

# Childhood obesity among school children: A cross-sectional study in Mumbai city, India

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## Abstract

**Background:** Highest rate of childhood obesity has been observed in developed countries, its prevalence is increasing in developing countries also. With increase in number of diabetics and hypertensive in Mumbai cities, it was necessary to have the accurate data on the prevalence of childhood obesity. **Aim:** To assess the prevalence of childhood obesity among school children. **Material and Methods:** Students of 5th and 6th standard (10 and 11 yrs. of age) were sampling frame to study childhood obesity. Total 210 children from two schools were selected for the present study. History regarding socio-demographic profile of the childlike, educational status of parents, food habits, Physical activities was obtained. The nutritional status was assessed by using height, weight and BMI. **Results:** Out of total 210 students 18 (8.57%) were obese and all the obese students were grade I obese while 9(4.29%) were overweight. It was seen that out of 27 overweight/obese students; 77.78% students were male while among the normal weight students 45.90% were male and the difference observed was statistically significant. **Conclusion:** The prevalence of obesity in the present study was 8.57% while the prevalence of overweight was 4.29%. it was observed that male gender of student and lower education of parents was also associated with overweight/ obesity.

**Key words:** Childhood obesity, overweight, male, education, BMI

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## INTRODUCTION

Obesity is now becoming a worldwide health problem affecting all levels of society and is described as global epidemic. More than 1 billion people are overweight and at least 300 million of them are obese. On one side the highest rate of childhood obesity has been observed in developed countries, its prevalence is increasing in developing countries also.<sup>1</sup> According to World Health Organization, 22 million children are overweight.

Globally the prevalence of childhood obesity varies from over 30% in U.S.A., 20% in U.K. and Australia, 15.8% in Saudi Arabia, 15.6% in Thailand, 10% in Japan and 7.8% in Iran.<sup>2,3</sup> In developing countries like India childhood obesity is becoming as major health problem.<sup>4</sup> Studies from Mumbai cities in India have reported high prevalence of obesity among affluent school children and children in urban slums.<sup>5,6</sup> Available studies from Chennai and Delhi have shown prevalence of obesity as 6.2%-7.4% respectively. 50-80% of obese children will grow to become obese adults and it is difficult to treat obesity in adults than in children.<sup>7,8</sup> Excess weight in child is leading cause many diseases like paediatric hypertension and these children are at risk of developing long term chronic condition like, Adult onset Diabetes mellitus, coronary heart disease, orthopaedic disorders, left ventricular hypertrophy, obstructive sleep apnea, psychological problems and respiratory diseases.<sup>9,10</sup> There are few studies reporting prevalence of childhood obesity from different parts of India that range from 3-29% and also indicating that prevalence is higher in urban

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than rural areas.<sup>11</sup> With recent rise in number of diabetics and hypertensive in Mumbai, it was necessary to have the accurate data on the prevalence of childhood obesity and therefore attempt was made to assess the prevalence of childhood obesity among school children aged between (10-12 yrs.) in a Mumbai. It was also decided to study the risk factors associated with obesity.

## MATERIAL AND METHODS

The present cross-sectional type of study was planned among public school and private high school students in Mumbai city. Data collection was done over period of six months. Students of 5th and 6th standard (10 and 11 yrs. of age) were sampling frame to study childhood obesity. Sampling unit was student himself/herself. Total two schools were selected for the present study. One private and other public school. According to the study of Kapil U *et al.*<sup>8</sup> High Prevalence of obesity among Affluent adolescent schoolchildren in Delhi. The prevalence of childhood obesity in Delhi is 7.4%. Scenario of childhood obesity in Delhi being comparable to Mumbai, so prevalence of 7.4% was considered for this study. Thus, the sample size was calculated as below -

Hypothesized % frequency of outcome factor in the population (p): =7.4% $\pm$ 5

Confidence limits as % of 100(absolute  $\pm$  %)(d): =5%

Design effect (for cluster surveys-DEFF): =1

Sample size = 105

## RESULTS

It was observed that out of total 210 students 18 (8.57%) were obese and all the obese students were grade I obese while 9(4.29%) were overweight.

**Table 1:** distribution of students according to BMI

BMI	No. of students	Percentage
Normal	183	87.14%
Overweight	9	4.29%
Grade I Obesity	18	8.57%
<b>Total</b>	<b>210</b>	<b>100%</b>

It was seen that out of 27 overweight/obese students; 77.78% students were male while among the normal weight students 45.90% were male and the difference observed was statistically significant.

**Table 2:** Distribution of students according to gender and BMI group

Sex	BMI group				Grand Total
	Normal		Obese / Overweight		
	No. of students	%	No. of students	%	
Male	84	45.90	21	77.78	105
Female	99	54.10	6	22.22	105
Grand Total	183	100.00	27	100.00	210

$\chi^2=9.563$ ,  $df=1$ ,  $p=0.001$  (significant)

It was observed that 59.02% normal weight and 55.56% overweight/obese students' father were graduate. And the difference observed was not statistically significant. It was seen that mother of majority of the overweight/obese students (81.49%) were graduate while 14.81% mother were educated upto primary level. Among the normal weight students' mothers of 75.96% students were graduate while 9.84% were post graduate. And the difference observed in the normal and overweight/obese students was statistically significant.

In public school also the sample size was calculated to 105 according to prevalence taken as above. Thus, total 210 children were selected for the present study.

Following inclusion and exclusion criteria was used to select the study subjects.

### Inclusion Criteria

- Students from school of 5th-6th standard were enumerated and Systemic random technique was used to calculate prevalence and risk factors associated with childhood obesity.

### Exclusion criteria

- Student who have taken bed rest >15 days due to any type of illness during last 6 months.
- Students suffering from chronic systemic disease.
- Students suffering from any physical deformity.
- Students absent during conducting study.

Students of (5th and 6th) standard were interviewed. A pretested interview schedule was used for data collection. History regarding socio-demographic profile of the childlike, educational status of parents, food habits, Physical activities, daily outdoor games, Time spent in front of T.V. or Computer, Time spent in sleep was obtained. The nutritional status was assessed by using Height, Weight, BMI. Students from this school <10 and >12 years of age were excluded from this study.

### Statistical analysis

Data was entered in Microsoft excel 2007 and analysis was done by using SPSS 16<sup>th</sup> version and Microsoft excel 2007.

**Table 3:** Distribution of students according to educational status of parents and BMI

Parameter		Normal		Obese / Overweight		Total	P value
		No. of students	%	No. of students	%		
Education of father	Illiterate	0	0	0	0	0	0.733
	Primary	0	0	0	0	0	
	S.S.C.	0	0	0	0	0	
	Graduate	108	59.02	15	55.56	123	
	Post graduate	75	40.98	12	44.44	87	
Education of mother	Illiterate	0	0	0	0	0	0.000
	Primary	0	0.00	4	14.81	4	
	S.S.C.	26	14.21	1	3.70	27	
	Graduate	139	75.96	22	81.48	161	
	Post graduate	18	9.84	0	0.00	18	
<b>Total</b>		<b>183</b>	<b>100.00</b>	<b>27</b>	<b>100.00</b>	<b>210</b>	

## DISCUSSION

In the present study total 210 students from 5th and 6th standard of two schools randomly selected (one private and other public school). It was observed that 18 (8.57%) students were obese and all the obese students were grade I obese while 9(4.29%) were overweight. In the study Shanmugam *et al*<sup>12</sup>, the prevalence of overweight and obesity among children in a private rural school was 8.32% and 4.72%, respectively. Krishnan RN<sup>13</sup> observed that among the total 1781 children in their study, 12.8% and 5.8% are respectively the population representing overweight and obesity category. In the Mahajan, *et al*<sup>14</sup> study the true prevalence of overweight and obesity was 4.98% and 2.24% respectively which was lower as compared to the present study. Chhatwal *et al*<sup>15</sup> reported overall prevalences of childhood obesity and overweight in Punjab as 11.1 and 14.2 per cent, respectively. It was seen that out of 27 overweight/obese students; 77.78% students were male while among the normal weight students 45.90% were male and the difference observed was statistically significant ( $X^2=9.563$ ,  $df=1$ ,  $p=0.001$ ). Shanmugam *et al*<sup>12</sup> also observed greater prevalence of obesity in boys when compared to girls (6.43% vs. 2.96%) but there was no statistically significant association between prevalence of overweight/obesity among boys and girls within this study. Krishnan RN<sup>13</sup> observed 11.8% and 7.3% boys respectively are overweight and obese, while girls are also following similar trend at 13.8% and 4.3% respectively for overweight and obese category. Sidhu and colleagues<sup>16</sup> from Amritsar reported overweight in 10 per cent among boys and 12 per cent among girls and obesity in 5 per cent boys and 6 per cent in girls. Kotian and co-workers<sup>17</sup> reported that the overall prevalences of overweight and obesity were 9.3 and 5.2 per cent, respectively among boys and 10.5 and 4.3 per cent among girls, in a semi urban city in Karnataka. Verma *et al*.<sup>18</sup> reported that 11.6% male children were overweight and 8.7% were obese while 12% female children were overweight and

6% were obese. It was observed that 59.02% normal weight and 55.56% overweight/obese students' father were graduate. And the difference observed was not statistically significant. It was seen that mother of majority of the overweight/obese students (81.49%) were graduate while 14.81% mother were educate upto primary level. Among the normal weight students mothers of 75.96% students were graduate while 9.84% were post graduate. And the difference observed in the normal and overweight/obese students was statistically significant. Rajaat Vohra *et al*<sup>19</sup> carried out a study in three government and three private schools Students and revealed that the important correlates of overweight/obesity were father's education and father's occupation.

## CONCLUSION

The prevalence of obesity in the present study was 8.57% while the prevalence of overweight was 4.29%. it was observed that male gender of student and lower education of parents was also associated with overweight/ obesity.

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