Studies on the Dietary Pattern of Urban School Children in Dhaka

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Introduction

At present about 40% of the children, under 5 years of age, are suffering from ptotein energy malnutrition throughout the world[1]. In Bangladesh high prevalence of malnutrition has been documented over the last three national nutrition surveys[2,3,4]. A recent report of the Bangladesh bureau of Statistics on child nutrition status[5] has shown that 57.6% of the rural children are stunted, 8.2% are wasted and 14.9% of them are having lower mid arm circumference. The corresponding figure of urban malnutrition specially among children below six years showed 44.2% stunting, 6,9% wasting with 9.9% of them having lower mid upper arm circumference.

The causes of malnutrition are multiple and complex. Among them the most important factor that affects the growth of the children is the variation in food intake, both qualitative and quantitative. Again it is widely recognized that health including nutrition is closely associated with the social and economic factors. Further poor sanitation, inadequate housing and other envioronmental factors may also contribute towards malnutrition[6].

The present study was designed to investigate the dietary pattern of the urban school children in Dhaka. The study also investigated the influence of family income on the dietary pattern of the urban school children.

Materials and Methods

Subjects

The study was conducted with 236 school children (136 boys and 100 girls) aged 5-12 years, from five schools in and around Dhaka University campus; Dhaka, Bangladesh. The schools choosen in this study were Dhaka University Laboratory (DUL), Engineering University (EU), Udayan Vidyalaya (UV), Nilkhet Girls' (NG) and Nilkhet Boy's (NB) school.

Development of Questionnaire :

An appropriate questionnaire was designed to obtain relevant information on the socio-economic status of the family. The purpose of the study was explained to each school administration. A questionnaire along with a consent form was sent to each child in the school. Parents were asked about selected social variables of the household.

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Collections of dietary data

On receipt of the consent form and the completed questionnaire, a date was fixed with each school to collect dietary information. On the prefixed date a detailed dietary information of the respondant child regarding his or her intake was obtained using a 24 hour dietary recall method by the same interviewer throughout the study. The collected information on the dietary pattern of these children were categorized by using individual food items and expressed as the per capita food frequency per day.

Statistical Analysis

Values are presented as the meen and 95 percent confidence interval. All values were analysed by one-way analysis of variance (ANOVA) using SPSS. Statistical significance of variation between groups was assessed by F ratios and the difference was considered significant when $p<0.05$.

Results

The school children participated in this study were categorized in terms of their family income and their percent distribution according to family income group in different schools is shown in Table 1. More than 50% children in this study from NB and NG schools were from the family income group-A (upto Tk. 2500/- per month) whereas in the DUL and EU School more than 60% of the children belonged to the family income group-C (TK. 5000 and above per month). In the case of UV school more than 90% children were from the family income group-C but not a single child was found in the family income group-A. About 5% of the children of UV school in this study came from the medium family income group (group-B, Tk. 2501-4999/- per month). When the family income group-B was condidered, 20-32% of the children were found in the DUL, EU, NB and NG schools.

A 24 hour dietary recall method was used to obtain information on the food intake of the children of different schools. The dietary pattern of the children for individual school was expressed as the per capita food frequency per day and is shown in Table 2. Wheat intake of the DUL school children appeared higher compared with the children of any other school, the differnce reached was statistically significant only for the children of NB and NG schools. Again the children of NG school showed significantly higher wheat intake compared with that of the NB school children ($P<0.001$). Roots and tubers intake of the children of NB and NG schools was significantly higher compared with that of the children of EU school ($P<0.004$). There was no significant difference for the roots and tubers intake between the children of DUL, UV, NB and NG schools. The intake of leafy vegetables by the children of EU and NG schools was significantly lower than that of the children of any other school ($P<0.01$). When the intake of rice, pulses, non-leafy vegetables and fish was considered, no statistically significant difference was observed

between the children of different schools. Meat intake of the children of NB and NG schools was significantly lower compared with that of the children of DUL and UV schools (P<0.001). There was no significant difference of meat intake between the children of EU, NB and NG schools. Milk, milk products and egg intake of the children of NB school was significantly lower (P<0.001) compared with those of the children of any other school.

***Table 1**: Percent distribution of the children in different schools on the basis of their family income.*

Name of school	Family income		
	Group-A %	Group-B %	Group-C %
DUL (n=40)	12.5	20.0	67.5
EU (n=34)	5.9	32.4	61.8
UV (n=19)	0.0	5.3	94.7
NB (n=79)	57.0	29.1	13.9
NG (n=64)	54.7	28.1	17.2

Various food items consumed by the school children over the 24 hour period preceding the interview were compared with the children between three family income groups (as descibed in Table 1) and are shown in Table 3. The children from the higher family income group (group-C) showed significantly lower rice consumption (P<0.05) and higher wheat consumption (P<0.01) compared with that of the children of the medium (group-B) and lower (group-A) family income groups. Statistically there was no significant difference of rice and wheat intake between the children of the family income group A and group B. In the case of roots and tubers intake, the children from the higher family income group had lower per capita food frequency compared with the children from the other family income groups but the difference was statistically significant only between lower and higher family income groups. When the intake of meat, milk, milk products and eggs was taken into consideration, the children from the higher family income groups showed significantly higher per capita food frequency per day compared with that of other family income groups. In the case of fish, pulses, leafy vegetables, non-leafy vegetables, sugar and sweet intake, there was no statistically signaficant difference between the children of different family income groups.

***Table 2** : Dietary pattern of the children of different schools.**

school.....	DUL		EU		UV		NB		NG		P value
	(n=41)		(n=32)		(n=19)		(n=80)		(n=64)		
Food items	mean	(95%CI**)	mean	(95%CI)	mean	(95%CI)	mean	(95%CI)	mean	(95%CI)	
Rice	2.3	(2.1-2.5)	2.2	(1.9-2.5)	2.7	(2.3-3.1)	2.5	(2.3-2.6)	2.4	(2.3-2.6)	0.12
Wheat	2.0	(1.7-2.3)	1.4	(1.1-1.8)	1.6	(1.1-2.1)	1.0	(0.8-1.2)	1.5	(1.2-1.7)	0.001
Roots & Tubers	0.3	(0.1-0.5)	0.1	(0.01-0.2)	0.3	(0.1-0.5)	0.4	(0.3-0.6)	0.6	(0.4-0.8)	0.004
Pulses	1.1	(0.8-1.4)	0.9	(0.6-1.3)	1.3	(0.8-1.7)	0.8	(0.6-1.1)	1.1	(0.9-1.4)	0.21
Leafy veg.	0.2	(0.03-.3)	0.03	(0.3-0.1)	0.3	(.01-0.5)	0.2	(0.1-0.4)	0.02	(0.02-0.05)	0.01
Non-Leafy Veg.	0.9	(0.6-1.3)	0.6	(0.4-0.9)	0.6	(0.2-1.0)	0.9	(0.7-1.1)	1.1	(0.8-1.3)	0.18
Meat	1.0	(0.7-1.3)	0.7	(0.4-0.9)	1.1	(0.6-1.5)	0.5	(0.3-0.6)	0.3	(0.2-0.5)	0.001
Fish	1.0	(0.7-1.2)	1.2	(0.9-1.5)	1.1	(0.7-1.5)	1.1	(0.8-1.3)	1.2	(0.9-1.4)	0.80
Milk & Milk Prod.	0.7	(0.4-1.0)	0.6	(0.4-0.9)	0.5	(0.2-0.9)	0.1	(0.03-0.2)	0.3	(0.2-0.5)	0.001
Eggs	0.5	(0.3-0.7)	0.4	(0.3-0.6)	0.8	(0.4-1.2)	0.2	(0.1-0.3)	0.4	(0.2-0.5)	0.001
Suger & Sweets	0.2	(0.1-0.4)	0.3	(0.1-0.5)	0.3	(0.1-0.7)	0.1	(0.03-0.2)	0.2	(0.1-0.3)	0.34

*Expressed as the per capita food frequency per day. **CI = Confidence interval.
+P value, calculated by one - way ANOVA for differences between different schools.

***Table 3** : Dietary pattern of the school children in different family income groups. **

Family income...	Group-A		Group-B		Group-C		P value+
	(n=88)		(n=61)		(n=86)		
Food items	mean	(95 % CI**)	mean	(95%CI)	mean	(95%CI)	
Rice	2.5	(2.3-2.6)	2.5	(2.3-2.7)	2.3	(2.1-2.4)	0.05
Wheat	1.2	(1.0-1.5)	1.2	(1.0-1.5)	1.7	(1.5-1.9)	0.01
Roots & Tubers	0.5	(0.4-0.7)	0.4	(0.2-0.5)	0.3	(0.2-0.4)	0.03
Pulses	1.0	(0.8-1.2)	1.0	(0.7-1.2)	1.1	(0.9-1.3)	0.70
Leafy vegetables	0.2	(0.05-.2)	0.1	(0.01-0.2)	0.1	(0.05-0.2)	0.90
Non-Leafy Veg.	1.0	(0.8-1.2)	1.0	(0.7-1.2)	0.7	(0.6-0.9)	0.23
Meat	0.4	(0.2-0.5)	0.3	(0.2-0.5)	1.0	(0.8-1.8)	0.001
Fish	1.0	(0.8-1.2)	1.3	(1.1-1.6)	1.0	(0.9-1.2)	0.12
Milk & Milk Prod.	0.2	(0.1-0.3)	0.3	(0.1-0.4)	0.6	(0.4-0.8)	0.001
Eggs	0.2	(0.1-0.3)	0.2	(0.1-0.3)	0.6	(0.5-0.8)	0.001
Suger & Sweets	0.2	(0.1-0.3)	0.1	(0.1-0.2)	0.2	(0.1-0.4)	0.21

*Expressed as the per capita food frequency per day. **CI = Confidence interval.
+P value, calculated by one - way ANOVA for differences between different family income groups.

Discussion

The present study has shown the dietary pattern of the children of different schools in and around the Dhaka University campus, Dhaka. The study also indicated the role of family income on the dietary pattern of these school children.

No single method has so far been able to yield precise and accurate quantitative amounts of food eaten. There are voluminous and largely negative literature on the validity of dietary assessment methods[7]. This study, therefore, dealt with the qualitative dietary intake of the urban school children rather than quantitative intake.

In this study, 236 school children were included and their percent distribution in different schools according to family income is shown in Table 1. Children from NB and NG schools tended to come from poorer families than the children of DUL, EU and UV schools. Further 39% children of the NB school and 48% children of the NG school were from the larger family size (7 and more members, data not shown).Since there was little difference in the 24 hour dietary pattern of the individual child with his or her family's dietary habit (data not shonwn), the present study compared the dietary pattern of the school children using a 24 hour dietary recall method. However, the dietary record over a few days seemed to be preferable specially for the estimation of usual dietary intake[8]. The number of children in each school varied from 19 to 80 depending upon the parents consent for the participation in this study. Thus the food items consumed by the school children were expressed as per capita food frequency per day in order to avoid any variation due to the unequal number of children in different schools. Meat, milk, milk products and eggs consumption by the children of Nilkhet Boys' and Nilkhet Girls' schools were found to be lower when compared with those of the children of other schools. Family income plays an important role on the family food availability and the expenditure on food depends on the households income and resouces[9]. Further the allocation of food per child is likely to decrease with the increase of family size, which in turn, may adversely affect the nutritional status of children[10]. Since most of the children of NB and NG schools were from the poor and large family background, the findings of the present study are in agreement with findings of others[9,10].

For more detailed analysis, the effect of family income on the dietary pattern of the school children was also investigated. The results showed that the children of low family income group had higher rice, roots and tubers (mainly potato) consumption compared with the children of the high family income group. Although it was not possible to quantify the amount of diet eaten by the children, the present study has clearly indicated that the main contributors of energy and protein for the children of lower family income group were rice, potato and wheat (the main staples). The other main contributors of protein for

these children were legumes and fish. On the other hand, the animal food (meat, milk, milk products and eggs) consumption by the children of high family income group was statistically significantly higher ($P<0.001$) compared with that of the children of the lower family income groups. Thus the major source of protein and fats for the children of higher family income group was animal food. Socio-economic differences in the patterns of food consumption resulted a poor nutritional status, as defined by anthropometric reference standards, in this study population[11].

Thus the results of the present study suggest that the patterns of food consumption of the children were different in different schools and the family income could be one of the important factors that has an impact on dietary pattern of the school children. However, other factors such as family size, cultural background, nutritional knowledge etc might have equal importance.

Summary

The dietary pattern of the children of five different schools in and around the Dhaka University campus, Dhaka was studied. The socio-economic status of the family was assessed through questionnaires and the dietary informations were collected by visiting school on a prefixed date. There was no difference in the consumption of rice, pulses, non-leafy vegetables, fish, sugar and sweets amongst the children of different schools. The meat intake by the children of NB and NG schools was significantly lower than DUL and UV schools ($P<0.001$). The consumption of milk, milk products, and eggs by the NB and NG school children was significantly lower than that of the children of other schools. When the role of family income was considered, it was found that consumption of rice was significantly lower in the case of children of higher family income group (group-C) whereas consumtion of wheat was significantly lower in the case of children of lower (group-A) and medium (group-B) family income groups. The consumption of milk, milk products and eggs by the children of higher family income group was significantly higher ($P<0.001$) compared with that of the children of other family income groups. These findings indicate that the dietary pattern of the children of different schools were different and the family income could be one of the important factors for the variation.

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