

PREVALENCE OF OBESITY AMONG URBAN SCHOOL CHILDREN OF KOCHI CITYShiji K. Jacob¹**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: OBJECTIVE: To study the prevalence of obesity and overweight among urban school children in Kochi. **SETTING AND DESIGN:** Secondary data analysis of a school-based cross sectional study of an urban school of Kochi. **MATERIALS AND METHODS:** A cross-sectional study was conducted in a private school in Kochi, India. A total of 1178 school children in the age group of 6-15 years were studied. Weight and height of each student was measured using standard measures and body mass index (BMI) was calculated. For children and teens, after BMI is calculated, the BMI number is plotted on the CDC BMI-for-age growth charts (for either girls or boys) to obtain a percentile ranking. Statistical analysis: Chi-square test. **RESULTS:** The prevalence of overweight (≥ 85 th percentile) among children was 10.1% and prevalence of obesity (> 95 th percentile) was 5.6%. Boys had the highest prevalence of overweight (11.5%) and obesity (6.53%). Male children from private schools and urban areas were at greater risk of being overweight and obese. **CONCLUSIONS:** Childhood obesity is a problem in boys and requires timely intervention for its control.

KEYWORDS: Obesity, body mass index, school children.

INTRODUCTION: Obesity is one of the most prevalent nutritional disease of children and adolescents in many developed and developing countries.¹ The World Health Organization (WHO) has declared overweight as one of the top ten health risks in the world and one of the top five in developed nations.² Existing WHO standards and data from 79 developing countries including a number of industrialized countries suggest that about 22 million children five years old are overweight worldwide. Once considered a problem of affluence, obesity is fast growing in many developing countries also.⁴ Even in countries like India, which are typically known for high prevalence of under nutrition, a significant proportion of overweight and obese children now coexist with those who are under nourished.⁵ National representative data for childhood obesity in India is unavailable, however available studies of Chennai and Delhi has shown that prevalence of 6.2% and 7.4% respectively.^{[3],[4]} 50-80% of obese children will continue as obese adults⁵ and falls into risk group of Diabetes, Hypertension, Coronary Heart Diseases and many more obesity related diseases. Complications of adult obesity are made worse if the obesity begins in childhood. Obesity is harder to treat in adults than in children⁶ Effective prevention of adult obesity will require the prevention and management of childhood obesity.⁷ WHO has also emphasized on urgent need of understanding the prevalence trend, factors contributing and developing strategies for effective intervention.

MATERIALS AND METHODS: This was a school-based, cross-sectional study. 1178 students studying between first and tenth standard of an affluent school (where the annual fees is more than 15000) of Kochi city were selected for the study. The data was, analyzed at Cochin medical college. Standing

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height was measured using a portable stadiometer. The child stood in socks on the flat base of the stadiometer with the back of the head, shoulder blades, buttocks and heels touching the vertical rod, and head in the Frankfurt plane. Gentle traction was applied to the mandibular process and the headboard lowered. The reading was taken to the last completed mm, avoiding parallax, and two such readings were averaged for analysis. Weight was measured using portable weighing scales accurate to 100 g. BMI is used as a screening tool to identify possible weight problems for children. For children and teens, BMI is age- and gender-specific and is often referred to as "BMI-for-age." The CDC and the American Academy of Pediatrics (AAP) recommend the use of BMI to screen for overweight and obesity in children beginning at two years old. However, BMI is not a diagnostic tool.

For children and teens, after BMI is calculated, the BMI number is plotted on the CDC BMI-for-age growth charts (for either girls or boys) to obtain a percentile ranking. Percentiles are the most commonly used indicator to assess the size and growth patterns of individual children in the United States. Percentiles are used for children and teens because the amount of body fat differs between boys and girls and body fat also changes with age. The percentile indicates the relative position of the child's BMI number among children of the same sex and age. The International Obesity Task Force references were used to define overweight and obesity in this study.^[13] Children were categorized into two groups namely overweight (85th to less than the 95th percentile) and obese. (Equal to or greater than the 95th percentile).

STATISTICS:

Chi-square test

Odds ratio=1.4879368 >1

Odd's ratio indicates that there is strong hazardous association between sex and obesity.

RESULTS: A total of 1178 children in the age group of 6-17 years were analyzed. Out of these 643 subjects were males and 535 subjects were females Table-1. The overall prevalence of overweight was 10.1% and obesity was 5.6% [Table 3]. The prevalence of overweight was 11.5% among boys and 8.41% among girls; 6.53 % and 4.49 % were obese, respectively. However, according to the Body Mass Index cut off values, 84.29% % (993) were normal, 10.1% (119) were overweight, and 5.6 % (66) were obese.

Age	Boys	Girls	Total
6	51	62	113
7	68	44	112
8	55	55	110
9	69	46	115
10	69	48	117
11	59	60	119
12	64	57	121
13	70	54	124
14	70	56	126
15	68	53	121
Total	643	535	1178

Table 1: Age and Sex Distribution of the Study Group

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A total of 1178 children in the age group of 6- 17 years were analyzed. Out of these 643 subjects were males, and 535 subjects were females.

Age in years	Boys	Girls
6	18.4142	18.8378
7	19.1524	19.6779
8	20.0679	20.6953
9	21.0889	21.8173
10	22.1541	22.9826
11	23.2136	24.1414
12	24.2299	25.2556
13	25.1781	26.2988
14	26.0466	27.256
15	26.8369	28.1237

Table 2: 95th Percentile of BMI for Boys and Girls

For children and teens, after BMI is calculated, the BMI number is plotted on the CDC BMI-for-age growth charts (for either girls or boys) to obtain a percentile ranking.

Sex	Obese	Non obese	Total
Boys	42 (6.53%)	601 (93.47%)	643 (100%)
Girls	24 (4.49%)	511 (95.51%)	535 (100%)
Total	66 (5.60%)	1112 (94.40%)	1178 (100%)

Table 3: Prevalence of Obesity by Sex

Statistical Test (P=0.1285)

Epidemiological Test

Odd's ratio indicates that there is strong hazardous association between sex and obesity.

Odds ratio=1.4879368 >1

Age	Obese	Non obese	Total
6	4 (3.54%)	109 (96.46%)	113 (100%)
7	10 (8.93%)	102 (91.07%)	112 (100%)
8	13 (11.82%)	97 (88.18%)	110 (100%)
9	12 (10.43%)	103 (89.57%)	115 (100%)
10	5 (4.27%)	112 (95.73%)	117 (100%)
11	1 (0.84%)	118 (99.16%)	119 (100%)
12	3 (2.48%)	118 (97.52%)	121 (100%)
13	6 (4.84%)	118 (95.16%)	124 (100%)
14	5 (3.97%)	121 (96.03%)	126 (100%)
15	7 (5.79%)	114 (94.21%)	121 (100%)
Total	66 (5.60%)	1112 (94.4%)	1178 (100%)

Table 4: Prevalence of Obesity by Age

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Sex	Overweight	Obese
Boys	74 (11.50%)	42 (6.53%)
Girls	45 (8.41%)	24 (4.49%)
Total	119(10.10%)	66 (5.60%)

Table 5: Prevalence of Overweight and Obesity Sex wise

The overall prevalence of overweight among the urban group was found to be 10.1 %, and obesity was found to be 5.6%

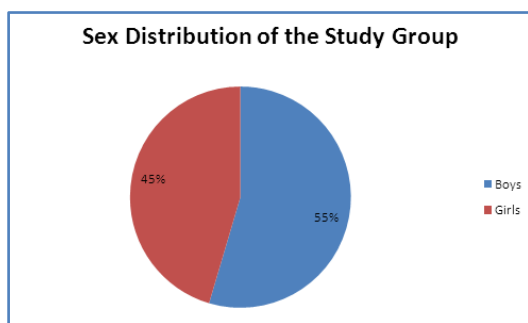


Diagram 1

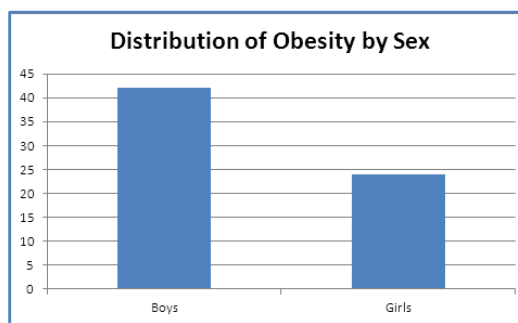


Diagram 2

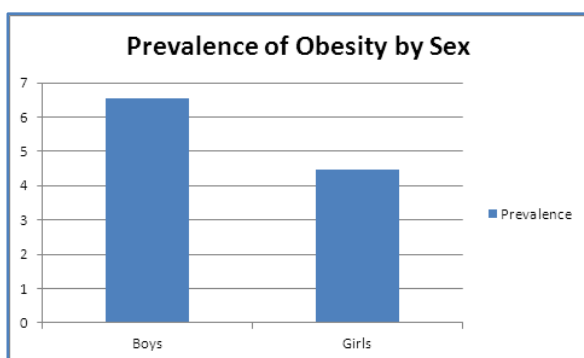
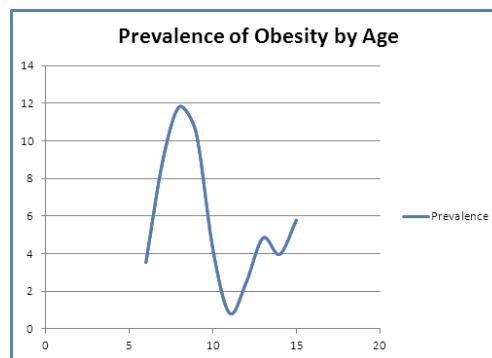


Diagram 3



Sex Graph 1

DISCUSSIONS: The overall prevalence of overweight among the urban group was found to be 10.1%, and obesity was found to be 5.6% {Table-3} which was consistent with a recent study² However, the National Nutrition Monitoring Bureau surveys in 2002, in rural areas, reported the prevalence of as little as 0.6%.³ A similar study done in Hyderabad showed that the prevalence of overweight was 7.2% among the 12 to 17 year age group.⁴ Although, some other studies done in India showed a higher prevalence of overweight and obesity.⁵⁻⁸ A study in Delhi on affluent school children showed the prevalence of obesity to be 7.4%.⁹ Another study among affluent girls in Delhi reported the prevalence of obesity and overweight to be 5.3 and 15.2%, respectively.¹⁰ Similar studies had been conducted to assess the prevalence of overweight and obesity in India and the results are comparable to our study, with respect to the prevalence of obesity.^{11,14} A study done in USA during 2001-2002 showed the prevalence of overweight and obesity as 31.5 and 16.5%, respectively, for the 6 to 19

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year age group.¹⁵ The widely differing prevalence of overweight and obesity was due to the definitions used, age group and sex taken for the study, uniformity of selection of the sample, area selected, and the methodology used for the survey. Overweight and obesity were marginally higher in the pubertal age groups of 13 to 15 years, perhaps because of increased adipose tissue and overall body weight in children during puberty. One of the major reasons for childhood obesity was watching television or using computers as shown by another study.^{4,16} A clear socioeconomic gradient in the prevalence of overweight and obesity was observed in this study, which was consistent with other studies.^{4,5,17} The results revealed that regular physical activity was an important factor in reducing the prevalence of overweight and obesity, which was consistent with other studies.^{4,5}

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