Original Article

Nutritional Status among Adolescents at Polytechnic Institution Level

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ABSTRACT

The nutritional status of adolescents impacts on the development of a country, as they are the striking force of a nation. But still now, malnutrition is one of the major public health problems in Bangladesh. This study aimed to see the nutritional status of adolescents at the polytechnic institution level and was conducted from 1ˢᵗ December 2021 to 31ˢᵗ May 2022 at Sylhet Polytechnic Institute among first year students of different subjects. For this purpose, 906 first year students were enrolled using the purposive sampling technique. A semi-structured questionnaire was used to collect data through a face-to-face interview, as well as height, weight and body mass index (BMI) were measured by standard procedure according to the World Health Organization (WHO). The results showed that most (90.8%) of the respondents were male. The mean heights of male and female respondents were 1.68±0.77 metres and 1.54±0.09 metres, respectively. The mean weight of males was 56.58±9.77 kg and females was 46.48±7.40 kg. The mean BMI index for males was 20.17±3.35 and for females was 19.73±3.51. Normal weight was found in 60.2% of the respondents, underweight was found in 31.7%, overweight 6.6%, and obesity was 1.5% (Obesity class I and II group) among total respondents. The underweight category of the BMI index was significantly associated (p=0.02) with gender. Female respondents have 1.75 times higher odds of being underweight than male respondents. So, the alarming double burden of malnutrition among adolescents and significant female under nutrition revealed here needs a sound national policy on adolescent nutrition.

Keywords: Nutritional status, Adolescent.

INTRODUCTION

Nutrition is an important health indicator to assess a country's health status. Bangladesh is a developing

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country, and malnutrition is still one of the major public health problems. The adolescent period presents a window of opportunity to build behaviours and practices that will support good nutrition, health, and family wellbeing well into adulthood. The nutritional status of adolescents impacts their physical growth, subsequently their educational performance, and finally their country's development. Investing in adolescent nutrition means investing in human capital and, thus, in

economic growth[1]. Adolescents are individuals in the age group of 10-19 years of age. It is categorized as early (Adolescents in the age group of 10-13 years of age), middle (Adolescents in the age group of 14-16 years of age), and late adolescents (Adolescents in the age group of 17-19 years of age)[1]. Nutritional status is a conceptual term with no simple measurement test. BMI is a useful way of identifying under or over-nutrition[2].

A survey in our country has revealed that among adolescents stunting has declined but remains high (27%), overweight is increasing (Currently 7%), and underweight (Thinness) has remained consistent, around 12% during recent years[3]. The government of Bangladesh has achieved the health-related Millennium Development Goals and is committed to attaining the Sustainable Development Goals (SDGs) by 2030. Adolescent health is aligned with the third goal of the SDGs, i.e. good health and wellbeing[4]. Additionally, the global strategy for women's, children's, and adolescent health has stated that adolescents are the core of all to achieve the SDGs by 2030[5]. Considering the facts, this study was aimed at assessing the current nutritional status of adolescents at the polytechnic institution level.

MATERIALS AND METHODS

This cross-sectional study was conducted from 1st December 2021 to 31st May 2022 at Sylhet Polytechnic Institute among 906 first year students of different subjects from different districts of Bangladesh. Samples were collected by purposive sampling. Here, we measured the height, weight, and BMI by the standard procedure for calculating the body mass index of students according to the WHO. A written consent was obtained from the head of the institute. A semi-structured questionnaire was used to collect data through a face-to-face interview. Data were edited, processed, and analysed with the use of the Statistical Package for Social Sciences (SPSS) version 11.0. Age was determined from the birth certificate. Height in centimetres was marked by a stadiometer. Students were asked to remove the foot wear and stand with heels together and their head positioned so that the line of vision was perpendicular to the body. The height was recorded to the nearest 1 cm. To measure the weight, a portable, validated weighing scale was used. Students were instructed to stand on it without footwear, with feet apart and looking straight. The weight was recorded to the nearest value. BMI is derived from a person's weight in kilogrammes, divided by their height (Squared) in metres. The recommended levels are adapted from the global WHO recommendation[2]. The demographic characteristics were expressed as frequency and percentage. Height, weight, and BMI were expressed as mean±SD. A Chi-square test was performed to test the association of gender and level of BMI. For exploring odds of underweight among students binary logistic regression model was used.

RESULTS

The results showed that 24.4% respondents were from electrical, 23.7% were from civil technology, and 17% were from the computer science and technology department. Among 906, 54% of students were aged between 15 and 17 years, and 46% were above 17 years. The percentage of male respondents (90.8%) was greater than that of female (9%) respondents (Table-I).

Table-I: Institutional demographic characteristics of study population, N=906

Characteristics	Category	Frequency	Percentage
Subject	Civil technology	215	23.7
	Computer science	154	17
	Electrical technology	221	24.4
	Electro medical technology	44	4.9
	Electronic technology	73	8.1
	Mechanical	139	15.3
	Power technology	60	6.6
Age (In years)	15 to 17	489	54
	Above 17	417	46
Sex	Male	823	90.8
	Female	83	9.2

Normal weight was found in 60.2% of the respondents, underweight was found in 31.7%, overweight 6.6%, and obesity is 1.5% (Obesity class 1 and 2 group) among the total study samples (Figure-1).

The mean heights of male and female respondents were 1.68±0.77 metres and 1.54±0.09 metres, respectively. The mean weight of males was 56.58±9.77 kg and females was 46.48±7.40 kg. The mean BMI index for males was 20.17±3.35 and for females was 19.73±3.51 (Table-II).

Pearson's Chi-square test was performed to test the association between gender and level of BMI for individual categories of BMI. The underweight category of the BMI index was significantly associated ($p=0.02$) with gender. There was no significant association between normal weight, pre-obesity, obesity and gender (Table-III).

From Chi-square test, we found that underweight is significantly associated with gender. In order to determine the likelihood that female students would

Table-II: Average measurement of anthropometric indicators according to their sex, N=906

Covariate	Sex	
	Male (Mean±SD)	**Female (Mean±SD)**
Height (Meter)	1.68±0.77	1.54±0.09
Weight (Kg)	56.58±9.77	46.48±7.40
BMI	20.17±3.35	19.73±3.51
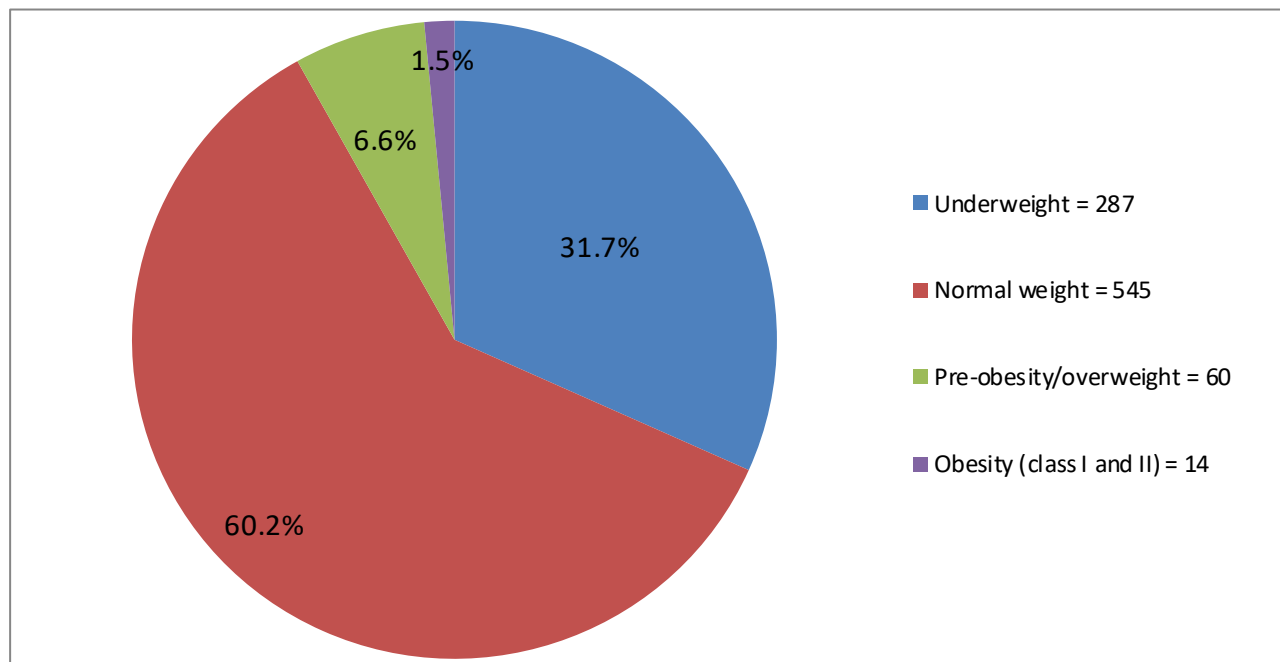
Figure-1: Nutritional status according to BMI irrespective of sex, N=906

Normal weight was found in 61.1% and 50.6% of male and female students, respectively. Among the rest, 30.5% male and 43.4% female students were underweight, 6.9% and 3.6% male and female suffered from pre-obesity or overweight, respectively, and 1.5% male and 2.4% female were obese in their respective groups.

be underweight relative to male students, binary logistic regression was performed in this study. Female respondents had 1.75 times higher odds of being underweight than male respondents, or 75% more statistically significant ($p=0.02$) chances for a female student to be underweight than a male student (Table-IV).

Table-III: *Association between BMI index and gender of adolescent students, N=906*

BMI category		Male n (%)	Female n (%)	*p-value
		Gender		
Underweight	Yes	251 (30.5)	36 (43.4)	0.02
	No	572 (69.5)	47 (56.6)	
Normal weight	Yes	503 (61.1)	42 (50.6)	0.08
	No	320 (38.9)	41 (49.4)	
Pre -obesity/overweight	Yes	57 (6.9)	3 (3.6)	0.35
	No	766 (93)	80 (96.4)	
Obesity	Yes	11 (1.3)	2 (2.4)	0.34
	No	812 (98.7)	81 (97.6)	

*Chi-square test were employed to analyse the data

Table-IV: *Result of Binary Logistic Regression Model for exploring odds of underweight among students, N=906*

Characteristics	Coefficient	Standard error	Wald	Sig.	Odds ratio	95% CI Lower	Upper
Gender							
Male	-	-	-	-	*1.00		
Female	0.56	0.23	5.66	.02	1.75	1.103	2.762

*Reference group

DISCUSSION

Most of the respondents were from the electrical (24.4%) and civil technology (23.7%) departments and 17% of the respondent studied computer science and technology. The percentage of students in mechanical, electronic technology, power technology and electromedical technology were 15.3%, 8.1%, 6.6%, and 4.9%, respectively. The difference in student numbers in different programmes was due to student enrolment according to the seat number of Sylhet Polytechnic Institute, under the Bangladesh Technical Education Board (BTEB). Of the students, 54% were in the 15-17 age range and 46% were older than 17. It might be due to the admission criteria for this institute. Students had to pass a secondary school certificate (SSC) or equivalent examination to be admitted to this institute when their age was around 17 years. The percentage of male respondents (90.8%) was greater than that of female (9%) respondents because there was only a 20% quota for girls in this institute.

In our study, we found the mean height of male and female respondents was 1.68±0.77 metre and 1.54±0.09 metre, respectively. An earlier study found that the average height of adolescent males in Bangladesh was 165.1 cm (5 ft 5 in) and females were 152.4 cm (5 ft 0 in)[6]. So we can say that a slight increase in height occurred compared to the previous study, which is a good achievement for our country.

The mean weight of males was 56.58±9.77 kg and females was 46.48±7.40 kg. The mean BMI index for males was 20.17±3.35 and for female respondents was 19.73±3.51, which was similar to another study in Bangladesh where they found mean height, weight, and

BMI were higher in boys than in girls[7].

From the BMI index, we found that among the total population, normal weight, irrespective of sex (60.2%) was more frequent in this study. On the other hand, underweight (31.7%) was the second-highest frequent group in the BMI category, followed by overweight (6.6%), and obesity (1.5%) (Obesity classes I and II). Among adolescent males, 61.1%, and females, 50.6%, students had a normal weight; 30.5% males and 43.4% females were underweight; 6.9% males and 3.6% females suffered from pre-obesity or overweight, respectively; and 1.5% males and 2.4% females were obese in their respective groups. Another study in Bangladesh found that the prevalence of underweight was 16.3% in boys and 12.7% in girls, and the mean prevalence of overweight was 10% (Boys 10.2%; girls 9.8%), and that of obesity was 5% (Boys 4.3%; girls 5.8%)[7], which differs both in the underweight and overweight categories in our study, probably due to the sample size and the fact that students belong to different districts included in our study. But one thing is common in both of these studies that underweight is still an existing problem, and overweight and obesity are growing problems in our country. This situation (Underweight and overweight combination) was known as the double burden of malnutrition[8] and it was evident in our study that this would make an unhealthy population burden. Another study in Bangladesh found overweight was increasing, currently at 7%, which is nearly similar to our study[3]. Another study by Gomez et al.[9] found the rise in BMI has accelerated in East and South Asia for both sexes and Southeast Asia for boys, which was also visible in our study. This increasing trend is probably due to urbanization, a sedentary lifestyle, and the poor quality dietary habits of adolescents in this region. According to UNICEF's 2011 State of the World's Children Report[10], undernutrition among teenage adolescent girls was higher (47%) in India than in any other country which is similar to our study. It signifies a lack of nutritional care among girls, which is not only present in our country but also in this region.

In our study, the underweight category of the BMI index was significantly associated with gender. Female respondents have 1.75 times higher odds of being underweight than male respondents. A survey was carried out from July to December 2013 in Bangladesh among adolescent girls. Researchers here found that, according to the BMI category (Kg/m^2) the prevalence of underweight (BMI<18.5) was 65.9%, and as per the Gomez classification (Weight for age), the prevalence of malnutrition was 48.2% (Mild), 23.5% (Moderate) and 2.8% (Severe) categories[11]. Considering these two studies, we could say that adolescent girls are still suffering from undernutrition in our country.

CONCLUSION

Though overall findings on the nutritional status of the country might not be reflected in this study, the alarming double burden of malnutrition among adolescents and especially females under nutrition revealed here needs a sound national policy on adolescent nutrition. To achieve the SDG goal, a coordinated approach and the collective responsibility of a range of line ministries, departments, and agencies, non-governmental organisations, the private sector, religious authorities, communities, families, and individual involvement are now a necessity.

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