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Nutritional status of adolescent girls in a rural area of Bangladesh: A cross sectional study

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Abstract

The improvement of adolescent nutritional status may help address the reduction of all forms of malnutrition in Bangladesh. This is because at this stage, they experience a growth spurt thus increasing the need for most nutrients, needed for growth and reproductive health. The objective of this research was to assess the nutritional status of adolescent girls in rural areas of Bangladesh and find out the associated factors that affects nutritional status. A cross sectional study was carried out among 106 adolescent girls of Nobabpur village in Comilla district. A questionnaire was developed to obtain demographic information, food intake pattern and anthropometric measures such as weight, height with measuring instruments. About 80% were found normal according to BMI where about 13% adolescent girls were malnourished, below the cut off value 18.5. Place of residence, education of adolescent girls, their family expenditure to food and improper knowledge on food and nutrition were identified as underlying causes. Nutritional profiles of adolescent girl can be improved by implementing effective nutrition education program, providing supplementary food, facilitating primary health care program and creating awareness about nutritional knowledge. Severely malnourished adolescent girl in the selected area should be identified as early as possible and brought under supplementary feeding program.

Key Words: Adolescent girl; Nutritional status; Body mass index (BMI)

Introduction

Nutritional status is defined as the condition of the body in those respects influenced by the diet; the levels of nutrients in human body and the ability of those levels to maintain normal metabolic integrity (Saxena and Saxena, 2009). Essential nutrient must be provided to body by the diet otherwise its inadequate causes health problems such as malnutrition. According to WHO (2006) adolescence as the period in human growth and development that occurs after childhood and before adulthood, from ages 10 to 19. Biological processes drive many aspects of this growth and development, with the onset of puberty marking the passage from childhood to adolescence (Mulugeta *et al.*, 2009) Growth during adolescence is faster than at any other time in an individual's life except the first year. Good nutrition during adolescence is critical to cover the deficits suffered during childhood and should include nutrients required to meet the demands of physical and cognitive growth and development, provide adequate stores of energy for illnesses and pregnancy and prevent adult onset of nutrition-related diseases (WHO, 2006).

Like other South-Asian countries, Bangladesh has shown deficiencies in the intake of all nutrients, particularly iron, calcium, vitamin A and vitamin C. The main reasons are mainly the low educational level of parents and low family income. Dietary intake with respect to adequate availability of food in terms of quantity and quality (particularly, the mean caloric intake), ability to digest, absorb and utilize food and the social discriminations against girls can greatly affect the adequate nutrition of adolescents. Many boys and girls enter adolescence undernourished, making them more vulnerable to disease and early death. Conversely, overweight and obesity another form of malnutrition with serious health consequences is increasing among other young people in both low and high income countries (Cole *et al.*, 2007).

Adequate nutrition and healthy eating and physical exercise habits at this age are foundations for good health in adulthood. Adolescents are the best human resources. But for many years, their health has been neglected because they were considered to be less vulnerable to disease than the young children or the very old. Their

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health attracted global attention in the last decade only. As adolescents have a low prevalence of infection compared to under-five children, and of chronic disease compared to ageing people, they have generally been given little health and nutrition attention, except for reproductive health concerns (Kalhan *et al.*, 2010). Malnourished adolescent girls who have babies at a young age are likely to experience, and will be less able to withstand, complications because the body has not yet reached maturity. Maternal mortality is higher in anemic women. Even when they survive, poorly nourished adolescent mothers are more likely to give birth to low birth-weight babies, perpetuating a cycle of health problems which pass from one generation to the next (Kumar, 2012). Hence it is essential to assess the nutritional status of adolescence girls, especially developing countries like Bangladesh. The objective of the present work is to assess the nutritional status of adolescent girls in rural areas of Bangladesh and find out the associated factor that affects nutritional status.

Materials and methods

Subjects and study area

To assess, analyze and evaluate the lifestyle; health and nutritional profile of adolescent girls various types of anthropometric, socio economic, food intake pattern and knowledge about nutrition have been collected from adolescent girls of the target population. For this purpose 106 adolescent girls were selected randomly for this study. The study was carried out at Nobabpur of Comilla, to find out the lifestyle, health and nutritional status of adolescent girls of that area.

Study design

The study was cross sectional in nature. The data were collected at one point of time from samples selected to describe the situation of nutritional status of adolescent girls.

Collection of demographic data

A Questionnaire was developed to obtain relevant information on age, sex, weight, socio-economic history through interview of the adolescent girls. A structured interview where asked to know the food intake pattern among adolescent girls.

Anthropometric data

To assess the nutritional status, the anthropometric measures such as weight, height and BMI were taken. A lever balance (Detecto-Medic, Detecto scales, USA) was used to record body weight (Anand *et al.*, 1999). Body weight recorded to the nearest 0.5 Kg on bare foot with minimum clothing. Height of the subjects were measured with a standard scale to the nearest 1 cm in standing up-straight without assistance, with bared heels close together. Legs straight, arms at the sides and shoulders relaxed, looking straight ahead. During measurement of height the person was allowed to take a deep breath and at maximum inspiration was recorded.

Calculation of Body mass index (BMI)

Body Mass Index (BMI) is an anthropometric index of weight and height that is defined as body weight in kilograms divided by height in meters squared. BMI of adolescent girls were calculated by using the following equation:

Body mass index (BMI) = Weight in kilogram (kg)/ Height in meter² (m²)

BMI is the commonly accepted index for classifying adiposity in adults and it is recommended for use with children and adolescents (Ulijaszek and Kerr, 1999).

Statistical analysis

The obtained data were stored in Microsoft Excel 2007 and then exported into SPSS Version 17.0 software (SPSS Inc., USA) for statistical analysis. Data of anthropometric and food habit pattern were analyzed by following above statistical procedure to assess the nutritional status of the children.

Results and discussion

A cross sectional study was carried out among the households with adolescent girls who were selectively selected in a village named Nobabpur. The educational status of adolescent girls is presented in Table-I.

Figure-1 shows the percent expenditure pattern of studied household. It reflects that only 2.76% cost is for housing, 14.95% expense is made for education, medicine and clothing costs almost equally but food is the largest sector of expenditure (53.73%).

Table I. Education level of adolescent girls

Class	Frequency	Percent
Class1-Class5	36	33.9
Class6-Class10	50	47.2
HSC to higher	13	12.3
Illiterate	1	0.9
Can sign	3	2.8
Can read and write	3	2.8
Total	106	100

do not familiar with iodine rich food but 86.8% family used iodized salt.

Figure-2 shows BMI, formerly called the Quetelet index, is a measure for indicating nutritional status in adolescent girls. Most of the adolescent girls about 80% were normal in range and 13% were malnourished in total.

With greater emphasis on the health of the women in general and the girl child in particular, the picture of nutritional status seen in the rural girls of Bangladesh is alarming though not surprising (Vasanthi *et al.*, 1994). The poor nutritional status of adolescents, especially girls, has important implications in terms of physical work capacity and adverse

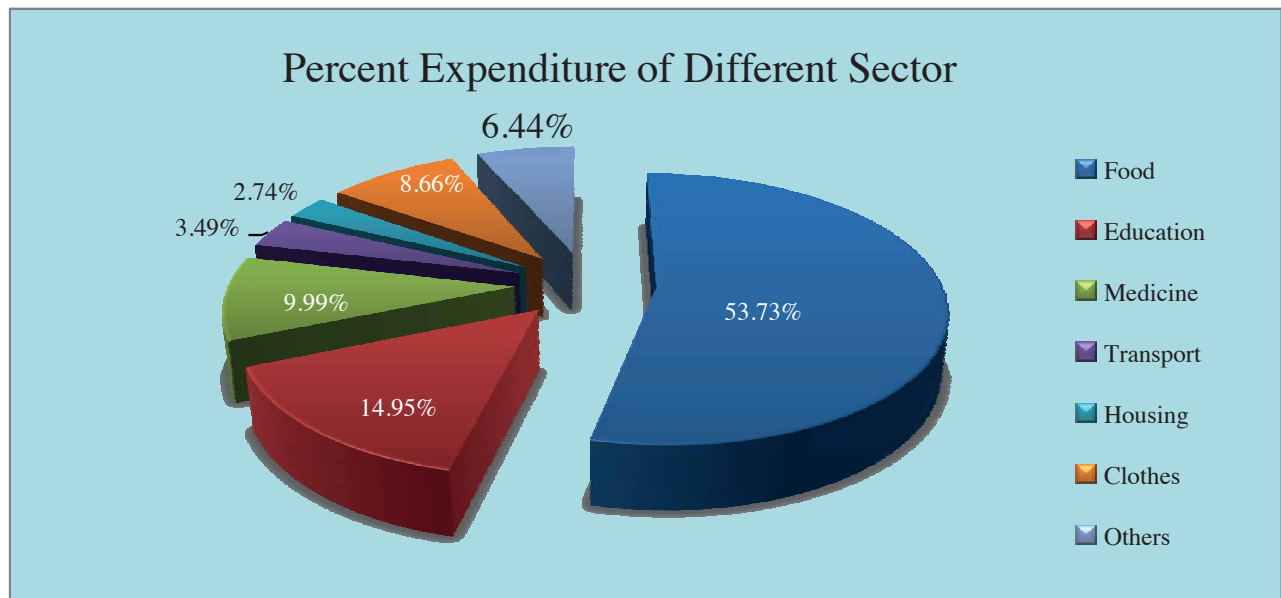


Fig. 1. Expenditure pattern of studied household

Table-II shows the adolescent girl’s nutrition knowledge such as sufficiency of the vegetables taken, habit of taking vitamin C rich foods, concept about iron rich foods, eating iron rich foods, knowledge about iron deficiency, knowledge about the occurrences of symptoms due to iron deficiency, sufferings experienced from the occurrences of vitamin A deficiency diseases, having the symptoms of vitamin C deficiency disease, knowledge about anemia and experienced sufferings from anemia.

In Table-III, it shows that, 66.9% household have no idea about balance diet .Imbalance intake of food would lead to deficit/excess of nutrient intake 66.9% of households ,who have no idea about balance diet. Although 56.6% households

reproductive outcomes (Haboubi and Shaikh, 2009). Adolescents (aged 10 to 19 years) have specific health and development needs, and many face challenges that hinder their wellbeing. It has been reflected in various studies and surveys done over 1991 to 2000 by different national and international bodies that nutrition and health situation particularly women, children and adolescent girls is grave in this country (WHO, 2006).

The main cause of poor nutritional status is the lack of knowledge of nutrition among the girls. Although significant rate of illiteracy does not prevail but 33.9% girl has dropped from primary school where 47.2% has entered higher study.

Table II. Knowledge about nutrition

Variables	Frequency	Percentage
Sufficient	62	58.5
Don't getting enough	44	41.5
Total	106	100
Habit of taking Vitamin C rich foods (n=106)		
Intake regularly	83	78.3
Irregular intake	23	21.7
Total	106	100
Concept about Iron rich foods (n=106)		
Potatoes	10	9.4
Fish/meat	22	20.8
Pulse	15	14.1
Vegetables	40	37.7
Others	19	17.9
Total	106	100
Eating of the above mentioned iron rich foods (n=106)		
Intake	89	83.9
Devoid of in taking iron rich foods	17	7.7
Total	106	100
Knowledge about iron deficiency(n=106)		
Concerned about IDD	42	39.6
Not concerned about IDD	64	60.4
Total	106	100
Knowledge about the occurrences of symptoms due to iron deficiency (n=106)		
Nausea	10	9.4
Vomiting	24	22.6
Colorless of tongue, lip, nail	1	0.9
Infection of tongue and lip	9	8.5
Fragile nail	10	9.4
Headache	13	12.3
Depressed	7	6.6
Others	32	30.1
Total	106	100
Sufferings from the occurrences of vitamin A deficiency diseases (n=106)		
Night blindness	1	0.9
Bitot's spot	1	0.9
Dryness of skin	39	36.8
Not occurred	65	61.32
Total	106	100

(Continued)

Having the symptoms of vitamin C deficiency disease (n=106)		
Blood release from the root of the teeth	30	28.3
Soreness of the root of the teeth	7	6.6
Absence of symptoms	34	32.1
Deserve no knowledge about Vit-C deficiency problem	35	33.0
Total	106	100
Knowledge about anemia(n=106)		
Have heard about	41	38.7
No clear idea	65	61.3
Total	106	100

Table III. Perception of adolescent girls about balance diet and different common disease related to nutrition

Parameter	Frequency	Percentage
Knowledge about balanced diet(n=106)		
Have heard about	35	33.0
Have no idea	71	66.9
Total	106	100
Knowledge about Goiter protecting foods(n=106)		
Iodized salt, vegetables & fruits, marine fish	31	29.2
Poor concept	15	14.2
Not conscious	60	56.6
Total	106	100
Usage of iodized salt(n=106)		
Taking iodized salt	92	86.8
Take non iodized salt	14	13.2
Total	106	100
Protein rich Body building foods(n=106)		
Rice	14	13.2
Fish	20	18.9
Vegetables	41	38.7
Not concerned about body building & repair	31	29.3
Total	106	100
Knowledge about protective foods(n=106)		
Vegetables & fruits	48	45.3
Egg, milk	13	12.3
Fish, meat	11	10.4
Unfamiliar with the protective action of food	34	32.1
Total	106	100
Knowledge about Vitamin A rich foods (n=106)		
Vegetable	45	42.5
Dal	8	7.6
Milk	4	3.8
Rice	8	7.6
Not concerned about dietary intake of vitamin-A	41	38.7
Total	106	100

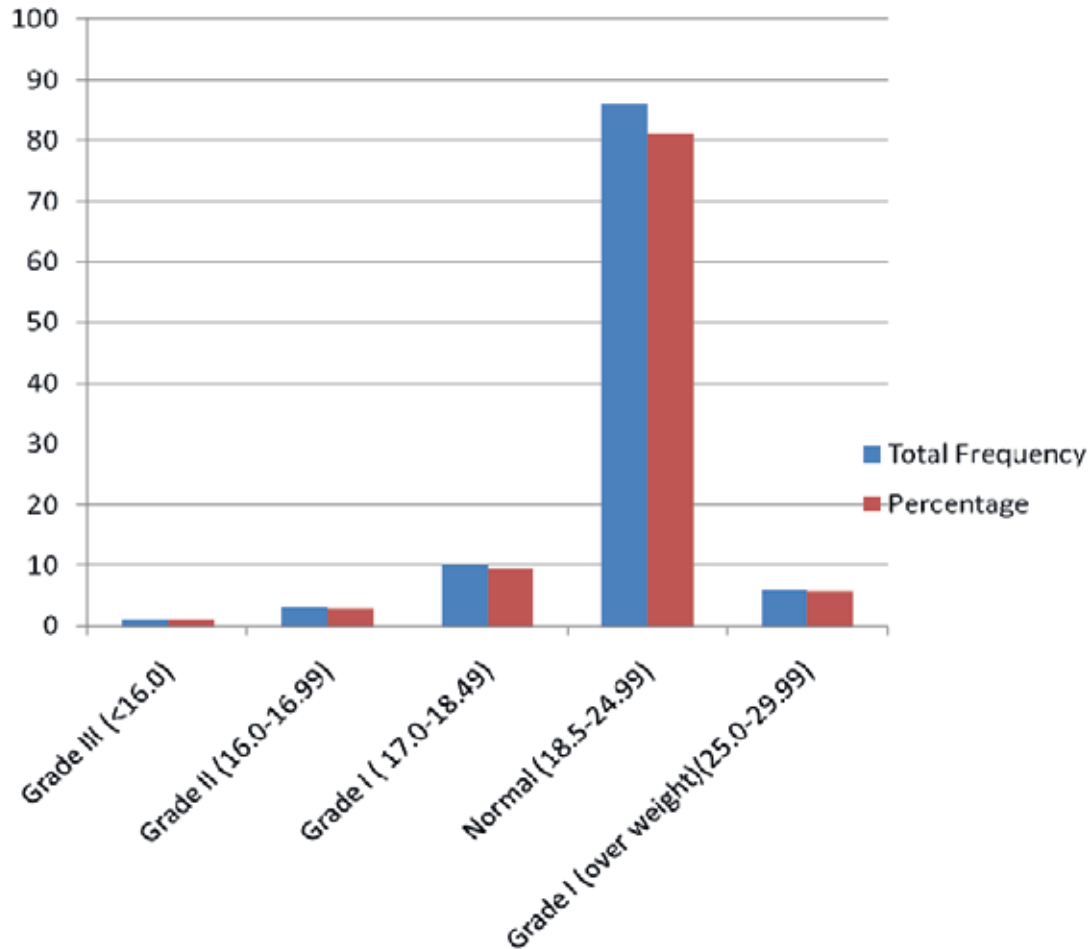


Fig. 2. Nutritional status of adolescent girls based on BMI (body mass index)

Attaining a degree from university or college was very rare among adolescent girl only 12.3%. Level of education has a significant independent effect on nutritional status in adolescent girls. Present study showed that, a tendency towards an increase nutritional status in adolescent girls with an increase in the level of their education. This may due to the relatively better understanding of public health knowledge to improve the nutritional status of adolescent girls (Mulugeta *et al.*, 2009).

Another cause is the expenditure pattern of studied household where these adolescent girls belong. Household cost for food was vast and largest share among other basic

needs and it is 53.73% of total expenditure. This is one of the factors which affect the nutritional status of adolescent girls. They also bought cloth costing 9% percent of their total expenditure. Treatment and curing of disease was expensed with 10% of expenditure. Present study observed that a tendency towards an increase nutritional status in adolescent girls with an increase in the family cost for food.

Adolescent girl nutrition knowledge and experienced sufferings can be explained as 58.5% adolescent girls took sufficient vegetable and almost 78.3% took citrus foods regularly. Vegetables are good source of iron according to 37.7% adolescent girl. Significant proportion of adolescent girl was

not concern about iron deficiency anaemia (IDA), vitamin A deficiency disorders, iodine deficiency disorders, and vitamin C deficiency disorder. 61.3% adolescent girl did not know about anemia and unable to confirm their position in at risky group of IDA along which among them 51.8% have experienced anemic condition in variably with different symptoms. Adolescent girls who have relatively better understanding of the public health and nutritional knowledge yield improve pattern of nutritional status.

Most of adolescent girls about 80% exist in normal range whereas only 13% were malnourished. Research has shown that better-nourished girls have higher pre-menarche growth velocities and reach menarche earlier than undernourished girls, who grow more slowly but for a longer, as menarche is delayed (WHO, 2006). Because underweight girls are growing for longer duration, they may not finish growing before their first pregnancy. Adolescents with a BMI above the 25-29.99 are at risk for overweight. Weight gain is the result of a positive energy balance (consuming more energy than is expended). Energy expenditure, as assessed through levels of physical activity, declines in children as they reach adolescence, particularly in adolescent girls (Naidu and Rao, 1994). There is evidence that children and adolescents of rural families are more overweight than in the past, possibly because of decreased physical activities, sedentary lifestyle, altered eating patterns and increased fat content of the diet. Increase in sedentary activities, such as television viewing and computer games, is suspected to be responsible for the decline in physical activity levels (WHO, 2006).

That adolescent girls have no access to resource and power, improper personal hygiene practices, poor knowledge about food and health, lower income of the family, high prevalence of stunting, wasting, underweight and thinness, and vulnerable to domestic abuse and violence is not unknown to third world country like Bangladesh. It should be emphasized to improve their situation without any subterfuge through preserving their right, proper health and care, necessary preventives and curatives, enriched balanced diet and ensuring sustainable environmental health, which demand paramount allocation of resource towards adolescent development to have a glorious future for all.

Conclusion

The present study reveals that nutritional status of adolescent girl in rural area of Bangladesh is in satisfactory level with minimal malnourished adolescent girl. Nutritional deprivation affects almost all growth parameters and final

adult body size resulting in thinness and stunting. However, nutritional status of both boys and girls improved with age, showing that the effect of malnutrition is more pronounced at the time of peak growth. Nutritional profiles of adolescent girl can be improved by implementing effective nutrition education program, providing supplementary food, facilitates primary health care program and creating awareness about nutritional knowledge. The least number of severely malnourished adolescent girls in the selected area should be identified as early as possible and brought under supplementary feeding program for improvement of their health status.

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