

Original Article

A Study on Anemia in Adolescent Girls Due to Food Habit at Gazipur District in Bangladesh

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Abstract: Over this time, adolescents gain up to 50% of their adult weight, 20% of their adult height, and 50% of their adult skeletal mass. In adolescence, physical growth is second only to that in the first year, and cognitive and psychological changes occur simultaneously. It increases energy and dietary needs, protein and calorie needs are peaking, Iron, calcium, and vitamin needs are also high. Failure to eat well during this time can delay sexual development and slow linear growth. This study determined the prevalence of Anemia in Adolescent Girls Due to Food Habit at Gazipur District in Bangladesh. The study was cross-sectional, conducted in urban and rural Gaspar district, Bangladesh, and used random sampling. The study included N=400 participants. Data came from original and secondary sources, primary data came from research respondents. Secondary data came from books, research reports, journals, theses, and the internet. Used questionnaire to obtain data, researchers interviewed respondents face-to-face. Only included students were briefly told of the study's goal and gave informed written consent. Qualitative researchers can use data to achieve study goals. We used simple statistics to process questionnaire data. Social science statistical packages analyzed data. Statistical Package for the Social Sciences created tables, graphs, and analysis. Bangladeshi adolescents are transitioning from undernutrition to overweight, although stunting and micronutrient deficiencies remain a major concern. Teens' diets are poor, and they could benefit from eating more micronutrient-dense, fiber-rich whole foods, especially ASFs. Despite reducing, early marriage and poor secondary school enrollment persist. Subpopulations vary in teenage malnutrition prevalence and causes. This gives possibilities to intervene along the pathway to poor teenage nutrition and problems in comprehending the intricacy of relationships between these and other factors. Since nutritional intakes are considerably below requirements, teenagers often have anemia, vitamin A, zinc, and iodine shortages, and calcium deficiencies. Malnutrition affects boys and girls differently depending on the indicator. Over half of females 10-49 have inadequately diversified diets, and subpopulations, especially wealth quintiles, differ.

Keywords: anemia, adolescent girls, Bangladesh

1. INTRODUCTION

The WHO defines adolescents as 10–19-year-olds. Globally, there are 1.2 billion teenagers, nearly 90% live in underdeveloped nations like Bangladesh [1]. Over this time, adolescents gain up to 50% of their adult weight, 20% of their adult height, and 50% of their adult skeletal mass [2]. In adolescence, physical growth is second only to that in the first year, and cognitive and psychological changes occur simultaneously [3].

Additionally, sexual development occurs. It increases energy and dietary needs. Protein and calorie needs are peaking, Iron, calcium, and vitamin needs are also high. Failure to eat well during this time can delay sexual development and slow linear growth. For slum adolescent females, undernutrition and poor infrastructure prevent them from receiving effective health treatment during illness [4]. Physical and social weakness makes them more prone to dietary insufficiency. More than 60% of Gazipur schoolgirls aged 10-16 consume less than 75% of the age-appropriate protein, iron, and calcium RDA [5]. Adolescent females' nutrition affects their health later in life. High rates of chronic energy and micronutrient deficits in adolescent girls affect the following generation. Without correcting these inadequacies, intergenerational undernutrition, chronic illnesses, and poverty continue. Early teenage girl malnutrition has long-term implications on growth, morbidity, cognitive development, education, and adult production [6]. Adolescent girls in slums are more likely to be undernourished, Poverty, periodic food shortages, child labor, disease frequency, inadequate infrastructure, low awareness, poor knowledge about long-term consequences of undernutrition in adolescents, poor housing, inadequate quantity and quality of food, and lack of access to health and nutrition services also contribute to poor adolescent nutrition. Poor infrastructural and environmental problems are frequent in slums [7]. Slum teens generally don't eat well due to poverty, insufficient balanced nutrition causes stunting and waste over time. In underdeveloped countries, 1200 million adolescents aged 10–19—19% of the world's population—face major nutritional issues. Bangladesh is one of the poorest countries in the world, with over 150 million inhabitants and 881/sq km density [8]. About 60 million people (40%) live below the poverty line, and 34.6% live in cities. 60.4% of Iranians live in cities. Bangladesh has 27.7 million adolescents aged 10-19 and 13.7 million girls, making up 20% of the population. Iran has 15 million individuals, 21.90% of whom are adolescents [9]. Over 67% of teen girls are married. This includes 48% 15–19-year-old girls. By 18, 50% of pregnancies occur, their adolescence is vital. Over this time, adolescents gain up to 50% of their adult weight, 20% of their adult height, and 50% of their adult skeletal mass [10]. Protein, caloric, iron, calcium, and vitamin needs are maximum and grow. A US study found that female adolescents did not increase energy intake with age. Nutrition is a major life quality aspect [11]. Nutrition is another significant health indicator for assessing a country's health and morbidity. Due to low to moderate prevalence of deficit, nutrition studies in childbearing adolescents are crucial [12]. Teenagers undergo severe physical changes due to puberty and develop emotionally, mentally, and socially. These changes are part of a continuous and dynamic process that begins with fetal life, continues through childhood with positive or negative environmental and social influences, and ends with complete physical growth, sexual maturation, personality consolidation, economic independence, and social integration [13]. All children and adolescents need to understand the relationships between nutrition, growth, and development. Eating, growing, and developing are different phenomena when considering physiological conception, but they are totally interactive, interdependent, and inseparable and express human potential. Because of this, historical, political, socioeconomic, and cultural transitions, epidemics, multiple diseases, ecological problems caused by urbanization and industrialization, and technological and scientific advances from globalization have also affected growth, maturation, and differentiation in time, shape, and body size [14]. However, the core of so many polemic studies, which still confuse pediatricians, is the question of how to improve quality of life, health, and well-being, as well as the factors that affect the nutritional status and growth of children, adolescents, and vulnerable social groups in their communities [15]. How to restore optimum patterns, reverse adverse nutritional losses or gains, choose low-cost interventions and effective prevention measures, and maximize growth potential and normal, natural, and healthy body development [16]. Clinical management should reduce harm and abnormalities induced by emotional eating disorders such as anorexia, bulimia nervosa, and obesity, as well as other

systemic states with nutritional involvement that often arise in adolescence [17]. Primary factors including asthma or intestinal parasites can affect appetite, caloric expenditure, and food absorption. Pediatricians must promote health education, preventive, and healthy lifestyles. Meetings with adolescents and their families always address growth and nutrition themes from the media [18]. According to 1991 Bangladesh Bureau of Statistics (BBS) figures, 21.8% of the 35 million people aged 10–19 are adolescents. There are few comparative, cross-sectional, or longitudinal epidemiological and anthropometric studies in Bangladesh that identify nutritional risks for several adolescent subpopulations based on five macro-regions, urban or rural homes, parents' income, and education [19]. The 1989 National Survey on Health and Nutrition provides some age group data, despite sample constraints related to pubertal spurt and sexual maturation in adolescents [20]. It found that 54.7% of teenagers had acceptable weight for their height, 26.3% had a weight deficit, and 19% had weight over the predicted for their height, indicating a major epidemiological transition in the country [21]. Because medical services and health units will use dietary advice, handling national and local information carefully is essential. Malnutrition affects many urban and rural Bangladeshi adolescent girls. Bangladeshi female adolescents have disturbingly high malnutrition rates [22]. Adolescent stunting is 36% and BMI 50%. Adolescent girls had 25-27% anemia (hemoglobin <12 g/dL) and 30% iron deficiency (serum transferrin saturation <15%) for ages 14-18. Vitamin A deficiency affects 47–54% of schoolchildren, whereas zinc deficiency in adolescents is unclear [23]. A 60% caloric deficit in pregnant and breastfeeding women might lead to malnourished kids. Rural adolescent females in Bangladesh consume 81% of the age-appropriate RDA for energy per capita. Adolescent growth spurt and skeletal development require protein, iron, and calcium [24]. More than 60% of Gazipur schoolgirls aged 10–16 consume less than 75% of the RDA for protein, iron, and calcium. High rates of chronic energy and micronutrient shortages in today's generation affect the following generation's quality [25].

2. MATERIALS & METHOD

The design of the study was cross sectional study, the study was conducted at urban and rural areas of Gaspar district in Bangladesh, random sampling method was used for the study. Total N=400 respondents were selected for the study. Data were collected from the students. Schools were selected for the study. From eight school's 50 girls students were selected from the study area. Data were collected from primary and secondary sources. Primary Data were collected from the respondents of the study area. Secondary Data were collected from Books, Research Report, Journal, Thesis, Internet etc. Questionnaire was used for data collection. Data were collected by face-to-face interview with the respondents. Students were only included, all the students were briefly understood about the purpose of the study and informed written consent was taken. In qualitative study the researcher has the freedom to marshal gathered data to meet the desired objectives of the study. 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.

3. RESULTS & DISCUSSION

Table 01: Age of the respondents

Age group	Frequency	Percentage
10-13 Years	76	38.00%
14-16 Years	74	37.00%
17-19 Years-50	50	25%
Total	200	100%

Source: Field survey.

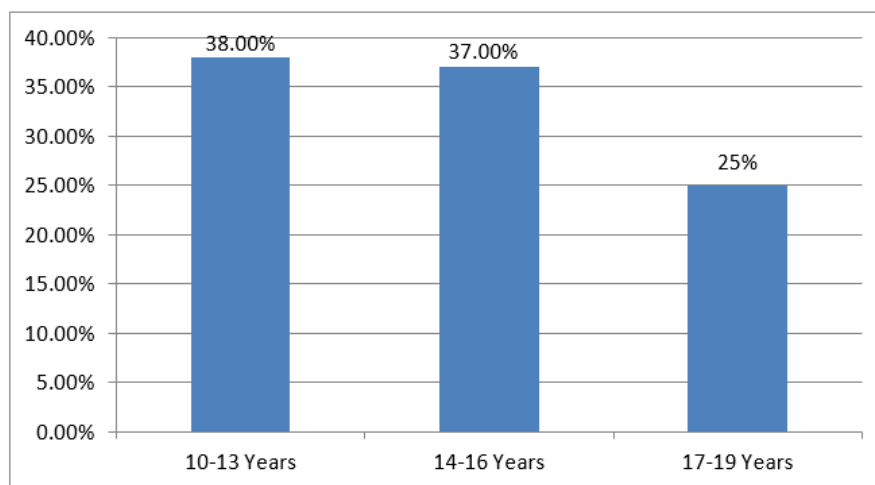


Figure 01: Age of the respondents (Source: Field survey)

Age of the respondents has shown in the above table and graph, from the result it was found that age group 10-13 years was 38% which was maximum but age group 17-19 years was 25% which was minimum. On the other hand age group 14-16 years was 37%.

Table 02: Religion of the respondents

Name of religion	Frequency	Percentage
Islam	150	75%
Hindu	46	23%
Christian	4	2%
Total	200	100%

Source: Field survey

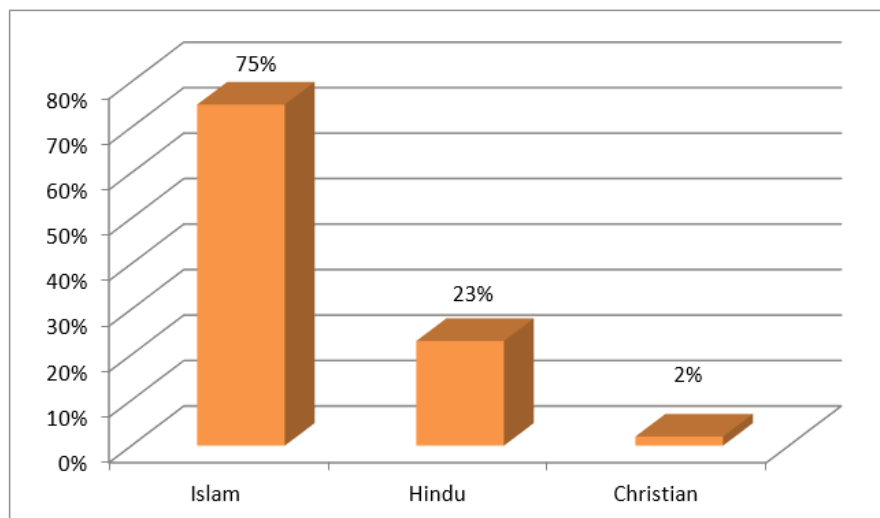


Figure 02: Religion of the respondents (Source: Field survey)

Religion of the respondents has shown in the above table and graph. From the result it was found that 75% respondents were from Islam which was maximum but only 2% were from Christian which was minimum. On the other hand 23% were from Hindu.

Table 03: Educational qualification of the respondents

Educational class	Frequency	Percentage
Class 6 to 8	80	38%
Class 9 to 10	80	42%
HSC	40	20%
Total	200	100%

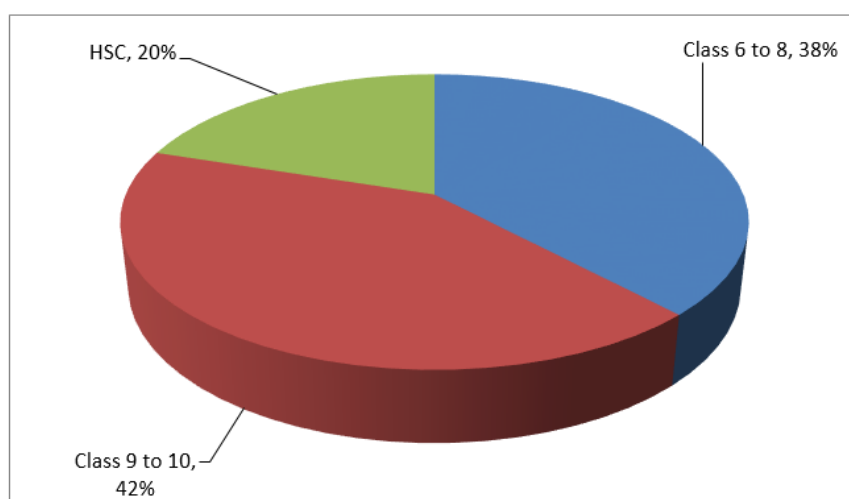


Figure 03: Educational qualification of the respondents (Source: Field survey)

Educational qualification of the respondents has shown in the above table and graph. From the result it was found that 42% respondents were from the students of class 9 to 10 which was maximum but only 20% respondents were from the students of HSC which was minimum. On the other hand 38% respondents were from the students of class 6 to 8.

Table 04: Family income of the respondents

Family income	Frequency	Percentage
Less than 15000 Taka	90	45%
15000 to 20000 Taka	70	35%
20001 to 25000Taka	30	15%
More than 25000 Taka	10	5%
Total	200	100%

Source: Field survey.

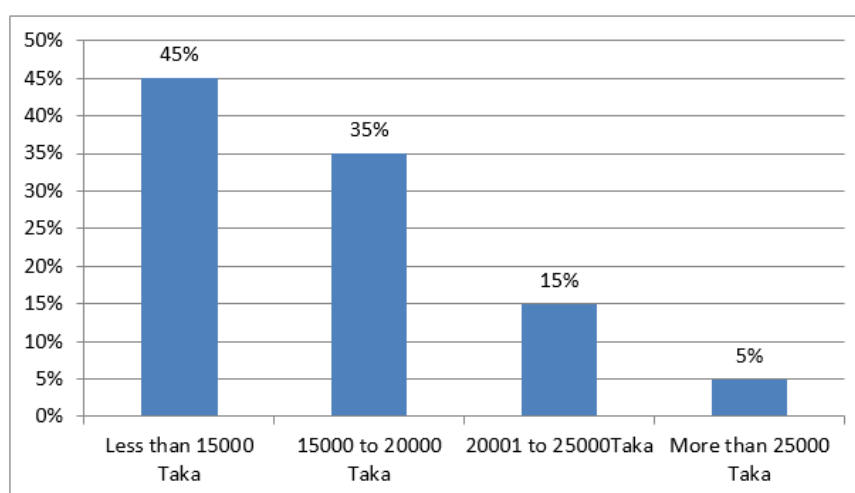


Figure 04: Family income of the respondents (Source: Field Survey)

Family income of the respondents has shown in the above table and graph. From the result it was found that 45% respondents' family income were less than 15000 Taka which was maximum but only 5% respondents' family income were more than 25000 Taka which was minimum. On the other hand 35% respondents' family income was 15000 to 20000 Taka and 15% respondents' family income was 20001 to 25000 Taka.

Table 05: Body structure of the respondents

Body structure	Frequency	Percentage
Severely thin	60	30%
Moderately thin	70	35%
Normal structure	66	33%
Obese	4	2%
Total	200	100%

Source: Field survey.

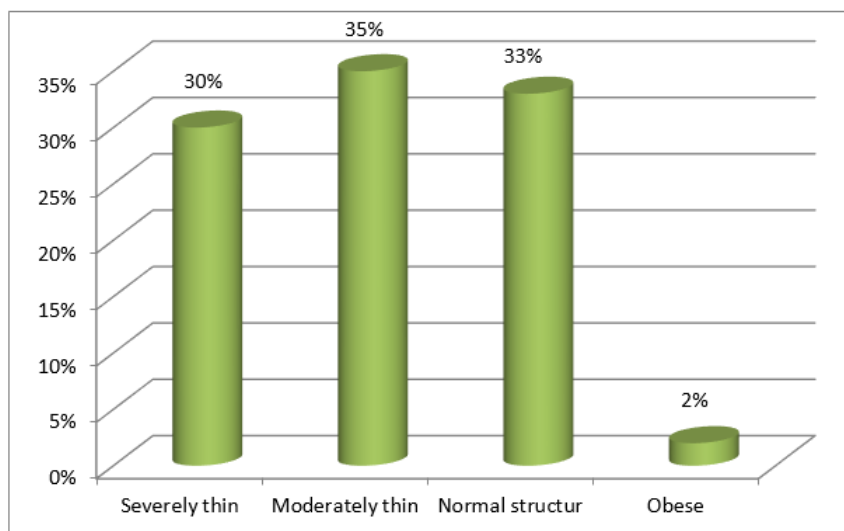


Figure 05: Body structure of the respondents (Source: Field Survey)

Body structure of the respondents has shown in the above table and graph. From the result it was found that 35% students' body structures were moderately thin which was maximum but 2% students' body structures were obese which was minimum. On the other hand 30% students' body structures were severely thin and 33% students' body structures were normal.

Table 06: Respondents' weight status

weight status	Frequency	Percentage
Severely stunted	50	25%
Mild to Moderate stunted	84	42%
Normal weight	66	33%
Total	200	100%

Source: Field survey.

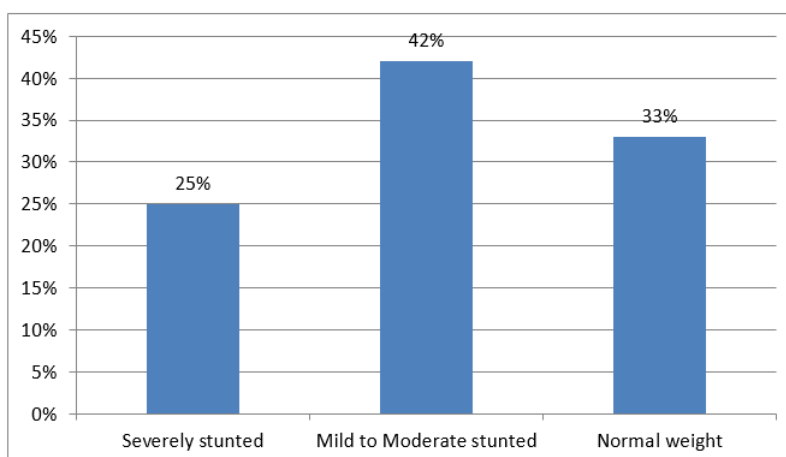


Figure 06: Respondents' weight status (Source: Field survey)

Respondents' weight status has shown in the above table and graph. From the result it was found that 42% respondents' weights were mild to moderate stunted which was maximum but 25% respondents weight were severely stunted which was minimum. On the other hand 33% respondents' weights were normal.

Table 07: Respondents' dietary diversity status

Dietary diversity status	Frequency	Percentage
Highest dietary diversity	10	5%
Medium dietary diversity	50	25%
Lowest dietary diversity	140	70%
Total	200	100%

Source: Field survey.

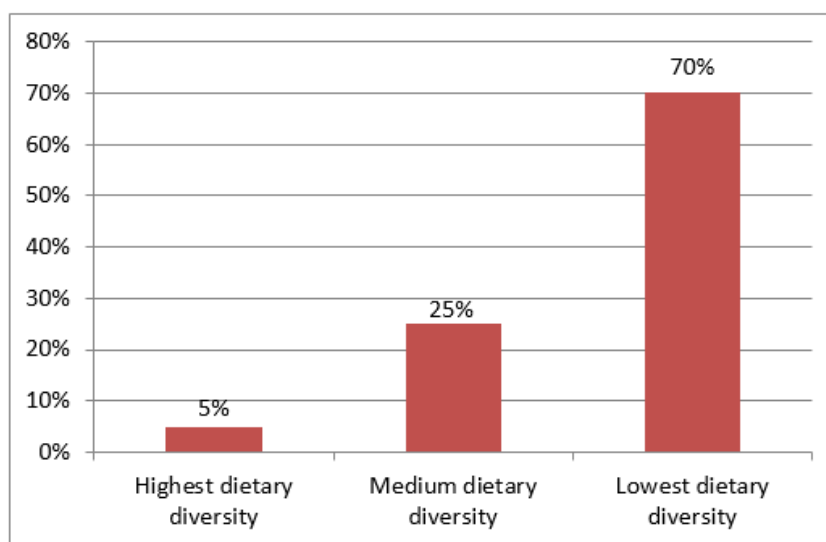


Figure 07: Respondents' dietary diversity status (Source: Field survey)

Respondents' dietary diversity status has shown in the above table and graph. From the result it was found that 70% respondents' dietary diversity status were lowest dietary diversity which was maximum but 5% respondents' dietary diversity status were highest dietary diversity which was minimum. On the other hand 25% respondents' dietary diversity statuses were medium dietary diversity.

Table 08: Respondents' food intake per capita/day

Food groups (gm)	Scanty	Less than Normal	Normal	Sufficient	Percentage
Rice				√	100%
Wheat		√			25%
Potato				√	100%
Carrot	√				2%
Radish		√			10%
Pulses		√			50%
Nut		√			40%
Vegetables					
Green banana		√			30%
Kolar Mocha		√			25%

Kolar thor		√			20%
Pointed gourd (Potol)		√			30%
Bitter gourd (Korola)		√			20%
Bean (Shem)		√			30%
Borboti		√			15%
Green leafy vegetables					
Aram leaf		√			10%
Palong shak		√			20%
Data shak		√			30%
Spinach		√			20%
Lal shak		√			25%
Kalmi shak		√			20%
Fruits					
Banana		√			40%
Jackfruit		√			45%
Guava		√			35%
Dates		√			20%
Mango		√			40%
Black berry		√			20%
Koromcha	√				5%
Papaya		√			30%
Pomegranate	√				5%
Orange	√				10%
Dragon fruit	√				5%
Gab	√				2%
Sabeda		√			20%
Meats					
Red meat					
Goat/Cow		√			20%
Lever	√				10%
Chicken			√		60%
Birds		√			25%
Egg		√			62%
Fish					
Big fish		√			44%
Small fish		√			38%
Sea fish	√				3%
Local fish		√			51%
Milk and milk product					
Ghee	√				6%
Cheese	√				4%
Curd		√			22%

Fats and Oils		v		100%
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Source: Field survey.

Respondents' food intake per capita/day has shown in the above table. From the result it was found that Respondents' food intakes per capita/day were not adequate as recommended food.

Table 09: Daily intake of energy and nutrients

Calorie and nutrients	Total intake	Recommended Daily Allowance
Energy (Kcal/day)	1800-2000	2200/day
Protein (g/day)	35(g/day)	50(g/day)
Carbohydrate (g/day)	250 (g/day)	130(g/day)
Fat (g/day)	7(ml/day)	10 (ml/day)
Iron (mg/day)	1 mg/day	8.7 mg/day
Vitamin A (RE, micro gram/day)++	100 µg(micro gram)	700-900 micro gram
Vitamin C (mg/day)	40 mg	75 mg

Source: Field survey

Daily intake of energy and nutrients has shown in the above table. From the result it was found that daily intake of energy and nutrients were less than recommended daily allowances.

Table 10: Respondents know about anaemia

Respondents' opinion	Frequency	Percentage
Yes	120	60%
No	70	35%
Don't Listen	10	5%
Total	200	100%

Source: Field survey

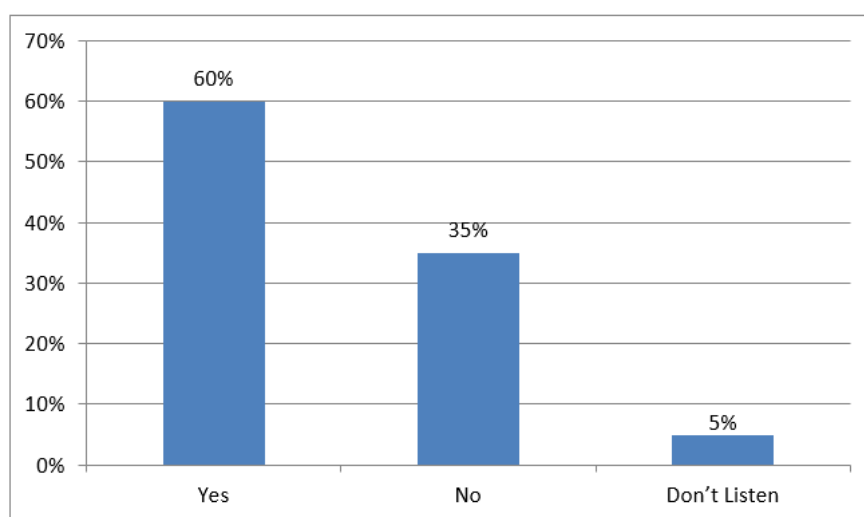


Figure 08: Respondents know about anaemia (Source: Field survey)

Respondents know about anaemia has shown in the above table and graph. From the result it was found that 60% respondents know about anaemia which was maximum but only 5% respondents don't listen about anaemia which was minimum. On the other hand 35% respondents don't know about anaemia.

Table 11: Respondents know about the reason of anaemia

Respondents' opinion	Frequency	Percentage
Yes	60	30%
No	130	65%
Don't Listen	10	5%
Total	200	100%

Source: Field survey.

Respondents know about the reason of anaemia has shown in the above table and graph. From the result it was found that 30% respondents know about the reason anaemia which was maximum but only 5% respondents don't listen about the reason anaemia which was minimum. On the other hand 65% respondents don't know about the reason anaemia.

Table 12: Respondents know about balanced diet

Respondents' opinion	Frequency	Percentage
Yes	134	67%
No	60	30%
Don't Listen	6	3%
Total	200	100%

Source: Field survey.

Respondents know about balanced diet has shown in the above table and graph. From the result it was found that 67% respondents know about balanced diet which was maximum but only 3% don't listen know about balanced diet which was minimum. On the other hand 30% respondents don't know about balanced diet.

Table 13: Respondents know how to prevent anaemia

Respondents' opinion	Frequency	Percentage
Yes	64	32%
No	128	64%
Don't Listen	8	4%
Total	200	100%

Source: Field survey.

Respondents know how to prevent anaemia has shown in the above table and graph. From the result it was found that 64% respondents don't know how to prevent anaemia which was maximum but only 4% respondents don't listen to prevent anaemia which was minimum. On the other hand 32% respondents don't know how to prevent anaemia.

Table 14: Respondents' anemia type

Type of anaemia	Frequency	Percentage
Severe anaemic	56	28%
Moderate anaemic	64	32%
Mild anaemic	70	35%
Not anaemic	10	5%
Total	200	100%

Source: Field survey.

Respondents' anemia type has shown in the above table and graph. From the result it was found that 35% respondents' anemia type was mild anaemic which was maximum but only 5% respondents' anemia type was not anaemic which was minimum. On the other hand 32% respondents' anemia type was moderate anaemic and 28% respondents' anemia type was severe anaemic.

4. CONCLUSIONS

A nutrition transition from under nutrition to overweight is occurring in Bangladeshi adolescents, but under nutrition remains a large concern, particularly stunting and micronutrient deficiencies. Diet quality of adolescents is very poor, and they would benefit from increased intakes of micronutrient-dense and fiber-rich whole foods, especially ASFs. Early marriage is declining but still common and secondary school enrolment is low. The prevalence and determinants of malnutrition indicators for adolescents often vary considerably by subpopulation. This presents opportunities to intervene along the pathway to poor nutrition outcomes in adolescents as well as challenges in understanding the complexity of interactions between these and other factors. While each indicator varies by subpopulation, in general, targeting by wealth and/or geography is particularly important, since the most nutritionally vulnerable subpopulations are poorer and often live in particular areas. Secondary school feeding programs along with conditional cash transfers or take-home rations are an ideal way to reach in-school adolescents and have potential for multiple benefits. Further disaggregation of available data on adolescents is needed to provide more detailed insight into the complex nutritional issues of adolescents in Bangladesh. This could be done by secondary analysis of raw data where available. However, collection of nationally representative data on adolescents, including boys, is essential to better guide interventions and monitor progress. Anaemia and micronutrient deficiencies are common in adolescents, notably vitamin A, zinc, and iodine, and other deficiencies such as calcium are also likely common, since dietary intakes are far below requirements. Both boys and girls are vulnerable to malnutrition to varying degrees depending on the indicator. More than half of females 10-49 years have inadequately diverse diets, and there are strong differences by subpopulation, particularly by wealth quintile.

4. RECOMMENDATION

Based on the main findings, several implications and recommendations are presented here at the individual, micro and macro-systems levels. At the individual level, the prevalent nutritional related problems (anaemia, overweight and underweight) imply immediate interventions by individual themselves, their families, schools and health professionals. This calls for focused targeted programmes that aim to identify nutrition-related problems as early as possible. Prevention should start from the early age of girls and boys at the kindergarten stage by educating and modifying the behaviour of girls, boys and their parents about healthy food choices. In addition, educational classes should be included in adolescent girls' and boys' schools and colleges, to enhance their knowledge and perceptions about body image, healthy

eating and the importance of physical activities in their life. These preventive efforts should take into consideration the influence of culture and societal norms in order to develop culturally sensitive programmes when tackling these issues. There is also a need to prepare clear guidelines on how to prevent and control weight problems among adolescent girls and boys, targeting education and health workers and other related professionals. Comprehensive and multisectoral programmes directed towards combating nutrition-related problems (overweight, underweight and anaemia) should be applied by Bangladesh government. These programmes should include schools, college and education through the mass media. The data collected here, and findings could be used as a basis for preparing materials for nutrition-related problems' interventions in Bangladesh. From the research point of view, national-base studies on overweight and underweight status among pre-schoolers, school and colleges children, and adolescents should be carried out in Bangladesh. At the micro-system level, the influence of the family and immediate physical environment of girls' and boys' schools and girls' and boys' colleges in Bangladesh should be targeted for prevention and intervention to improve their nutrition knowledge, to encourage uptake of standardized international guidelines of healthy school and college meals. In addition, public health education using school and college venues, media and leaflets could help in distributing proper information about healthy eating and lifestyle for both adolescents and their families. Future research should include families, schools and colleges as they influence adolescent eating behaviours and lifestyles. For example, research on knowledge among overweight and underweight parents could help to examine the home environment that adolescents live in.

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