

# Prevalence of overweight and obesity among the urban adolescent English Medium School girls of Kolkata, India

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## ABSTRACT

**BACKGROUND:** the prevalence of child obesity is increasing rapidly worldwide. In developing countries such as India, especially in urban populations, childhood obesity is emerging as a major health problem. In view of these contexts, the present study was undertaken to estimate the prevalence of overweight and obesity in an urban population of girl adolescent students attending the English Medium School in Kolkata, India.

**METHODS:** a total of 571 girl students, aged 12-18 years, were evaluated. Cole et al. (2000) recommended cut-off points were utilized to assess overweight and obesity.

**RESULTS:** the overall prevalence rates of overweight and obesity were 28.5% and 4.2% respectively. The rate of overweight was the highest when compared with that of different parts of India, including Kolkata, and also when compared to rates from the USA and Great Britain.

**CONCLUSIONS:** in the context of the present study, it can be presumed that, the higher prevalence of overweight in these school children may be due to their eating habits, as well as to their lack of awareness on proper eating habits. In addition, low involvement in physical activities may also have influenced the rate of overweight and obesity. Thus, it can be concluded that the study definitely highlighted the existence of an obesity threat, which is likely to persist among Bengalee school children of wealthier families.

*Key words: Overweight, Obesity, Adolescent school girls, Kolkata*

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## INTRODUCTION

The prevalence of child obesity is increasing rapidly worldwide. Childhood obesity has more than tripled in the past 30 years. The prevalence of obesity among children aged 6 to 11 years has increased from 6.5% in 1980 to 19.6% in 2008. The prevalence of obesity among adolescents aged 12 to 19 years has increased from 5.0% to 18.1%. (1, 2). Obesity is the result of a caloric imbalance (too few calories expended for the

amount of calories consumed) and is mediated by genetic, behavioral, and environmental factors (3). It is associated with several risk factors for later heart disease and other chronic diseases including hyperlipidaemia, hyperinsulinemia, hypertension, and early atherosclerosis. Obesity has become a global health problem, affecting more than 1.3 billion adults in both developed and developing countries (4). Globally, the prevalence of childhood obesity varies from over 30% in the USA to less than 2% in sub-Saharan Africa.

Currently the prevalence of obese school children is 20% in the UK and Australia, 15.8% in Saudi Arabia, 15.6% in Thailand, 10% in Japan and 7.8% in Iran (5, 6). Effective prevention of adult obesity will require the prevention and management of childhood obesity (7). Healthy lifestyle habits, including healthy eating and physical activity, can lower the risk of becoming obese and developing related diseases (3). Overall, obesity in childhood appears to increase the risk of subsequent morbidity, whether or not obesity persists into adulthood (8). It is believed that 50-80% of obese children will continue to be obese as adults (9). Children and adolescents who are obese are at greater risk for bone and joint problems, sleep apnea, and social and psychological problems such as stigmatization and poor self-esteem (3). Healthy lifestyle habits, including healthy eating and physical activity, can lower the risk of becoming obese and developing related diseases (3). Complications of adult obesity are made worse if the obesity begins in childhood. Obesity is harder to treat in adults than in children (10).

In developing countries such as India, especially in urban populations, childhood obesity is emerging as a major health problem (11). Studies from metropolitan cities in India have reported a high prevalence of obesity among affluent school children (12-14). Despite National representative data for childhood obesity in India being unavailable, some studies carried out in Chennai and Delhi have shown that the prevalence of obesity there is 6.2% and 7.4% respectively (15, 16). The children in developing countries presently suffer from the double jeopardy of malnutrition - urban children are afflicted with problems of over-nutrition while rural and slum children suffer from effects of under-nutrition (17).

In view of these contexts, the present study was undertaken to estimate the prevalence of overweight and obesity among the English Medium School adolescent girl students of Kolkata, India.

## METHODS

After obtaining ethical permissions from the school authorities, the class teachers were briefed on the purpose of the study, a rapport was built up with the girl students, and verbal consent was obtained from them. The students were also briefed regarding the questionnaire administered to them.

### Area of study

The study was conducted during the period from November, 2008 to September, 2009. Two Higher Secondary (English Medium) Girls' Schools of Kolkata participated in the study, namely: Mahadevi Birla Girls' Higher Secondary School, Darga Road, Park Circus, Kolkata, and Auxillium Convent School, Barasat, 24 Parganas North, Kolkata.

### Sample population

The data were collected from 571 girls attending these schools, ranging in age from 12-18 years (classes 8 to 12 standard). The majority of the students were from families having a monthly income between 15 000 to 30 000 Rupees (55.87%). Families with a monthly income between 30 000 to 50 000 Rupees followed (31.54%). About 14.42 % of the participants came from families having a monthly income of 10 000 to 15 000 Rupees and very few students (1.35%) came from families with a monthly income of 50 000 Rupees and above.

### Measurements

Anthropometric measurements like height (in cm) and weight (in kg) were taken following standard methods (18).

### Questionnaire

The questionnaire was prepared to assess the eating habits of the girls participating in the study. They were questioned about the timings of main meals, intake of fast foods, consumption of ice-creams, cold drinks and chocolates (frequency of consumption per week in <2 days, 2-3 days and >3 days), fondness of vegetarian or non vegetarian food, consumption of snacks in between meals, etc.

### Personal information

Before taking measurements, some personal information regarding family income, food-intake habits, and other relevant issues were asked.

### Statistical analyses

After taking measurements and collecting information, statistical analyses were carried out using SPSS-PC package for social sciences. The BMI was calculated following standard formula - weight (in kg) divided by height (in metres) squared. The categories overweight and obesity were determined with the help of the cut off points (Table 1) as proposed by Cole and others in 2000 (19).

### RESULTS

The mean height and weight of the participants were 154.6 cm (highest - 155.2 and lowest - 153.0 cm) and 54.5 kg (highest - 57.4 and lowest - 51.7), respectively. Though the increase of the mean height was not gradual with increasing age, weight showed a gradual increase in relation to the increase in age.

Table 2 shows the frequency of consumption of fast food among the students in the age ranging from 12 years to 18 years. It is evident from the table that girls of lower ages (12 years to 15 years) consumed fast food more frequently (58.42% to 54.89%) as compared to the girls of higher ages (16 years to 18 years) who consumed them markedly less (45.53% to 21.63%). In accordance with the previous table, Table 3 represents the consumption of ice-creams, cold drinks and chocolates per week among the studied subjects. This also reveals that the girls of lower ages (12 years to 15 years) were more fond (58.73% to 56.89%) of these food items than their senior counterparts (16 years to 18 years) who consumed these more cautiously and much less (44.53% to 29.31%).

Table 4 represents the prevalence of overweight and obesity among the studied subjects. The overall (age combined) prevalence rates of overweight and obesity were 28.5% and 4.2%

TABLE 1

COLE ET AL. (2000) RECOMMENDED CUT-OFF POINTS FOR OVERWEIGHT AND OBESITY ON BMI AMONG GIRLS

AGE (YEARS)	OVERWEIGHT	OBESITY
12	21.7	26.7
13	22.6	27.8
14	23.3	28.6
15	23.9	29.1
16	24.4	29.4
17	24.7	29.7
18	25.0	30.0

TABLE 2

FREQUENCY OF CONSUMPTION OF FAST FOOD PER WEEK

AGE IN YEARS	< 2 DAYS	2-3 DAYS	> 3 DAYS
12	7.23%	34.35%	58.42%
13	13.76%	28.44%	57.79%
14	11.87%	29.37%	58.75%
15	16.38%	28.73%	54.89%
16	25.43%	29.04%	45.53%
17	39.20%	33.52%	27.28%
18	47.11%	31.26%	21.63%

TABLE 3

FREQUENCY OF CONSUMPTION OF ICE-CREAM, COLD DRINKS AND CHOCOLATE PER WEEK

AGE IN YEARS	< 2 DAYS	2-3 DAYS	> 3 DAYS
12	5.70%	35.57%	58.73%
13	13.77%	28.44%	57.79%
14	13.46%	29.37%	57.17%
15	16.39%	26.72%	56.89%
16	27.43%	28.04%	44.53%
17	45.41%	17.23%	37.36%
18	55.51%	15.18%	29.31%

TABLE 4

PREVALENCE OF OVERWEIGHT AND OBESITY AMONG THE STUDIED SCHOOL GIRLS

AGE IN YEARS	OVERWEIGHT N (%)	OBESITY N (%)	TOTAL N (%)
12 (N=40)	20 (50.0)	2 (5.0)	22 (55.0)
13 (N=66)	24 (36.4)	3 (4.5)	27 (40.9)
14 (N=56)	19 (33.9)	5 (8.9)	24 (42.8)
15 (N=87)	21 (24.1)	6 (6.9)	27 (31.0)
16 (N=132)	28 (21.2)	4 (3.0)	32 (24.2)
17 (N=131)	41 (31.3)	3 (2.3)	44 (33.6)
18 (N=59)	10 (16.9)	1 (1.7)	11 (18.6)
<b>TOTAL (N=571)</b>	<b>163 (28.5)</b>	<b>24 (4.2)</b>	<b>187 (32.7)</b>

respectively. In both the cases, the rates more-or-less decreased gradually with increasing age of students from 12 years to 18 years, with some exceptions. The highest rate (50.0%) of overweight was noticed at 12 years of age and it gradually decreased thereafter to the lowest rate (16.9%) of overweight at 18 years of age, the exception being students of 17 years of age where the overweight percentage was higher (31.3%). For obesity, a similar trend of prevalence rates was observed in the age-group of 14 years, where the rate was highest (8.9%). Obesity rates gradually decreased to 1.7% in the 18 year old students. The rate of prevalence of obesity among students of 12 and 13 years of age were also high compared to the overall rate, 5.0% and 4.5%, respectively.

## DISCUSSION

Several studies have focused on age variations in anthropometric characteristics and nutritional status of men and women of different ethnic groups, of both tribal (20, 21) and non-tribal populations (22), of children (23) and of adults (24). In most of these studies in India, under-nutrition was the principal variable assessed (25, 26, 27) rather than the prevalence of overweight and obesity. Overweight/obesity among children is progressing towards epidemic levels. The health risks of excessive body fat are noted even with a relatively small increase in body weight, and not only with marked obesity (7). The World Health Organization has described obesity as one of today's most neglected public health problems. Following the increase in adult obesity trends, the proportion of children and adolescents who are overweight and obese has also been increasing (28). The rate of overweight (28.5%) seen in the present study was the highest when compared to the prevalence rate from different parts of India, including Kolkata, and when compared to rates from USA and Great Britain (16.5% and 11.7%, respectively) (19). A previous study (14) from Kolkata had shown that overweight and obesity among school girls were 17.63% and 5.1% respectively. The rate of obesity of the school children of the present study was to some extent closer (4.2%) to the previously seen one. The prevalence of overweight among the children from Punjab and Chennai, India, was 14.3% (29) and 15.8% (30), respectively. But Delhi children showed much lower rates (7.4%) of overweight (23). In a study (24) among school going children of Wardha city, Central India, a

higher prevalence (9.7%) was found among English medium schools compared to other schools (3.7%). The higher prevalence of overweight (28.5%) and obesity (4.2%) of the school children of the present study was due to their food intake habits, as well as to a lack of awareness. This finding suggests that students in these school settings may be less involved in physical activities, though this was not recorded specifically during the study. The students were reluctant about being involved in physical activities in their daily life patterns, like playing out door games, practicing yoga and so on. Besides food intake habits, these exercise factors may also have an influence on overweight and obesity. This is quite evident, as can be deduced, from Tables 2 and 3, which clearly show that the younger girls consume fast food, ice-creams, cold drinks and chocolates more frequently than their elder counterparts. A reflection of the comparatively higher rate of overweight and obesity among younger girls is evident also from Table 4. Generally, they were fond of consuming fast food, ice-cream, cold-drinks (42 %-53 %) etc. aside from their daily diet. Most students (39%-53%) from all the classes consumed snacks in between meals. Moreover, between 50% to 60% of students reported to moderately consume fruits. Similar findings were prominent from the study conducted among the school children of Davangere city, Central Karnataka. The prevalence of obesity in that study was 5.74 % among the affluent school children of Davangere city. Unlike the present study, where overweight and obesity were found to be decreased with increasing age of the girls, the prevalence of obesity increased with an increase in age, and in both boys and girls of Davangere city. Snacking of high energy junk foods was one of the important influencing factors of obesity among the Davangere school children (25), similar to that of the girls of the present study. One thing that can be mentioned from the present study is that, as age increased gradually, students may have become cautious about their figure and health, and may have tried to consume less amounts of junk food, which was reflected in the lower prevalence rate of overweight, as well as obesity, in the higher age groups. Obesity was more common among Thai (10.0%) and Chinese (7.90%) children, whereas, in the case of the present study, it was much less common (4.2%). The obesity rate of the present study was more-or-less similar to another Asian technologically advanced country i.e. Japan (4.6%). But this rate is very low (1.0%), for example, in Singapore (19). As reported in various studies from developed countries (5, 6), in

most of the high-income populations, overweight and obesity can be tracked from childhood to adulthood. If the current trends of overweight and obesity are tracked from childhood to adulthood in developing countries also, as has been observed in the developed nations, then, in the next few decades, West Bengal may experience a prevalence of adult overweight and obesity similar to, or higher than, those presently observed in the developed nations (14). As the present study was conducted in a pocket of Kolkata population, it should not be considered as representative of the State as a whole. However, it is definitely indicative of the obesity threat, which may likely persist among the Bengalee school children from wealthier families.

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