

## Childhood Obesity in Public and Private Middle School Students

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### ABSTRACT

**Background:** Obesity is defined as the syndrome in which excessive fat deposits in the adipose tissues, which affects the normal functioning of the body. Childhood obesity is the great challenge these days. In Pakistan recent study on children 10-15 years of age shows high prevalence of childhood obesity. The present study will help to inform the community regarding the frequency and percentage of overweight and obese children in middle standard schools.

**Objective:** Objective so this study were to identify the recent estimate of frequency of obesity in middle school students in year 2017 and then to compare the frequency of obesity in public and private sector schools.

**Material and methods:** This Descriptive cross sectional study was conducted in 2 private schools of Sahiwal and 2 government schools of Lahore, Punjab, Pakistan. About 324 children (81 from each school) were recruited randomly and interviewed about their physical activities. Height and weight were measured and BMI was calculated. Children were distributed in different BMI group and obesity as assessed.

**Results:** The mean age of children in government school was  $13.01 \pm 1.09$  years while in private school was  $12.75 \pm 1.08$ . 50% were females from government school and 50% from private school. 50% were male students from government school and 50% from private schools. The mean BMI of participants was  $18.48 \pm 3.36$  kg/m<sup>2</sup> in government school while  $20.14 \pm 3.66$  kg/m<sup>2</sup> in private school. When frequency of government and private school was compared results shows that out of 162 students from each school, 13 (8%) in government schools and 24 (14.8%) in private schools are overweight, while 8 (4.9%) in government schools and 17 (10.5%) in private schools are obese.

**Conclusion:** High frequency of obesity and over weight in children of middle schools was noted. This frequency is greater in students of private schools both males and females as compared to students of government schools both males and females.

**Keywords:** Obesity, school going Children, private school, government school, body mass index, height, weight

### INTRODUCTION

Obesity is defined as the syndrome in which excessive fat deposits in the adipose tissues, which affects the normal functioning of the body.<sup>1,2</sup> Childhood obesity is the great challenge these days. All over the world about 10% of school going children have unnecessary body weight while 1/4<sup>th</sup> of them are obese.<sup>3</sup> The American children shows the highest percentage of overweight children i.e. 32%, while the lowest percentage is in African children i.e. 2%. About 12-16% of European children 4-18 years of age are overweight and 4-6% is obese, while 16-22% of have excessive body weight.<sup>4</sup> Practically all the developing and developed countries are facing the wide ranging of obesity but excessive deviation is found among and inside the countries.<sup>5,6</sup>

In Pakistan recent study on children 10-15 years of age shows prevalence of childhood obesity that is 11.9% are obese and 21.8% are overweight. Many other recent researches in Pakistan also show increasing trends of overweight and obese children.<sup>7</sup> Obesity is not only frequent in middle age but is progressively becoming predominant between fresher grown-ups and children as well in more prosperous countries. The threats of cardiovascular disease, diabetes and hypertension are increasing unceasingly with increasing weight this is because of neglecting obesity.<sup>8</sup>

Evidence is provided by many studies on physiology and molecular genetics of obesity that body weight is controlled by some genes. The increasing prevalence of obesity in the United States apparently represents the interaction of these genes with an environment. The environment which boosts intake of calories and a sedentary lifestyle. Genetic changes couldn't occur with this rapid rate this is the role of many environmental factors. So, there is a need of advance studies on some relevant genes and the causes by which their effects are facilitated by environment and this leads to more effective prevention and treatment of obesity.<sup>9</sup>

Now a day's people are adapting sedentary life style which is also getting common in children. Children avoid playing outside in open environment. A huge proportion of children are affected by obesity. Physical activity is the prevention to overweight and obesity in childhood. It reduces the risk of obesity. In different countries a numerous children do not do the recommended physical activities, although the children who played physically

more showed less obesity. Recent research shows that physical inactivity is inversely correlated with obesity.<sup>10</sup>

Recent studies show that higher prevalence of overweight and obesity is found in children from high SES as compared to those from middle and low SES. This is because the children from high SES receive a good amount of pocket money from their parents or care takers to buy lunch and snacks. An increase in industrialization and trend of people towards brands and entertainment in the form of going to restaurants and other junk food stores many multinational companies are creating their setups in developing countries that attracts children of school going age in a large number. School cafeterias are providing fast food to school children especially in private schools. Mostly children going to the private schools travel by school bus or car whereas walking or bicycling is more common among children in government schools. According to a recent data, prevalence of overweight in children was 29% in private school and 11.3% in government school.<sup>11</sup>

Parents should encourage children to adopt a healthy lifestyle and should keep a check on them. Parents should offer kids meal with appropriate number of calories. Make favorite dishes healthier and nutrition rich. Use of vegetables, fruits, whole-grain and dairy products in a balanced proportion. Eat poultry, fish, lentils, beans and nuts for protein. Drink plenty of water. Avoid use of artificially sweetened beverages, sodium, sugar and saturated fat.<sup>12</sup>

Physical activity benefits a lot like bone strengthening, decreasing blood pressure, reducing stress and increases self-esteem. Children should participate in at least 60 minutes of moderate intensity physical activity everyday if possible. Limit time for using TV, video games and Internet to no more than two hours a day. The American Academy of Pediatrics doesn't recommend TV for kids age 2.<sup>10</sup> The frequency of obesity decreases with the greater number of meals used up during the day. In the children who ate 3 or less meals per day, 15% of children were overweight and 4.2% were obese. Among children who ate 5 or more meals per day, the prevalence of overweight is 8.1% and obesity is and 1.7%<sup>5</sup>.

The study was conducted to estimate the present situation regarding percentage of obesity and overweight children within this age group so that steps should be suggested to control the

problem in this age to prevent from further complications. The present study will help to inform the community regarding the frequency and percentage of overweight and obese children in middle standard schools. Moreover, this study not only provides the gender base comparison of frequency and percentages of overweight and obese children but also gives the estimates of these variables in public and private sector.

**Objectives:** Objective so this study were to identify the recent estimate of frequency of obesity in middle school students in year 2017 and then to compare the frequency of obesity in public and private sector schools.

## METHODOLOGY

**Study Design:** Descriptive cross sectional study.

**Setting:** The study was conducted in 2 private schools of Sahiwal and 2 government schools of Lahore, Punjab, Pakistan.

**Duration Of Study:** The study was completed over a period of 4 months from September to December 2017 after the approval of my synopsis.

**Sample Size:** Required Sample Size was 324 (81 children from each school)

**Sampling Technique:** Simple Random Sampling was used as sampling technique. Lottery method was adopted to avoid biasness while collecting sample.

**Inclusion criteria:**

- Children of 10-16 years of age
- With no chronic illness
- Males and Females

**Exclusion criteria:**

- Children under 10 years and above 16 years of age
- Children with any chronic illness

**Data Collection:** Permission was sought from administration of all the schools after explaining the purpose of the researcher project thoroughly. Student were selected randomly by using lottery method from all the sections of class 6<sup>th</sup>, 7<sup>th</sup> & 8<sup>th</sup> in the survey. Consents with information sheet were given to all the students one week before the initiation of the survey to be filled & signed by the parents. Performa was designed to calculate the BMI of both genders of different age groups ranging from 10 to 16 years. The name of the students was held confidential on school authority demand and each student was given a participant code on the basis of their roll numbers. The assessment Performa contained the questions about demographic details including the age, gender, height, weight, class & school. All the recruited students were questioned and responses were noted. Weight was assessed in minimal clothes and height was assessed in erect position without shoes on wall-mounted stadiometer. The cutoff criteria used for the BMI for ages 2 – 20 years was taken from National Health and Nutrition Examination survey i.e.

- Below 5% percentile underweight
- 5 - 85% percentile normal
- 85% percentile over weight
- Above 95% percentile Obese.

**Data Analysis:** SPSS 25 statistical software was used to analyze the data. Results were computed as frequencies and percentages for qualitative variables, while mean  $\pm$  standard deviation for quantitative variables.

## RESULTS

The mean age of children in government school was  $13.01 \pm 1.09$  years while in private school was  $12.75 \pm 1.08$ . 50% were females from government school and 50% from private school. 50% were male students from government school and 50% from private schools. The mean height of government school children was  $150.85 \pm 7.66$  cm while  $155.47 \pm 7.31$  cm in private school. The mean weight of participants was  $42.23 \pm 9.59$  kg in government school while  $48.88 \pm 10.53$  kg in private school. The mean BMI of participants was  $18.48 \pm 3.36$  kg/m<sup>2</sup> in government school while  $20.14 \pm 3.66$  kg/m<sup>2</sup> in private school. Table 1

When frequency of government and private school was compared results shows that out of 162 students from each school 25(15.4%) students in government schools and 14(8.6%) in public schools are underweight. 116(71.6%) in government schools and 107(66%) in private schools are normal. 13(8%) in government schools and 24(14.8%) in private schools are overweight. 8(4.9%) in government schools and 17 (10.5%) in private schools are obese. Table 2

Table 1: Findings in both government and private school

	Government school	Private school	Total
Age	$13.01 \pm 1.09$	$12.75 \pm 1.08$	$12.88 \pm 1.09$
Gender			
Male	81 (50%)	81 (50%)	162 (50%)
Female	81 (50%)	81 (50%)	162 (50%)
Height (cm)	$150.85 \pm 7.66$	$155.47 \pm 7.31$	$153.16 \pm 7.82$
Weight (kg)	$42.23 \pm 9.59$	$48.88 \pm 10.53$	$45.55 \pm 10.59$
BMI	$18.48 \pm 3.36$	$20.14 \pm 3.66$	$1.31 \pm 3.60$

Table 2: Distribution of children in different categories of BMI

		Government	Private	Total
BMI category	Underweight	25 (15.4%)	14 (8.6%)	39 (12.0%)
	Normal	116 (71.6%)	107 (66.0%)	223 (68.8%)
	Overweight	13 (8.0%)	24 (14.8%)	37 (11.4%)
	Obese	8 (4.9%)	17 (10.5%)	25 (7.7%)
Total		162 (100%)	162 (100%)	324 (100%)

Chi-square test = 9.976

P-value = 0.019

## DISCUSSION

After completion of this study I found that 39(12%) students are underweight, 223(68.8%) have normal BMI, 37(11.4%) are overweight and 25(7.7%) are obese. So by doing this study I found that 7.7% children (male and female) are obese in middle schools and need great attention and care to protect them from future problems of obesity. The results of sample of 162 students of government school/public school shows that 25(15.4%) students are underweight, 116(71.6%) have normal BMI, 13(8%) are overweight and 8(4.9%) are obese. Whereas the results of private schools students out of 162 sample size shows that 14(8.6%) are underweight, 107(66%) are normal, 24(14.8%) are overweight and 17(10.5%) are obese.

When I compared the results of private sector and public sector school students I found that private school students are more obese than public school students. Underweight and normal BMI ratio is higher in public schools while overweight and obese ratio is higher in private school students.

Aryeetey et al., conducted a survey on 3089 school going children. BMI were estimated by using age, height & weight. About 17% children were found to be overweight or obese. Among them 44% overweight or obese children more likely to those who had less participation in physical activities. Belonging to the higher socioeconomic class and attending a private school were also significantly associated with higher risk of being overweight or obese.<sup>13</sup>

Li et al., conducted a survey to assess the childhood obesity and to determine the relationship with type of school, by using the data retrieved from US Centers for Disease Control & Prevention. Irrespective of the socioeconomic status of the families, children going to the public schools showed 0.401 times higher BMI as compared to children going to private schools. The suitability of free or less costly lunch programs in the public schools were found to be positively correlated with the BMI of the children.<sup>14</sup>

When I compared the students on gender base 25(15.4%) males and 14(8.6%) females are underweight, 107 (66.04%) males and 116 (71.6%) females have normal BMI, 19 (11.7%) males and 18 (11.11%) females are overweight and 11(6.7%) males and 14(8.6%) females are obese. In the gender based comparison of BMI I found that the female students are more obese than male students but male students are more underweight than female

students and females has more normal BMI than males. Overweight ratio is same in both gender. The overall ratio of comparisons of both genders does not give any significant results so this shows that difference of BMI in both genders is not considerable.

When I compared my study with other international studies I found out that in developing countries the frequency of obesity or overweight are in following ratio; 41.8% in Mexican, 22.1% in Brazilian, 22.0% in Indian, and 19.3% in Argentinean whereas in Pakistan was 19.1% (11.4% overweight and 7.7% obese).

A local study by Anwar et al 2010 had shown consistent results to my study with BMI 47.1% normal, 11.9% were obese and 21.8% were overweight while 19.1% were below normal range. This study also shows that a large number of children falls in category of overweight and obese in private schools.

Midha et al., conducted a study to assess the prevalence of obesity in Indian children. Nine epidemiological studies were identified, and data about 92,862 children were analyzed. The prevalence of overweight children was observed as 12.64% (95% CI; 8.48-16.80%) while obesity was 3.39% (95% CI; 2.58-4.21%).<sup>15</sup>

Anwar et al 2010, conducted a study to determine the prevalence of obesity among the school-going children (6<sup>th</sup> and 7<sup>th</sup> grade) of Lahore. The sample size was 293 children from two private schools of Lahore, Pakistan. The results of this study show BMI 47.1% normal, 11.9% were obese and 21.8% were overweight while 19.1% were below normal range. This study shows that a large number of children falls in category of overweight and obese in private schools.<sup>16</sup>

## CONCLUSION

High frequency of obesity and over weight in children of middle schools was noted. This frequency is greater in students of private schools both males and females as compared to students of government schools both males and females. Comparison of obesity on the basis of gender doesn't show any significant results this shows that there is no difference in frequency of obesity in males and females.

**Recommendations:** As results conclude that students from private schools are more obese as compared to students from government schools so special attention is required for these students. Parents should encourage children to adopt a healthy lifestyle and should keep a check on them. Children should eat healthy diet containing more protein and fewer fats. Moreover this research is on small level due to lack of time and funds. This research should be conducted at national level as this is a vast topic and needs attention of children, parents and health department.

**Limitations:** The limitations of this study were shortage of time. The students belonged to Lahore and Sahiwal only so there was lack of variability. The obesity of only few students belonging to

different schools both government and private was predicted. This study was not identifying the associated factors for obesity. Finding consequences of obesity were not part of this study.

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