agro-ecological Location.

## **Introduction**

Bangladesh comprises a small area of 1,47,570 km<sup>2</sup> with a large population size of 13 million. Agriculture is predominant with a cropped area of 13.7 million hectare and 79% cropping intensity. Tropical and sub-tropical crops are grown throughout the year. Rice and wheat are the stable foods of the Bangladeshi people. On the basis of land capability classes, thirty agro-

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*\*Author for Correspondence*

ecological regions and 88 subregions have been identified by adding successive layers of information on the physical environment which are relevant for land use and for assessing agricultural potential.<sup>1</sup> High and medium highlands are mostly suitable for horticultural crops production. Bangladesh is blessed with many horticultural crops. More than 90 vegetables, 60 fruits and 25 spices are being grown in the country. Major vegetables include potato, tomato, brinjal, cabbage, cauliflower, aroids, pumpkin, bottle gourd, cucumber, pointed gourd, bitter gourd, hyacinth bean and yard long bean. The total cultivated area of horticultural crops is about 0.69 million hectare which is about 5% of the total cropped area.<sup>2</sup> Over the last 25 years, since independence, the growth rates in rice production, acreage and yield were 2.53%, 0.33% and 1.20% per annum, respectively. In general, this was achieved via high growth rates in rice yield. During 1980s and 1990s the highest growth in acreage (9.64%) and production (9.03%) were achieved for MV wet season rice (Aman) followed by MV winter season (Boro) rice whose growth in acreage production were 8.84% and 8.83% per annum respectively.<sup>3</sup> The total vegetables production are also gradually increasing year after year<sup>4</sup>. In spite of this situation, micronutrients deficiency, as well as malnutrition are reported from various surveys<sup>5,6,7,8</sup>. Women and children are the primary victims of malnutrition<sup>9</sup>. In terms of micronutrients deficiency, the consumption of vegetables plays major role in addressing this problem. The nutritional surveys of 1975-76, 1981-82, 1995-96 and other surveys among children have shown inadequate consumption of vegetables affecting their nutritional status,<sup>10,11,12,13</sup> which results in wide spread protein, energy and micronutrients malnutrition. Every year about 30,000 children become blind due to chronic vitamin A deficiency<sup>14</sup>. On the other hand, about 70% of the women and children suffer from iron deficiency anemia. About half (68.9%) of the population are biochemically iodine deficient and 0.55% are cretins.<sup>15</sup> According to UNICEF report, the situation of infant, children and maternal malnutrition in Bangladesh is among the worst in the world<sup>16</sup>. Brown *et. al.* found in 1986 that children in the low-income area of South-East Asia are at the highest nutritional risk<sup>17</sup>. Recently it is estimated that 600 children die everyday due to malnutrition in Bangladesh<sup>18</sup>. Although in very recent years the infants mortality rate has declined but low birth weight rate is about 50%. Ultimately malnutrition adversely affect the developmental potentials and capability of the nation.

In addition to socio-economic factors, lack of nutritional knowledge also contributes to the problem of malnutrition. The literacy rate of Bangladesh among both men and women is under optimal level, which ultimately influenced the food intake and health care.

Therefore, the present study was undertaken to obtain comparative information regarding their socio-economic, educational aspects, exposure to nutritional knowledge and also to determine their nutrients intake and nutritional status of selected households from selected locations of three different agro-ecological zones of Bangladesh.

### **Methodology**

A cross sectional study was conducted in three selected locations of Bangladesh among 150 households of Dhaka, Chittagong and Khulna divisions. Experimental sites viz. Bagerhat, Dhaka and Brahmanbaria belongs to Ganges tidal floodplain (typic haplaquent), Modupur tract (oxic hapludalf and aquic dystrocrept) and old Meghna estuarine floodplain (typic haplaquent) agro-ecological regions respectively.<sup>19</sup> The fertility status of these regions varies considerably. The study locations were Dumni village of Dhaka district, Jagannathpur village of Brahmanbaria district and Gurfa village of Bagerhat district. Each village was selected by random sampling method from each division gradually through district, thana, union and village level and 50 households having children between 2-5 years were selected from the study village of each division.

**Questionnaire:** An initial questionnaire was developed to obtain relevant information on the household's socio-economic status such as monthly family income, educational qualification, occupation, religion, family size etc. It also included vegetables production information, anthropometric measurements (weight, height and MUAC) and a dietary history format to record daily food intake.

**Collection of data:** To collect data, the researchers visited the respondents' households and filled in the questionnaire using person to person interviews of the respondents on every question.

**Collection of anthropometric data :** Anthropometric data was collected by measurements of weight, height, mid upper arm circumference (MUAC) by standardized balance, height scale and measuring tape, respectively.

**Dietary Survey :** Food taken individually by households members were weighed every time before eating from morning till going to bed. Per day consumption of food by children between 2-5 years was also measured. Equivalent raw food weights were calculated using INFS conversion exercises and a conversion table for Bangladeshi foods formulated at the INFS<sup>20</sup>.

*Data Analysis:* The data analysis was performed using SPSS PC+ Package and tabulated according to the key variables.

## Results

The soil characteristics affect the production of vegetables in terms of quality and quantity. Existing diversified soil types in Bangladesh results in certain food specially fruits and vegetables to be grown in abundance in certain agro-ecological zones. Due to differences in soil characteristics, agricultural production and nutritional knowledge, the dietary intake of vegetables may vary to some extent among the population.

A total of 150 households from three selected locations of Dhaka, Chittagong and Khulna division were included in this study. These were Dumni village of Dhaka, Jagannathpur village of Brahmanbaria and Gurfa village of Bagerhat district. Table 1 shows the socio- demographic nature of the respondents of the three selected locations of Bangladesh. Majority (86%) of the households were muslims where as only 0.6% i.e. one household was christian. Percent distribution of households by occupation shows that

**Table 1. Socio-demographic data of selected households from three locations in different agro-ecological zones.**

Indicators	Agro-ecological Zones			
	Dhaka (%)	Brahmanbaria(%)	Bagerhat(%)	Total(n=150)%
<b>Religion</b>				
Islam	26.7	26.7	32.6	86.0
Hinduism	6.7	6.7	0.0	13.4
Christianity	0.0	0.0	0.6	0.6
<b>Occupation</b>	(%)	(%)	(%)	(%)
Service	4.7	9.3	9.3	23.3
Business	10.7	12.0	4.7	27.4
Farmer	17.3	8.7	15.3	41.3
others	0.7	3.3	4.0	8.0
<b>Family size</b>	(%)	(%)	(%)	(%)
3-5	10.0	9.3	12.0	31.3
6-8	16.0	16.7	14.7	47.4
9-11	5.3	6.0	6.0	17.3
12-15	2.0	1.3	0.7	4.0
<b>Monthly Income (Tk.)</b>	(%)	(%)	(%)	(%)
<1500	4.0	6.7	6.0	16.7
1501-3000	12.7	10.7	14.6	38.0
3001-4500	9.3	7.3	5.4	22.0
4501-6000	2.6	4.7	4.7	12.0
>6001	4.7	4.0	2.6	11.3

highest percentage (41.3%) of the total households were farmers. When comparison was made regarding occupation among these three locations, farmers were highest (17.3%) in Dhaka. Again there were 12% businessmen in Brahmanbaria location. Amongst the total households, 47.4% had family size of 6-8 members followed by 31.3% having 3-5 members as shown in Table-1. The three locations has almost similar trend in family size distribution. It can be noted that 54.7% of the households had monthly income below TK.3000 only. The households at Bagerhat had lowest percentage (2.6%) in the income range of TK.6001 and above as compared to Brahmanbaria and Dhaka location. About 47% households' food expenditure were between 1500-3000 taka. In terms of home production, vegetables were grown abundantly and were been sold in the market largely. Most of the households (58%) used 1 to 10 decimal land for vegetables production.

Figure 1 shows that the percent ditribution of the households in terms of previous exposure to nutrition education. When the respondents were asked about their exposure to nutrition education, it was found that almost equal number of them had previous exposure to nutrition education by either radio, television or any other activities of non-government organizations (NGO). Among the respondents in Dhaka, 50% of them had been exposed to nutrition education, whereas in Brahmanbaria two third of the respondents and in Bagerhat one third had been exposed to nutrition education.

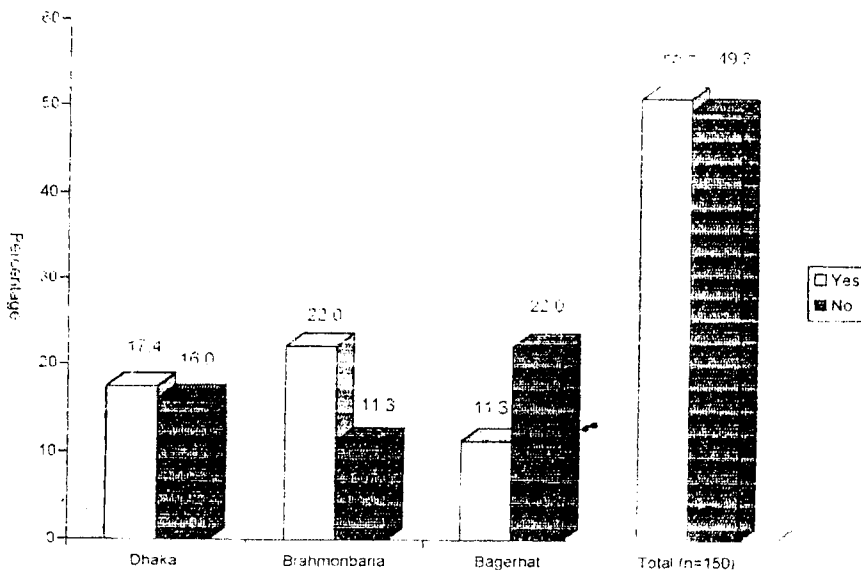


Fig. 1. Percent distribution of the households in terms of previous exposure to nutrition education (n = 150)

Table 2 represents the mean per capita nutrients and energy intake of the household members by location. Similar findings are shown in terms of iron, calcium and vitamin A intake.

**Table 2. Mean per capita nutrients and energy intake of the household members by location (n=150)**

Nutrients	Dhaka (n=50)	Brahmanbaria (n=50)	Bagerhat (n=50)	Total (n=150)
Calorie(Kcal)	2138	2131	2201	2157
Protein(g)	49.6	45.8	50.3	48.6
Fat (g)	17.9	16.3	18.1	17.4
Carbohydrate(g)	441.1	439.8	437.8	439.6
Ca(mg)	247.4	348.2	349.2	314.9
Fe (mg)	12.9	10.5	13.1	12.2
Vit A (I.U.)	1743	1608	1780	1710
Vit B <sub>1</sub> (mg)	1.4	1.43	1.17	1.33
Vit B <sub>2</sub> (mg)	0.5	0.65	0.53	0.56
Niacin(mg)	21.0	22.0	19.31	20.8
Vit C (mg)	14.6	14.7	15.0	14.8

Pattern of the nutritional status of the children between 2-5 years was presented in Table 3 with various indicators. Considering the above criteria it can be noticed that under weight malnourished children were highest (53.3%) with only 10% malnourished children in terms of MUAC classification. The stunted and wasted values were 48.7% and 26% respectively among those children. In all the cases of weight and height, -2SD was taken as cut off point of malnutrition. underweight children were

**Table 3. Percent distribution of the children between 2-5 years terms of nutritional status by location with various indicators (n=150)**

Nutritional Indicators	Status	Dhaka (n=50)	Brahmanbaria (n=50)	Bagerhat (n=50)	Total (n=150)
Weight for age ( $\leq$ -2SD)		40	48	72	53.3
Height for age ( $\leq$ -2SD)		40	46	60	48.7
Weight for Height( $\leq$ -2SD)		26	16	36	26
MUAC( $\leq$ 12.5cm)		2	6	22	10

highest (72%) in Bagerhat with 22% malnourished children in terms of MUAC classification as compared to Dhaka (40%) and Brahmanbaria (48%). Distribution of underweight children of 2-5 years by different agro-ecological

locations are presented in Table 4 and on the basis of chi-square test, it was found that three agro-ecological locations have strong association with underweight (malnourished) children.

**Table 4. Distribution of under weight (malnourished) children of 2-5 years by locations.**

Locations	Malnourished Percent	Normal Percent	Total
Dhaka	40	60	100
Brahmanbaria	48	52	100
Bagerhat	72	28	100

$X^2 = 22.29$  ;  $p < 0.00$

### Discussion

The soils of Bangladesh are classified under three major geomorphological groups. These are (i) Floodplain soils, (ii) Plio- plastocene terrace soils and ( iii) Plio-pliocene hill soils. The soils belonging to each physiographic unit have been recognised by the differences in morphological, physical, chemical and mineralogical properties. Experimental sites viz. Begerhat, Dhaka and Brahmanbaria belong to Ganges tidal floodplain (typic haplaquent), Modupur tract (oxic hapludalf and aquic dystrocrept) and old Meghna estuarine floodplain (typic haplaquent) agro-ecological regions respectively. Their characteristic differences are responsible for the variable nutritional properties of the soils of these areas.<sup>19</sup> It was a cross-sectional study conducted among selected households in three above mentioned locations of different agro-ecological zones of Bangladesh. The primary respondents were housewives who were responsible for child caring, cooking and other domestic works and a total of 150 households from three selected locations were included. Socio-demographic features of selected households shows that majority (86%) of the respondents were muslims, national religion distribution also shown similar pattern (88.3%)<sup>16</sup>. When comparison was made regarding occupation among these three locations, farmers were highest in Dhaka (17.3%) and Bagerhat (15.3%). Again there were 12% businessman in Brahmanbaria location, which correlates with national data.<sup>21</sup>

In terms of monthly income, the three locations had almost similar distribution, 54.7% of the households had monthly income below TK.3000 only, whereas the households at Bagerhat had lowest percentage (2.6%) in the income range of TK>6001 and above as compared to Brahmonbaria and Dhaka location.

Among the respondents in Dhaka, 50% of them had been exposed to nutrition education, whereas in Brahmanbaria two third of the respondents, and in Bagerhat one third had been exposed to nutrition education (Figure 2). The possible reason could be that the villages in Dhaka and Brahmanbaria have more facilities of radio, television, at the same time NGOs are more active there compared to Bagerhat. Because of the vicinity of Dhaka location nearer to the capital Dhaka, the respondents might have been more exposed to NGO activities as compared to Brahmanbaria and Bagerhat locations. Even between Brahmanbaria and Bagerhat locations respondents of Bagerhat seemed to be less exposed to various NGO activities because of its distance from Dhaka. The household members of Dhaka locations possibly enjoyed more chances of being acquainted with the awareness programmes and thus became influenced in their food behaviour.

Mean per capita nutrients and energy intake of the household members by location indicated that calorie and protein intake of Bagerhat were higher in terms of average intake as compared to Dhaka and Brahmanbaria. Similar findings were found in terms of iron, calcium and vitamin A intake. BNS of 1995-96 showed that calorie intake was lower than the present study. This high intake of calories can be justified by the higher intake of carbohydrate among the households of present study. The question of contribution of vegetables intake for various nutrients and energy were taken into account (Table 2).

Percent distribution of the children between 2-5 years in terms of nutritional status by location can be noticed that underweight malnourished children were highest (53.3%) with only 10% malnourished children in terms of MUAC classification. Within these three locations, children of Bagerhat were more underweight as compared to Dhaka and Brahmanbaria and also in terms of MUAC classification (Table 3). If we consider the per capita intake of nutrients, the situation of Bagerhat is better than other two locations. These discrepancies can be explained by the fact that per capita nutrients and energy intake of the household members is not true reflection of the picture of dietary pattern of 2-5 years children. Possibly many other factors like child caring practices etc. have influenced this finding. In Bangladesh, 50% of the children are born with low birth weight<sup>16</sup> but in Bagerhat, low birth weight rate may be even higher considering other pre imposed circumstance like faulty food during pregnancy and lactation as well as other social taboos. On the other hand, BNS 1995-96 shows that 51.2% children aged 6-71 months were both stunted and underweight which data correlates with the present study.<sup>6</sup>



Different agro-ecological locations have significant relation with underweight (malnutrition) among 2-5 years children (table 4).

Therefore, from this study it may be concluded that income level of respondent households has variations along with other nutritional indicators in three agro-ecological locations. This study does not suggest any single variable as the cause of malnutrition, rather cumulative effect of lack of nutrition education, improper dietary practices etc. also play vital role in this regard.

## References

1. Bangladesh Agricultural Research Council (BARC). Fertilizer recommendation guide- 1997. Soil publication no. 14. pp-196.1997.
2. Bangladesh Bureau of Statistics (BBS). Statistical Yearbook of Bangladesh ,1996.
3. FAO, The Sixth World Food Survey, Rome. pp-155. 1996.
4. BRAC, Research and Research Priorities in Nutrition, October 1997.
5. Dhaka University and US Department of Health, Education and Welfare, National Nutrition Survey,1962-64.
6. INFS, Dhaka University, Nutrition Survey of Rural Bangladesh, 1975-76.
7. INFS, Dhaka University, Nutrition Survey of Rural Bangladesh, 1981-82.
8. INFS, Dhaka University ,National Nutrition Survey of Bangladesh, 1995-96.
9. Rahman KM and Awal AMMA , Nutrition and Poverty. Abstract in 7<sup>th</sup> Bangladesh Nutrition Conference, March15-17,1997.
10. BBS, Report of the Child Nutrition Status Module, Bangladesh Household Expenditure Survey, 1985-86.
11. BBS, Report of the Child Nutrition Status Survey, 1989-90.
12. BBS, Child Nutrition Status Survey of Bangladesh, 1992.
13. BBS, Child Nutrition Status Survey of Bangladesh, 1995-96.
14. IPHN and HKI, Bangladesh Nutritional Blindness Study, 1982-83.
15. Dhaka University, ICCIDD and UNICEF, National Iodine Deficiency Disorders Survey in Bangladesh, December,1993.
16. UNICEF, Dhaka,Situation of Children and Priorities for Action in Bangladesh, Background for the 1990s.,
17. Brown JE, Serdula M, Cairns K, Godes JR, Jacobs DR, Elmor P and Trowbridge FL, Ethnic growth differences in nutritional status of young children from low income areas of an urban community . Am.J.Clin.Nutr, December: 44(6): 738-44, 1998.
18. Ministry of Health and Family Welfare ,Concept Paper, National Nutrition Program, April ,1998.

19. Hassan, MM. Soils of Bangladesh: Their genesis, Classification and use potential. Allied Agro Industries, 1999, pp-194.
20. Ali, SMKA and Pramanik MMA, Conversion Table, INFS, 1991.
21. Bangladesh Bureau of Statistics (BBS). Statistical Yearbook of Bangladesh ,1998.