Original Research Article

Prevalence of obesity and overweight in private schools of Jaipur city in 11-17 year age group children

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Abstract: Objective of this article is to assess the proportion of obese and overweight in 11-17 years age group children in private schools of Jaipur city and to determine associated risk factor for overweight and obesity, if any .It was a cross-sectional study carried out on 1250 children (age 11-17 years) in private schools of Jaipur city. Anthropometric measurements were taken using standard protocol. Overweight and Obesity was assessed using Body Mass Index (BMI) criteria, BMI was calculated for each child according to WHO approved CDC age-specific BMI charts, and the data was analyzed using appropriate statistical method. The overall prevalence of obesity and overweight was found to be 6.2 %(7.6% male, 4.7% female) and 12.9 %(13.9% male and 11.8% female) respectively. Prevalence was found to be higher, consuming high calorie food regularly and in those who do not exercise regularly. Family history of diabetes and obesity were not found to be positively associated. Conclusion is that Prevalence of obesity is on rise in Indian children, highlighting the possible role of change in the dietary pattern and physical activities with increase in income levels. Collective effort of parents and schools are required to institute early preventive measures to reduce March towards obesity and its future complications.
Keywords: Obesity, Overweight, body mass index, private school children, exercise, high calorie food

INTRODUCTION:

Obesity has emerged as one of the global health problems with 200 million school-aged children world-wide categorized as being overweight/obese, of which 40-50 million are obese [1]. The factors attributing to increasing childhood obesity are increased intake of high-calorie foods that are low in vitamins, minerals and micronutrients coupled with decreased physical activity [2]. Various studies done in India from 2002-2012 indicate a rising trend in the prevalence of overweight and obesity in children and adolescents [3-11]. This may have major implications towards increasing prevalence of non-communicable disease (NCD) like diabetes, hypertension and cardiovascular disease in early adulthood [11, 12].

In India there is paucity of data on the prevalence of childhood obesity which is an emerging health challenge. Therefore we decided to contribute to the data collection by investigating the prevalence of obesity in private school children in Jaipur city .This will help us in estimating the local prevalence of this condition and will prepare us for the challenge of introducing primary prevention in this area .Habit

formation occurs mainly during childhood and adolescence .So primary interventions targeting this age group has high possibility of yielding good results. This is the reason why we have targeted the age group of 11 to 17 years. Thus the aim of this project was to find out the prevalence of overweight and obesity in the private school children in selected schools of Jaipur city and also to study risk factor for overweight and obesity, if any.

MATERIAL AND METHODS

Present study was conducted in Senior Secondary Private Schools of Jaipur city during school hours from December 2010 to October 2011. It was Observational cross sectional study. The Sample size was calculated keeping in view expecting 25% overweight and obese children in affluent population . Total 1250 children were included in present study. The list of private schools in Jaipur city was gathered from district educational department, and then with help of simple random sampling two schools selected for this study. On refusal of selected school, another school from the pool was selected. All students studying in class and present at the time of study in school were

included in sample from each selected school. Students in 11-17 year of age group in selected private schools of Jaipur city (Class VIth to XIIth) included in study. Children suffering from any chronic disease identified by history were excluded from study.

Investigator explained the purpose of study and took permission for examination of students from selected school authorities. Informed consent from parents was taken. Some information like name, age, and sex, religion, cast recorded from school record and other information like height, weight and blood pressure was recorded on a predesigned Performa at the time of examination. A predesigned questionnaire prepared in English was used to gather information about dietary habits, physical activities, TV watching and family history of high blood pressure, myocardial infarction, stroke and diabetes. All students were advised to sit in a room and the procedure of blood pressure, height & weight measurement was explained to allay anxiety and fear. Following parameter was recorded; Age recorded from school record and rounded off in completed years. Weight was measured without shoes to nearest ½ kg, using portable weight machine previously calibrated with digital weighing machine. Children were in their regular uniform. Height of each child was measured by stadiometer. Height was measured without shoes. The child stood upright; nearest one cm. reading was considered for measurement [13]. Questionnaire was given to all children who attended school on the day of the survey. Children who were absent from school because of sickness or other reasons were not followed-up. Questionnaire items assessed were, participation in sports, physical exercise, diet (having vegetarian or non-vegetarian food), having junk food or not, chocolate eating habit.)Vegetarian: children who have never taken egg and meat: Non vegetarian: children who used to take egg and meat. History of frequent intake of Junk food or fast food like Maggie/noodles/ Pizza/Burger/ Pav Bhaji/ Samosa/ Tinned item/ Tikia/aerated drinks/chocolate was taken. Regular consumption: if consumed more than 4 times a week. For TV viewing, more than 2 hrs. Per day was taken as regular TV viewing for the purpose of this study. The present study also assessed family history of diabetes and obesity.

Obesity develops on deposition of excess of adipose tissue in body. BMI is best measurements for identifying children with obesity. Body mass index (BMI) was calculated as weight in kilograms / (Height in meter) 2.

Children whose BMI is at the or greater than 85 percentile are overweight and children whose BMI is at or greater than the 95th percentile are obese [14]. The reference data used to identify the cut-off points were taken from the CDC 2000 dataset for BMI [15].

All the data entered on Excel Sheet and analyzed using XL stat software. Quantitative data summarized in form of mean ± SD and the difference in mean was analyzed with help of Z test. Qualitative data was summarized in form of proportion and difference in proportion was analyzed with chi-square test. The level of significance and α error was 95% and 5% respectively for statistical analysis.

Table 1: Distribution of children according to age & gender

Age group (In yrs.)	Male (%)	Female (%)	Total (%)
11	158 (12.64)	96 (7.68)	254 (20.32)
12	10 (8.16)	70 (5.60)	172 (13.76)
13	83 (6.64)	65 (5.20)	148 (11.84)
14	79 (6.32)	51 (4.08)	130 (10.40)
15	111 (8.88)	80 (6.40)	191 (15.28)
16	95 (7.60)	87 (6.96)	182 (14.56)
17	86 (6.88)	87 (6.96)	173 (13.84)
Total	714 (57.12)	536 (42.88)	1250 (100.00)

Table 2: Distribution of children according to bodyweight and age

Age(yrs.)	Underweight(kg)	Normal weight(kg)	Overweight(kg)	Obese(kg)	Total
11	26(10.1%)	151(59.3%)	47(18.5%)	30(11.8%)	254(100%)
12	25(14.4%)	88(51.1%)	33(19.2%)	26(15.1%)	172(100%)
13	21(14.2%)	99(66.9%)	21(14.2%)	7(4.7%)	148(100%)
14	15(11.4%)	88(67.7%)	19(14.5%)	8(6.2%)	130(100%)
15	30(15.7%)	135(70.7%)	23(12.1%)	3(1.6%)	191(100%)
16	39(21.3%)	129(70.9%)	10(5.5%)	4(2.2%)	182(100%)
17	39(22.4%)	124(71.7%)	9(5.2%)	1(.6%)	173(100%)
Total	195(15.6%)	814(65.1%)	162(12.9%)	79(6.2%)	1250(100%)

Table 3: Distribution of children according to bodyweight and gender

Sex	Underweight(kg)	Normal weight(kg)	Overweight(kg)	Obese(kg)	Total
Male	13(15.7%)	448(62.6%)	99(13.9%)	54(7.6%)	714(100%)
Female	82(15.3%)	366(68.3%)	63(11.8%)	25(4.7%)	536(100%)
Total	195(15.6%)	814(65.12%)	162(12.96%)	79(6.32%)	1250(100%)

Table 4: Distribution of children according to bodyweight and exercise

Regularity of exercise	Underweight(kg)	Normal weight(kg)	Overweight(kg)	Obese(kg)	Total
Yes	184(15.4%)	786(65.7%)	154(12.9%)	73(6.1%)	1197(100%)
No	11(20.8%)	28(52.8%)	8(15.1%)	6(11.3%)	53(100%)
Total	195(15.6%)	814(65.1%)	162(12.9%)	79(6.2%)	1250(100%)

Table 5: Distribution of children according to bodyweight and TV viewing (2hrs or more)

TV viewing	Underweight(kg)	Normal weight(kg)	Overweight(kg)	Obese(kg)	Total
Yes	22(27.5%)	40(45.5%)	11(13.7%)	7(8.8%)	80(100%)
No	173(14.9%)	774(66.2%)	151(12.9%)	72(6.2%)	1170(100%)
Total	195(15.6%)	814(65.1%)	162(12.9%)	79(6.2%)	1250(100%)

Table 6: Distribution of children according to bodyweight and dietary habit

Type of food	Underweight(kg)	Normal weight(kg)	Overweight(kg)	Obese(kg)	Total
Veg	127(14.502%)	582(66.6%)	113(12.9%)	50(5.6%)	872(100%)
Nonveg	68(17.9%)	232(61.3%)	49(12.9%)	29(7.7%)	378(100%)
Total	195(15.6%)	814(65.1%)	162(12.9%)	79(6.2%)	1250(100%)

Table 7: Distribution of children according to bodyweight and consumption of energy dense food

h/o of consumption of energy dense food	Underweight(kg)	Normal weight(kg)	Overweight(kg)	Obese(kg)	Total
Regular	42(8.5%)	296(60.9%)	96(19.75%)	52(10.6%)	486(100%)
Occasional	153(20%)	518(67.8%)	66(8.6%)	27(3.4%)	764(100%)
Total	195(15.6%)	814(65.1%)	162(12.9%)	79(6.2%)	1250(100%)

Table 8: Distribution of children according to bodyweight and family history

Family history of diabetes and hypertension	Underweight(kg)	Normal weight(kg)	Overweight(kg)	Obese(kg)	Total
Yes	87(20.8%)	260(62.2%)	51(12.2%)	20(4.9%)	418(100%)
No	108(12.9%)	554(66.6%)	111(13.3%)	59(7.1%)	832(100%)
Total	195(15.6%)	814(65.1%)	162(12.9%)	79(6.2%)	1250(100%)

RESULTS:

Present cross sectional observation study was done in two private schools of Jaipur city from December 2010 to October 2011. Total 1250 children were included in present study. Out of 1250 students, 714 (57.12%) were male and 536 (42.88%) were female. In each age group male outnumber the female except in 17 year age group. Maximum numbers of students were present in 11 years of age group. Out of 1250 children, 162(12.9%) were overweight and 79(6.2%) were obese. Number of overweight and obese was maximum in 12 yr age group and minimum were in 17 yr age group. Male children were more overweight and obese then female children and this was statistically significant (p<.05).

The percentage of overweight and obesity was high in those who don't exercise regularly (15.1% and 11.3%) as compared to those who exercise regularly (12.9% and 6.1%) this was statistically significant (p<.05). The percentage is much higher in those who consume junk food regularly (19.75% and 10.6%) as compared to those who don't consume these regularly (8.6% and 3.4%).Vegetarian diet or non-vegetarian diet

did not have any effect on prevalence of overweight and obesity.

DISCUSSION:

There is rapid increase in prevalence of childhood obesity in India: Nutritional, Socio-economic and behavioral factors are responsible for obesity. Unhealthy eating habits and physical inactivity is major culprit. The sedentary life style of children and adolescents have been attributed mainly to television viewing, computer games, internet, over emphasis on academic excellence, unscientific urban planning and ever increasing automated transport.[16] National Health and Nutritional Examination Survey (NHANES) data in United States clearly shows epidemic proportion of this problem, for adolescent age (12-19 yr.) 30.4% were overweight. They clearly state that prevalence of obesity over 25 year doubled in adolescents [17].

In present study out of 1250 students, 162 (12.9%) and 79(6.2%) were overweight and obese respectively. Study by Jonathan M. Sorof *et al.;* [18]; In their study prevalence of overweight children was 20% which is similar to our study. Manu Raj *et al.;* [16]; prevalence of overweight children in private schools of Kerala was 7.17%, this result was less than our study. This may be because study was conducted long back in years (2003-06) and there is rapidly rising trend of obesity in recent years. Another reason may be difference in life style of children living in Kerala.

In present study incidence of overweight (19.2%) and obesity (15.1%) was maximum in 12 year age group and minimum in 17 year age group. This may be because of height spurt during adolescent. The overall prevalence of overweight and obesity among boys was 13.9% and 7.6% respectively and in girls 11.8% and 4.7% respectively. Study by Jonathan M Sorof *et al.;* [18] showed that male had higher prevalence of overweight than female (24% v/s 16% p <0.1). Khadilkar *et al.;* [6] showed prevalence of overweight in boys was 25.6%.Our results are similar to their Observation.

Study by Marwaha *et al.;* [7] the overall prevalence of overweight and obesity among boys from Upper Socioeconomic Status was 16.75% and 5.59% respectively and in girls 19.01% and 5.73% respectively. Girls were more overweight because this study was conducted in Delhi where girls may give more emphasis on academic and in excellence, computer and Internet than outdoor games and household work.

The overall prevalence of overweight and obesity among vegetarian was 113(12.9%) and 50(5.6%) respectively and in nonvegetarian 49(12.9%) and 29(7.7%) respectively. It was not statistically significant (P>0.05).This may be because of similar physical activities performed in schools and living areas and most of the non-vegetarian children were eating nonveg food infrequently.

418 children had positive family history of hypertension and associated risk factors, out of these 51 (12.2%) were overweight and 20(4.9%) were obese. 832 students had no family history out of this 111 (13.3%) were overweight and 59(7.1%) were obese which was not statistically significant (P>0.05).This may be because of under recognition of risk factors in the families because of lack of health awareness.

CONCLUSION:

Prevalence of obesity is on rise in Indian children, highlighting the possible role of change in the dietary pattern and physical activities with increase in income levels. Collective effort of parents and schools are required to institute early preventive measures to reduce March towards obesity and its future complications.

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