

## Dietary Pattern and Food Intake Habit of the Underprivileged Children Residing in the Urban Slums

Tanvir Chowdhury Turin<sup>1</sup>, MBBS; Nahid Rumana<sup>1</sup>, MBBS; Nahid Shahana<sup>2</sup>, MPHIL

1. Department of Health Science, Shiga University of Medical Science, Shiga, Japan.

2. Department of Anatomy, Bangladesh Medical College, Dhaka, Bangladesh.

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### Abstract

**Objective:** Nutritional status directly affects the growing up of children in terms of physical and mental development. In the urban slums the underprivileged children lag behind the basic necessary amount of food and nutrition which is likely to lead to their ill development. This study was undertaken to investigate the dietary food intake pattern among urban slum dwelling children attending schools Dhaka city and to examine the association with various social factors.

**Material & Methods:** This study is a cross-sectional study among 396 school going children who are residents of slums in different parts of Dhaka Metropolitan city.

**Findings:** The age of the children were categorized into three age groups; Mean age for the children of age group-1 was 6.51 ( $\pm 1.01$ ) years, for the age group-2 was 9.24 ( $\pm 1.09$ ) years and for the age group-3 was 12.5 ( $\pm 0.91$ ) years. In 77.8 % of the cases the child gets three meals per day but inadequate in amount. In most of the cases the common foods were rice, lentil, potato and green leafy vegetables. The food frequencies reported by the children were; eggs: 1.4 times per week, milk: 1.2 times per week, meat: 0.4 times per week, fish: 2.8 times per week and fruits 2.9 times per week. Those children from families with lower incomes and less educated parents had a dietary pattern which tended to be poor regarding egg, milk, meat and fruit.

**Conclusion:** The diets of these urban slum school children were inadequate for macronutrients and micronutrient, which is a danger for significant nutritional and health implications. The need to develop healthy food supply and habits should be emphasized.

**Key Words:** Urban, Slum, Children, Food habit, Malnutrition

### Introduction

In Bangladesh, health and nutritional problems, a consequence of poor dietary intake, are

widespread and persistent. Like other developing countries nutritional health issue is a very serious public health problem in Bangladesh<sup>[1]</sup>. This is especially true and matter of major apprehension

\* Correspondence author;

Address: Department of Health Science Shiga University of Medical Science Shiga 520-2192, Japan

E-mail: turin@belle.shiga-med.ac.jp

concerning the children. It is not only a major health problem, but also a serious impediment to national socio-economic development<sup>[2]</sup>. Increasing evidence suggests that diet and lifestyle in childhood and adolescence have a potential lifelong effect on risks for many chronic diseases such as obesity, coronary heart disease, hypertension, diabetes mellitus and certain types of cancer<sup>[3-8]</sup>.

Patterns of food distribution within the family may be contributing to malnutrition in certain populations. Because of the widespread prevalence of malnutrition among children living in developing countries, supplementary feeding programs have become a widely endorsed strategy for promoting health and preventing diseases<sup>[9]</sup>. Conclusive evaluations of food supplementation programs in developing countries are generally unavailable. Most such programs have been implemented without attention to the requirements that must be met in order to derive robust conclusion from program evaluation.

Rapid urbanization has occurred throughout the developing world during the recent decades, and 80% of the world's big cities are now located in the developing countries. 60% of their inhabitants are slum dwellers<sup>[10]</sup>. Geographical migration from rural areas to urban localities will expose migrants to new environmental. Urban slum dwellers are exposed to poor environmental conditions (overcrowding, poor quality drinking water and sanitation, no removal of waste). Ignorance and difficult conditions of life in the slums are likely to result in improper food habits, low health care use and hygiene awareness, lack of knowledge of the origin of sickness and proper measures for cure. The situation is further worsened due to lack of necessary health centers, medicines, vaccines and health care personnel. Children living under such conditions are at especially high risk for health and nutritional problems.

The objective of the present study is to assess the dietary intake and food pattern of a sample of school going children residing in the slums in Dhaka city, and explore the factors which might influence the dietary pattern and food intake of the children.

## *Material & Methods*

The population of Bangladesh was nearly 130 million in 2000, making it one of the most densely populated countries in the world. Bangladesh is considered to be one of the economically underprivileged nations in the world. The gross national product (GNP) in 1999 was 47 million dollars (per capita 370 dollars), and the rate of growth between 1998 and 1999 was 3.3 percent<sup>[11]</sup>. Despite the economic growth, the wealth is not evenly distributed. In 1999, the lowest 20 percent earned only 8.8 percent of the national income and the richest 20 percent earned 42.8 percent of the national income<sup>[11]</sup>. In 1996, 30 percent of Bangladeshi populations were below the poverty line and 77 percent were earning less than 2 dollar a day<sup>[11]</sup>. Despite these the health and population indicators has shown an improving trend in Bangladesh. Infant mortality was 73 per 1000 births in 1998, which has improved from 132 per 1000 births in 1980<sup>[11]</sup>. Maternal mortality was 3.0 per 1000 births in 1998, which has improved from 4.7 per 1000 births in 1991<sup>[11]</sup>.

Dhaka is the national capital and the largest city of Bangladesh. Thirty million people, over 20% of the total population of Bangladesh, live in urban areas. By the year 2005 this figure will have risen to 46 million and by 2015 projections indicate that 68 million (more than a third of the total population of Bangladesh) will live in urban areas<sup>[11-13]</sup>. The number of slum settlements has grown rapidly around the world, especially in the developing world in recent years and the urban poor are now estimated at around 11 million, or 37% of the urban population<sup>[13-14]</sup>. Fourteen per cent of the urban population lives below the national poverty line and the largest gap between rich and poor is in the urban areas<sup>[15-16]</sup>. In Dhaka the slums has mainly developed on government land or disputed lands. These have been occupied informally by squatters as long as 20 years or more. There also are some slums owned by private land lords. Most of the slums consist of poor housing within lower-middle and lower class residential housing settlements. The present study was carried out in the urban slums of the Dhaka city.

The study design was of an observational survey with cross-sectional approach. Slum dwelling school going children were chosen for the study. For this purpose ten schools were chosen from ten different area slums of Dhaka City. 396 students of different age groups were randomly selected from these schools. Among the students belonging to the same household only one of them was included in the study. Random selection was done and the selected students were informed the day before the study day fixed for the study team to conduct study in a school. The study was conducted from November, 2001 to January, 2002. The guardians of the students in most of the cases were interviewed along with the students. Physicians for health status information checked the student as per the checklist.

A questionnaire which requested information on socioeconomic status, personal characteristics, dietary intake, health, and morbidity status was designed and pre-tested before finalization. For health status information physicians used a checklist. In this study mothers were asked about the immunization status of their children, morbidity in the preceding one month, presence of any disease, etc. Hygiene state of the children and clinical signs of malnutrition were assessed by physicians. Information was recorded about family size, structure, housing characteristics and sanitation and drinking water circumstances.

The schools were visited for data collection on prefixed dates. The selected students were informed through the school administration the day before the interview was conducted. Informed consent was taken from the parents regarding the involvement in the study. Data collection team comprised of two nutritionists and two physicians. Data collectors collected raw data for the research about health, nutritional status and the food habit under supervision of the investigators. For health status information, physicians examined the children as per the checklist. The guardians of the students in most of the cases were interviewed along with the student.

Food consumption was assessed with the 72-hour dietary recall method using school days only and thus diet at the weekend was not recorded. In order to increase the reliability of the

estimates of portion sizes for individual foods consumed, we used models / pictures for different foods, and displayed serving plates, cups and spoons of different sizes. From this, the weight of each serving of the different food items was calculated. The equivalent weight of the raw food was calculated using a conversion table for Bangladeshi foods. A 7-day food frequency questionnaire on selected food items was used to obtain information on the habitual dietary pattern of each participant. During the data collection we omitted the food taken in special situation, like any invitation meal, marriage ceremony meal, etc. We focused on the normal regular daily diet habit of the respondents.

Students were divided into three age groups: Age Group-1 (4-7 years), Age group-2 (8-11 years) and Age group-3 ( $\geq 12$  years). Data was analyzed with univariate analysis for simple frequency distribution of selected variables. For each of the variables, normality of the distribution of the data was assessed with goodness of fit test. The mean, median, standard deviation and range were determined for all parameters. The data were divided into groups, using suitable cut-off points. For per capita monthly income by household and average daily energy intake by the children, quartile was calculated. Data was then entered into the computer using EPI info software and analyzed using SPSS software.

## Findings

Table 1 summarizes the basic demographic characteristics of the study population included in the survey. The study included 396 school going children (Male: 47.2% and Female: 52.8%) of 10 different urban slum areas in Dhaka city. Mean age of the children was 6.5( $\pm 1$ ) years for the age group-1 (4-7yrs), 9.2( $\pm 1.1$ ) years for the age group-2 (8-12yrs) and 12.5( $\pm 0.9$ ) years for the age group-3 (12+yrs). In 88.4% cases the father was the guardian of the family. General physical signs of nutritional deficits were present in 57.6% of the children. In 96.2% cases the level of hygiene status was not satisfactory.

**Table 1-** The baseline characteristics of the surveyed children

Aspect		Result	
<b>Age group</b>	1 (4-7 years)	Boy	47.2%
	2 (8-11 years)	Girl	52.8%
	3 ( $\geq 12$ years)		51.7%
			46.4%
<b>Mean age of children</b>		<b>Respondents</b>	<b>years (<math>\pm</math>SD)</b>
	Age group 1	26.5 %	6.51 (1.01)
	Age group 2	59.3 %	9.24 (1.09)
	Age group 3	14.1 %	12.5 (0.91)
<b>Family information</b>	Family member	5.65 (SD $\pm 1.7$ )	
	Sibling number	3.75 (SD $\pm 1.7$ )	
	Illiterate mothers	69.7 %	
	Illiterate guardians	55.6 %	
<b>House hold head</b>	Father	88.4 %	
	Mother	9.6 %	
<b>Guardians occupation</b>	Day earner	59.8 %	
	Service	20.2 %	
	Business	10.1 %	
<b>Family income (monthly) (Taka)</b>		2757.45 (SD $\pm 1314.3$ )	

\*SD: Standard deviation

Table 2 shows the average meal frequency difference by different parameters among the slum dwelling children of the schools covered. Table 3 shows the meal frequency per day for the children by mothers' education, house member number and guardians' occupation. The average meal per day for the study children were 3.2 times per day. The family income seems to have been affecting the number of meals children used to have. The number of meal frequency increases

with the increase of the income level. Number of siblings in family and number of family members were related to the meal frequency.

Enquiring about the food pattern, it shows that all the children take rice, lentil, potato and green leafy vegetables. In most of the cases the common staple food is rice. The other major food items (taken per week) of the children by gender and age is shown in the table 4. Percentiles have also been presented to give an idea of the

**Table 2-** The meal frequency per day for the children by gender, age category and family income quartile

Category		Average meals (SD*)	CI† 95%	At least 3 meals / day	Chi <sup>2</sup> value	p value
<b>Gender</b>	Boy	3.2 (0.56)	3.2 – 3.3	76.2 %	112.2	< 0.001
	Girl	3.1(0.45)	3.1 – 3.2	78.7 %		
<b>Age group</b>	4-7 years	3.1 (0.43)	3.1 – 3.3	81.9 %	129.6	< 0.001
	8-11 years	3.2 (0.47)	3.1 – 3.2	78.7 %		
	$\geq 12$ years	3.3 (0.55)	3.0 – 3.5	75.0 %		
<b>Family income category</b>					6.9	0.07
	Lowest quartile	3.1 (0.38)	(3.1 – 3.2)	84.8 %		
	2 <sup>nd</sup> quartile	3.2 (0.54)	(3.1 – 3.3)	83.7 %		
	3 <sup>rd</sup> quartile	3.3 (0.51)	(3.2 – 3.4)	73.7 %		
	Highest quartile	3.3 (0.54)	(3.1 – 3.4)	73.1 %		

\*SD: Standard deviation, †CI: Confidence intervals

**Table 3-** The meal frequency per day for the children by mothers' education, house member number and guardians' occupation

Category	Average meals ( $\pm$ SD*)	CI <sup>†</sup> 95%	At least 3 meals / day	Chi-square value	p value
<b>Mothers' education level</b>					
No education	3.2 (0.47)	3.1 – 3.3	78.6 %	267.6	< 0.001
Primary	3.2 (0.60)	3.1 – 3.3	81.1 %		
Above Primary	3.3 (0.46)	3.0 – 3.6	71.4 %		
<b>Household member number</b>					
Up to median 6	3.2 (0.55)	3.1 – 3.3	78.1 %	72.9	< 0.001
More than 6	3.1 (0.39)	3.1 – 3.2	81.4 %		
<b>Guardians' occupation</b>					
Day earner	3.2 (0.45)	3.1 – 3.2	80.6 %	267.5	< 0.001
Fixed service	3.2 (0.49)	3.1 – 3.4	75.0 %		
Small business	3.3 (0.46)	3.2 – 3.6	70.0 %		
Others	3.1 (0.33)	3.0 – 3.2	87.2 %		

\*SD - Standard deviation, †CI – Confidence intervals

**Table 4-** Weekly patterns of consumption of foods items for the study respondents

Items	Category	Average (times / week) ( $\pm$ SD*)	Percentile						
			5 <sup>th</sup>	10 <sup>th</sup>	25 <sup>th</sup>	50 <sup>th</sup>	75 <sup>th</sup>	90 <sup>th</sup>	95 <sup>th</sup>
Egg	Boy	1.5 (1.4)	0.0	0.0	0.5	1.0	2.0	3.0	4.0
	Girl	1.3 (1.5)	0.0	0.0	0.2	1.0	2.0	3.0	4.8
	4-7 years	1.4 (1.5)	0.0	0.0	0.3	1.0	2.0	3.0	5.7
	8-11 years	1.4 (1.2)	0.0	0.0	0.5	1.0	2.0	3.0	4.0
	$\geq$ 12 years	1.5 (1.8)	0.0	0.0	0.3	1.0	2.0	4.4	7.0
Milk	Boy	1.3 (2.0)	0.0	0.0	0.0	0.4	2.0	6.0	6.0
	Girl	1.1 (1.8)	0.0	0.0	0.0	0.2	1.0	3.5	6.0
	4-7 years	1.4 (2.1)	0.0	0.0	0.0	0.3	2.0	6.0	6.0
	8-11 years	1.1 (1.8)	0.0	0.0	0.0	.3	2.0	3.5	6.0
	$\geq$ 12 years	0.9 (2.0)	0.0	0.0	0.0	0.0	0.5	6.0	7.0
Meat	Boy	0.5 (0.6)	0.0	0.2	0.3	0.3	0.5	1.0	1.1
	Girl	0.4 (0.4)	0.0	0.0	0.2	0.3	0.5	1.0	1.0
	4-7 years	0.3 (0.4)	0.0	0.0	0.2	0.3	0.5	1.0	1.0
	8-11 years	0.4 (0.6)	0.0	0.2	0.2	0.3	0.5	1.0	1.0
	$\geq$ 12 years	0.5 (0.5)	0.0	0.0	0.2	0.3	0.5	1.0	2.0
Fish	Boy	2.9 (1.5)	0.1	1.0	2.0	3.0	4.0	5.0	6.0
	Girl	2.8 (1.6)	0.0	1.0	2.0	3.0	4.0	5.0	6.0
	4-7 years	2.6 (1.5)	0.0	0.0	2.0	3.0	4.0	5.0	5.0
	8-11 years	2.9 (1.5)	0.3	1.0	2.0	3.0	4.0	5.0	6.0
	$\geq$ 12 years	2.7 (1.7)	0.0	0.8	2.0	2.0	4.0	5.0	7.0
Fruit	Boy	3.2 (2.0)	0.0	1.0	2.0	3.0	5.0	7.0	7.0
	Girl	2.7 (1.7)	0.0	1.0	1.0	3.0	4.0	5.0	7.0
	4-7 years	2.8 (1.9)	0.0	0.0	2.0	3.0	4.0	6.0	7.0
	8-11 years	3.0 (1.8)	0.0	1.0	2.0	3.0	4.0	6.0	7.0
	$\geq$ 12 years	3.1 (2.1)	0.0	1.0	1.0	3.0	4.0	7.0	7.0

\*SD - Standard deviation

**Table 5-** The weekly pattern of consumption of food items by monthly family income quartile.

Family income	Item	Frequency of consumption of food (times per week)				p value
		0 times	1-3 times	4-6 times	7 or more	
<b>Lowest quartile</b>	Egg	26.6 %	70.9 %	1.3 %	1.3 %	<0.05
	Milk	50.6 %	39.2 %	7.6 %	2.5 %	<0.001
	Meat	20.3 %	79.7 %	0.0 %	0.0 %	0.07
	Fish	11.4%	70.9%	15.2%	2.5%	<0.05
	Fruit	17.7%	58.2%	19.0%	5.1%	0.001
<b>2<sup>nd</sup> quartile</b>	Egg	24.2 %	70.3 %	3.9 %	1.6 %	<0.05
	Milk	47.7 %	39.8 %	11.7 %	0.8 %	<0.001
	Meat	10.9 %	89.1 %	0.0 %	0.0 %	0.07
	Fish	4.7%	67.2%	26.6%	1.6%	<0.05
	Fruit	7.0%	66.4%	21.1%	5.5%	0.001
<b>3<sup>rd</sup> quartile</b>	Egg	9.5 %	81.1 %	7.4 %	2.1 %	<0.05
	Milk	41.1 %	49.5 %	6.3 %	3.2 %	<0.001
	Meat	8.4 %	90.5 %	1.1%	0.0 %	0.07
	Fish	6.3%	63.2%	26.3%	4.2%	<0.05
	Fruit	7.4%	56.8%	27.4%	8.4%	0.001
<b>Highest quartile</b>	Egg	18.5 %	74.2 %	5.3 %	2.0 %	<0.05
	Milk	28.0 %	59.1 %	5.4 %	7.5 %	<0.001
	Meat	7.5 %	91.4 %	1.1 %	0.0 %	0.07
	Fish	4.3%	51.6%	39.8%	4.3%	<0.05
	Fruit	1.1%	58.1%	23.7%	17.2%	0.001

distribution of the majority respondents. It has been learnt that in some of the cases the child takes egg more than 3-4 times in a week but he or she has to share it with the other siblings. So the aggregate of the egg per week comes down to 1-2 eggs per week. Also in one school the students of the school were being provided with a glass of milk everyday by the school authority. If that group of students are not taken into consideration the frequency of milk intake per week comes down to 1.03, 0.953 and 0.774 glass per week for the age group-1, 2 & 3 respectively. Table 5 shows the weekly pattern of consumption of food items by monthly family income. Overall food consumption frequency and item frequency in general increased with the family socio-economic level. Using the same bivariate groupings, the relationships with dietary patterns were examined. The children from families where income was higher were more frequent consumers of eggs, milk and fish. There was more frequent consumption of eggs and milk by the girls whose household guardians were more

highly educated ( $p=0.026$ ). The frequency of use of eggs, milk, meat and fruits was greater in children whose mothers had higher levels of education ( $p=0.06$ ). Increase of number of household members seemed to be inversely related to the food frequency.

## Discussion

Patterns of food distribution within the family may be contributing to malnutrition in certain populations. Problems related to food intake and child health especially nutritional problems have been identified as widespread and important concerns for public health in Bangladesh. The present study has focused on the dietary patterns of school children in the urban slum areas of Bangladesh. These children represent the most disadvantaged group in the country.

All nutrition studies in rural or urban Bangladesh have reported food consumption

differential between boys and girls, which is caused by a male preference in the intra-household allocation of food and health care<sup>[17-20]</sup>. Engle and Nieves<sup>[21]</sup> also observed that mothers were not giving the child targeted as malnourished by the health center, any more food than any other similar aged child. The authors<sup>[21]</sup> finally suggested teaching the family to rehabilitate the malnourished child by allocating targeted required food for successful implementation of supplementary feeding program. The influence of the common society regarding the preference towards a boy is the background regarding this issue. In the Bangladesh society, especially in the faction of lesser education stratum, the preference for male children to female children exists.

The 7-day food frequency questionnaire revealed very narrow differences in the pattern of foods taken by the children. Rice, lentil, potato and green leafy vegetables were the major food items consumed. Relatively small numbers of children took eggs, milk or meat. Fish had an important impact on the overall nutrient intake in a number of children's dietary habit. We sought to explore whether social factors played any role in the dietary patterns and nutrient intakes of the children. Children from relatively poorer social circumstances could be characterized as coming from families with lower income and lower expenditure on food and parents who had achieved lower standards of formal education. In general, those children with poorer social standing tend to have diets of poorer quality. These children had diets in which variety was less, and they were less likely to consume eggs, milk, meat and fruits compared with children from families in relatively better economic circumstances with parents of relatively higher educational standard. It is interesting to note that these differences were more strongly related to differences in maternal education than in the educational level of the guardian, most of the cases which was the father of the children. But most probably all of these findings are supplementary to each other, because the socioeconomic status of a group or population is a multidimensional conception. This can be assessed as a function of a number of variables such as social position, educational level and

income. Even though as a group these children represent the most unprivileged disadvantaged in Bangladesh society, it is important to note that the education of the parents had shown a relationship to the patterns of food intake. It is interesting to see that even among this economically lowest society members, economic status within themselves also play an important role in patterns of dietary behavior. However, dietary diversity was also shown to be strongly associated with household socioeconomic status<sup>[22-23]</sup>, and links between socioeconomic status and child nutrition and health outcomes have long been established. Interpretation of associations between dietary diversity and nutritional status is therefore complicated by the fact that both are strongly linked to household socioeconomic factors. Families with greater incomes and resources tend to have more diverse diets, but they are also likely to have better access to health care and better environmental conditions.

In our study population of children the absence of balanced diet habit is very much remarkable. The food habit was based mainly on a staple food item without any inclusion of protein source or good nutritional source. The young children need a variety of foods to meet requirements for essential nutrients, and the value of a diverse diet has long been recognized. Lack of diversity is a particularly severe problem among poor populations in Bangladesh as well as the developing world, where diets are based predominantly on starch based staple food and often include few or no animal products and only seasonal fruits and vegetables. For infants and young children, the problem is particularly critical because they need energy- and nutrient-dense foods to grow and develop both physically and mentally and to live a healthy life. Associations between dietary diversity and child nutritional status were documented previously in some reports<sup>[21-23]</sup>.

## Conclusion

Our study suggests that even under a very low social standing a number of socioeconomic factors and family characteristics influence the

dietary patterns. Our findings provide some useful insights to guide those interested in promoting healthy eating behavior among children of the vulnerable group. Efforts to promote a healthy diet should start during childhood.

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