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PHYSICAL ACTIVITIES AND BODY MASS INDEX (BMI) IN URBAN ADOLESCENT.

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Abstract

Physical activity is recognized to be an important determinant of health and nutritional status; few instruments have been developed to assess physical activity and Body mass index. Physical inactivity and sedentary lifestyles are known to predispose to overweight and obesity. This study aimed to assess the relationship between physical activity and body mass index of urban adolescents. A cross sectional study was conducted among urban adolescent of Dhaka north city among 270 adolescent. Purposive sampling method was used for interview by using pre-tested semi-structural questionnaire and International Physical Activity questionnaire. Among total respondents, Majority (78.8%) had age ranged 10-15 years and Mean ± SD was 13.88±1.92. Almost 50.0% were involved in moderate physical activities, and 44.4% had performed low physical activity. There were statistically significant difference between gender and physical activity (p=0.00). Adolescent overweight were (10.7%) and 15.6% thinness and severe stunted were 6.3% and 17.0% were stunted. A large proportion of the adolescent in urban area did not participate in physical activity. The prevalence of overweight and obesity is low but under nutrition is a major nutritional problem among these adolescents. Researcher suggests that regular exercise can reduce overweight and obesity among urban adolescent.

Introduction

Adolescent population in the world 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[1]. Childhood obesity and physical inactivity are increasing in both developing and developed countries although at different rates. The underlying plausible hypothesis in the development of obesity is that the feedback from energy expenditure to appetite may be weak at low levels of physical activity and that sedentary lifestyles, therefore, favor positive energy balance and weight gain [2]. According to world health organization (WHO), a school-aged youth should accumulate at least 60 minutes of moderate to vigorous intensity physical activity every day to ensure healthy development. It is estimated that less than one-third of young people are sufficiently active to benefit their present and future health and wellbeing. This decline is largely due to increasingly common sedentary ways of life like fewer children walk or cycle to school and excessive time is devoted to watching television, playing computer

games and other sedentary activities. School-based physical activities have also been decreasing. 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 the urban area. There are about 27.7 million adolescents aged 10-19 years of age in Bangladesh, which makes up about one-fifth of the total population. 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 [3]. 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 childbearing age because of low to moderate prevalence of possible deficiency.[4] 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%. The 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) forage. Protein, iron, and calcium are also important for the 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 [2]. However, little-published data exits on physical activity and body mass index of Bangladeshi adolescent in the urban groups. This study is therefore helpful in evaluating the nutritional status and physical activity of adolescents. This study may further provide certain information of the nutritional status of their earlier age of life.

Methodology

This study was the cross-sectional study conducted from 1st January to 30th December 2017 to assess the association between physical activities & Body Mass Index in urban adolescent of the selected school of Dhaka, Bangladesh. The systemic sampling method was followed for sample selection. The total sample size was 270. All participants were given questionnaire sheet and explained about the study objective and written informed consent was obtained. Face-to-face interview were taken by using pre-tested semi-structured questionnaire which were divided into three sections which included: Section I comprised of Socio-demographic details such as age,

sex, education, occupation, type of family and socioeconomic status; Section II was incorporated of anthropometry measurement and Section III comprised of International Physical Activity Questionnaire (IPAQ). Data were analyzed by using statistical software package SPSS-23 version was used for data entry and analysis. All data were analyzed after checking, cleaning, editing and compiling the software of SPSS-23 version. Results were recorded as frequencies, figures, and P-values. Level of significance was taken 0.05.The study was approved by the Institutional of Review Board at the National Institution of Preventive and Social Medicine (NIPSOM). The researchers highly consider about the human right of the participant of this study. Data were collected after obtaining approval from IRB of NIPSOM and written permission was taken from school authority and each respondent. The researcher was explaining clearly about the purpose of the study, the procedure, the possible benefit, and risk of the study to the participants.

Result

Table 1: Socio-demographic characteristics of the study respondents.

Socio-economic variable	(f)	%
Age of respondents		
10-14 years	161	59.62
15-19 years	109	40.37
Gender		
Male	172	64.0
Female	98	36.0
Educational level		
PSC	122	48.0
JSC	129	45.0
SSC	19	7.0
Monthly family income		
Less than 10000	79	29.3
10001-20000	85	31.5
20001-30000	49	18.1
30001-40000	13	4.8
More than 40000	44	16.3
Housing status		
Building	194	71.9
Semi building	46	17.0
Teen shade	30	11.1

Table 1 shows that majority (59.62%) of respondents aged ranged had belonged to 10-14 years and 40.37% had 15-19 years. Male (64.0%) respondents higher than female (36.0%). Most (48.0%) of the respondents had completed Primary School Certificate (PSC) and 45.0% had completed Junior School Certificate (JSC). Most of the respondent's monthly family income had within the range of 10001-20000 Tk and 29.3% respondent's family monthly income had below 10000tk. Most of the respondents live in Building.

Table 2: Distribution of respondents by their level of physical activity. (n=270)

Level of physical activity (PA)	**(f)**	**(%)**
Low physical activity	120	44.4
Mild physical activity	134	49.6
Moderate physical activity	16	5.9
High physical activity	00	00
Total	**270**	**100.0**

Table 2 shows that most 49.6% of the respondents had performed the mild physical activity and 44.4% had performed the low physical activity.

Table 3: Distribution of respondents by Nutritional status. (n=270)

Weight for age Z score	**(f)**	**(%)**
Normal (-2 to +1)	199	73.7
Thinness (<-2SD)	42	15.6
Overweight (>+1SD)	29	10.7
Height for age Z score		
Normal (-2 to +2)	203	75.2
Stunted (<-2 SD)	47	17.4
Severe stunted (<-3SD)	17	6.3
Tall (>+2 SD)	3	1.1

Above table 3 shows that majority 73.7% of the respondents had normal body weight, 15.6% had the thinness and 10.7% were overweight. On the other hand, normal height had 75.2% and stunted 17.4%.

Table 4: Association between Physical activity and Nutritional status. (n=270)

Height for age Z score	Physical activity (PA)			Total	Significance
	Low (PA)	Mild (PA)	Moderate (PA)		
Severe stunted	7	9	1	17	$\chi 2$=4.34 df=6, p=0.630
Stunted	26	20	1	47	
Normal	85	104	14	203	
Tall	2	1	0	3	
Weight for age Z score					
Overweight	14	12	3	29	$\chi 2$=5.74 df=4, p=0.219
Thinness	23	19	0	42	
Normal	83	103	13	199	
Total	120	134	16	270	

There was no statistically significant difference between physical activity and height for Z score (p-value > 0.630). There was no statistically significant difference between physical activity and BMI for Z score (p-value > 0.219).

Table 5: Association between Gender and Nutritional status. (n=270)

Height for age Z score	**Gender**		**Total**	**Significance**
	Male	**Female**		
Severe stunted	11(10.8)	6(6.2)	17	$\chi 2$=2.73 p=0.43
Stunted	25(29.9)	22(17.1)	47	
Normal	134(129.3)	69(73.7)	203	
Tall	2(1.9)	1(1.1)	3	
Weight for age Z score				
Overweight	21(18.5)	8(10.5)	29	$\chi 2$=1.73 p=0.42
Thinness	24(26.8)	18(15.2)	42	
Normal	127(126.8)	72(72.2)	199	
Total	172	98	270	

There was no statistically significant difference between gender and height for age Z score (p-value > 0.43). No statistical differences were found between gender and BMI for age Z score as the p-value was more than 0.05.

Table 6: Relationship between gender and level of physical activity of respondents.

Gender	Level of physical activity			Total	Significance
	Low (PA)	Mild (PA)	Moderate (PA)		
Male	61(76.4)	98(85.4)	13(10.2)	172	$\chi 2=15.88$ p=0.01
Female	59(43.6)	36(48.6)	3(5.8)	98	

There was the statistically significant difference between gender and physical activity (p-value > 0.01).

Figure 1: Parents educational level of the respondents.

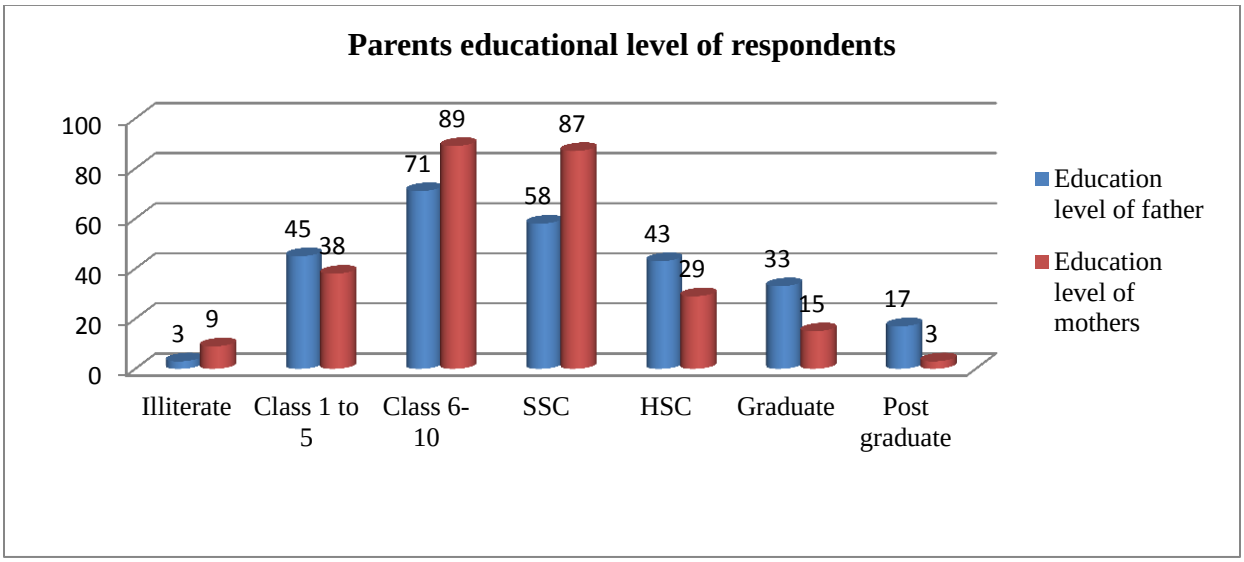

Figure 1 shows that most of the respondents mother education level 33.0% were class 6 to 10, followed by illiterate were 3.3%, class 1 to 5 were 14.1 %, Secondary School Certificate or equivalent was 32.2%, Higher School Certificate or equivalent was 10.7%, graduate or equivalent was 5.6% and postgraduate or equivalent was 1.1%. Table 3 shows majority about 26.3% were class 6 to 10, illiterate were 1.1%, class 1-5 were 16.7 %, Secondary School Certificate or equivalent was 21.5%, Higher School Certificate or equivalent was 15.9%, graduate or equivalent were 12.2% and postgraduate or equivalent was 6.3%.

Discussion

Adolescent age is considered as a dynamic period of growth and development because children undergo physical, mental, emotional and social changes. In other words, the foundations of good health and sound mind are laid during the adolescent age period [5]. The present cross-sectional study was conducted during August to September 2017 conducted to assess the physical activities & body mass index in an urban adolescent. In the present study, among total 270 respondents, Majority 81.8% of respondent's age was 10-15 years. The mean age of the urban respondents was 14.17± 1.482 years and the male was higher than female. The similar study was conducted in Anambra State by [6] where Out of 365 pupils, 50.4% were males and 49.6% were females. In this study, the majority of the respondents had completed Junior School Certificate were 48.0% and Primary School Certificate was 45.0%. Some preceding studies conducted in Tangail District, by [7]. This study seems to be similar to this present study. In this study, Majority 26.3% of the respondent's fathers education level was class 6 to 10, class 1-5 were 16.7 %, Secondary School Certificate or equivalent was 21.5%, Higher School Certificate or equivalent was 15.9%, graduate or equivalent were 12.2% and postgraduate or equivalent was 6.3%. Most of the respondent's mothers' education level 33.0% were class 6 to 10, followed by Secondary School Certificate or equivalent was 32.2%, Higher School Certificate or equivalent was 10.7%. Some previous studies conducted in Nigeria in the rural setting by Boma et al., 2014. This study seems to be similar to this present study. In the current study, Majority 31.5% was monthly income within a range of 10001-20000 Tk, followed by 29.3% was monthly income less than 10,000 Tk and 16.3% was monthly income more than within 40,000 Tk. Some previous studies conducted in Tangail District by [8]. This study is consistent with this present study. In this study, Most 49.6% of the respondents had performed a mild physical activity and 44.4% had performed the low physical activity. There was the statistically significant difference between gender and physical activity (p-value 0.00). In this study physical activity was inversely and significantly associated with Body Mass Index among urban adolescent. The overweight adolescent (10.7%) and thinness were (15.6%) in this study. Even though adolescence is a growth period with increased body fat deposit and an increased risk of obesity, the data reveal that the day-to-day persistence of low activity levels may have contributed to the overweight status of this group. Another important finding of this study is that African American adolescent was on the average 7% less active than Mexican American and non-Hispanic white adolescent[9]. This is particularly troubling given that African American and Mexican American adolescent share a heavier burden of obesity-related disease such as hypertension and diabetes than the general population, which may be partially controlled by regular physical activity. Despite measurement problems of physical activity among children and adolescents, physical activity as an intervention strategy to prevent and treat obesity is an accepted and promising strategy[10]. However, a consensus on guidelines as to what might be a therapeutic activity level is lacking. There is a critical need for integration of efforts and resources of schools, communities, and local governments to develop physical activity programs aimed at promoting participation in physical activity among youth during and after school hours. Considering

competing demands on the resources of schools, and the focus of schools on high academic achievements on standardized tests, evaluation programs are needed to determine effective and efficient intervention programs to increase participation in physical activity [11]. Team efforts of parents, educators, and healthcare professionals are needed to promote physical activity by role modeling active lifestyles as well as making physical activity fun and enjoyable for adolescent before, during, and after school hours [12]. School activity programs should be diversified with built-in incentives to encourage inactive students to become more active. School nurses and other healthcare professionals should routinely assess levels of physical activity of students and encourage inactive students and their families to adopt more active lifestyles.

Conclusions

In this study majority, two-thirds of the respondents were normal and significant amount was thinness and overweight. The decreased physical activity of adolescents may be an important factor in perpetuating obesity. Our study found that female adolescents are at greater risk for physical inactivity. Health professionals, families and school authorities should encourage adolescents to incorporate physical activity into their daily life and observe the influence of media on adolescents' attitudes, which may be encouraging the adoption of sedentary behaviors in daily activities.

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