

Prevalence of overweight and obesity among peri-pubertal children of rural school in India

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Abstract

Background: Overweight and obesity in children have become a public health problem worldwide. This poses a high risk for adult obesity. The prevention of obesity onset should include preventative policies and measures against childhood obesity. **Aim:** To examine the prevalence of overweight and obesity in prepubertal children in rural school. **Material and Methods:** The present study involved 300 children from government school i.e. from class 7th to class 9th (all in age group of 12-14years). Anthropometric measurements like height, body weight and body mass index were taken by standard protocol and procedure. **Results:** Out of 300, 21 (7%) were overweight and 9 (3%) were obese. Overweight and obesity was more predominant in girls i.e., (11.76% and 9.8%) compared to boys i.e., (6.02% and 1.61%). Overweight was predominantly found in class II (18.18%) and obesity was found more in class I (23.08%). **Key Words:** Rural school-going children, overweight, obesity, socio-economic status.

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INTRODUCTION

Overweight and obesity in children have become a public health problem worldwide. For children and adolescents, overweight and obesity are defined using age and sex specific normograms for body mass index (BMI). Children with BMI equal to or exceeding the age-gender-specific 95th percentile are defined obese. Those with BMI equal to or exceeding the 85th but are below 95th percentiles are defined overweight and are at risk for obesity related co-morbidities.¹ Overweight and obesity primarily happen either due to excess calorie intake or insufficient physical activity or both. Furthermore, various genetic, behavioural, and environmental factors

play a role in its pathogenesis. Excess body weight in children poses a high risk for adult obesity. Research by Guo *et al.*^{2,3} indicated that being overweight at age 35 years may well be predicted from the age of 13 years. Therefore, the prevention of obesity onset should include preventative policies and measures against childhood obesity.^{4,5} Moreover, childhood overweight may be associated with immediate negative health outcomes such as high cholesterol,⁶ high blood pressure,^{7,8} prediabetes,⁹ osteoarticular problems, sleep apnea, and psychological problems.¹⁰ The present study was conducted to examine the prevalence of overweight and obesity in prepubertal children in rural school.

MATERIAL AND METHODS

The present study involved all the children from government school i.e. from class 7th to class 9th (all in age group of 12-14years). There were total 300 children of 7th to 9th standard. Children studying in 7th to 9th standard with age group of <12years and >14 years were excluded from the study. Ethical clearance from our institutional ethical committee was obtained. Informed consent of parents or guardians was taken by school authorities. Prior intimations were given to school authorities to minimize absenteeism. Efforts were made

to include maximum children in to the study by surveying a class twice subsequently. Data apart from personal particulars like name, age, sex, also included height, weight and blood pressure. Anthropometric measurements were taken by standard protocol and procedure given below.

Anthropometric measurements were taken by standard protocol and procedure given below.

- a. **Height:** Height in centimeter was marked on the wall in school with the help of measuring tape. The children were asked to stand straight, without footwear with heels together, buttocks, shoulders and back of head touching the wall. The head was held comfortably erect with lower border of the orbit in the same horizontal plane as that of external auditory meatus. Hands were hanging by sides. A wooden scale was placed on the topmost point of the head of child, standing against the wall, where the calibration was done. The height was recorded to the nearest 0.5 cm.
- b. **Weight:** Weight was recorded with a portable type weighing machine, and standardized every week with standard weight. Children were asked to stand in center of machine without footwear, and with the body weight evenly distributed on both feet. Clothes were not removed, as adequate privacy was not available. The weight was recorded in kilograms to nearest 0.5 kg.
- c. **Body mass index:** Body mass index (BMI) was calculated dividing the weight (kg) by square of height (meter). The BMI values that were considered to be underweight, overweight, and obesity were defined as <5th, ≥85th and ≥95th percentile, respectively, of age- and sex-specific

value of National Centre for Health Statistics/Centres for Disease Control and Prevention (NHCS/CDC 2000).

RESULTS

In the present study age of school children ranged from 12 to 14 years. Majority of children were from the age group of 14 years and 13 years i.e.118 (39.33%) and 106 (35.33%), followed by 76(25.33%) in 12 years of age group. Out of 300, 21 (7%) were overweight and 9(3%) were obese. Out of 300, 249 were boys and 51 were girls. Out of 249 boys, 15(6.02%) were overweight and 4(1.61%) were obese. Out of 51 girls, 6(11.76%) were overweight and 5(9.8%) were obese. In the present study overweight and obesity was more predominant in girls i.e., (11.76% and 9.8%) compared to boys i.e., (6.02% and 1.61%) which was statistically significant.

Table 1: Distribution of school children according to sex and BMI

BMI	Boys (%)	Girls (%)	Total	
			No.	%
Underweight	155(62.25)	30(58.82)	185	61.67
Normal	75(30.12)	10(19.61)	85	28.33
Overweight	15(6.02)	6(11.76)	21	7
Obesity	4(1.61)	5(9.8)	9	3
Total	249(100)	51(100)	300	100

$\chi^2=13.21$, $df=3$ and p value = 0.004 (significant)

Out of 300, 21(7%) were overweight and 9 (3%) were obese. Overweight was predominantly found in class II (18.18%), followed by class V (10.42%), class III (5.5%), class IV (4.6%) and no children found overweight in class I. Obesity was found more in class I (23.08%), followed by class II (6.06%), class V (2.08%), and lastly (1.97%) in class IV. No child found obese in class III.

Table 2: Association between overweight and obesity with socioeconomic status (SES)

SES	Overweight	%	Obesity	%
Class – I(13)	-	00	3	23.08
Class – II(33)	6	18.18	2	6.06
Class – III(54)	3	5.5	-	00
Class – IV(152)	7	4.6	3	1.97
Class – V(48)	5	10.42	1	2.08
Total(300)	21	7	9	3

$(\chi^2=5.825$, $df=3$, p value = 0.12) Not significant
 (Class I and II are clubbed)

$(\chi^2=17.25$, $df=3$, p value= 0.0006) Significant
 (Class II and III are clubbed)

Above table shows significant association between obesity and SES. With prevalence of obesity more in class I. There was no association between overweight and SES.

DISCUSSION

Childhood obesity affects both developed and developing countries of all socio-economic groups, irrespective of age, sex or ethnicity. In the present study age of school children ranged from 12 to 14 years. Maximum number of school children i.e., 200 (66.67%) were observed to be

from lower socioeconomic group, i.e. socioeconomic class IV and V. Out of 300, 21 (7%) were overweight and 9(3%) were obese. Overweight and obesity was more predominant in girls i.e., (11.76% and 9.8%) compared to boys i.e., (6.02% and 1.61%) which was statistically significant. The girls have restricted mobility outside the homes as per the prevailing culture. Reduced opportunities for physical work and playtime could explain higher risks of getting obese among girls. Studies indicate that in girls early sexual maturation is associated with higher prevalence's of overweight/obesity, while in boys the findings are still divergent.¹¹Bansal AK *et al*¹² studied the prevalence of obesity and its lifestyle risk factors in school-age children. Overall prevalence of obesity and overweight were 5.69% and 14.83% respectively. In girls, the prevalence of obesity and overweight was 6.58% and 16.23% respectively while in boys, it was 5.11% and 13.92% respectively. This study found a higher prevalence of obesity in girls in the affluent schools unlike the study of Goyal *et al*,¹³ wherein the prevalence of obesity was found to be more in boys. Goyal *et al* studied determinants of overweight and obesity in affluent adolescent in Surat city. In this study, the prevalence of obesity and overweight was 6.7 and 15.1 in boys and 6.4 and 13.35 in girls, respectively. Agrawal *et al*¹⁴ observed the prevalence of obesity and overweight in boys 3.4% and 15% and in girls 3.4% and 10.2% in affluent adolescent school children from Ludhiana, Punjab. Kapil *et al*¹⁵ showed the prevalence of obesity and overweight in boys 8.3% and 23.1% and in girls 7.4% and 24.7% among affluent adolescent school children in Delhi. The present study observation is comparable with Bansal AK *et al* study.¹² In our study, out of 300, 21 (7%) were overweight and 9 (3%) were obese. Overweight was predominantly found in class II 6 (18.18%) followed by class V 5 (10.42%) and no children found overweight in class I. Obesity was found more in class I 3 (23.08%) followed by class II 2 (6.06%). No child found obese in class III. Present study shows significant association between obesity with socioeconomic status. So, prevalence of overweight and obesity was found more in higher SES group. Marwaha *et al*,¹⁶ showed that among children in the upper SES the prevalence of overweight and obesity were 17 and 5.6% in boys and 19 and 5.7% in girls, respectively, whereas in the lower SES the values were 2.7 and 0.4% in boys and 2.1 and 0.5% in girls, respectively. Children from upper class SES have behaviours that have been shown to promote obesity include frequent consumption of fast-food meals, consumption of high calorie foods, such as high-fat, low-fiber foods and intake of sweetened beverages. Television viewing and other sedentary activities have also been related to childhood obesity.¹⁷

unfortunately, this habit is growing exponentially in villages as well. The present study shows that overweight and obesity rates in children are increasing not just among the higher socio-economic groups but also in the middle income groups. This suggests the need for a comprehensive approach in the fight against childhood obesity and for the implementation of public health policies for the prevention of the obesity epidemic.

REFERENCES

1. Donohoue PA. Obesity. In: Behrman RE, Kleigman RM, Jenson HB, editors. *Nelson textbook of pediatrics*. 17th ed. Philadelphia: WB Saunders; 2004. pp. 173–7.
2. Guo Chumlea. Tracking of body mass index in children in relation to overweight in adulthood. *Am J Clin Nutr*. 1999; 70:145S–148S.
3. Guo SS, Wu W, Chumlea WC, Roche AF. Predicting overweight and obesity in adulthood from body mass index values in childhood and adolescence. *Am J Clin Nutr*. 2002; 76:653–658.
4. Dombrowski SU, Knittle K, Avenell A, Araújo-Soares V, Snihotta FF. Long term maintenance of weight loss with non-surgical interventions in obese adults: systematic review and meta-analyses of randomised controlled trials. *BMJ*. 2014; 348:g2646.
5. Golomb I, Ben David M, Glass A, Kolitz T, Keidar A. Long-term metabolic effects of laparoscopic sleeve gastrectomy. *JAMA Surg*. 150:1051–1057.
6. Van Vliet M, Heymans MW, von Rosenstiel IA, Brandjes DPM, Beijnen JH, Diamant M. Cardiometabolic risk variables in overweight and obese children: a worldwide comparison. *Cardiovasc Diabetol*. 2011; 10:106.
7. Freedman DS, Mei Z, Srinivasan SR, Berenson GS, Dietz WH. Cardiovascular risk factors and excess adiposity among overweight children and adolescents: the Bogalusa Heart Study. *J Pediatr*. 2007; 150:12–17. e2.
8. Sypniewska G. Laboratory assessment of cardiometabolic risk in overweight and obese children. *Clin Biochem*. 2015; 48:370–376.
9. Ali O, Cerjak D, Kent JW, James R, Blangero J, Zhang Y. Obesity, central adiposity and cardiometabolic risk factors in children and adolescents: a family-based study. *Pediatr Obes*. 2014; 9:e58–62.
10. Herget S, Rudolph A, Hilbert A, Blüher S. Psychosocial status and mental health in adolescents before and after bariatric surgery: a systematic literature review. *Obes Facts*. 2014; 7:233–245.
11. Benedet J, da Silva Lopes A, Adami F, de Fragas Hinnig P, de Vasconcelos F de AG. Association of sexual maturation with excess body weight and height in children and adolescents. *BMC Pediatrics*. 2014; 14:72.
12. Bansal A K, Manohar R *et al* (2013) Bansal A K, Manohar R, Y adav R, Sharma D, Y adav N, Lohani H. Prevalence of obesity and its lifestyle risk factors in school-age children in Jaipur. *IJRRMS* 2013;3(2):16-9.
13. Goyal JP, Kumar N, Parmar I, Shah VB, Patel B. Determinants of Overweight and Obesity in Affluent Adolescent in Surat City, South Gujarat region, India. *Indian J Community Med*. 2011 Oct;36(4):296-300

14. Aggarwal T, Bhatia RC, Singh D, Sobti PC. Prevalence of obesity and overweight in affluent adolescent from Ludhiana, Punjab. *Indian Pediatr.* 2008; 45:500–2.
15. Kapil U, Singh P, Pathak P, Dwivedi SN, Bhasin S. Prevalence of obesity amongst affluent adolescent school children in Delhi. *Indian Pediatr.* 2002; 39:449–52.
16. Marwaha RK, Tandon N, Singh Y, Aggarwal R, Grewal K, Mani K. A study of growth parameters and prevalence of overweight and obesity in school children from Delhi. *Indian Pediatr.* 2006; 43:943–52.
17. Gortmaker SL, Must A, Sobol AM, Peterson K, Colditz GA, Dietz WH. Television viewing as a cause of increasing obesity among children in the United States, 1986-1990. *Arch Pediatr Adolesc Med.* 1996; 150:356–62.

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