J. Rangpur Med. Col, 2019; 4(1):55-56

Original Aticle

Prevalence of Overweight and Obesity along with Dietary Habits amongst School-Aged Adolescents in English Medium School in the Rangpur City

Tamanna Hamid[1], Mahmudul Bari[2], Munira Begum[2], Tasnim Sarwar[3], Mst. Rukshana Begum Chowdhury[4], Marufa Mahazabin[5], Labib Hasan[2], Sultana Bilkis[2]

Abstract:

Background: The global prevalence of overweight and obesity among school going adolescents is increasing at an alarming rate. As a developing country, Dhaka and other divisional cities of Bangladesh are not free from this problem. The aim of this study was to assess the prevalence of overweight and obesity along with dietary habits amongst school-aged adolescents in English medium school in the Rangpur city. **Methods:** This study was a cross sectional type of descriptive study which was carried out at the Millennium Stars School and College in Rangpur city by 3rd year students of Rangpur Medical College under the guidance of Department of Community Medicine. Data were collected through a self-administered pre-tested structured questionnaire and BMI was assessed by portable Weighing Scale and Stadiometer. **Results:** Results indicate that out of 371 respondents, most of them (52.26%) were 12-14 years old with average 14.30±1.187 years. The prevalence of overweight and obesity among the respondents were 18.3% and 8.1% respectively (14.98% and 6.28% of boys, 22.56% and 10.37% of girls). The total prevalence of overweight and obesity was significantly higher among girls than boys ($p<0.001$). This study also shows that among the overweight and obese students, 47.96% took fast food ≤4 times per week and 52.04% took fast food ≥3 times per week. There is supporting evidence that excessive fast food intake has a positive association (p value< 0.00001) with the rising rates of obesity and overweight in the adolescents. **Conclusion:** Our study suggested that prevalence of overweight and obesity is quite alarming and "Fast food intake" is very significantly associated. Nutrition and health education programs could help the adolescents to reduce this problem.

Indexing words: Overweight and obesity, School-aged adolescents, Body mass index, Fast food, English medium school

Introduction:

Overweight and obesity among adolescents has emerged as an alarming health problem in today's world. It is being considered as a global epidemic, not only in economically developed countries, but also in developing countries. Over 340 million children and adolescents aged 5-19 were overweight or obese in 2016[1]. WHO has defined overweight and obesity as "abnormal or excessive fat accumulation that presents a risk to health"[2]. It occurs as a result of "Caloric imbalance" – too few calories expended for the number of calories consumed and it is affected by various genetic, behavioral and environmental factors[3]. The use of body mass index (BMI) for age to define being overweight and obese in adolescents is well established for both clinical and public health applications, because of their feasibility under clinical settings and in epidemiological studies. The normal range for BMI in children varies with age and sex. While a BMI above the 85th percentile is defined as overweight, a BMI greater than or equal to the 95th percentile is defined as obesity by Centers for Disease Control and Prevention (CDC). It has published tables for determining this in children[4]. WHO (2013) considers childhood obesity as "one of the most serious public health challenges of 21st century"[5]. A study conducted by CDC

1. Assistant Professor, Dept. of Community Medicine, Rangpur Medical College
2. Lecturer, Community Medicine, Rangpur Medical College
3. Major, CMH, Rangpur Cantonment
4. Senior Clinical Pathologist, Rangpur Medical College Hospital
5. Assistant Professor, Dept. of Community Medicine, Rangpur Community Medical College

over the year 2011 to 2014 shows 20.5% prevalence of overweight and obesity in USA among the 12-19 years old children[6]. In Canada, the prevalence of overweight and obesity was found to be 27% among 3-19 years old in a study done by Rodd and Sharma in 2016[7]. Through collection of data from various sources, Wang & Lim displayed showed 22.7% prevalence of overweight and obesity among boys & 26.6% among girls in 5-17 age groups, in England (2007), 22.6% among boys & 17.7% among girls in 3-17 age groups, in China (2005), 21.7% among boys & 17.1% among girls in 10-19 age groups[8]. The developed Arabian countries has an even higher prevalence rate such as 32.5% in age groups 13-15years, in Egypt, 38.4% age groups 13-15years, in UAE, 51.4% age groups 13-15years[9].

Our neighbouring country, India also has shown proof of high prevalence rates of overweight and obesity among school-going adolescents in urban areas as seen in the study of Ramachandran et al, which was 17.8% among boys & 15.8% among girls in 13-18 age group[10]. Another study conducted by Das et al. at Dhaka shows 6.7% overweight and obesity prevalence among children aged between 5-19 years. They found a positive association between high socio-economic status and children being overweight[11]. A cross sectional study, conducted in September 2006 in one of the affluent private schools in Dhaka by Mohsin et al. shows a prevalence of overweight and obesity of 17.9% [12]. Obesity & overweight in childhood gives rise to some and sows the seeds for many other problems involving physical, mental, social and economic aspects. This includes cardiovascular diseases, type 2 diabetes, lung problems, liver problems, renal diseases, musculoskeletal complications and also certain malignant conditions. Obese adolescents are more likely to have prediabetic, joint problems, sleep apnea, social and psychological problems[13]. In the preliminary results of a nationwide study recently conducted by ICDDR,B on overweight and obesity prevalence among adolescents in urban areas of Bangladesh, it was seen that of children aged 5-18 years, 10% are overweight while 4% are obese. The figures are alarming, considering the size of our young population. The research identified availability of high-calorie fast/processed food, sedentary lifestyle, better transportation facilities, less outdoor recreational space and intake of more food and beverages as result of attractive media campaigns as some of the important factors contributing to childhood overweight and obesity among school-going children of Bangladesh. According to Obesity Prevention Source of Harvard School of Public Health, South Asian countries like Bangladesh, India and Pakistan have low child obesity rates compared to other countries. But the large populations of these countries add up to large numbers of children who are overweight or obese[14].

Obesity in children and adolescents is rising alarmingly and approaching epidemic proportion in many economically developed countries, particularly in USA, Canada, Australia and several European countries[15]. Likewise, in developing countries this issue is emerging as a public health crisis. According to a recent report, out of an estimated 43 million obese adolescents worldwide in 2010, by 2020, it is estimated that the global prevalence of childhood obesity will reach approximately 60 million. This dictates that, the overweight and obesity problem has already reached an epidemic rate in developed countries of Europe, the Americas and Asia[16]. Apart from the divisional City, the prevalence of overweight and obesity is ever on the rise in other cities also. Since then, urbanization has taken a big leap. With growing number of restaurants and decreasing number of playgrounds, the overweight and obesity status of the adolescent population is also on the rise. The availability of fast foods near the schools, parents' negligence towards their child's nutrition is starting to take a toll on the BMI status among these school going children. This could lead to morbidity in mass population in the future and eventually, handicap the society to a great extent. Therefore, a study observing the obesity and overweight pattern and dietary habits amongst adolescent school going children is of utmost importance to plan the proper intervention measures and halt the problem in its initial stages.

Methods:

It was a cross sectional type of descriptive study. The study was carried out at The Millennium Stars School and College, Rangpur Cantonment, Rangpur City on 25th March to 25th April 2018. The aim was to screen 371 respondents, males

207(55.8%) and females 164(44.2%) between 12 and 17 years at class 7, 8, 9 &10 purposively. All the students of these classes were invited to participate in the study. Informed consent was obtained from the school authorities to make weight and height measurement using portable weighing Scale & portable Stadiometer respectively. Height and weight of the students were measured without shoes using standard procedures and BMI was calculated using standard formula (weight in kg/ height in meter^2). Measurements were plotted against 2000 growth chart of CDC (Centre for Disease Control) for boys & girls. After BMI calculation, it was expressed as a percentile which was obtained from either a graph or a percentile calculator The CDC defines underweight as BMI for age below 5th percentile, normal as between 5th to 85th percentile, overweight as BMI 85th to 95th percentile and obese as BMI above 95th percentile[4]. The data were collected through a self-administered pretested structured questionnaire from the school children. "Food Frequency Questionnaire" included questions regarding food habits. The answers were recorded according to written responses.

- Fast-food intake was categorized as: ≤3 times per week and ≥4 times per week.

The dietary habits action is performed every day:

- Regularly/Always
- Frequently: The action is performed ≥4 days to <7 days per day
- Rarely: The action is performed ≤3 days per day[4].

After collection of data they were checked, verified and edited manually to reduce error. The data were processed manually and a master table was prepared from that table. Data compilation and tabulation were done by using scientific calculator. Data were analyzed using SPSS (Statistical Package Social Science) version 25. Descriptive statistics are presented as means and standard deviations. Chi-square test was calculated to determine the statistical association between BMI and associated variables.

Results:

Regarding the socio-demographic characteristics, among 371 students, majority 205(52.26%) were 12-14 years old & 166(44.74%) were 15-17 years old (mean=14.30 ± 1.187). About 207 (55.8%) were male and rest 164 (44.2%) were female. Mother's level of education 274(73.85%) were university and above and 97(26.15) were less than university. Father's level of education of majority 260 (70.08%) were university and above and 111(29.92%) were less than university. Among 371 students, most of the students' father 148 (39.90%) were businessmen, 120 (30.2%) were government employees & 103 (27.8%) were non-government employees. The study revealed that majority 289 (77.89%) of the students' mother were housewives, 38 (10.24%) were government employees and 44 (11.86%) were non-government employees. It was seen that majority, 10 (2.70%) students' monthly family income in taka was below <20,000/-, 209 (56.33%) students' family income was between 20,000- 39,999/- and 152 (40.97%) was 40,000/- or more (Table 1).

Table 1: Socio-demographic characteristics of school adolescents (n=371)

General characteristics	Frequency	Percentage
Age (in years)		
12-14	205	55.26
15-17	166	44.74
Mean =14.3 ± 1.18 SD		
Sex		
Male	207	55.80
Female	164	44.20
Educational level of mother		
University and above	274	73.85
Less than university	97	26.15
Educational level of father		
University and above.	260	70.08
Less than university	111	29.92
Father's Occupation		
Government	120	32.35
Non-government	251	67.65
Mother's occupation		
House wife	289	77.89
Employed	38	10.24
Unemployed	44	11.86
Monthly family income (in taka)		
Less than 20000/-	10	2.70
200000-39999/-	209	56.33
400000/- or more	152	40.97

Regarding frequency of meals and snack intake among adolescents according to gender: majority 280(75.47%) of the students took breakfast regularly (79.71% boys, 70.12% girls), 55(14.82%) took breakfast frequently, 36 (9.70%) took breakfast rarely or none. About 358 (96.5%) students took lunch regularly (91.79% boy's, 85.96% girl's), 9 (2.4%) took lunch frequently and only 04 (1.1%) students took lunch rarely or none. Most of them 295 (79.5%) students took supper regularly (39.61% boy's, 9.75% girl's), 45 (12.1%) took supper frequently, 31 (8.34%) took supper rarely or none. It is revealed that majority of the students 133 (35.8%) frequently took snacks between breakfast and lunch, 111 (29.9%) took it regularly (29.47% boy's, 26.22% girl's), 127 (34.20%) took snacks rarely or none between breakfast and lunch. Among 371 students, majority 136 (34.39%) took snacks between lunch and supper frequently, 120 (32.3%) took it regularly (9.66% boy's, 14.02% girl's), 93 (31%) took snacks rarely or none between lunch and supper (Table 2).

Table 2: Frequency of Meals and Snacks Intake according to Gender (n=371)

Meals / Snacks Frequency	Boys		Girls		Total		p-value
	N	%	n	%	N	%	
Breakfast							
Regularly	165	79.71	115	70.12	280	75.47	
Frequently	25	12.07	30	18.29	55	14.82	p<.001
Rarely or none	17	8.21	19	11.59	36	9.70	
Lunch							
Regularly	190	91.79	141	85.96	331	89.46	
Frequently	14	6.76	21	12.80	35	9.46	p<.024
Rarely or none	3	1.45	2	1.22	5	1.35	
Supper							
Regularly	82	39.61	16	9.75	98	26.49	
Frequently	20	9.66	33	20.12	53	14.32	P<.001
Rarely or none	105	50.72	115	70.12	220	59.30	
Snacks between breakfast & lunch							
Regularly	61	29.47	43	26.22	104	28.03	
Frequently	103	49.76	100	60.97	203	54.72	P<.382
Rarely or none	43	20.77	21	12.80	64	17.25	
Snacks between lunch & supper							
Regularly	20	9.66	23	14.02	53	14.29	
Frequently	87	42.03	50	30.49	127	34.23	p<.078
Rarely or none	100	48.31	91	55.49	191	51.48	

Among the respondents, largest portion, 172 (46.4%) took 4 meals per day, 107 (28.8%) students took 5 meals per day, 72 (19.4%) students took 3 meals per day, 20 (5.66%) students took 2 meals per day (mean=3.99 ± 0.837) (Table 3).

Table 3: Intake meals per day among school adolescents (n=371)

Intake meals per day	Frequency	Percentage	
2 meals	20	5.66%	
3 meals	72	19.4%	
4 meals	172	46.4%	M=3.99 ± 0.837 SD
5 meals	107	28.8%	
Total	371	100	

Among 371 students, large portion 275 (74.12%) took fast food less than or equal to 3 times per week and 96 (25.88%) took fast food more than or equal 4 times per week (Table 4).

Table 4: Fast food intake per week among school adolescents (n=371)

Intake fast food	Frequency	Percent
≤ 3 times per week	275	74.12%
≥ 4 times per week	96	25.88%
Total	371	100

From weight and height measurement and plotting them on age-based BMI percentile charts according to gender, it showed that among the 371 students, 245 (66.0%) had a normal (between 5th to 85th percentile) status of boy's 73.91% and girl's 56.09%, 68 (18.3%) were overweight (between 85th to 95th percentile) status of boy's 14.98% and girl's 22.56%, 30 (8.1%) were obese (above 95th percentile) status of boy's 6.28% and girl's 10.37% and the rest 28 (7.5%) were underweight (below 5th percentile) status of boy's 4.83% and girl's 10.98% (Table 5).

Table 5: Distribution of BMI status among the respondents according to Gender (n=371)

BMI status	Boys	Girls	Total	p-value
Normal				
Between 5th to 85th percentile	153(73.91%)	92(56.09%)	245(66%)	-
Under weight				
Below 5th percentile	10(4.83%)	18(10.98%)	28(7.5%)	-
Overweight				
Between 85th to 95th percentile	31(14.98%)	37(22.56%)	68(18.3%)	p<.001
Obese				
Above 95th percentile	13(6.28%)	17(10.37%)	30(8.1%)	p<.001
Total	**207**	**164**	**371**	

Association between fast food intake and weight status among 371 students, majority 224(82.05%) of non overweight or non-obese took fast food ≤3 times per week and rest 49 (17.95%) took fast food ≥4 times per week, 51(52.04%) of overweight or obese took fast food ≤3 times per week and rest 47 (47.96%) of overweight or obese took fast food ≥4 times per week (Table 6).

Table 6: Fast food intake according to school adolescents BMI status (n=371)

Fast food intake	Non overweight or obese	Overweight or obese	p Value
≤ 3 times per week	224(82.05%)	51(52.04%)	p<0.00001
≥ 4 times per week	49(17.95%)	47(47.96%)	
Total	273(73.58%)	98(26.42%)	

Discussion:

This study indicates unfavorable dietary habits of school adolescents in Rangpur city. It was found that majority (55.26%) were 12-14 years old. The prevalence of overweight and obesity was highest among them. The overweight and obesity among girls (22.56%, 10.37%) were significantly higher (p<0.001) than boys (14.98%, 6.28%), which was similar to the study of Ramachandran et al. in India[10] and Musaiger et al.[17] in Bahrain. In relation to the prevalence of overweight and obesity among the respondents were 18.3% and 8.1% respectively which were dissimilar to the study in Argentina[18] (26.4% and 14.1%). It was seen that 56.33% of the overweight children's parents' monthly income was 20000-39999/-, which is similar to the study of Das et al. in Dhaka[11]. Most of the respondents had regular breakfast habit (81.64% boys, 73.17%), took lunch regularly (91.79% boys, 85.96% girls) and took supper regularly (39.61% boys, 9.75% girls). Breakfast and supper were significantly more regularly consumed by boys than girls (p<0.001) but lunch had no significant differences between boys than girls (p<0.024). Of males 81.64% regularly consumed breakfast compared with 73.17% which was similar to the study Musaiger et al.[19] in Bahrain (77.1% boys and girls 70.8%). There were no significant differences between gender in morning and afternoon snacking. Of the total students, 28.03% and 14.29% regularly consumed foods during morning and afternoon snacking time respectively which were similar to the study[19] (23.7% and 14.8%). The habit of taking 4 meals per day was predominant (46.4%). In our study, about 20.28% and 29.88% of school boys and girls skipped breakfast which were similar to the study in Bahrain[19] (19% boys and 22% girls) and a similar tendency for skipping breakfast has been reported among Swedish[20] and Turkish[21] adolescents. For girls, skipping breakfast may be connected in some way to feeling about body

shape and it may also method of dieting. For boys, however, skipping breakfast may be associated with lack of time or accessibility[22]. Skipping breakfast may be related to risk for obesity and cardio-metabolic health. It has been documented that boys and girls with irregular breakfast intake had received a high percentage of their energy needs from in between meals[20].

The habit of eating fast food is still low among the adolescent students in Rangpur city as the study reveals that about 25.88% students took fast food ≥4 times per week which was dissimilar to the another study[16] (72.5% of them were taking fast food ≥4times per week). But there was a positive association between fast food intake and overweight and obesity ($p<0.00001$). This is similar to the study of Almuhanna et al. in Riyadh city[16]. While 82.05% of non-overweight school students were taking fast food ≤3times per week which was similar to the another study[16] (72.4% were taking fast food ≤3times per week). On the other hand, Sudanese adolescents[17] 26.6% ate fast food more than or equal 4times per week which was similar to our study (25.88%). This finding is higher than Morocco[23] but very close to that practiced in Bahrain[17] and Saudi Arabia[24].

Conclusion:

The prevalence of obesity and overweight in adolescent has raised to a significant level globally with serious public health consequences. In addition to cardiovascular, emotional and social issues, it poses a serious hazard to the basic health care delivery system. Anyhow, our study only established that taking excess fast food is positively associated with overweight and obesity. It could not establish any other positively associated factors. The prevalence of overweight and it may lead to a society burdened with non-communicable diseases. A holistic approach to tackle the adolescent obesity epidemic needs an array of activities which includes steps like influencing policy making, mobilizing communities, imparting community education as well as enriching and reinforcing individual knowledge and skills. However, further research needs to examine the most effective strategies of intervention, prevention and treatment of obesity. These strategies should be culture specific, ethnical and consider the socio-economic aspects of the targeting population. Parents must take necessary precautions for the diet of their children and should adopt healthy life style. The government and media should also play their role in creating awareness for healthy meals and the risk factors associated with overweight and obesity.

References:

1. WHO Fact sheets: Obesity and overweight; Reviewed February 2018. http://www.who. int/mediacentre/ factsheets/fs311/en/.
2. World Health Organization: Health Topics: Obesity (http://www.who.int/topics/obesity/en/)
3. Daniels SR, Arnett DK, Eckel RH, Gidding SS, Hayman LL, Kumanyika S, et al. Overweight in children and adolescents; pathophysiology, consequences, prevention and treatment. Circulation 2005; 111:1999-2002
4. Healthy Weight: Assessing Your Weight: BMI: About BMI for Children and Teens". CDC.
5. World Health Organization: Childhood overweight and obesity on the rise: Global Strategy on Diet, Physical Activity and Health. 2013, (http://www.who.int/ dietphysicalactivity/ childhood/en/)
6. Prevalence of Childhood Obesity in the United States, 2011-2014 (https://www. cdc.gov/ obesity/ data/childhood.html)
7. Rodd C, Sharma AK. Recent trends in the prevalence of overweight and obesity among Canadian children. CMAJ : Canadian Medical Association Journal. 2016; 188(13):E313-E320.
8. Wang Y & Lim H. The global childhood obesity epidemic and the association between socio-economic status and childhood obesity; https://doi.org/10.3109/09540261.2012.688195
9. Lobstein T. Prevalence and Trends across the World. (http://ebook.ecog-obesity.eu/chapter-epidemiology-prevention-across-europe/prevalence-trends-across-world) accessed at 3.5.2018.
10. Ramachandran A, Snehalatha C, Vinitha R, Thayyil M, Kuma CK, Sheeba L,Joseph S VijayV; Prevalence of overweight in urban Indian adolescent school children. Diabetes Res ClinPract. 2002; 57:185-90.
11. Das SK, Chisti MJ, Huq S, Malek MA, Vanderlee L, Salam MA, Ahmed T,Faruque ASG, Al Mamun A: Changing trend of overweight and obesity and their associated factors in an urban population of Bangladesh. Food Nutr 2013, 4:678–689.
12. Mohsin F, Tayyeb S, Baki A, Sarker S, Zabeen B, Begum T, Azad K, Nahar N. ; Prevalence of obesity among affluent school children in Dhaka, Mymensingh Med J. 2010; 19(4):549-54
13. Frank M, Biro Michelle Wien. Childhood obesity and adult morbidities. The American Journal of Clinical Nutrition 2010; 91(5):1499S–1505S.

14. The Daily Star November 26, 2013 By Wara Karim
15. Janssen I, Katzmarzyk PT, Boyce WF, King MA, Pickett W. Overweight and obesity in Canadian adolescents and their associations with dietary habits and physical activity patterns. J Adolesc Health 2004; 35(5):360-7.
16. Almuhanna MA, Alsaif M, Alsaadi M, Almajwal A.: Fast food intake and prevalence of obesity in school children in Riyadh city; Sudan J Paedtr 2014; 14(1):71 – 80.
17. Musaiger AO, Bader Z, Al-RoomiK, D'Souza. Dietary and lifestyle habits amongst adolescents in Bahrain. Food Nutr Res. 2011; 55.
18. Catalani F, Fraire J, Perez N, Mazolla M, Martnez AM, Mayer MA. Underweight, overweight and obesity prevalence among adolescents school children in Argentina. Acceped: 10.16.2015
19. Musaigor AO, Gregory WB. Dietary habits of school children in Bahrain. J Royal Soc Health. 1992; 112:159-62.
20. Samuelson G. Dietary habits and nutritional status in adolescents over Europe. An overview of current studies in the Nordic countries. Eur J ClinNutr. 2000; 54:S21-8.
21. Bas M, Kiziltan G. Relations among weight control behaviors and eating attitudes, social physique anxiety, and fruit and vegetable consumption in Turkish adolescents. Adolescence. 2007; 42:167-78.
22. Shaw ME. Adolescent breakfast skipping: an Australian study. Adolescence. 1998; 33: 851-61.
23. Hamrani A, Mehdad S, EL-KoriK, et al. Phyical activity and dietary habits among Moroccan adolescents. Public Health Nutr. 2015; 18(10):1793-800.
24. Al Hzzaa HM et al. Dietary habits among Saudi adolescents relative to age, gender, religion. Int J Behav Nutr Physical activity. 2011; 8:140.