Original Research Article

Prevalence of Overweight and Obesity among Adolescent School Girls in Urban Slum of Kolkata

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ABSTRACT

Objectives: To estimate the prevalence of overweight, obesity and the associated lifestyle risk factors among female adolescent school students of urban slum of Chetla, Kolkata.
Design: Cross-Sectional, observational study.
Settings: Two high schools (for girls) in urban slum community of Kolkata.
Participants: All the students of 9th and 10th standard (two hundred sixty girls) of 14-16 years were included.
Methods: Body Mass Index (BMI) of all 260 adolescent girls was measured. Global School based student health survey (GSHS) questionnaire was administered. Physical activity, leisure hours, mode of transport to school from home, junk food intake was assessed.
Results: Prevalence of underweight, overweight and obesity among the school girls were 30%, 23.5% and 11.2% respectively. Majority (66.52%) of girls in the study were from low socioeconomic status. Seventy two percent of students in the overweight/obese group had 3 or more leisure hours/day, while 73.7% of students in the underweight or normal category of BMI had less than 3hours/day leisure hours. It was observed that 73.3% students of underweight/normal category and 26.3% of students in the overweight/obese category of BMI walked to school. Forty nine percent of overweight/obese students consumed junk food 3 times or more per week.
Conclusion: Malnutrition in the form of under nutrition and overweight/obesity prevail among low socioeconomic adolescent school girls of urban slum. Prevalence of overweight and obesity (combined) was higher than under nutrition. Physical inactivity & intake of junk food were the main factors that contributed to the nutritional status of adolescent girls.
Keywords: Adolescent girls, Body Mass Index (BMI), Leisure hours, Junk food

INTRODUCTION

World Health Organization (WHO) identifies adolescence as a period of transition between childhood and adulthood, between 10 to19 years of age that demands extra nutrients and energy-rich food for rapid growth and maturation.[1] For adolescent girls it is a time to prepare herself

for the nutritional demands related to adolescent growth spurt, pregnancy, lactation and heavy workloads that girls will soon experience. Adolescent girls are thus particularly vulnerable to be effects of malnutrition.

The urban slum adolescent girls are subjected to more physical and mental challenges on a day to day basis due to ever increasing pressure of modernization. [2] Faulty diet and unfavorable environmental condition and emerging life style related changes in developing nations like India may adversely affect the growth and nutrition of adolescents. The prevalence of overweight/ obesity is increasing rapidly in all age groups including adult, adolescent and childhood groups worldwide. [3] Obesity rates have doubled since 1980 among the children and tripled for adolescents (12-19 years). The proportion of adolescent who are obese increased from 5% in 1980 to 21% in 2012. [3,4] The prevalence of obese school children is 20% in the UK and Australia, 15.8% in Saudi Arabia, 15.6% in Thailand, 10% in Japan and 7.8% in Iran. [5,6] Studies from USA and Mauritius have reported the prevalence of overweight and obesity to be higher in adolescent students of low socioeconomic status. [7,8] Now, India is also beginning to experience the emerging problem of overweight among adolescents. [9-11] Factors such as dietary habits (intake of junk food or fatty food), lack of physical exercise, duration of leisure hours, mode of transport to school have been reported to be related with Body Mass Index (BMI). [12]

Studies from different parts of India have investigated the prevalence of obesity among the children and adolescents. [9-14] However, there are no such published data on adolescent girls in urban slums from this part of country. Present study was designed to assess the nutritional status specially the prevalence of overweight and obesity of a representative sample of adolescent school girls in urban slum area of Kolkata and factors associated with it.

MATERIALS AND METHODS

This cross sectional observational study was conducted from November 2013 to January 2014 among adolescent girl students of class IX and X of two randomly selected girls schools situated in the slum area of Chetla, Kolkata. Out of three girls high schools located close to the slum area in Chetla two were selected randomly. All girl students of Class IX, X (14 to 16 years) of the two schools were included in this study.

The study was approved by the Institutional Ethics Committee of All India Institute of Hygiene & Public Health, Kolkata and necessary permission was obtained from authority of the selected schools. Students were briefed about the objectives and purpose of the research study and their written consent were obtained. Those who were not interested to participate were excluded from the study. Data were collected from the students in their class rooms during school hours by administering a pre-designed and pretested questionnaire mainly based on Global School Health Survey. [15]

Every adolescent girl was subjected to anthropometric measurements. Weight of every girls was taken with standard weighing machine and height was measured with the stadiometer.(as per WHO guideline). BMI table for age girls WHO - 2007 was followed for BMI determination of study population. For socioeconomic status determination Modified B.G. Prasads's classification 2013 was used. [16]

Statistical Methods:

Data of 260 study subjects were checked for consistency and completeness and then entered to excel sheet. Data analysis was done by Epi Info[TM] (version 7). Prevalence of overweight and obesity was

estimated. Chi square test was applied as test of significance for categorical variables and significance level was set at p value < 0.05. Odds Ratios (including 95% confidence interval) were computed for bivariate analysis to find association between BMI category of overweight/ obesity with different predictor variables.

RESULTS

Two hundred sixty adolescent slum school girls were studied. Among them 106 (40.76%) and 67 (25.76%) were classified as socioeconomically grade IV and grade V according to Modified B.G. Prasads's classification 2013 (table 1). Based on BMI criteria, 90 (34.7%) were overweight and obese. (Table 2).

Table 1. Distribution of urban slum school girls according to socioeconomic status (N=260).

Modified B.G.Prasad`s Classification:2013	Number	Percentage (%)	Overweight (%)	Obesity (%)
I >Rs 5156	15	5	1 (6.6)	0 (0%)
II Rs 2578-5155	21	8.07	2 (9.5)	1(4.76)
III Rs 1547-2577	51	19.6	8 (15.68)	5(9.80)
IV Rs 773-1546	106	40.76	31 (29.24)	17(16.03)
V <Rs 773	67	25.76	19 (28.35)	6(8.95)
Total	260	100	61	29

Table 2. Distribution of urban slum girls according to BMI status. (N=260)

BMI category	Number of students	Percentage (%)
Underweight	78	30
Normal	92	35.3
Overweight	61	23.5
Obese	29	11.2
Total	260	100

Duration of physical activity (sports, skipping, cycling) undertaken by the girls was assessed. Observation reveals that, 67(25.8%) girls performed at least 60 minute of physical activity in a day in a week. Sixty six (25.4%), 73 (28.1%) and 54 (20.8%) girls did similar physical activity for at least 60 minutes in a day for 2-3 days/week, 4-5 days/week and 6-7days/week respectively.

Leisure hours   like duration of TV/Video watching, listening to music or reading story books were assessed in hour per day .Ninety three (35.8%) of girls enjoyed at least one hour of leisure time per day, 120 (46.2%) enjoyed 2-hour /day, 41(15.8%) enjoyed 3-hour /day and 6 (2.3%)

enjoyed 4-hours/day. Thus, 47 out of 260 girls enjoyed 3-hour or more of leisure time. Out of these 47 girls, 34(72%) were in overweight/obese category of BMI and 13(27.6%) were in underweight/normal category of BMI (Table 3). This difference was statistically significant (p=0.00)

Among 260 girls, 95 (36.5%) walked to the school from home,73 (28.1%) girls used bicycle, 92(35.4%) girls used bus or a three wheeler. Seventy (73.7%) girls who walked to the school belonged to underweight and normal BMI category, in comparison to 25 (26.3%) in overweight/ obese category (Table 4).

Again, 54 (20.8%) girls consumed junk food at least once a week. Eighty four (32.3%) girls consumed 2-3 times /week and 26 (10.0%) of girls consumed fast food 6-7times /week. Overweight/obesity was significantly more among the girls who consumed junk food more than 3 times per week (p=0.00). (Table 5)

Table 3: Association of Leisure hours with BMI category

Leisure hours/day	BMI category			
	Underweight/Normal	Overweight/Obese	Total	Significance
≥3	13(27.6%)	34(72.3%)	47(100%)	P<0.000
<3	157(73.7%)	56(26.3%)	213(100%)	CI*=3.61-14.88
Total	170(63.3%)	90(34.6%)	260(100%)	

*CI - Confidence Interval.

Table 4: Association of mode of transport to school from home with BMI category.

Mode of transport	BMI category			
	Underweight/Normal	Overweight/Obese	Total	Significance
Vehicle	100 (60.6%)	65 (39.4%)	165 (100%)	P=0.032
Walk	70 (73.7%)	25 (26.3%)	95 (100%)	CI*= 1.04-3.16
Total	170(65.3%)	90 (34.6%)	260 (100%)	

*CI - Confidence Interval.

Table 5: Association of intake of junk food with BMI category.

Intake of junk food (No of days /week)	BMI category			
	Underweight/Normal	Overweight/Obese	Total	Significance
≥3days	56(50.9%)	54(49.0%)	110(100%)	P<0.000
<3days	114(76.0%)	36(24.0%)	150(100%)	CI*=1.79-5.18
Total	170 (65.0%)	90(35.0%)	260(100%)	

*CI=Confidence Interval

DISCUSSION

The present study demonstrate that the combined prevalence of overweight and obesity (34.7%) was more than under nutrition among the urban slum adolescent school girls residing in slum areas of Chetla Municipality area of South Kolkata, and that overweight and obesity were increasing even in low socioeconomic status school girls. This study also revealed that adolescents who had less physical activity, who used public transport system for travel to school, those who enjoyed at least 3 hours or more of leisure hours per day or girls who consumed junk food at least 3 times or more per week were likely to be overweight and obese.

Shah Tet al reported that based on BMI, out of 112 students of Ahmedabad, 34% were found to be overweight and obese and that female adolescents were more obese. [12] In their study among affluent 12-18 years girls of English medium school, Mondal A et al showed that 28.5% were overweight and 4.2% were obese. [9] A multicentric study by Kumar K et al reported a varying prevalence of 20-25% women (15-49 years) being overweight and obese in slum areas of Delhi, Mumbai & Kolkata. [13] Our study is the first to document the high prevalence of overweight and obesity among adolescent school going girls in slums of Kolkata. Indian researchers have reported high prevalence of overweight

and obesity among adolescents of higher socio-economic status group by. [9,14] However, higher prevalence of overweight and obesity among low socio-economic status adolescents have been reported by Gearhart Jr R F et al & Begum W et a.l [7,8] Our study results are in accordance with the later observation. We hypothesize that this trend of increasing prevalence of overweight and obesity among adolescent school girls may be an effect of multimedia advertisement of various energy dense foods which attract adolescents. Lack of parental consciousness, of slum girls, about measures to prevent overweight and obesity may also be a contributory factor.

In the present study, it was seen that less number of slum girls performed physical exercise daily in a week (at least for 60 minutes /day). Bachani D et al showed that only 8.8% boys and 9.2% of girls among Indian adolescents had physical activity daily. [17] A study conducted by Center for disease control and prevention, USA reported that the 17.7% of female and 36.6% of male adolescent students had physical activity at least 60 minutes /day for 7 days. [18] A survey by WHO observed that fewer than 25% adolescents meet the recommended guidelines for physical activity of 60 minutes of moderate to vigorous physical activity, [19] for physical activity of 60 minutes of moderate to vigorous physical activity. [19] Our study

results also reveal a poor trend of physical activity pattern among the adolescent urban slum girls from low socioeconomic status.

The present study results show that overweight and obesity were common among the girls who used public transport system. Singh P et al from Lucknow and Goyal J et al from Surat reported that prevalence of overweight was 3-times higher among those school going urban adolescents who used public or private transport than who walked to school. [2021] The adolescents who spent 3 hours or more of leisure hour/day such as TV watching or sitting idle mostly were overweight and obese. Similarly, Tharnar S et al & Liou et al reported that adolescent who watched TV more than 2 hours were obese. [22,23] In present study 49% of adolescents, who consumed junk food 3 times or more per week were overweight and obese. Sain S et al reported that out of 245 students, 87.72% consumed junk food for 4 days or more per week. [24] Goel S et al found that 91.25% of adolescent preferred junk food and reported a strong correlation between intake of junk food and obesity.[25] Developing healthy food habits (less saturated fat and trans fatty acids free sugar, salty food) and exercise habits during adolescence are foundations for good health in adulthood.

The strength of this study is that it is one of the few studies conducted among the urban slum school adolescent girls with low socioeconomic status. The study results are alarming us about the increased prevalence of overweight and obesity among this population. Our study has few limitations; this study was conducted among the girls only in southern part of the city of Kolkata. The national data will require more studies with large sample size.

CONCLUSION

In conclusion, the present study report that adolescent overweight and obesity is rising even in low socioeconomic status. The factors like duration of leisure hours, mode of transport to school and frequency of intake of junk food are associated strongly with overweight and obesity among the adolescent school girls of an urban slum. Emphasis should be on obesity prevention awareness program among the school students by reinforcing lifestyle modification.

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