

# A cross sectional study of lifestyle factors associated with childhood obesity among school children

Sachin Prakashrao Rathod<sup>1</sup>, Rujuta S Hadaye<sup>2\*</sup>

<sup>1</sup>Assistant professor, Department of Community Medicine, Government Medical College, Latur, Maharashtra, INDIA.

<sup>2</sup>Professor, Department of community Medicine, Seth G S Medical College and K E M Hospital, Mumbai, Maharashtra, INDIA.

Email: [alchemistsach@gmail.com](mailto:alchemistsach@gmail.com)

## Abstract

**Background:** Indian data regarding current trends in childhood obesity are emerging. Lifestyle changes and worldwide nutrition transition are important factors for obesity epidemic. Current eating habits include low consumption of fruits, green vegetables and milk, increased consumption of junk food, sweets and soft drinks etc. These eating habits with decreased physical activity will lead to childhood obesity. **Aim:** To study the lifestyle factors associated with childhood obesity among school children. **Material and Methods:** This cross-sectional type of study was planned among public school and private high school students in Mumbai city. Students of 5th and 6th standard (10 and 11 yrs. of age) were sampling frame to study childhood obesity. History regarding food habits, Physical activities, daily outdoor games, Time spent in front of T.V. or Computer was obtained. The nutritional status was assessed by using height, weight, BMI. **Results:** It was observed that 63.93% normal weight students and 88.89% overweight/ obese students had not drink carbonated drink during the past 30 days and the difference observed was statistically significant. It was observed that 49.73% normal weight students and 66.67% overweight/ obese students had eat sweets 2 times per day and the difference observed was statistically significant. **Conclusion:** Eating fast food/ quick meals, drinking carbonated soft drinks and eating frequent sweets were associated as risk factors for overweight/ obesity. While spending much time in front of TV and playing computer games i.e., reduced physical activity were also associated with overweight/ obesity. **Key Words:** Childhood obesity, overweight, junk foods, carbonated soft drinks, physical activity

## \*Address for Correspondence:

Dr. Rujuta S Hadaye, Professor, Department of community Medicine, Seth G S Medical College and K E M Hospital, Mumbai, Maharashtra, INDIA.

Email: [alchemistsach@gmail.com](mailto:alchemistsach@gmail.com)

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## INTRODUCTION

For children and adolescents, overweight and obesity are defined using age and sex specific cut-offs 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 percentile are defined overweight and are at risk for obesity related co-morbidities.<sup>1</sup> Overweight and obesity are by definition, abnormal or excessive fat accumulation that may impair health or simply as a state of excess adipose tissue.<sup>2,3</sup> Another definition says that obesity is an excessive accumulation of adipose tissue containing stored fat in the form of triglycerides.<sup>4</sup> Indian data regarding current trends in childhood obesity are emerging. Available studies of Delhi and Chennai has shown the prevalence of 7.4% and 6.2% respectively.<sup>5,6</sup> A study conducted among adolescent school children in South Karnataka has shown the prevalence of overweight and obesity to be 9.9% and 4.8% respectively.<sup>7</sup> Lifestyle changes and worldwide nutrition transition are important factors for obesity epidemic. Economic growth, modernization, urbanization (increased use of automated

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transport, technology at home) and globalization of food markets are important factors for increased prevalence of obesity. Food intake has been associated with obesity not only in terms of volume of food ingested but also in terms of composition and quality of diet. Current eating habits include low consumption of fruits, green vegetables and milk, increased consumption of junk food, sweets and soft drinks etc. These eating habits with decreased physical activity will lead to childhood obesity.

## MATERIAL AND METHODS

This cross-sectional type of study was planned among public school and private high school students in Mumbai city. Students of 5th and 6th standard (10 and 11 yrs. of age) were sampling frame to study childhood obesity. The data collection was done over period of six months. 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> There was 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

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

### 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 of age will be excluded from this study.

### Statistical analysis

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

## 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.

**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 observed that 53.55% of normal weight students and 29.63% overweight/ obese students were having breakfast 3-4 times per week and the difference was not statistically significant. It was seen that during last 7 days 51.91% normal weight students and 70.37% overweight/ obese students had eat vegetables, such as cauliflower, ladyfinger, pumpkin, brinjal, spinach Occasionally (<3 times per week). It was observed that 12.02% normal weight students and 44.44% overweight/ obese students had eat fast food/ quick meals such as samosa, patties, burger, pizza, fried food for 4 time /week and the difference observed was statistically significant. It was observed that 63.93% normal weight students and 88.89% overweight/ obese students had not drink carbonated drink during the past 30 days and the difference observed was statistically significant. It was observed that 49.73% normal weight students and 66.67% overweight/ obese students had eat sweets 2 times per day and the difference observed was statistically significant. Majority of the students were taught in their classes about the benefits of healthy eating during this school year. It was seen that 59.02% normal weight students and 85.19% overweight/obese students eat outside food by pocket money expenditure when they have not brought the Tiffin and the difference observed was statistically significant. Majority of the students bring home made food in tiffin and content was Chapatti-bhaji. It was observed that 41.53% normal weight students and 51.85% overweight/obese students took 3 meals in a day and the difference was not statistically significant. It was seen that all the students in the present study were participating

in sports activity three hours per week. It was observed that 66.12% normal weight students and 70.37% overweight/ obese students were spending 1-2 hr/day

during a typical or usual day sitting and watching T.V, casual talking without doing any physical activity after school.

**Table 2:** Distribution of students according to food habits

		Normal		Obese / Overweight		Total	P value
		No. of students	%	No. of students	%		
How many times do you take your Breakfast per week?	1-2	0	0.00	0	0.00	0	0.067
	3-4	98	53.55	8	29.63	106	
	4-5	85	46.45	19	70.37	104	
During last 7 days how many times per day did you eat vegetables, such as cauliflower, lady finger, pumpkin, brinjal, spinach?	Every day	0	0.00	0	0.00	0	0.119
	Didn't eat	0	0.00	0	0	0	
	Occasionally (<3 times per week)	95	51.91	19	70.37	103	
	Everyday 1-2 servings	74	40.44	8	29.63	93	
During last 7 days how many time days did you eat fast food/ quick meals ( samosa, patties, burger, pizza, fried food)?	Everyday > 2 servings	14	7.65	0	0.00	14	0.000
	0 days	0	0.00	0	0.00	0	
	1 days	0	0.00	0	0.00	0	
	2 days	105	57.38	0	0.00	105	
How many times per day do you take fast food /quick meals (Samosa, patties , burger, pizza, fried food):	3days	42	22.95	5	18.52	47	0.000
	4 days	22	12.02	12	44.44	34	
	5 days	14	7.65	6	22.22	20	
	>5 days	0	0.00	4	14.81	4	
During last 30 days how many times per week did you usually drink carbonated soft drinks?	0 times	10	5.46	6	22.22	16	0.000
	1 times	130	71.04	5	18.52	135	
	2 times	43	23.50	13	48.15	56	
	3 times	0	0.00	3	11.11	3	
During last 30 days how many times per week did you usually drink carbonated soft drinks?	>3times	0	0.00	0	0.00	0	0.000
	Did not drink carbonated drink during the past 30 days	66	36.07	3	11.11	69	
	<1 time per week	56	30.60	20	74.07	76	
	2 time per week	61	33.33	4	14.81	65	
How many times per day do you eat sweets?	3 time per week	0	0.00	0	0.00	0	0.000
	>3 time per week	0	0.00	0	0.00	0	
	0	0	0.00	0	0.00	0	
	1	81	44.26	0	0.00	81	
During this school year, were you taught in any of your classes the benefits of healthy eating	2	91	49.73	18	66.67	109	0.585
	3	11	6.01	9	33.33	20	
	>3	0	0.00	0	0	0	
	Yes	181	98.91	27	100	208	
How many days do you bring the Tiffin	No	2	1.09	0	0	2	0.000
	<3 days	9	4.92	0	0	9	
	>3 days	107	58.47	3	11.11	110	
	Every day	67	36.61	24	88.89	91	
What do you do if you have not brought the Tiffin?	Don't eat	41	22.40	0	0	41	0.012
	Eat from friends Tiffin	34	18.58	4	14.81	38	
	Eat outside food by pocket money expenditure	108	59.02	23	85.19	131	
	Upama	2	1.09	0	0	2	
What do you bring in tiffin in school?	Shira	11	6.01	0	0	11	0.264
	Biscuits	9	4.92	0	0	9	
	Chapatti-bhaji	108	59.02	18	66.67	126	
	Bread-butter	27	14.75	2	7.41	29	
Usually what type of food do you bring	other	26	14.21	7	25.93	33	0.093
	Homemade food	155	84.70	25	92.59	180	
	Packed food	0	0.00	1	3.70	1	
	Market food	28	15.30	1	3.70	29	

	1	4	2.19	0	0	4	
How many times do you take meals in a day?	2	103	56.28	13	48.15	116	0.482
	3	76	41.53	14	51.85	90	
	>3	0	0.00	0	0.00	0	
	<b>Grand Total</b>	<b>183</b>	<b>100</b>	<b>27</b>	<b>100</b>	<b>210</b>	

It was observed that 13.11% normal weight students while 25.93% overweight/ obese students were spending 1-2 hr/day during a typical or usual day sitting and Playing computer games, Video games but the difference was not statistically significant. Watching TV and playing computer games were the most hobbies observed among all the students. It was observed that 62.96% overweight/ obese students think that their body image looks fatty while 73.77% normal weight students think that their body image looks medium and the difference observed was statistically significant.

**Table 3: Distribution of students according to lifestyle factors**

		Normal		Obese / Overweight		Total	P value
		No. of students	%	No. of students	%		
Numbers of sports hour per week	Once	0	0	0	0	0	NA
	Twice	0	0	0	0	0	
	Thrice	183	100	27	100	210	
	>thrice	0	0	0	0	0	
How much time do you spend during a typical or usual day sitting and watching T.V, casual talking without doing any physical activity after school?	<1 hr/day	38	20.77	5	18.52	43	0.907
	1-2 hr/day	121	66.12	19	70.37	140	
	3-4hr/day	24	13.11	3	11.11	27	
	>4hrs/day	0	0	0	0	0	
How much time do you spend during a typical or usual day sitting and Playing computer games, Video games	<1 hr/day	145	79.23	20	74.07	165	0.092
	1-2 hr/day	24	13.11	7	25.93	31	
	3-4hr/day	14	7.65	0	0.00	14	
	>4hrs/day	0	0	0	0	0	
What are your Hobbies	Watching T.V.	65	35.52	9	33.33	74	0.308
	Playing Video games	22	12.02	1	3.70	23	
	Computer games	32	17.49	9	33.33	41	
	Playing indoor games	35	19.13	4	14.81	39	
	Playing outdoor games	29	15.85	4	14.81	33	
	Reading books	0	0	0	0	0	
	Others	0	0	0	0	0	
What do you think about your body image?	Fatty	0	0	17	62.96	17	0.000
	Thin	48	26.23	1	3.70	49	
	Medium	135	73.77	9	33.33	144	
<b>Grand Total</b>		<b>183</b>	<b>100</b>	<b>27</b>	<b>100</b>	<b>210</b>	

## DISCUSSION

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. Krishnan RN<sup>8</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>9</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. It was observed that 53.55% of normal weight students and 29.63% overweight/ obese students were having breakfast 3-4times per week and the difference was not statistically significant. It was seen that during last 7 days 51.91% normal weight students and 70.37% overweight/ obese students had eat vegetables, such as cauliflower, ladyfinger, pumpkin, brinjal, spinach Occasionally (<3

times per week). It was observed that 12.02% normal weight students and 44.44% overweight/ obese students had eat fast food/ quick meals such as samosa , patties, burger, pizza, fried food for 4time /week and the difference observed was statistically significant. It was observed that 63.93% normal weight students and 88.89% overweight/ obese students had not drink carbonated drink during the past 30 days and the difference observed was statistically significant. It was observed that 49.73% normal weight students and 66.67% overweight/ obese students had eat sweets 2 times per day and the difference observed was statistically significant. Majority of the students were taught in their classes about the benefits of healthy eating during this school year. It was seen that 59.02% normal weight students and 85.19% overweight/obese students eat outside food by pocket money expenditure when they have not brought the Tiffin



and the difference observed was statistically significant. Majority of the students bring home made food in tiffin and content was Chapatti-bhaji. It was observed that 41.53% normal weight students and 51.85% overweight/obese students took 3 meals in a day and the difference was not statistically significant. The junk food/fast foods play as a key contributor to the rising prevalence of obesity among children because of fast food's poor nutritional quality, as fast foods have higher total energy, total fat, and saturated fat intakes; have refined carbohydrates and lower fiber intakes; and with higher energy density.<sup>10,11</sup> Further, fast food consumption is also associated with higher intake of sugar sweetened beverages and French fries and lower intake of milk, fruit, and vegetables.<sup>12,13</sup> Verma et al.<sup>14</sup> reported that out of 147 overweight children, 87 (59.2%) use to take junk/fast food 1–2 times/week. Out of 94 obese children, 52 (55.3%) use to take junk food 1–2 times/week. Those who were taking junk food 2–4 times/week, 51 (43.7%) students out of total 147 were overweight and 25 (26.6%) students out of 94 were obese. This was found to be statistically significant ( $P = 0.001$ ) Study conducted by S Kumar et al.<sup>15</sup> in Davengere showed that eating junk food for >2 times per week to be associated significantly with obesity ( $p < .001$ ). The chance of being obese was 5.6 times more in those who ate more junk food and chocolates. In a study by Rajaaat Vohra et al.<sup>16</sup> in Lucknow city it was observed that risk of overweight/obesity was significantly higher in children those who consumed more junk food ( $OR = 9.17$  95%CI=1.28-1.86. In the study done by Kotian et al.<sup>17</sup> in South Karnataka ( $P < 0.001$ ), the study done by Seema Jain et al.<sup>18</sup> in Meerut ( $P < 0.001$ ) also showed significant association of junk food consumption with the prevalence of obesity and overweight. In another study by Goyal RK<sup>19</sup> from Ahmedabad found that eating habits like junk food, chocolate, eating outside at weekends were having remarkable effect on prevalence of overweight and obesity in children among middle to high socioeconomic group. It was seen that all the students in the present study were participating in sports activity three hours per week. It was observed that 66.12% normal weight students and 70.37% overweight/ obese students were spending 1-2 hr/day during a typical or usual day sitting and watching T.V, casual talking without doing any physical activity after school. It was observed that 13.11% normal weight students while 25.93% overweight/ obese students were spending 1-2 hr/day during a typical or usual day sitting and Playing computer games, Video games but the difference was not statistically significant. Watching TV and playing computer games were the most hobbies observed among all the students. It was observed that 62.96% overweight/ obese students think that their body image looks fatty

while 73.77% normal weight students think that their body image looks medium and the difference observed was statistically significant. Rapid increase in childhood obesity has also been attributed to a shift in the activity patterns from outdoor play to indoor entertainment; television viewing, internet, and computer games. A study suggested that decreasing any type of sedentary time is associated with lower health risk in youth aged 5-17 years. In particular, the evidence suggested that daily TV viewing in excess of 2 hours is associated upward in BMI.<sup>20,21</sup> Another study by Herman KM et al.<sup>22</sup> showed that Overweight and obese children were more sedentary and higher screen time than normal weight children. Further, a European youth heart study conducted by Ekelund U et al.<sup>23</sup> among 9-10 year old boys and girls found the significant positive relationships between TV viewing and adiposity after adjusting for gender, age group, study location, sexual maturity and birth weight. Mitchell et al.<sup>24</sup> studied the association of hours of objectively measured sedentary behaviour and odds of being obese and confirmed that sedentary behaviour was positively associated with obesity.

## CONCLUSION

Thus we conclude that eating fast food/ quick meals, drinking carbonated soft drinks and eating frequent sweets were associated as risk factors for overweight/ obesity. While spending much time in front of TV and playing computer games i.e., reduced physical activity were also associated with overweight/ obesity.

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