Dietary Pattern and Nutritional Status of Child Labour at Dhaka City in Bangladesh

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Abstract

A cross sectional study was conducted to observe the dietary pattern and nutritional status of a selected group of working children in Dhaka metropolitan city. The study was conducted on randomly selected 100 children from a school run by an NGO at Moghbazar in Dhaka engaged in child labor age ranging between 8 to17 years. The socio-economic profile, anthropometric measurements and dietary pattern of children were assessed. Information on socio-economic conditions was collected by interviewing the respondents through questionnaire. Dietary intake of the respondents was collected by 24 hours recall method. While considering age, majority of the children (51%) belonged to the age group of ≤12 years. While considering Z-score, 17% respondents were stunted and 15% were underweight. According to gender distribution 30.0% of boys and 13.8% of girls were stunted, 30.0% of boys and 11.3% of girls were under weight. Girls were seen nutritionally well than the boys by HAZ and WAZ. According to the body mass index (BMI) 81% of the children were found to be thin, 18% were normal and only 1% was overweight. Average monthly income, family size, duration of occupation and household monthly income of the respondents were 430.73Tk, 3.68, 24.88, 8231.12Tk respectively. Energy intake of the children was 1120 ± 205 kcal which filled up only 60% of their RDA. Both groups of respondents (boys and girls) were consumed 85% of protein's RDA. Fat and carbohydrate intake was 63% and 59% of RDA respectively. In both sex, calcium intake was inadequate (259 ± 184 mg) in terms of RDA. Boys fulfilled 46.3% of vitamin A and girls fulfilled 32.1% of RDA. Both groups fulfilled the RDA of Niacin, Zinc and Iron. Boys fulfilled 91.1% of vitamin C, 88.9% of thiamine and only 38.9% of Riboflavin whereas; girls fulfilled 77.8%, 92.2% and 42.2% only of RDA respectively.

Key words: Nutritional status, Dietary pattern, Socio-economic profile, Child labor and Dhaka

Introduction

In recent years, there has been an astonishing proliferation of empirical work on child labor. Child labor is an emotive subject. Especially where very young children are concerned, it evokes images of maltreatment and exploitation. Some countries officially define child labor as wage work (e.g. Pakistan) or market work that is harmful to the future well-being of children (e.g. Vietnam). This later standard is

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based on the precedent of the International Labor Organization's (ILO) C138. C138 on the Minimum Age for Admission to Employment was passed in 1973 and has been signed by 135 countries to date. Signatories agree to pursue a national policy to abolish "child labor" and to increase the minimum age of employment to "a level consistent with the fullest physical and mental development of young person's" (C138, Article 1). Neither "child labor" nor" employment" is defined in the convention, but the age appropriateness of various activities depends on consideration of their effects on the health and development of the young.

In Bangladesh, boys and girls from lower economic condition come to work outside. Because of poverty, their parents are unable to meet their children's basic needs and influence them to work outside. At growing age, adolescent girls and children required sufficient amount of food. But the supply of balance diet is inadequate. Consequently, children not only suffer potentially their physical health but also to their psychosocial health as they suffer the multiple effects of malnutrition, marginalization, subservience and frequent illness. Food intake pattern, health and nutritional status of the child labor in Dhaka city of Bangladesh are pitiable and deprived of their basic socioeconomic, educational, psychological, mental and nutritional needs, thus suffer from malnutrition, mostly under nutrition. The consequences of under-nutrition are serious, long-term, intergenerational and mostly irrevocable, resulting in increased morbidity and mortality, increased disease burden, and decreased IQ, physical capacity, and productivity. All of these have negative effects on income and economic growth of the country[1]. Good nutrition is not only a determinant of development, it is also an outcome. The two-way relationship between nutrition and development applies equally to malnutrition and poverty. Without a proper developmental start, children are more apt to fail in school and join the labor force earlier, thus repeating the cycle in the next generation. Efforts to eliminate child labor ought to be integrated with global efforts to eliminate micronutrient deficiencies as well as efforts to improve maternal health[2]. Growth and development of working children was compared with students, who were matched for nutritional status at age 5. Working children lost considerable ground and suffered significant growth deficits[3].

Methodology

The study was a randomized type of cross sectional study.

Study Population: This study was conducted among the child labor of the Dhaka Metropolitan city.

Sampling Technique and sample size: The subjects of the study were the child labor of the Dhaka Metropolitan city aged between 8 to 17 years.

Number of boys and girls $= n$

$$n = \frac{n_o}{1 + \frac{(n_o - 1)}{N}}$$

$$= \frac{385}{1 + (385 - 1)/135}$$

$$= 100$$

Here,

$$n_o = \frac{Z^2 \, pq}{e^2} = \frac{(1.96)^2 (0.5)(0.5)}{(0.05)^2} = 385$$

N = Sample Population size of elderly people after screening = 135

p = 0.5 (maximum variability)

q = (1-p) = (1-0.5) = 0.5

Z = the value associated with 95% confidence interval = 1.96

e = level of precision (±5%) = 0.05

Sample Selection Criteria:

Sample was selected by the following criteria:

1. Those who were engaged in child labor.
2. Children who were engaged in domestic work were included.

Consent: The purpose and nature of the study was explained to the NGO authority and permission to carry out the work in their students was sought for. Each participant and after getting the verbal consent, they were recruited in the study.

Development of the Questionnaire: A questionnaire was developed containing both closed and open ended questions to obtain relevant information on socioeconomic, educational, anthropometric and dietary history. Dietary history was recorded by 24 hours recall method. All questions were designed, pretested, modified and resettled to obtain and record information easily. After pre-test, the individual questionnaire which were related for quantitative data collection were corrected and reformed to ensure content coverage, the reliability and validity of the study.

Collection of Socioeconomic Information: The part of the questionnaire that was designed to obtain socioeconomic information was collected by interviewing the respondents. All the respondents were interviewed about personal characteristics and their family size, personal income, family income, their educational information, housing conditions, living conditions. All of the information's were collected through pretested standard questionnaire.

Collection of anthropometric information: The anthropometric data were collected based on standard methods. The anthropometrical data (weight and height) were taking individually. The age of the children were collected from the NGO's school record as well as respondents itself.

Collection of Dietary Information: Information about their habitual dietary pattern was obtained by using 24 hour recall method, food frequency questionnaire and food record method. Participants were asked about their dietary habit. The Participants were shown various standard utensils, such as measuring cups, spoons, glasses, plates and models of different foods to get nearest possible of serving sizes of the cooked food consumed. Intake of snacks or meals outside at home was also recorded. From this information the serving weight of different food items were calculated. Bangladesh and Indian food consumption tables (developed by INFS, University of Dhaka) used to calculate the intake of nutrients from food.

Data Analysis: The data was first checked, cleaned, and entered into the computer (using SPSS program) from the numerical codes on the form. The data was edited if there were any discrepancy found. The frequency distribution of the entire variables was checked by using SPSS (version-12) for windows program. Epi-info (3.4.3) used to derive indices of anthropometric measurements (WAZ, HAZ). A software package program MS excel DANS[1(R)] (Dietary analysis for nutritional sciences) were used for conveniently analysis the estimation of calorie, protein, fat, carbohydrate, and several essential micronutrients.

Tables and figures

Figure 1: Percent distribution of respondents according to sex (n=100).
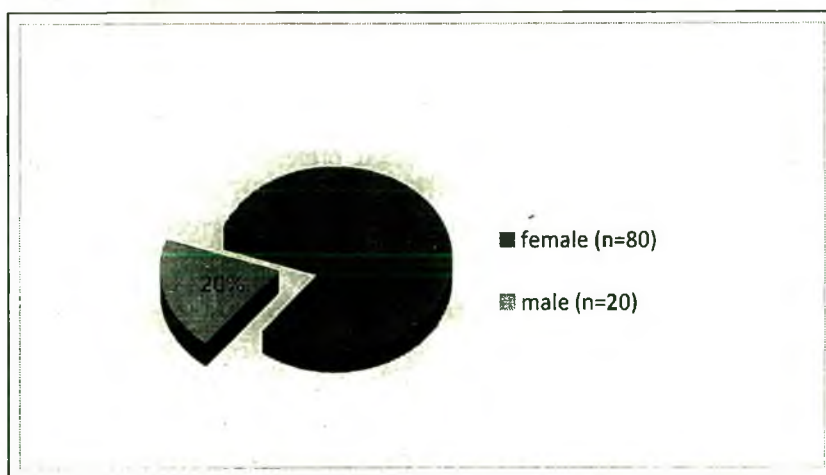
Figure- 2: Percent distribution of respondents according to age (n=100).
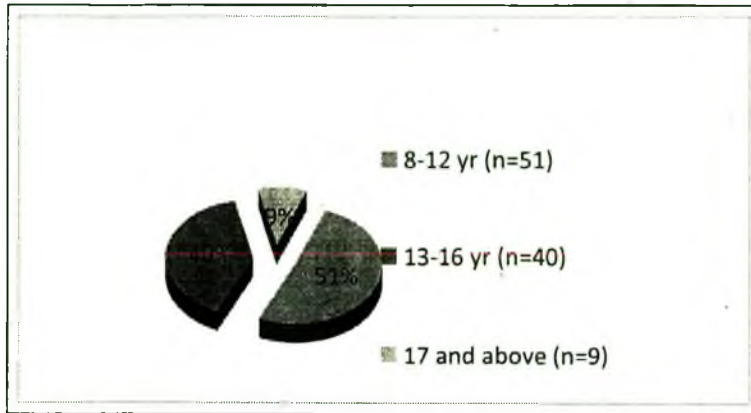
Table 1: Occupation of the respondent children (n=100).

Nature of work	Frequency	Percentage
Domestic work	74	74.00
Shop assistant	6	6.00
Small trade	10	10.00
Vending	3	3.00
Garage/workshop	3	3.00
Factory & others	4	4.00
Total	100	100.0

Figure 3: Percent distribution of respondent's monthly income by sex (n=100).
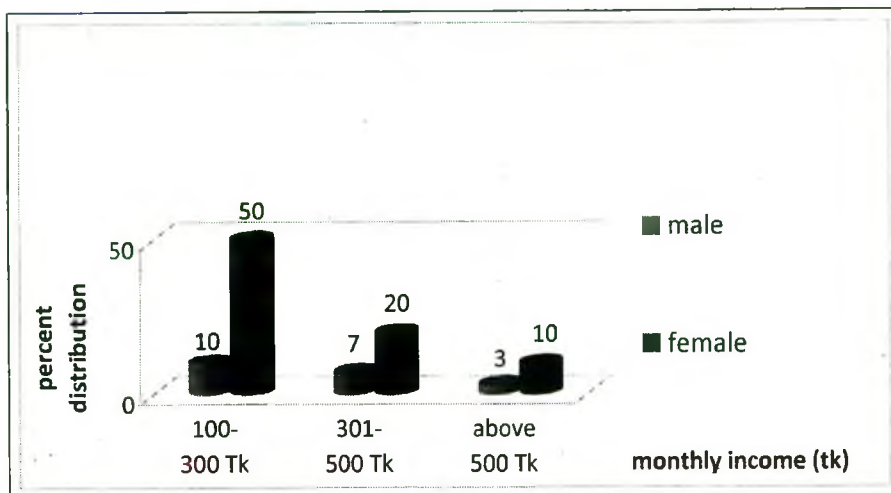

Table 2: Mean distribution of respondents duration (months) of occupation, own income, family size and income.

Indices	Mean ± SD	Minimum	Maximum
Duration of occupation (months)	24.88± 19.897	2	84
Monthly own income	430.73 ± 184.158	100	1000
Family size	3.68 ± 1.367	1	8
Monthly income of the family	8231.12 ±4312.49	0	25700

Table 3: Occupation of the respondent father.

Father's Occupation	Frequency	Percent
Farmer	1	1.0
Small trade	30	30.0
Labor	1	1.0
Rickshaw/Van/cart puller	24	24.0
Hawker	3	3.0
Dead	6	6.0
Others	35	35.0
Total	100	100.0

Table 4: Occupation of the respondent mother.

Name of occupation	Frequency	Percent
Housewife	45	45.0
Domestic laborer	35	35.0
Business	3	3.0
Dead	2	2.0
Others	16	16.0
Total	100	100.0

Table 5: Frequency distribution of respondent fathers monthly income by occupation.

Types of occupation	Monthly income(tk.)		
	< 3000	3001 - 6000	> 6001
Rickshaw/Van/Cart puller	3(3)*	20(20)	3(3)
Small Trader	3(3)	17(17)	10(10)
Day labor/Driver(CNG/Micro bus)/ Farmer/ worker /other occupation	5(5)	10(10)	8(8)
Service holder / Garments worker / Restaurant worker / Guard	4(4)	12(12)	5(5)

* Figure in parentheses is percentage

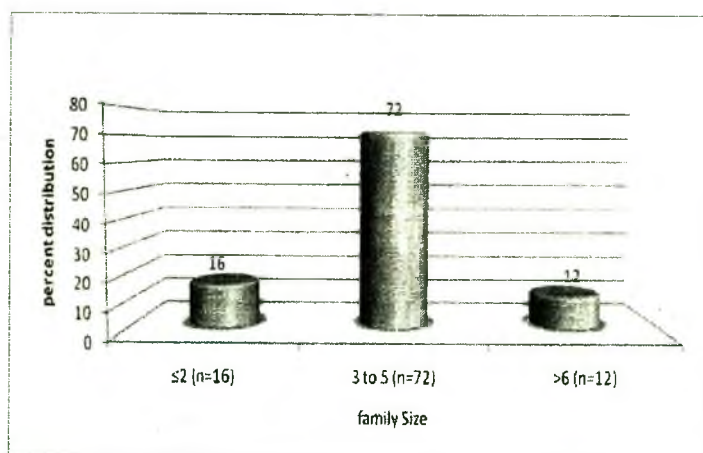**Figure 4:** Family size of the respondents (n=100).
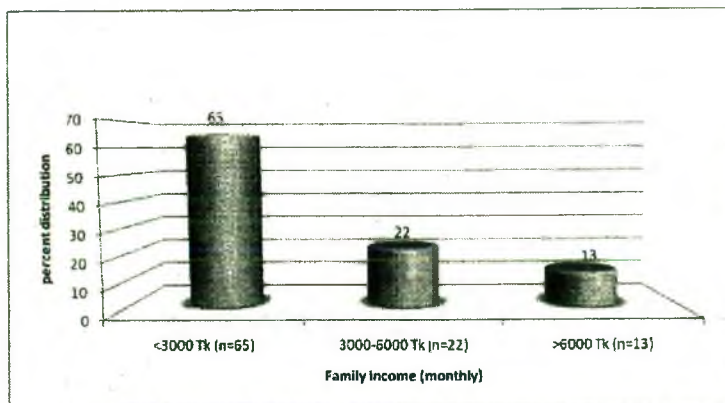
Figure 5: Distribution of monthly family income.

Table 6: Distribution of respondents (n=100) according to weight, height, age and sex.

Indices	Categories	Sex		Age in years		
		Boys	**Girls**	**≤12**	**13 -16**	**≥ 16**
weight (kg)	**<35.0**	3 (15.0)*	20(25.0)	20 (39.2)	6 (15.0)	0 (0)
	35.5-45.0	13(65.0)	55(68.7)	30 (58.8)	27 (67.5)	7 (77.8)
	>45.5	4(20.0)	5(6.3)	1 (2.0)	7 (17.5)	2 (22.2)
Height (cm)	**≤135.0**	0(0)	6(7.5)	7(13.7)	1(2.5)	2(22.2)
	135.1 -150	7(35.0)	59(73.8)	41(80.4)	22(55.0)	1(11.1)
	>150.0	13(65.0)	15(18.7)	3(5.9)	17(42.5)	6(66.6)

* Figure in parentheses is percentage

Table 7: Distribution of mean weight, height, BMI of studied children (n=100).

Indices	Mean ± SD	Minimum	Maximum
Weight in kg	36.24±7.385	20.5	57.0
Height in cm	144.33± 15.34	123.0	163.7
Height for Age Z-score (HAZ)	-1.21± 0.755	-3.61	0.77
Weight for Age Z-score (WAZ)	-1.30± 0.945	-2.85	0.93
Body Mass Index (BMI)	16.98 ± 2.317	11.14	25.73

Table 8: Nutritional status according to age of the respondents (n=100).

Nutritional status		≤12	13-16	≥ 16	Total
		Age in years			**Total**
HAZ	Severely stunted (≤ -3.00 SD)	1(2)	0	0	1(1)
	Moderately stunted (-2.99 SD to -2.00 SD)	2(3.9)	10(25)	4(44.4)	16(16)
	Not Stunted (> -2.00 SD)	48(94.1)	30(75)	5(55.6)	83(83)
WAZ	Moderately Under weight (-2.99 SD to -2.00 SD)	6(11.8)	7(17.5)	2(22.3)	15(15)
	Not under weight (> -2.00 SD)	45(88.2)	33(82.5)	7(77.7)	85(85)

* Figure in parentheses is percentage

Table 9: Nutritional status according to age of the respondents (n=100).

		Categories	Boys (n=20)		Girls (n=80)	
			Malnourished ≤ -2.00 SD	**Well nourished > -2.00 SD**	**Malnourished < -2.00 SD**	**Well nourished ≥ -2.00 SD**
NUTRITIONAL STATUS	**Indices**	Height for Age Z-score	6(30.0)*	14(70.0)	11(13.8)	69(86.2)
		Weight for Age Z-score	6(30.0)	14(70.0)	9(11.3)	71(88.7)
	BMI	Thinness (<5th percentile)	14(70.0)		67(83.7)	
		Normal (5th-85th percentile)	6(30.0)		12(15.0)	
		Overweight (>85th percentile)	0(0)		1(1.3)	

* Figure in parentheses is percentage

Table 10: Food frequency table.

Food items	Daily (%)	Weekly (%)	Fortnightly (%)	Monthly (%)
Meat	87	12	1	0
Fish	79	16	5	0
Egg	96	2	1	1
Milk & milk products	13	38	43	6
Fruits	38	22	25	15
Vegetables	86	12	1	1
Pulses	100	0	0	0
Cereals	100	0	0	0

Table 11: Percentage distribution of energy from macronutrients and compare it with National mean intake (BNNS; 1995-1996).

Nutrients	Mean ± SD	Energy (Kcal)	Percentage of calorie	National mean intake*	Comment
Carbohydrate (g)	225 ± 38	900	80.3	384.0	41% less
Protein (g)	40 ± 15	160	14.3	46.93	15% less
Fat (g)	10 ± 8	90	5.4	15.95	37% less
Energy (kcal)	1120 ± 205	1120	100	1868	40% less

*Bangladesh National Nutrition Survey (BNNS); 1995-1996.

Table 12: Mean intake of micronutrient (per capita per day), National mean intake (BNNS; 1995-1996) and percentage of RDA fulfilled by sex.

Nutrients	Sex						
	Boys			National mean intake**	Girls		
	Mean (±SD)	RDA*	RDA fulfilled (%)		Mean (±SD)	RDA*	RDA fulfilled (%)
Vitamin-A (IU)	926±725	2000-3000	46.3-30.9	1668	641±569	2000-2335	32.1-27.5
Thiamin(mg)	0.80±0.20	0.9-1.2	88.9-66.7	1.17	0.83±0.23	0.9-1.0	92.2-83.0
Riboflavin(mg)	0.35±0.16	0.9-1.3	38.9-26.9	0.48	0.38±0.15	0.9-1.0	42.2-38.0
Niacin(mg)	13 ± 3	12-16	108.3-81.2	18.34	12±2	12-14	100-85.7
Vitamin-C(mg)	41±32	45-75	91.1-54.7	32.8	35±21	45-65	77.8-53.8
Zinc (mg)	26±26	8-11	325-236.3	--	32±24	8-9	400-300
Ca (mg)	259±184	1300	20.0	335.34	259±184	1300	20.0
Iron (mg)	9±5	8-11	112.5-81.8	11.38	11±6	8-15	137.5-73.3

*Food and Nutrition Board, Institute of Medicine, National Academies.
**Bangladesh National Nutrition Survey (BNNS); 1995-1996.

Table 13: Mean intake of different macro nutrients by family income of the respondents.

Family income (Tk.)		Energy(kcal)	Protein (g)	Fat (g)	CHO(g)
≤3000	Mean ± SD	1109±166	36±14	9±9	219±32
3001 - 6000	Mean ± SD	1110±213	39±13	9±9	217±37
≥6001	Mean ± SD	1153±259	40±10	12±13	218±44

Table 14: Mean intake of micro nutrients by monthly income of the family.

Income in Tk.		Ca (mg)	Iron (mg)	Vit-A (IU)	Thiamin (mg)	Riboflavin (mg)	Niacin (mg)	Vit-C (mg)	Zinc (gm)
≤3000	Mean ± SD	212±124	9±5	660±745	0.8±0.2	0.4±0.1	12±2	38±26	30±26
3001 - 6000	Mean ± SD	289±214	11±6	556±630	0.8±0.2	0.4±0.1	12±3	35±26	27±23
≥6001	Mean ± SD	275±172	11±5	836±1043	0.8±0.2	0.4±0.2	12±3	44±32	37±32

Result and discussion

Malnutrition was present possibly due to substandard and inadequate food that the child domestic worker got from the employer. Also the high prevalence of malnutrition was likely due to long working hours, lack of nutritious food and low income as observed by other workers. The study was conducted to identify the dietary pattern; nutritional status and other socio economic parameter of the domestic child labor of the Dhaka Metropolitan city. This descriptive cross sectional survey documents the plight of domestic child labor at Dhaka metropolitan city in Bangladesh, where 20% domestic children were boys and 80% were girls (Figure-1). On the other hand, considering the age group, 40% respondent's age was between 13-16 years and 51% was ≤ 12 years and only 9% was ≥16 years (Figure-2). As of 2011 child labor was common in Bangladesh in rural and urban areas with about 10% of children between age 5 and 14 in the work force and about 7% of the children between age 7 and 14 attending school and working[6]. Child worker were mostly engaged in domestic work (74%) according to this study where most of them are girls (Table-1 and Figure-1), a study on child labor also revealed this findings[4, 7-10]. The average family size of the respondents was 3.68 and 72% family was found whose members were 3 to 5, the average duration of occupation of the respondents was 24.88 months. Monthly income of the respondents was Tk. 430.73 and family income was Tk. 8231.12 (Table-2 and Figure-4) which is much lower comparing the income trends of Bangladesh [5]. Again, BBS survey in 1996 found that the average monthly income of boys in paid work was 464 Tk. while it was 291 Tk. for girls[12]. Respondent's parents were engaged in various types of occupation, among them highest 30% respondent's father was small traders, 24% was rickshaw puller /cart puller/van puller and 35% was engaged in other occupations. In contrast, half (45%) of the respondent's mother was house wife and 35% was domestic worker (Table- 3 and 4). Most of the boys (65%) heights were above 150cm and weight 35.5 to 45 kg where majority of the girls heights were between 135 to 150 cm and weight between 35.5 to 45 kg and that was 73.8.% and 68.7% respectively (Table-6). In the present study it was found that the mean weight and height of the studied respondents were

36.24 kg, 144.33 cm respectively. The mean height for age and weight for age Z-score of the studied respondents were -1.21 and -1.30 respectively. The mean body mass index (BMI) was 16.98 (Table-7) which is far below than normal BMI range considering age and gender[11].

Regarding to the BMI (5th and 85th percentiles for cut-off points of BMI for –age for adolescents) those 83.7% girls and 70% boys were thinness, 18% were normal (boys-30%, Girls-15%) and combining both groups only 1% was overweight. The mean weight, and height of the studied respondents were 36.24±7.385 kg, 144.33±15.34 cm, respectively. The mean height for age and weight for age Z- score of the studied respondents were -1.21± 0.755 and -1.30± 0.945 respectively. According to height for age z-score (HAZ), 17% (boys- 30%, Girls-13.8%) respondents were malnourished. According to this study, boys are more malnourish compare to the girls. This is due to the reason that girls mostly engaged in household services[4] and consumed food from that household. The national prevalence of underweight and stunting in 2007 were 41% and 43% respectively[13]. Begum et al. found 23.89% girls and 21.21% had normal nutritional status[14,] but this study revealed that 83% and 85% children were normal in the nutritional indices of HAZ and WAZ respectively. In another study (among 5 to 12 years) sex wise distribution of nutritional status and we found that only 19.99% boys and 22.14 % girls were normal[15]. By WAZ 15% (boys-30%, Girls-11.3%) respondents were malnourished. At the age group of <12 yrs, 3.9% were moderately stunted and 94.1% were normal only 2% was severely stunted. At the age between 13-16 yrs, 25% respondents were moderately stunted and remaining was normal. About 44.4% respondents were moderately stunted and 55.6% were normal at age of ≥16 yrs by HAZ. According to WAZ, among the three age groups, at the age between 13-16 yrs 17.5% of respondents were found to be under weight and remaining respondents 82.5% were normal. At the age group of ≤12 yrs and ≥16 yrs, 11.8% and 22.3% respondents were found to be under weight and remaining were found to be normal (Table-7,8 and 9).

Dietary behavior is the primary indicator of nutrition which is related to the performance of a child, their nutritional status & life style among selected child of the Dhaka Metropolitan city. Cereals and pulses are very common and regular items as rice is the staple food in Bangladesh and pulses are low cost protein sources. However, meat and fish are also very common items of them 87% and 79% of them regularly taken. Vegetables also consumed regularly (86%). But, milk and milk products like curd, yogurt etc. were not regularly but frequently eaten by them (Table-10).

Consecutive three days twenty four hours food recall methods were done for all the participants. All types of foods consumed by the twenty four hours by the all participants were analyzed and mean daily intake of energy and other nutrients and there after compare with RDA (Recommended Dietary Allowance) for 9-16 years

boys and girls. The average energy, protein, fat and carbohydrate intake was 1120 kcal/day, 40 g/day, 10 g/day and 225 g/day respectively (Table-11).

In both sex, calcium intake was inadequate in terms of RDA[16], met only 20%. Boys fulfilled 46.3% of vitamin A and girls fulfilled and 32.1% of RDA[19] respectively. In case of both groups, Intake of Riboflavin was below 50% of RDA[17] respectively. However, Iron and Niacin intake were fulfilled nearly of RDA[17, 19]. Zinc intake for the boys and girls were 2 to 4 times higher than RDA[19]. Girls (83.0-92.2%) almost fulfilled their requirement[17] (RDA) of thiamine than boys (66.7-88.9%) (Table-12). In respect of family income of the respondents, at the income level ≤3000 Tk., 3001-600 Tk. and ≥6000 Tk. the mean intake of calorie was 1109, 1110 and 1153 kcal /day respectively. At the income level of ≤3000 Tk., the mean intake of Ca, Iron, Vit-A, Thiamin, Riboflavin, Niacin, Vit-C, and Zinc was 212±124, 9±5, 660±745, 0.8±0.2, 0.4±0.1, 12±2, 38±26, 30±26 respectively. At the income level between 3001 – 6000 Tk., the mean intake of Ca, Iron, Vit-A, Thiamin, Riboflavin, Niacin, Vit-C, and Zinc was 289±214, 11±6,556±630, 0.8±0.2, 0.4±0.1, 12±3, 35±26, 27±23 respectively. At the income level of ≥6001 Tk., the mean intake of Ca, Iron, Vit-A, Thiamin, Riboflavin, Niacin, Vit-C, and Zinc was 275±172, 11±5, 836±1043, 0.8±0.2, 0.4±0.2, 12±3, 44±32, 37±32 respectively (Table-13 and 14).

Malnutrition is largely a reflection of poverty. Calories and micronutrient consumption raises with income in this study. Though there are controversies in this topic[20]. In conclusion it can be said that these selected children are deprived of some of their basic needs and are not aware about better living condition and healthy nutritional status.

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