

# Nutritional Status and Dietary Intake of Adolescent Girls in Bangladesh

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## Abstract

The world's adolescent population is about 1200 million persons at the age of 10–19 years and about 19% of the total population of the world faces a series of serious nutritional challenges in developing country. Bangladesh is one of the poorest countries, with over a 150 million population and densely populated countries of the world (881/sq km), and about 60 million people (40%) live below the poverty line and 34.6% currently lives in urban area. whereas 60.4% of the population lives in the urban area of Iran. There are about 27.7 million adolescents aged 10–19 years of age in Bangladesh and about 13.7 million girls, which make up about one-fifth of the total population, and, in Iran, with a population of 15 million people, 21.90% are adolescents aged 10–19 years. Sixty-seven percent and over of the adolescent girls are married. This includes 48% girls aged 15–19 years. About 50% of the pregnancies occur by the age of 18 years. Adolescence is a crucial part of their life. During this period, adolescents gain up to 50% of their adult weight, 20% or more than that of their adult height and 50% of their adult skeletal mass. Requirements of calories and protein are maximal, as also requirements of other nutrients, e.g. iron, calcium and vitamins, which increase. One US study showed that female adolescents generally did not tend to increase energy intake with increasing age. Nutrition is one of the most important factors influencing the quality of human life. Nutritional status is also an important health indicator to assess a country's health status and morbidity pattern. Studies of nutrition status are very important in the adolescent of child bearing age because of low to moderate prevalence of possible deficiency.

**Keywords:** Nutrition, Dietary Intake, Adolescent Girls

## INTRODUCTION

A large number of adolescent girls are suffering from malnutrition both in urban and rural areas of Bangladesh. The prevalence of malnutrition is found to be alarmingly higher among female adolescents in Bangladesh. Adolescence stunting is 36% and body mass index (BMI) is 50%. Rate of anemia of adolescent girls is 25–27% (hemoglobin <12 g/ dL) and iron deficiency in the age group of 14–18 years is 30% (serum transferrin saturation <15%). Vitamin A deficiency is prevalent in about half (47–54%) of school going children, and zinc deficiency in adolescence is unknown. Pregnant and lactating women have about 60% or over insufficient caloric intake, which can produce malnourished babies.

The average per-capita energy intake by rural adolescent girls in Bangladesh is 81% of the recommended dietary allowance (RDA) for age. Protein, iron and calcium are also important for growth spurt and skeletal development in adolescence. Sixty percent and more of school girls aged 10–16 years in Dhaka city consume protein, iron and calcium less than 75% of the RDA for age. The quality of the next generation is directly linked to the high prevalence of chronic energy and micronutrient deficiencies of today's generation.

However, little published data exists on dietary intake, anthropometric measurement and energy intake of Bangladeshi low-income family's adolescent girls in the urban and rural groups. This study is therefore helpful in evaluating the nutritional status and severe thinness (according to WHO reference of BMI) based on dietary intake and anthropometric variables of adolescents of different physiological status in the two same economic statuses in both urban and rural groups. This study may further provide certain information of their nutritional status of their earlier age of life.

## OBJECTIVE OF THE STUDY:

The objectives of the study are as follows:

1. To identify the real scenario of nutritional status and dietary intake of adolescent girls in Bangladesh.
2. To identify the challenges and find out necessary solution about nutritional status and dietary intake of adolescent girls in Bangladesh.
3. To find out necessary developments of nutritional status and dietary intake of adolescent girls in Bangladesh.

## METHODOLOGY OF THE STUDY

### Study design:

The design of the study was cross sectional study.

### Study area

The study was conducted at urban and rural areas of Dhaka district in Bangladesh.

### Study Period

The study was conducted from July 2018 to June 2020.

### Sampling method

Random sampling method was used for the study.

### Sample Size

Total 352 respondents were selected for the study. Data were collected from the students. Schools were selected for the study. From six school's 50 students were selected but 52 students were selected from one school.

### Sources of Data

Data were collected from primary and secondary sources.

### Sources of Primary Data

Primary Data were collected from the respondents of the study area.

### Sources of Secondary Data

Secondary Data were collected from Books, Research Report, Journal, Thesis, Internet etc.

### Tools for Data Collection

Questionnaire was used for data collection.

### Method of Data Collection

Data were collected by face to face interview with the respondents.

### Inclusion Criteria

Girls students were only included. Their nutritional status and dietary intakes were included. No other diseases were included.

### Exclusion Criteria

All diseases were excluded.

### Ethical Consideration

Permission for ethical consideration was taken from the School Authorities. All the girls students were briefly understood about the purpose of the study and informed written consent was taken.

## Data Processing and Analysis

In qualitative study the researcher has the freedom to marshal gathered data to meet the desired objectives of the study (Creswell 2009). Partial data of questionnaire survey were processed using simple statistics. The rest of the data were explained carefully to meet the aim of the study and research question and also attempted to establish relation among the variables. Some important and strong statements were referred in the analysis part to add value to the findings. Computer Program Statistical Packages for the Social Sciences were used for data analysis. Data were analyzed according to the objectives of the study. Tables, graphs and statistical analysis were done by Computer Program Statistical Package for the Social Sciences.

## RESULTS AND DISCUSSION

Table 1: Mean ( $\pm$ SD) of height, weight and BMI of adolescent girls according to age group

Age Group	Height(cm)	Weight(Kg)	BMI(Kg/m <sup>2</sup> )
10 – 13 yr	143.45 (4.59)	44.58 (5.38)	21.66 (2.34)
14 – 16 yr	152.21 (8.31)	48.44 (7.04)	20.90 (3.02)
17 – 19 yr	152.05 (9.61)	47.84 (7.75)	20.94 (4.70)

Values are mean (s.d.)

Out of 352 girls 68 (19.3%) were 10-13 year of age, 156 (44.3%) were 14-16 year of age and 128 (36.4 %) were 17-19 year of age. Among them about 17.0% respondents were from a family of up to 3 members, 70.5% from 4-5 members and 12.5% were from a family with more than 5 members. The results revealed that, 9.1% respondents had a monthly family income <10,000 BDT; 11.4% had income 10,000-15,000; 25.0% had income 15,001-20,000 and 51% had income >20,000. Table 1 summarizes the average of height, weight and BMI of the study population. Most results are stratified by three age groups (10 - 13 years , 14 - 16 years and 16 - 19 years) based on the consideration that the sample is inadequate to present more detailed age breakdowns. The Body mass index was calculated as weight in kg/and height in meter square. The BMI revealed that 14.8% of the girls were underweight (BMI <18.5), 80.7% were within normal limits (BMI 18.5 – 24.99) and 4.6 were either overweight or obese (BMI  $\geq$  25).

Table 2: Percent distribution of the respondents on the BMI and exercise time

Time spent per day	Body Mass Index (BMI)				Total
	<18.5	18.5-24.99	25.0-29.99	>30.0	
20 minute	24 (6.8)	52 (14.8)	8 (2.3)	-	84(23.9)
30 minute	8 (2.3)	112 (31.8)	-	4 (1.1)	124 (35.2)
1 hour	8 (2.3)	84 (23.9)	-	-	92 (26.1)
>1 hour	12 (3.4)	36 (10.2)	-	4 (1.1)	52 (14.8)
Total	52 (14.8)	284 (80.7)	8 (2.3)	8 (2.3)	352 (100)

Table 3: Food intake (per capita per day) of adolescent girls

Food groups	Food intake (Mean $\pm$ SD)
Cereal (g)	341.0 $\pm$ 74.0
Root & tubers (g)	45.0 $\pm$ 36.0
Pulse & nut (g)	11.0 $\pm$ 4.5
Vegetable (g)	87.9 $\pm$ 26.0
Fruits (g)	14.0 $\pm$ 5.0
Meats (g)	8.0 $\pm$ 4.0
Fish (g)	26.0 $\pm$ 8.0
Milk and milk product(g)	10.0 $\pm$ 4.0
Fats & oils (g)	5.2 $\pm$ 2.3

Per capita food intake of the studied population and comparison with the national intake (95 – 96) is presented in Table 3. Cereal intake was found to be lesser, intake of protein containing foods like pulse & nuts, meat, egg, fish, milk & milk products were very much close to the national intake.

Table 4: Mean calorie and nutrient intake (per capita per day) and percentage of the requirement by different socio-economic groups

Calorie and nutrients	RDA <sup>10</sup>	Mean intake	% of RDA
Energy (kcal)	2200	2090.0 (256.0)	95.00
Protein (g)	46	43.0 (14.8)	93.48
Fat (gm)	15	14.5 (6.9)	96.67
Carbohydrates (g)	250	380.0 (73.5)	130.40
Calcium (mg)	450	279.0 (310)	62.00
Iron (mg)	30	19.0 (12.3)	63.33
Vitamin A (RE)	720	862.0 (322.0)	119.72
Thiamine (mg)	1.2	1.12 (0.7)	93.33
Riboflavin (mg)	1.4	1.08 (0.4)	77.14
Niacin (mg)	16.4	17.2 (5.0)	104.88
Vitamin C (mg)	30	33.8 (11.0)	112.67

(Figures in parentheses are standard deviation)

Percentages of calorie and nutrient requirement fulfilled by the population are depicted in Table 4. The intakes of all macronutrients were less than the average requirement of Bangladeshi adolescent except carbohydrate. On the average the studied population fulfilled 95% of calorie, 93.5% of protein and 96.5% of their fat requirement. They also fulfilled almost 62%, 63%, 120%, 93%, 77%, 104%, 112.5% of their Ca, Fe, Vit A, Thiamin, Riboflavin, Niacin and Vit C requirement respectively.

**Table 5:** Food consumption pattern of the adolescent girls

Food item	Consumption frequency			
	Weekly		Fortnightly (%)	Monthly Never (%)
	5-7 day / week(%)	1-4 day / week(%)		
Rice	100.0	-	-	-
Flour	60.5	39.5	-	-
Roots & Tuber	-	86.0	14.0	-
Dal (Pulses)	33.0	65.0	2.0	-
Leafy vegetables	50.0	45.0	5.0	-
Non-leafy vegetables	17.0	83.0	-	-
Fish	7.0	93.0	-	-
Meat	5.0	48.0	46.0	1.0
Egg	18.0	58.0	24.0	-
Milk	12.0	43.0	40.0	5.0
Milk products	-	35.0	58.0	7.0
Fruits	8.0	26.0	56.0	10.0

Consumption frequencies of different food items among the adolescent girls are shown in Table 5. It depicts that, all the studied population consumed rice daily. All types of vegetables were frequently consumed by all the adolescent girls. But their milk, egg and fruits consumption were very less.

**Table 6:** Pattern of intake of selected food items by urban adolescent college girls

Food item	Frequency of intake /week				
	0 %	1-2 %	3-4 %	5-6 %	≥ 7 %
Meat	7.4	26.2	36.3	10.4	19.7
Fish	10.7	23.1	30.7	16.8	18.7
Eggs	16.0	29.2	29.2	15.4	10.2
Milk	46.1	23.1	12.3	12.3	6.2
Liver	64.6	27.8	4.6	1.5	1.5
Leafy vegetables	27.7	44.6	15.4	4.6	7.7
Other vegetables	9.2	18.6	23.1	18.5	30.6
Fruits		6.5	15.4	10.9	67.2

Results are expressed as the percentage (%) of the participants consuming different frequencies of each food items in the week preceding the interview.

A large proportion of the participants consumed meat (62.5%), fish (53.8%) and eggs (58.4%) 3 to 4 times or less in the week preceding the interview (Table-6). A substantial proportion of the girls did not take milk (46.1%) and liver (64.6%) at all in the week. About 27.7% did not take leafy vegetables; while substantial proportions of the participants had other vegetables (72.2%) 3 to 4 times or more in the week. Fruits were highly popular among the girls, being consumed at least 3 times in the week by an overwhelming majority of the participants (93.5%). Most of the fruits consumed were mango, jackfruit, pineapple, banana, lemon and guava.



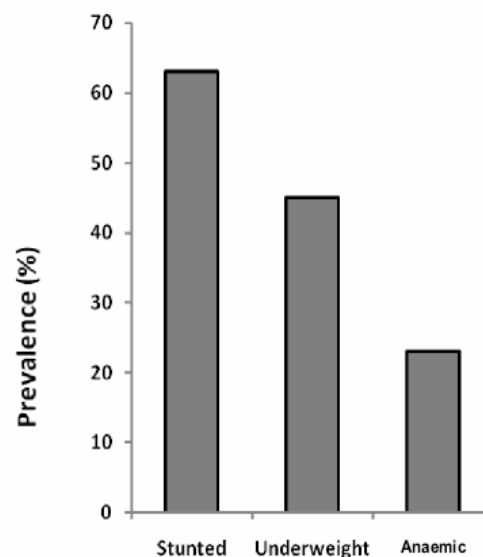
Table-7: Daily intake of energy and nutrients by urban adolescent college girls in relation to

Energy/nutrients	Total intake		RDA	Percentage of RDA
	Mean	SD		
Energy (kcal/day)	1495.0	370.0	1968.0+	76.0
Protein (g/day)	68.0	26.0	44.0	154.5
Carbohydrate (g/day)	250.0	65.0	369.0	67.8
Fat (g/day)	25.0	7.0	32.8	76.2
Iron (mg/day)	28.8	12.2	15.0	192.0
Vitamin A (RE, $\mu$ g/day)++	1530.0	420.0	750.0	204.0
Vitamin C (mg/day)	75.6	32.7	60.0	126.0

\*RDA: Recommended Dietary Allowances. +Calculated using factor for activity level with a multiple of BMR based on body weight of the individuals according to FAO/WHO/UNU11. ++Calculated using factors recommended by IVACG12. RE: Retinol equivalents.

There was a mean deficit of daily energy intake of 473.0 kcal (Table-7). The largest proportion of energy (67%) was obtained from carbohydrates, followed by protein (18%) and fats (15%). Mean intakes of iron and vitamin A were almost double of the RDA. Intake of vitamin C was also above the RDA (Table-7).

Figure 1: Prevalence of stunting, underweight and anaemia in urban adolescent college girls.



From the result it was found that 64.89% adolescent college girls were stunted growth which was maximum, 46% adolescent college girls were underweight and 23% adolescent college girls were anemic which was minimum.

## CONCLUSION

The overall nutritional status in urban adolescent college girls of Bangladesh is not satisfactory. Prevalence of anaemia and knowledge regarding anaemia as well as iron rich foods is not adequate among college girls in this study. Thus, effective measures should be undertaken to improve their nutritional status and reduce the prevalence of anaemia.

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