# Original Research Article

# Childhood obesity and socio-economic class

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## ABSTRACT

**Background:** Childhood obesity has reached epidemic levels in developed countries. Overweight and obesity in childhood are known to have significant impact on both physical and psychological health. The mechanism of obesity development is not fully understood and it is believed to be a disorder with multiple causes. There are supporting evidence that excessive sugar intake by soft drink, increased portion size and steady decline in physical activity have been playing major role in the rising rates of obesity all around the world. The aim of this study was to compare the obesity status of children (5-18 years) from the upper and middle socio-economic class.
**Methods:** 400 children (200 boys and 200 girls) in the age group of 5-18 years from upper and middle socio-economic status (According to the modified version of Kuppuswamy's socio-economic status scale) were selected as subjects for this study. Weight and height were measured in minimum acceptable standard clothing without shoes and socks and BMI was calculated. Because there are changes in body weight and height with age, BMI levels among children and teens need to be expressed relative to other children of the same age and sex. Number of children in each BMI-for-age-percentile-range were calculated. By using chi–square test an association of overweight/obesity with socio-economic class was studied in children.
**Results:** The prevalence of overweight/obesity was more in upper socio-economic class boys in comparison with middle socio-economic class boys, more girls from upper socio-economic class were overweight/obese in comparison with middle socio-economic class girls and more girls were obese in comparison to boys from upper socio-economic class.
**Conclusions:** The primary prevention could be the key plan for controlling the current epidemic of obesity and these strategies seem to be more effective in children than in adults.

**Keywords:** Body mass index, Obesity, Socioeconomic

## INTRODUCTION

The world is undergoing a rapid epidemiological and nutritional deficiencies, as evidenced by the prevalence of stunting, anaemia, iron and zinc deficiencies concomitantly, there is a progressive rise in the prevalence of obesity, diabetes and other nutrition related chronic diseases (NRCDs) like obesity, diabetes, cardiovascular diseases, and some forms of cancer.

Obesity has reached epidemic levels in developed countries. The highest prevalence rates of childhood obesity have been observed in developed countries; however, its prevalence is increasing in developing countries as well.[1] There has been a phenomenal rise in proportions of children having obesity in the last four decades, especially in the developed world.[2] Childhood obesity is associated with a higher chance of obesity, premature death and disability in adulthood. In addition,

it is associated with a future risk of increased breathing difficulties, increased risk of fractures, hypertension and early marker of cardiovascular diseases, insulin resistance and psychological effects.[3] Although definition of obesity and overweight has changed over time, it can be defined as an excess of body fat (BF). There is no consensus on a cut-off point for excess fatness of overweight or obesity in children and adolescents.[4] The centre for disease control and prevention defined overweight as at or above the 95th percentile of body mass index (BMI) for age and at risk for overweight as between 85th to 95th percentile of BMI for age.[5,6] An Indian research study has defined overweight and obesity as overweight (between ≥85 and <95th percentile) and obesity (≥95th percentile).[7]

BMI is interpreted differently for children and teens even though it is calculated as Weight (kg)/height$^2$ (m).[8] Because there are changes in body weight and height with age, as well as their relation to body fatness, BMI levels among children and teens need to be expressed relative to other children of the same sex and age. These percentiles are calculated from the CDC growth charts, which were based on national survey data collected from 1963-65 to 1988-94.[9]

### Table 1: Weight status category in relation to BMI in children.

| Weight status category | BMI-for-age-percentile-range |
|---|---|
| Underweight | less than 5th percentile |
| Normal or healthy weight | 5th percentile to less than 85th |
| Overweight | 85th percentile to less than 95th |
| Obese | equal to or greater than 95th |

The aim of this study was to compare the obesity status of children (5-18 years) from the upper and middle socio-economic class.

## METHODS

400 children (200 boys and 200 girls) in the age group of 5-18 years from upper and middle socio-economic status were selected as subjects for this study. The study was conducted in Gian Sagar Medical College and Hospital, Ramnagar, Patiala, Punjab, India. For determination of socio-economic status, the modified version of the Kuppuswamy's socio-economic status scale was used.[10]

### Table 2: Modified version of Kuppuswamy's socio-economic status scale.

| Total score | Socio-economic class |
|---|---|
| 26-29 | Upper (I) |
| 16-25 | Upper-middle (II) |
| 11-15 | Lower-middle (III) |
| 5-10 | Upper-lower (IV) |
| <5 | Lower (V) |

A standard physical examination of the children was done. Weight and height were measured in minimum acceptable standard clothing without shoes and socks. Number of children in each BMI percentile range were computed as a function of age, disaggregated by gender.

### Statistical analysis

Data were analyzed using chi-square test for calculating association of overweight/obesity with socioeconomic class in children.

## RESULTS

In the present study, 400 children (200 boys and 200 girls) in the age group of 5-18 years from upper and middle socio-economic status were selected as subjects for this study.

### Table 3: Number of boys in each BMI-for-age-percentile-range.

| Weight status category | BMI-for-age- percentile-range | Upper socio-economic class | Middle socio-economic class | Total number |
|---|---|---|---|---|
| Underweight | less than 5th percentile | 10 | 19 | 29 |
| Normal or healthy weight | 5th percentile to less than 85th | 67 | 108 | 175 |
| Overweight | 85th percentile to less than 95th | 52 | 41 | 93 |
| Obese | Equal to or greater than 95th | 71 | 32 | 103 |
| Total | | 200 | 200 | 400 |

In Table 5, we formulated a hypothesis (called the null hypothesis) that there was no difference in percentage of overweight/obese children (boys) from upper and middle socio-economic class. Since the observed value was much higher, null hypothesis was rejected. Since the results were highly significant (p<0.001), The present study concluded that the prevalence of overweight/obesity was more in upper socio-economic

class boys in comparison with middle socio-economic class boys. In Table 6, we formulated a hypothesis (called the null hypothesis) that there was no difference in

percentage of overweight/obese children (girls) from upper and middle socio-economic class.

**Table 4: Number of girls in each BMI-for-age-percentile-range.**

| Weight status category | BMI-for-age-percentile-range | Upper socio-economic class | Middle socio-economic class | Total number |
|---|---|---|---|---|
| Underweight | less than 5th percentile | 6 | 22 | 28 |
| Normal or healthy weight | 5th percentile to less than 85th | 59 | 104 | 166 |
| Overweight | 85th percentile to less than 95th | 60 | 40 | 97 |
| Obese | equal to or greater than 95th | 75 | 34 | 109 |
| Total | | 200 | 200 | 400 |

**Table 5: Association of socio-economic class with overweight/obesity in boys.**

| Socio-economic class | Overweight plus obese | Non-obese | Total |
|---|---|---|---|
| Upper | 123 (61.5%) | 77 (38.5%) | 200 |
| Middle | 73 (36.5%) | 127 (63.5%) | 200 |
| Total | 196 | 204 | 400 |

Chi square = 25.008, degree of freedom=1, p=<0.001 (highly significant).

**Table 6: Association of socio-economic class with overweight/obesity in girls.**

| Socio-economic class | Overweight plus obese | Non-obese | Total |
|---|---|---|---|
| Upper | 135 (67.5%) | 65 (32.5%) | 200 |
| Middle | 74 (37%) | 126 (63%) | 200 |
| Total | 209 | 191 | 400 |

Chi square=37.30, degree of freedom=1, p=<0.001 (highly significant).

**Table 7: Association of gender with overweight/obesity (in children) in upper socio-economic class.**

| Upper socio-economic class | Overweight plus obese | Non-obese | Total |
|---|---|---|---|
| BOYS | 123 (61.5%) | 77 (38.5%) | 200 |
| GIRLS | 135 (67.5%) | 65 (32.5%) | 200 |
| Total | 258 | 142 | 400 |

Chi square= 1.572, degree of freedom=1, p=<0.5(significant).

Since the observed value was much higher, null hypothesis was rejected. Since the results were highly significant (p<0.001), we concluded that more girls from upper socio-economic class were overweight/obese in comparison with middle socio-economic class girls. In Table 7, we formulated a hypothesis (called the null hypothesis) that there was no difference in percentage of overweight/obese boys and girls from upper socio-economic class. Since the observed value was much higher, null hypothesis was rejected. Since the results were significant (p<0.5), we concluded that more girls were obese in comparison to boys from the upper socio-economic class.

## DISCUSSION

Prevention of obesity should begin in early childhood. Obesity is harder to treat in adults than it is in children.

The control of obesity centres around weight reduction. This can be achieved by dietary changes, increased physical activity and a combination of both.[3]

Increased fast food consumption has been linked with obesity in the recent years. Many families, especially those with two parents working outside the home, opt for these places as they are often favoured by their children and are both convenient and inexpensive.[11] Food served at fast food restaurants tends to contain a high number of calories with low nutritional value.[12] Sugary drinks are another factor that has been examined as a potential contributing factor to obesity. Sugary drinks are less filling than food and can be consumed quicker, which results in a higher calorie intake.[13] Another factor that has been studied as a possible contributing factor of childhood obesity is the consumption of snack foods. Snack foods include foods such as chips, baked goods, and candy. One of the factor that is most significantly

linked to obesity is a sedentary lifestyle. While extensive television viewing and the use of other electronic media has contributed to the sedentary lifestyles, other environmental factors have reduced the opportunities for physical activity. Opportunities to be physically active and safe environments to be active in the past, have decreased in the recent years. The majority of children in the past walked or rock their bike to school. Children who live in unsafe areas or who do not have access to safe, well-lit walking routes have fewer opportunities to be physically active.[14]

Now a days television and print media is playing an important role in producing obesity by heavy advertisement of fast food outlets of energy dense, micronutrient poor food and beverages of multinational corporations, which influence the daily eating habits.[3] Fast foods are one of the most advertised products on television and children are often the targeted market.[15]

The growing issue of childhood obesity can be slowed, if society focuses on the causes, there are many components that play into childhood obesity, some being more crucial than others. A combined diet and physical activity intervention conducted in the community with a school component is more effective at preventing obesity or overweight. Moreover, if parents enforce a healthier lifestyle at home, many obesity problems could be avoided.[16]

## CONCLUSION

Prevalence of overweight/obesity was more in upper socio-economic class boys in comparison with middle socio-economic class boys. More girls from upper socio-economic class were overweight/obese in comparison with middle socio-economic class girls. More girls were obese in comparison to boys from upper socio-economic class. Obesity is a chronic disorder that has multiple causes. Apparently, primary prevention could be the key plan for controlling the current epidemic of obesity and these strategies seem to be more effective in children than in adults.

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