

Prevalence of adolescent obesity among high school students of Kerala, South India

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ABSTRACT

Objectives: To study the prevalence of obesity among high school students of age 15-17 years and identify the associated risk factors.

Materials and Methods: A descriptive cross-sectional study involving the measurement of height and weight and calculation of body mass index among high school students of Kottukal and Pallichal localities of Trivandrum districts in Kerala, South India. A study questionnaire was administered among the participants and their parents to understand the relationship of food intake, parental obesity, and physical activity to obesity.

Results: Of the 560 students enrolled, 49 (8.75%) were overweight and 27 (4.82%) were obese. With this, the prevalence of obese is computed as 4.8%. The parental obesity posed a significant risk factor among the study population.

Conclusion: Creating awareness among adults and school-goers on the negative health effects of obesity, the key for maintaining good health.

INTRODUCTION

World Health Organization considers obesity in the early stage as one of the serious public health challenges of this century.^[1] Obesity is the leading cause of preventable deaths involved with cardiovascular risks, endothelial dysfunction, diabetes mellitus, premature puberty, and obstructive sleep disorder etc.^[2] The obesity is associated with many health complications among school-goers that include hypertension^[3] high-level nicotine addiction,^[4] and depression.^[5] Interestingly, some studies in the past have associated school absenteeism with obesity as it has direct impact on the psychosocial and physical characteristics.^[6] A number of documented literatures suggested the direct relationship between obesity with socio-economic status, dietary habits, life style, sedentary behavior, and parental obesity.^[7-11] The obese are also in high risk for

many types of cancers.^[12] The overweight adolescents pose a threat of 70% chance of becoming overweight adults, which may increase to 80% when either of the parents is overweight or obese.^[13] Over the years, the body mass index (BMI) calculation is being used for the proxy measure of adiposity.

MATERIALS AND METHODS

The class XI and XII students from the schools of Kottukal and Pallichal localities of Trivandrum districts in Kerala, South India were randomly enrolled into the study. It was a descriptive study of cross-sectional type.

The boys and girls of the same area with an age group of 15-17 years, who may or not have obesity-related debilitating disease, were included in the study. The exclusion criteria were the adults of other age groups and who have other debilitating diseases. Of the 560 students enrolled, 228 (40.71%) were boys and 332 (59.29%) were girls. The study was described to parents and participants as an investigation of adolescent mental and physical health. Informed consent was obtained from the principal of the school, school PTA, and the participants themselves.

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Height was measured for all the study participants using an anthropometric rod (corrected to 0.1 cm). It was measured while the students were standing with arms at side and the buttocks and heels touching the stand/wall with the head held erect and plane passing through the lower border of orbit and Frankfurt plane parallel. The weighing machine (corrected to 0.5 kg) was checked for zero error before the weight was measured for all the students. The BMI for each student was calculated, and the variations are plotted in distribution and box-whisker plots. More than 95th centile was taken as cutoff for obesity. NCHS, IOTF cutoff, and Indian cutoff was used. The BMI between 18.5 kg/m² and 21.9 kg/m² was considered normal, and the BMI between 22 kg/m² and 25 kg/m² was marked as overweight. The BMI of above 25 kg/m² was noted as obese.^[14]

The second part of the study involved the administration of a set of questionnaires among the parents of the respective obese and overweight students. The physical activity index^[14,15] and food intake pattern^[16] for the past 4 weeks were assessed, while the first questionnaire identified the daily energy expenditure and leisure activities. It provides valuable insights into physical activity patterns. The latter assessed how frequent they take high-fat food including snacks, fast foods, and soft drinks. The perceived parental obesity was assessed by another dichotomous questionnaire.^[17] The collected data were statistically analyzed using Epi6 and SPSS software.

RESULTS

Of the 560 students enrolled, 49 (8.75%) were overweight and 27 (4.82%) were obese. A total of 76 students with normal BMI were randomly considered for the control group. The Table 1 represent the students identified as overweight and obese. Table 2 gives the results obtained in the BMI calculation.

The findings obtained from the questionnaires indicated that the parental obesity remained a significant cause for childhood/adolescent obesity among the study participants. One or both the parents of about 9% children were overweight or obese.

Also, the food intake pattern and physical activity index had not shown significant role in the overweight and obese students in this study.

The Figures 1, 2, and 3 illustrate the distribution of overweight and obese students enrolled in the study.

Table 1: Number of students identified as overweight, obese, and control

Group	Total n (%)	Boys n (%)	Girls n (%)
Overweight	49 (8.75)	24 (4.29)	25 (4.64)
Obese	27 (4.82)	11 (1.96)	16 (2.86)
Control	76 (13.57)	35 (46.05)	41 (53.95)

Table 2: Statistical parameters of overweight and obese students compared with the control group

Group	Body mass index			
	N	Mean	Variance	SD
Overweight and obese	76	27.5	7.06	2.66
Control	76	20.5	1.74	1.32

DISCUSSION

The current study involved the direct reading of height and weight among the study participants of above-mentioned localities. The predictors of obesity were assessed directly through survey questionnaires. A study done on 2002 assessed the effect of energy expenditure (including resting metabolic rate, total energy expenditure, and activity energy expenditure with substrate oxidation/respiratory quotient) on the development of obesity.^[18] The limitations of the current study may include that the self-reported measures may tend to have limited validity. The adolescents who reported parental obesity were at more than 4-fold increase of obesity onset than others. Childhood obesity increases the risk of adolescent obesity. Obese children without any parental obesity comparatively pose a low risk/chance of developing adolescent obesity.^[19] Contrary to the documented proofs on the impact of food habits and exercises on obesity, this study did not provide sufficient evidence on their relationship with the obesity onset. The schools have greater impact on the childhood obesity. Reducing the high-fat and high-sugar foods during the school lunches can prevent unwanted obesity among students.^[20,21] A good number of school-based obesity prevention camps and initiatives have shown significant results in the Western world.^[22-24] An obesity prevention program is highly recommended in schools in the rural areas of developing nations.

Reportedly, the urban children in India are more affected by obesity due to various reasons. The different degrees of income and poverty may lead to either underweight or overweight in the country.^[25]

CONCLUSION

The study identified the students who were obese and overweight. Parental obesity remained the

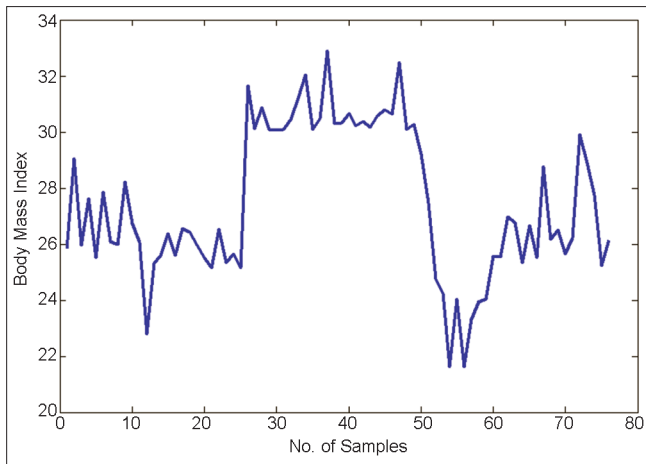


Figure 1: Body mass index – Overweight and obese

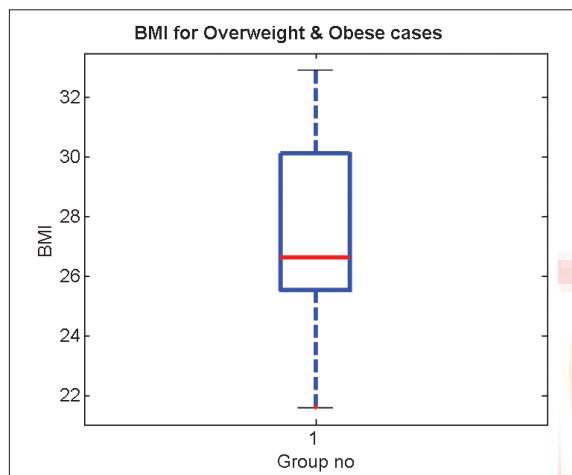


Figure 2: Box and Whisker – Overweight and obesity

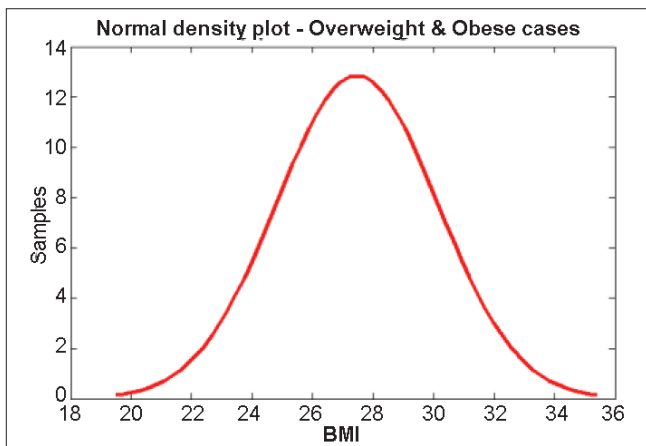


Figure 3: Overweight and obese

cause among those students, which can also lead to various complications when they grow up. Effective intervention and awareness on the various risk factors associated with and leading to obesity should be provided among the students and parents in the locality. Although the study did not show any direct

relationship between obesity and food intake and life style habits, the awareness on healthy life style habits and proper nutritious food intake is mandatory among the school goers. Reduction of the sedentary behavior and promotion of physical activity as a good health practice for all children can prevent the development of adolescent obesity.

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