



PREVALENCE OF OVERWEIGHT AND OBESITY AMONG SCHOOL GOING ADOLESCENTS, AGARTALA, TRIPURA.

Community Medicine

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ABSTRACT

Background: Overweight and obesity is a growing pandemic affecting millions of adolescents in developed as well as developing countries. **Objectives:** (1) To estimate the prevalence of overweight and obesity among adolescent students in Agartala, West Tripura. **Methodology:** The cross sectional study was carried out among 216 adolescent students in three schools of Agartala and selected by multistage sampling method. **Results:** Out of 216 students examined, the prevalence of overweight and obese was found 11.6% and 2.3% respectively. Maximum number of overweight students were found in age group of 13 years (7; 3.2%) followed by 17 years (6; 2.8%) and 12 years (5; 2.3%) while obesity was found more in age group of 12 and 15 years (2; 0.9%) and minimum number in age group 11 years (1; 0.5%). In the present study, it was observed that girls were more overweight (7.4%) than boys (4.2%). Whereas boys were found little bit more obese (1.9%) than girls (0.5%) and it was statistically significant ($p=0.009$).

Conclusions: In the present study, overweight was more observed than obesity among adolescent students.

KEYWORDS

Prevalence, Overweight, Obesity, Adolescents, Agartala

Introduction:

The World Health Organization (WHO) describes overweight and obesity as one of the today's most important public health problem, which is being escalated as a global epidemic. The problem of being overweight and obesity is confined not only to adults but also being reported among the children and adolescents in the developed countries during the past two decades as well as similar trends are being observed even in the developing world.¹ According to several reports, approximately 80% of obese adolescents remain obese even in adulthood.² Various studies done in India from 2002-2012 indicate a rising trend in the prevalence of overweight and obesity in children and adolescents. This may have major implications towards increasing prevalence of non-communicable disease (NCD) like diabetes, hypertension and cardiovascular disease in early adulthood.³ Hence, close monitoring of overweight prevalence in children and adolescents and taking timely preventive measures will be an effective approach in dealing with the problem of obesity.¹ So the present study was designed with the objective to estimate the prevalence of overweight and obesity among adolescent students in Agartala, West Tripura.

Materials and Methods: The present cross sectional study was conducted among 216 adolescent students in the three schools of Agartala for a period of one month from 1st March 2017 to 30th March 2017. Adolescent students of age group 10-19 years of both genders available during the time of examination in the schools were included in the study and those students with history of suffering from any chronic diseases and who could not be contacted after two visits to the schools were excluded from the study.

Sample size: Sample size was calculated using the formula ($n = Z^2 \cdot \frac{pq}{d^2}$), considering the prevalence of overweight/ obesity among adolescent to be 14 %, ⁴ at significance level of 5% and an absolute precision of 5 %. So minimum required sample size was 185 and after adding 10% of non response rate, came around 203 & finally 216 adolescent students were included in the study.

Sampling procedure: Multistage sampling method was followed for selecting the study participants. In first stage, out of 44 schools of Agartala Municipal Corporation, 3 schools were selected by simple random sampling. In the second stage, 72 students were selected from each school, considering each class (from class 6 to 11) as strata. Then from each strata, 12 students were selected by simple random sampling using lottery method. So finally, 216 students ($72 \times 3 = 216$) were selected by using stratified random sampling.

Study tools: Predesigned, structured self administered questionnaire, Bathroom weighing machine and stadiometer were used to record weight and height of the school students. WHO BMI for age chart for boys and girls were used to plot the Body Mass Index (BMI) for every participant.

Procedure of Data collection: Official permission was obtained in advance from the Head of the school. A meeting of teachers and students was organized in each school, in order to explain the objectives of study. Verbal consent of parents was taken after explaining the purpose of the study and ensuring them about the confidentiality of information. The age verification of the each student was done by checking date of birth from the school records. The procedures of anthropometric measurements (weight and height) were explained to the students. Weight of the each student was measured without shoes (to the nearest 0.1 kg) by using bathroom weighing machine and height of the each student was measured by stadiometer in upright position without shoes (to the nearest 1 cm).

Data analysis: Data analysis was done by using IBM SPSS software version 20. Descriptive statistics were expressed as frequency and percentages. Shapiro- Wilk test was used to check the test of normality. Chi- square test and Fisher's exact was used to find the association between categorical variables (BMI categories with gender). Kruskal wallis test was used to find out the significant differences between BMI categories with age for non parametric distribution. P value < 0.05 was taken as significant.

Ethical Consideration: Institutional Ethics Committee of AGMC had given the approval for conducting the study.

Operational definition:

BMI- BMI of the students were calculated by considering the formula
BMI = Weight in Kgs / Height in m²

The BMI categories were recorded considering the BMI for age Z scores for boys and girls according to the World Health Organization 2007.

- 1. Obesity** – Obesity is considered if a student's BMI is more than +2 standard deviation from the median BMI score for the corresponding age.
- 2. Overweight** – Overweight is considered if a student's BMI falls between +1 standard deviation to +2 standard deviation from the median BMI score for the corresponding age.
- 3. Normal BMI** – Normal is considered if a student's BMI falls between +1 standard deviation to -2 standard deviation from the median BMI score for the corresponding age.
- 4. Thinness** – Thinness is considered if a student's BMI falls between - 2 standard deviation to - 3 standard deviation from the median BMI score for the corresponding age.
- 5. Severe thinness** – Severe thinness is considered if a student's BMI is less than -3 standard deviation from the median BMI score for the corresponding age.

RESULTS: A total number of 216 school going adolescents were included in the study with majority of the students belonged to 12 years (20.40%) followed by 13 years (18.10%) and 14 years (14.80%). The median age of the study subjects was 14 (IQR=12-15). Boy's students were 118 (54.6%) whereas girl's students were 98(45.4%). Maximum number of students belonged to Hindu religion (99.4%) and General caste (43.1%). Out of the 216 students examined, 5 (11.6%) were overweight and 25 (2.3%) were obese, 154 (71.3%) had normal BMI. (Figure 1) The overall prevalence of overweight and obesity was 13.8%. Maximum number of overweight students were found in age group of 13 years (7; 3.2%) followed by 17 years (6; 2.8%) and 12 years (5; 2.3%) while overweight was not observed among age group of 18 and 19 years. Obesity was noted equally prevalent in age group of 12 and 15 years (2; 0.9%) and minimum number of obesity was observed in age group 11 years (1; 0.5%). (Table 1)

Caste wise distribution showed that overweight and obesity was more prevalent among general caste (6%) and less among schedule caste (1.4%). But this was not found to be statistically significant ($P=0.18$). The present study observed that girls were more overweight (7.4%) as compared to boys (4.2%). Whereas boys were found to be little bit more obese (1.9%) than girls (0.5%). (Figure 2) This observation was found statistically significant ($p=0.009$).

DISCUSSION:

The present study showed that the prevalence of overweight and obesity among adolescent students was 11.6 % and 2.3% respectively with majority of the students had a normal BMI (71.3%). Similar prevalence of overweight and obesity was observed in study conducted by Prasad R Vishnu et al.⁴ Chandra N. et al⁵ study revealed high prevalence of overweight and obesity (35.8% and 24.6% respectively) and only 38.7% of the students had a normal BMI. This was in contrast to our study findings. This difference could be due three factors: first, the criteria used to classify school students as overweight and obesity (Indian Academy of Paediatrics growth chart) and second, the study included only children from an affluent schools and third, age (school children aged between 9 and 15 years were included in the study). In current study the prevalence of obesity among boys (1.9%) was slightly higher as compared to girls (0.5%) and the findings was similar to as reported by Pathak S. et al.⁶ It was also observed by Eshwar et al⁷ in a study conducted in Rajkot, Gujarat the low prevalence of obesity among girls. In both male and female students, the prevalence of overweight and obesity was high in a study done by Gautam Sujana⁸ but girls were more overweight (7.4%) as compared to boys (4.2%) in our study. Verma V. et al⁹ study revealed that maximum number of overweight students were in 11 years of age group (51; 20.1%) and minimum in the 17 years of age group (8; 5.3%) while obesity was found maximum in 18-year age group (6; 15%) and minimum in 15 years of age group (6; 3.2%). This observation was inconsistent with our study findings. Hindu students were less likely to be overweight /obese in a study done by Gautam Sujana⁹ whereas in the present study, it was observed that the prevalence of overweight and obesity was more among Hindu students. This variation may be because of more number of subjects in our study were Hindu.

The limitation of our study is that the findings of our result may not be generalizable to entire nation and also in our state as study was conducted only in three schools of Agartala Municipal Corporation. Another limitation is that BMI for age Z scores for boys and girls according to World Health Organisation (WHO) 2007 criteria has been used for classification of adolescent students as "overweight" or "obesity".

CONCLUSION: In the present study, the prevalence rate of overweight and obesity were 11.6% and 2.3% respectively. It was observed that among adolescent students, girls were more overweight (7.4%) as compared to boys (4.2%) while boys were found slightly higher obese (1.9%) than girls (0.5%) and was found to be statistically significant ($p=0.009$).

RECOMMENDATION: Further studies can be conducted with large sample size by using different cut off points and different growth standards involving age group of 5-19 years from both rural and urban school students so that it will help to detect more accurate prevalence of overweight/obesity among children and adolescent students in our state.

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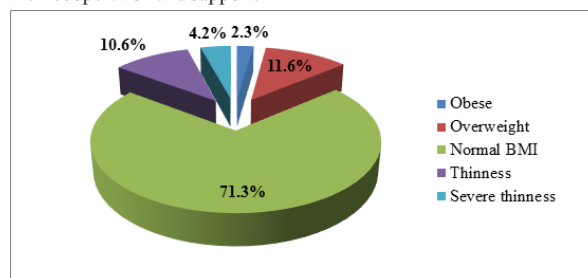


Figure1: BMI category of the adolescent students

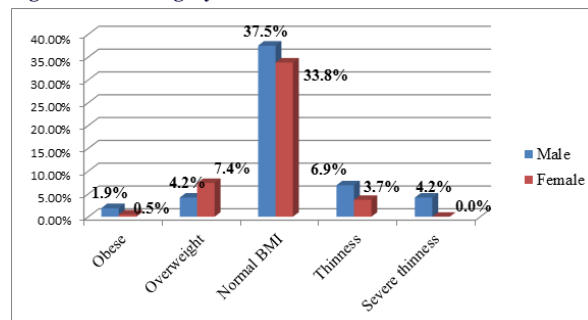


Figure 2: BMI category of the adolescent students and sex distribution

Table 1: Distribution of the adolescent students with BMI category in different age groups

Age	BMI Category					Significance
	Obese n (%)	Overweight n (%)	Normal BMI n (%)	Thinness n (%)	Severe thinness n (%)	
11 years	1 (0.5)	2 (0.9)	8 (3.7)	1(0.5)	0 (0)	P= 0.564
12 years	2 (0.9)	5 (2.3)	34 (15.7)	3 (1.4)	0 (0)	
13 years	0 (0)	7 (3.2)	23 (10.5)	6 (2.8)	3 (1.4)	
14 years	0 (0)	2 (0.9)	25 (11.6)	3 (1.4)	2 (0.9)	
15 years	2 (0.9)	2(0.9)	27 (12.5)	3 (1.4)	2 (.9)	
16 years	0 (0)	1 (0.5)	12 (5.6)	2 (0.9)	0 (0)	
17 years	0 (0)	6 (2.8)	18 (8.3)	3 (1.4)	2 (0.9)	
18 years	0 (0)	0 (0)	6 (2.8)	0 (0)	0 (0)	
19 years	0 (0)	0 (0)	1 (0.5)	2 (0.9)	0 (0)	

Kruskal wallis test applied.

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