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Prevalence of Obesity and Overweight among English Medium School Children of Dhaka City in Bangladesh

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Abstract: A cross sectional study was conducted to find out the prevalence and underlying causes of childhood overweight and obesity among 7 selected English medium schools of Dhaka, Bangladesh. For study purpose, 112 participants were selected from English medium schools located different places of Dhaka city to collect data through a well structured questionnaire by face to face interview. The prevalence of overweight and obesity was found 20.5% and 24.1 % respectively and also the prevalence of overweight and obesity among boys were 16.4% and 26.9% respectively, and for girls were 26.7%, 20.0% respectively. Most (7.46% and 8.95%) of the male obese students were in the age group of 9-10, 13-14 years and most (6.67% and 6.67%) of the female obese students were in the age group of 9-10 & 11-12 years. The prevalence of overweight and obesity was found quite high in this study. It is demonstrated that several risk factors such as more meal taking habit, snacking habits, physically less active lifestyle and high levels of sedentary activities to be major underlying factors for increasing prevalence of childhood overweight and obesity among English medium school children in Dhaka, Bangladesh.

Key Words: Obesity, Overweight, Physical activity, Risk factors, School children

Introduction

The prevalence of overweight and obesity among children and adolescents has increased significantly in the developed countries during the past two decades and similar trends are being observed even in the developing world, though less rapidly (Jahnavi *et al*., 2011). The magnitude of overweight and obesity is a global public health problem (WHO, 2005); as there has been an upward trend in the prevalence of obesity both in developed and developing countries.

Obesity is caused by an imbalance in our energy intake versus our energy output (WHO, 2008) but the rise in childhood obesity is multi-factorial and complex. Childhood overweight and obesity is a condition where excess body fat negatively affects a child's health or wellbeing. So, it is very much essential to know the prevalence of overweight and obesity among children. Children residing in cities like Dhaka are often overburdened with studies with little time and space for outdoor games and activities (Mohsin *et al*., 2012). A study conducted on under 5 children in Bangladesh found that 1.9 % girls and 1.4% boys were overweight in urban area (Bangladesh bureau of statistics, 2007). Long term follow up indicates that obese children and adolescents tend to become obese adults (Power *et al*., 1997).

During childhood, level of body fat and body composition change with age, consequently overweight and obesity are defined using BMI percentiles for age and sex. Children>2year old with a BMI >95th percentile meet the criterion for obesity and those with a BMI between 85th and 95th percentile fall in the overweight range (Ogden *et al*., 2002). The U.S. Centres for Disease Control and prevention (CDC) 2000 growth charts for ages 2-19 year is widely used for classifying overweight and obesity in young people. A large variety and number of risk factors have been identified for the development of obesity in childhood (Kipping *et al.*, 2008; Monasta *et al*., 2010). These range from factors which would be difficult or impossible to modify, such as genes and ethnicity, to those which are potentially modifiable such as excessive hours of television viewing; low levels of physical activity; and dietary factors such as eating a diet high in fat, carbohydrate and sugary drinks, missing breakfast and large portion sizes (Kipping *et al.*, 2008; Monasta *et al*., 2010). Moreover, fast food consumption is also correlated with higher BMI levels, and the possibility of being obese increased as the frequency of fast food consumption increased (Schröder *et al*., 2007). This relation is established through the association of BMI with morbidity. Studies which have shown that overweight (BMI! 25) and obesity (BMI! 30) are correlated with the prevalence of hypertension (Despres *et al*., 1990), coronary heart disease (Hubert *et al*., 1983), diabetes (Golay and Ybarra, 2005) and certain types of cancers (Garfinkel, 1985).

There is not sufficient information on the prevalence of childhood obesity among the people of Bangladesh has been found in the published literature as we can create awareness to reduce this problem. In this circumstance, the present study has been undertaken to determine the overweight and obesity among the students of English Medium School going children in Dhaka city. Our study demonstrated several risk factors for increasing prevalence of childhood overweight and obesity among English medium school children in Dhaka. As a result people could be able to understand the causes of obesity and they would choice their food item that will not be the factors of developing overweight. This study also would be a source

for Public health programs to increase awareness on these risk factors among children and adolescents in order to reduce the future burden of obesity associated with chronic diseases. This study would be able to provide a message that life style modification with a variety of physically active recreational activities and healthy dietary practices of the school students should be encouraged through School Health Service Programme.

Methods and Materials

This research had been conducted in Dhaka city at seven different English medium schools which had children of 7 to 14 years. At first, we listed schools based on their tuition fees, location and willingness to participate in the study. Seven schools were chosen based on the following criteria: availability of cafeteria, vending machines, and fast food shops in or near the school.

Study Design: The study was designed as cross sectional study.

Development of Questionnaire:

A standard questionnaire was developed for collecting data on anthropometry (Height, Weight and Mid upper-arm circumference).

Collection of data:

After attaining consents from school authority and parents, we went to collect data from these seven schools on seven different specific days. These seven schools provided 112 students (Boys-67, Girls-45) to participate in this study.

Anthropometric Measurements:

Children's weight and height were measured according to standardized procedure using appropriate device. Height and weight of the students were measured using WHO standard protocol. Digital weighing machine and stadiometer were used for measuring weight and height respectively. Measurements of Mid Upper-Arm Circumference (MUAC) were made using a flexible, non-stretch tape made of fibreglass.

The U.S. Centers for Disease Control and prevention (CDC) 2000 growth charts for ages 2-19 year is used for classifying overweight and obesity in young people.

Data analysis:

Data was analyzed by statistical software SPSS v20. SPSS-20 software was used to organize, analyze and statistical analysis of the quantative and qualative data. For tabular, charts and graphical representation Microsoft Word and Microsoft Excel were used.

Results and Discussions

Anthropometry

Table 1: Determination of Height, Weight and MUAC of the children (n=112)

Variable	Sex						P value for difference
	Boys (n=67)			Girls (n=45)			
	Min	Max	Mean ± SD	Min	Max	Mean ± SD	
Height (cm)	119	172	143.81±15.579	116	172	145.04±14.951	P=0.082
Weight (kg)	20	84	44.91±15.507	22	77	46.40±14.404	P=0.001
MUAC (cm)	15	33	24±4.736	16	33	24.94±4.683	P=0.841

Table 1 shows the determination of height, weight and MUAC of the children. The mean weight of the study population was out to be 46.40±14.404 kg for girls and 44.91±15.507 kg for boys and the mean height was 145.04±14.951 cm for girls and 143.81±15.579 cm for boys. It represents that there were no significant difference between the boys and girls in height and MUAC, while there were statistically significant difference in weight ($p < 0.001$) between boys and girls

Table 2: Comparison between boys and girls according to nutritional status

BMI for age		Number of children assessed		
		Boys	Girls	Total
		%(n=67)	%(n=45)	%(n=112)
Under weight	<5th percentile	4.5 (3)	2.2 (1)	3.6 (4)
Healthy weight	5th-85th percentile	52.2 (35)	51.1 (23)	51.8 (58)
Over weight	85th-95th percentile	16.4 (11)	26.7 (12)	20.5 (23)
Obese	>95th percentile	26.9 (18)	20 (9)	24.1 (27)

Table 2 shows that 20.5 % of the children were overweight. Among them 16.4% were boys and 26.7 % were girls. Among 24.1 % obese, 26.9% were boys and 20% girls. It also shows that girls had higher prevalence of overweight than boys and boys had higher prevalence of obesity than girls.

Table 3: Overweight in different age group

Age (years)	Overweight children(Boys and Girls) 20.5%(23),n=112	
	Boys 16.4%(11), n=67	Girls 26.7%(12), n=45
7-8	2.98 (2)	0 (0)
9-10	2.98 (2)	13.33 (6)
11-12	5.97 (4)	8.89 (4)
13-14	4.47 (3)	4.44 (2)

Table 3 shows that 20.5 % of the children were overweight. Among them 16.4% were boys and 26.7 % were girls. It shows that 24.1 % of the students were obese. Among them 26.9% were boys and 20% girls. It shows that girls had higher prevalence of overweight than boys and boys had higher prevalence of obesity than girls. About 5.97% boys of 11-12 age groups are mostly overweight whereas 13.33% girls of 9-10 years old are mostly overweight.

Table 4: Obesity in different age group

Age (years)	Obese children (Boys and Girls) 24.1%(27),n=112	
	Boys 26.9%(18), n=67	Girls 20%(9), n=45
7-8	4.48 (3)	4.44 (2)
9-10	7.46 (5)	6.67 (3)
11-12	5.97 (4)	6.67 (3)
13-14	8.95 (6)	2.22 (1)

Table 4 shows that a total of 24.1% children (26.9% boys and 20% girls) are obese. Among them 7.46% boys of 9-10 years are mostly obese and 13-14 years old are obese and 8.95 whereas girls of 9-10 and 11-12 years of old are obese 6.67% respectively.

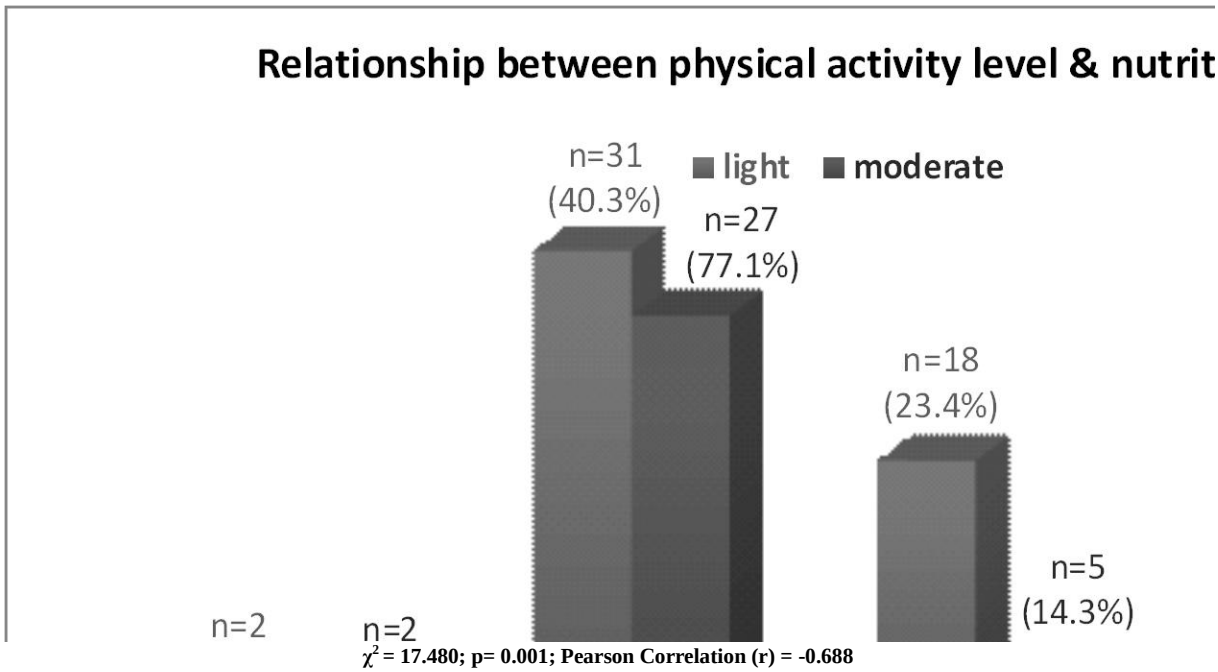

Fig. 1: Relationship between physical activity level and nutritional status of the children

Figure 1 shows that most of the obese and overweight children performed light physical activity. Among them about 23.4% overweight and 33.8% obese children was lightly physically active. On the other hand 14.3% overweight and 2.9% obese children was moderately physically active. Chi square test were done to find out relation and they revealed to be statistically significant ($p < 0.05$). Pearson correlation (r) shows that there was a negative relationship between physical activity and nutritional status of the children.

Table 5: Relationship between nutritional status and number of meal taken in a day including snacks

Nutritional status	Percent of respondent taken meal in a day including snacks				
	3 times	4 times	5 times	6 times	7 times
Under weight	0%	50%	0%	50%	0%
Healthy weight	0%	44.8%	50%	5.2%	0%
Overweight	4.3%	4.3%	56.5%	30.4%	4.3%
Obese	0%	0%	11.1%	59.3%	29.6%

The number of meal (including snacks) taken by the children in a day according to weight status category is shown in the table 5. 44.8%, 50%, 5.2% healthy children took meal respectively 4, 5 and 6 times in a day. Most of the overweight children about 56.5%, 30% and 4.3% took meal respectively 5, 6 and 7 times in a day. About 11.1%, 59.3%, 29.6% obese children took meal respectively 5, 6, 7 times in a day. Overweight and obese children were taken 5, 6, 7 meal in a day and most healthy weight children were taken 4, 5 meal per day.

Table 6: Cross table with Chi-square test

Dependant variable	Independent variable	p-value
Nutritional status	sex	0.514
	age	0.982
	Monthly income	0.010
	Economic status	0.028
	Mother's education level	0.356
	Father's education level	0.140
	Spend money for food purpose	0.040
	Family size	0.103

Table 6 shows the association between nutritional status and different other variable. Chi-square test was used to determine the association. From above table it is found that variable, monthly income ($p=0.010$), spend money for food purpose ($p=0.040$) and economic status ($p=0.028$) is statistically significant with nutritional status at 5% level of significance. And for other variables (sex, age, parent education, and family size) there is no significant association exists.

In developing countries like Bangladesh, the problem of overweight is being emerging at a time when under nutrition is still a significant problem. The present study presented childhood overweight and obesity problems in upper and middle class English medium school going children of Dhaka city aged 7 to 14 years. In this study 24.1% of the students were found to be obese and 20.5% were found to be overweight among this section of children by their BMI for age percentile score. This study may be compared to a study conducted in Dhaka City in 2010 which revealed that obesity and overweight of children aged with 6 - 13 years was 17.8% and 13.2% (Sultana S, 2010). Another cross sectional study find-out the obesity and overweight problems in children (7-12 yrs) coming from affluent families in Dhaka city (2011) found the proportion of the childhood obesity and overweight to be 25% and 21.88% of the respondents (Saha S *et al*., 2011). In this study, the prevalence of obesity was more prevalent in boys compared to girls according to CDC criteria. Among boys 26.9% are obese and for the girls it was 20%. Among boys 16.4% are overweight and for the girls it was 26.7%. The proportions of overweight among the girls were higher than the boys.

Our data demonstrated that most of the obese and overweight children performed light physical activity. In this study it was found that overweight and obese children eat more meal in a day than healthy weight children. Obese children do tend to eat larger portions or higher calorie foods, like high-fat foods (Media Guide on Food Safety & Nutrition, 2007-2009).

Conclusion

This study demonstrated that several risk factors such as high levels of sedentary activities, Positive energy balance are associated with overweight and obesity. It was observed that a significant number of students are overweight and obese which is too much alarming for our country. A variety of physically active recreational activities and healthy dietary practices of the school students should be encouraged which can prevent any future sickness. We should aware of both groups to reduce obesity and overweight problems.

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