Research Article

Prevalence of overweight and obesity among children aged 5–15 years in a rural school in Coimbatore

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Abstract

Background: Childhood obesity is a fast emerging problem in developing countries such as India because of lifestyle changes and economic transition.[1] Childhood overweight and obesity are major risk factors for many chronic diseases such as diabetes, hypertension, cardiovascular diseases, and cancer.[1–4] Effective preventive measures will prevent the risk of developing chronic diseases in adult life.

Objective: To study the prevalence of overweight and obesity among school children in a rural school in Coimbatore using the WHO standard reference for age 5–19 years.

Materials and Methods: A cross-sectional study was conducted along with annual school health check up for the children studying in a rural matriculation school located in Neelambur village, Coimbatore district. A total of 890 school children in the age group 5–15 years enrolled in the study were examined for height and weight, and BMI was calculated. The WHO standard reference for age 5–19 years was used to define overweight (>2SD) and obesity (>3SD).

Result: In our study, prevalence of overweight was 8.32% and prevalence of obesity was 4.72%. Among boys, prevalence of overweight and obesity was 8.43% and 6.43%, respectively. Among girls, prevalence of overweight and obesity was 8.20% and 2.96%, respectively. There is no statistical significant difference in the prevalence of overweight/obesity among boys and girls.

Conclusion: A high proportion of Rural School children in our study are having weight more than their normal weight, indicating the need for public awareness and preventive measures on childhood obesity. Intervention in the form of health education should be initiated at all levels of society to stop the progression of the problem.

KEYWORDS: Overweight, childhood obesity, body mass index, school children

Introduction

India is going through an economic and nutritional transition rapidly. In India under nutrition among children is common. Childhood obesity is also increasing in India due to increased purchasing power, decreasing physical activity, change in dietary habits, more comfortable and luxurious living.[1,2] Childhood obesity and overweight are associated with several risk factors for many chronic diseases such as diabetes mellitus, hypertension, cardiovascular diseases, and cancer.[3]

Estimating early childhood overweight and obesity during schooling helps in preventing disease progression into adulthood. Approximately 50%–80% obese children will continue as obese adults.[3] Studies on prevalence of obesity and overweight in Indian cities such as Delhi, Pune, and Chennai showed higher prevalence of obesity and overweight.[4–6] Different studies used different criteria to define childhood obesity and overweight such as International Obesity Task Force classification (IOTF), NCHS classification, Agarwal classification, and WHO classification.[7–10] So the

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prevalence of overweight and obesity varies with each standard classification. Only few studies have been conducted using the WHO growth references.[25] The WHO defines childhood (5–19 years) overweight as >+2SD (equivalent to BMI 25 kg/m2 at 19 years) and obesity as >+3SD (equivalent to BMI 30 kg/m2).[25] This study was conducted to find out the prevalence of obesity and overweight among school children aged 5–15 years in a rural school in Coimbatore using the WHO growth references.[25]

Materials and Methods

This cross–sectional study was conducted along with annual school health check up for the children studying in a matriculation school located in Neelambur village, Coimbatore district. The study protocol was approved by Ethics committee of PSG Institute of Medical Science and Research, Coimbatore. The study was carried out after obtaining prior consent from school authorities, parents, and assent from children. A total of 890 school children in the age group 5–15 years were enrolled in the study.

Their age was verified from school registration records and rounded off to completed years. All anthropometric measurements were taken by medical professionals. Weighing scale and stadiometer were calibrated and validated by Department of Biometrics prior to the study. Height and weight were measured based on the WHO standards with sensitivity of 0.5 cm and 0.1 kg. Zero error was set after every 10 measurements. The children were made to stand straight with heels, buttocks, and back touching the vertical limb of the instrument and stretching upward to the fullest extent with arms hanging on the side. The head was aligned so that the lower rim of the orbit and the auditory canal were in horizontal plane (Frankfurt plane). Weight was measured without any footwear and with minimal clothing (school uniform) using Krup's weighing scale.

BMI was calculated and cut-off values for children as proposed by the WHO growth reference were used for defining overweight and obesity. The WHO defines childhood (5–19 years) overweight as >+2SD (equivalent to BMI 25 kg/m^2 at 19 years) and obesity as >+3SD (equivalent to BMI 30 kg/m^2).[25]

Statistical Analysis

Data entry and analysis was carried out using Statistical Package for Social Sciences (SPSS) version 19. All the entries were double checked and verified randomly. Prevalence of obesity and overweight was shown in percentage. χ^2-Test was carried out to find association of obesity and overweight among boys and girls.

Result

In the study, 890 school children were examined of which 451 (50.7%) were boys and 439 (49.3%) were girls [Tables 1 and 2]. In our study, the overall prevalence of overweight/obesity was found to be 13.03%. There is no statistically significant association between prevalence of overweight/obesity among boys and girls within this study [Table 3].

Discussion

In our study the prevalence of overweight and obesity among children in a private rural school was 8.32% and 4.72%, respectively. Prevalence of obesity was greater in boys when compared to girls (6.43% vs. 2.96%). Prevalence of overweight was almost equal in both sexes. There is no statistically significant association between prevalence of overweight/obesity among boys and girls within this study.

The prevalence in our study was higher compared to a study carried out in rural school in Udupi, Karnataka among school children aged 6–15 years using the WHO percentile criterion which showed prevalence of overweight and obesity as 1.5% and 1.3%,[9] respectively and also a study in Puducherry conducted among urban and rural school children using 85th percentile as overweight and 95th percentile as obesity which showed a prevalence of overweight as 4.98% and obesity as 2.24%,[6] respectively. But the prevalence is lower in our study when compared to a study in Pune using International cut-off points which showed prevalence of overweight as 19.9% conducted among affluent school boys[11] and also a study carried out in urban school children in Delhi using International cut-off points which showed a prevalence of overweight as 11.1% and obesity as 14.2%, respectively. [10] A study carried out in Karnataka using the WHO percentile criterion showed a prevalence of obesity in boys with 2.8% and in girls with 2.6%.[9] A study in Punjab using 85th percentile as overweight and 95th percentile as obesity showed prevalence of obesity and overweight was higher in boys when compared to girls (12.4% vs. 9.9%, 15.7% vs. 12.9%).[13] Our study that was conducted among private rural school children in Coimbatore showed a higher prevalence of overweight and obesity similar to urban school children in other studies. This might be because of lifestyle transition and economic improvement in rural area.

Difference in prevalence of overweight/obesity with other studies might be due to different standards used for estimation in other studies. In this study, the prevalence of overweight and obesity was analyzed using standard WHO growth references[25] among 890 school children age group 6–15 years. Not determining the risk factors for higher prevalence of overweight/obesity was a limitation to this study.

Complications of obesity during adult life worsen if obesity starts in childhood. Early prevention of childhood obesity is easier. It is recommended that high fat and junk foods should be avoided by children. Sedentary lifestyle should be discouraged and increased physical activity should be encouraged. Health education should be given to parents, children, and teachers regarding dietary habits and sedentary lifestyle.

Table 1: Age-wise distribution of overweight and obesity among boys

Age	Total	Normal weight *N* (%)	Underweight *N* (%)	Overweight *N* (%)	Obesity *N* (%)
5	16	7(43.75%)	7(43.75%)	1(6.25%)	1 (6.25%)
6	47	28(59.57%)	18(38.30%)	0	1(2.13%)
7	48	18(37.50%)	25(52.09%)	4(8.33%)	1(2.08%)
8	41	20(48.78%)	17(41.46%)	1(2.44%)	3(7.32%)
9	79	36(45.57%)	36(45.57%)	2(2.53%)	5(6.33%)
10	62	29(46.78%)	17(27.42%)	8(12.90)	8(12.90%)
11	45	21(46.67%)	12(26.67%)	10(22.22%)	2(4.44%)
12	33	16(48.49%)	12(36.36%)	1(3.03%)	4(12.12%)
13	31	10(32.26%)	16(51.61%)	3(9.68%)	2(6.45%)
14	21	7(33.33%)	9(42.86%)	4(19.05%)	1(4.76%)
15	28	17(60.72%)	7(25.00%)	3(10.71%)	1(3.57%)
Total	451	209(46.34%)	176(39.02%)	37(8.21%)	29(6.43%)

Table 2: Age-wise distribution of overweight and obesity among girls

Age	Total	Normal weight *N* (%)	Underweight *N* (%)	Overweight *N* (%)	Obesity *N* (%)
5	20	11(55.00%)	8(40%)	1(5.00%)	0
6	45	25(55.56%)	14(31.11%)	2(4.44%)	4(8.89%)
7	52	19(36.54%)	26(50.00%)	6(11.54%)	1(1.92%)
8	39	23(58.97%)	11(28.21%)	5(12.82%)	0
9	49	28(57.14%)	16(32.66%)	3(6.12%)	2(4.08%)
10	55	33(60.00%)	16(29.09%)	4(7.27)	2(3.64%)
11	39	29(74.36%)	10(25.64%)	0	0
12	55	27(49.09%)	22(40%)	4(7.27%)	2(3.64%)
13	41	21(51.22%)	10(24.39%)	8(19.51%)	2(4.88%)
14	17	9(52.94%)	7(41.18%)	1(5.88%)	0
15	27	19(70.37%)	5(18.52%)	3(11.11%)	0
Total	439	244(55.58%)	145(33.03%)	37(8.43%)	13(2.96%)

Table 3: Prevalence of overweight and obesity by sex

	Overweight/obesity			χ2-value	*P*-value
	Present	Absent	Total		
Boys	66(14.63%)	385(85.37%)	451	2.07	0.150
Girls	50(11.39%)	389(88.61%)	439		

Conclusion

The results of the study shows that the prevalence of overweight and obesity among school children is becoming high in rural area which is an alarming signal and calls for an immediate action. Effective implementation of lifestyle modifications behaviors such as healthy diet intake, avoidance of high calorie foods, and promoting physical activity in early school life help in preventing future complications as a part of primordial preventive strategies.[1–4]

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