ORIGINAL ARTICLE

PREVALENCE OF OBESITY AMONG THE SCHOOL-GOING CHILDREN OF LAHORE AND ASSOCIATED FACTORS

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Objective: To determine the prevalence of obesity among the school- going children (6th and 7th grade) of Lahore and ascertain the associated factors. **Method:** A descriptive study with sample size of 293 children conducted over a period of four months in two private sector schools of Lahore. Information was gathered by the help of a pre designed questionnaire after getting formal consent from parents. Children included in the study were healthy with no reported chronic illness. Body weight was measured in minimal clothing using a weight scale; body height was measured in erect posture without shoes using a stadiometer. Obesity, underweight and overweight were defined by plotting BMI against age (in months and years) on WHO BMI-for-age (5–19 years [percentiles]) charts. **Results:** Out of 293 children 11.9% were obese (more than 97th percentile) while 21.8% were overweight (85th–97th percentile). Among obese children 74.3% were found to watch TV for 1-2 hours daily while 25.7% watch TV for 3–4 hours. 48.6% of obese children did not participate in any field sports while 34.3% have less than 3 hours participation in field sports. Among parents of obese children, 60% were found to have little or no influence on their children's food intake at school whereas 22.9% parents of obese children never advise them against eating junk food. Parents think that ban on advertisements promoting unhealthy foods (75.1%) and use of popular media characters in promoting healthy foods (83.6%) and exercise can help in preventing obesity in children. **Conclusion:** This study shows that high prevalence of obesity and overweight among children in private schools has direct relationship with decreased physical activity and other factors like watching TV, role of media and lack of diet control by parents.

Keywords: obesity, children, school age, parents, physical activity

INTRODUCTION

Globally, childhood obesity has become a great challenge from the last few decades. According to WHO report, around 1.5 billion people above 20 years and 43 million children under the age of five are overweight worldwide.[1] Obesity is often simply defined as a condition of abnormal or excessive fat accumulation in adipose tissue, to the extent that health may be impaired.[2] Almost all the developing and developed countries are experiencing an epidemic of obesity but great variation is found between and within countries.[3] The number of overweight children, aged 6–17 years, has doubled within the last three decades. Whereas about one in five children in the United States is now overweight.[4–6] In more affluent countries, obesity is not only common in the middle-aged, but is becoming increasingly prevalent among younger adults and children as well. With the risks of diabetes, cardiovascular disease and hypertension rising continuously with increasing weight, there is much overlap between the prevention of obesity and the prevention of a variety of chronic diseases, especially type 2 diabetes.[3] Obese people are also at increased risk of gout, sleep apnoea, obstetric and surgical complications.[7]

The most important long-term consequence of childhood obesity is its persistence into adulthood, with all the associated health risks. Obesity is more likely to persist when its onset is in late childhood or adolescence and when the obesity is severe.[8]

Body Mass Index (BMI) is not as reliable a measure of obesity in children, especially across different ages and degrees of maturity, as it is for adults who have attained their peak height.[5] For children (5–19 years of age) obesity, overweight, thinness and severe thinness can be defined by the WHO BMI-for-age (5–19 years [percentiles]) charts.[9–10] The new curves are closely aligned with the WHO Child Growth Standards at 5 years and the recommended adult cut-offs for overweight and obesity at 19 years. They fill the gap in growth curves for the 5 to 19 years age group by providing an appropriate reference.[11] According to the WHO, all children falling between the 15th and 85th percentile are defined as normal, between the 85th and 95th percentile as overweight, and greater than 95th percentile as obese. On the other side of the spectrum, those falling between the 3rd and 15th percentile are defined as thin whereas those below the 3rd percentile as severely thin.[12,13]

The increasing industrialisation, urbanisation and mechanisation occurring in most countries around the world are associated with changes in the diet and behaviour of all age groups alike. In particular, diets are becoming richer in high-fat, high energy foods, poorer in micro-nutrients and lifestyles are becoming more sedentary. In many developing countries undergoing economic transition, rising levels of obesity often coexist in the same population (or even the same household) with chronic under-nutrition.[14]

In USA the prevalence of the overweight, has increased from 7.6 to 10.9% for children aged 6–11 years and from 5.7 to 10.8% for adolescents aged 12–19 years between 1976 to 1980, and 1988 to 1991.[6,15]

Pakistan is also facing an increasing trend in childhood obesity despite the fact that it includes in those countries where majority of the population are undernourished.[16] According to the BMI cut-off values specific for Asian-pacific region, almost one fourth of the population of Pakistan are overweight and obese. Optimal identification of those at risk of hypertension and diabetes and healthy targets may require the use of even lower BMI cut-off values than those already proposed for an Indo-Asian population.[17] According to National Health Survey Pakistan, prevalence of obesity is more in urban population as compared to rural population. Childhood obesity is strongly associated with sedentary life styles and increased caloric intake,[18] less physical activity[16,19] and high socioeconomic status[19]. Awareness about balanced diet, improvement in the level of education and socioeconomic conditions and increased physical activity could help in decreasing the obesity in children.[20]

The purpose of this study was to estimate the prevalence of obesity in school-going children (6^{th} and 7^{th} class) and study the effects of dietary habits, physical activity, watching television on obesity. Moreover attitude of parents towards children dietary habits and their perceptions about role of media in promoting and decreasing obesity in children was also determined.

MATERIAL AND METHODS

This is a descriptive cross sectional study done over a period of four months, September to December 2009 in two private sector schools of Lahore, Pakistan. Cluster sampling technique was used for the selection of sample.

Permission was obtained from the administration of both schools after thorough introduction and explanation of the study. Random sections of class 6 and 7 were selected for the survey; all students in those sections were included in study. A total number of 340 students were initially enrolled. Consent forms with information sheet were handed out to the students a week before the start of the study to be filled and signed by their parents. Out of them, 293 students got written permission and then were entered in the study. No student was reported to be chronically ill.

A self designed questionnaire was used after pre-testing on students of the same age group, following which the study's questionnaire was updated accordingly. Questionnaire was designed to assess the different aspects of childhood obesity. It comprised of questions about demographic information which includes name, age, height, weight, gender, class and school name and evaluation of dietary intake including number, quantity, and type of food taken. Information about specific food intake like chocolates, junk food, cold drinks, burgers, pizza, chips was also taken. Assessment of parental awareness about the nutritional requirements of children along with the role of media was also done. Questions about the assessment of physical activity, hours spent in watching television, participation in the sports activities and regularity in the breakfast intake were also included.

All students were interviewed and questionnaires filled under direct supervision of the researchers, after which the students were provided with a questionnaire for their parents to be filled and returned in a weeks' period. A simple weekly food chart was particularly developed in context of local culture and cuisine for assessing general eating trends in these children.

Body weight was measured in minimal clothing to the nearest kg using a weight scale and body height was measured in erect position without shoes to the nearest cm using a wall mounted stadiometer.

Obesity, underweight and other criteria were defined by plotting BMI against age (in months and years) on WHO BMI-for-age (5–19 years [percentiles]) charts (2007 WHO Reference).

Data was computed and analysed using SPSS-17. Descriptive analysis was done. Results are reported as frequencies and percentages.

RESULTS

Response rate of our study was 86%. Out of the 293 children interviewed, 131 were boys and 162 were girls. Mean age in our sample was 12 years with a standard deviation of 4.5 years. Mean weight was 43.1 Kg with standard deviation of 20.3 Kg. Mean height was 1.5 m with a standard deviation of 0.31 m.

The prevalence of obesity in children was 11.9% (more than 97^{th} percentile) and that of overweight was 21.8% (85^{th}–97^{th} percentile), 11.6%

(3^{rd}–15^{th} percentile) were under the category of thinness and 7.5% (less than 3^{rd} percentile) were under severe thinness (Table-1).

Table-1: Frequency and Percentage of children in present study in different categories of BMI-for-age

	Frequency	Percent
More than 97^{th} percentile	35	11.9
85^{th}–97^{th} percentile	64	21.8
50^{th}–85^{th} percentile	73	24.9
15^{th}–50^{th} percentile	65	22.2
3^{rd}–15^{th} percentile	34	11.6
Less than 3^{rd} percentile	22	7.5
Total	293	100.0

All of the obese children were found to watch TV, 74.3% of who watch for 1–2 hours daily while 25.7% watch TV for 3–4 hours. On the other hand 5.65% of the children falling in the normal percentile do not watch TV at all, 69.1% watch it for 1–2 hours daily while 21% watch it for 3–4 hours.

Of the total number of obese children 48.6% did not participate in any field sports, 34.3% have less than 3 hours participation in field sports (Table-2). Out of the obese children, 71.4% attend no gym or any other physical training class, whereas for normal children this value is only 46.8%.

Table-2: Comparison of weekly time spent on field sports among obese, overweight and normal children

			Time spent in a week on field sports			
			None	<3 hours	3–6 hours	>6 hours
BMI	**Obese**	Count	17	12	4	2
		% within BMI-for-age	48.6	34.3	11.4	5.7
	Overweight	Count	28	22	9	5
		% within BMI-for-age	43.8	34.4	14.1	7.8
	Normal	Count	14	37	54	33
		% within BMI-for-age	11.1	26.8	39.0	24.1

Eighty percent of the obese children were found to face some kind of problem in following a regular exercise schedule, 74.3% of them quoted that this is due to studies burden and too much home work.

Frequency and percentage of weekly dietary intake of different types of food is mentioned in Table-3.

Table-3: Comparison of weekly consumption of products from different food groups along with frequency and percentage of children obtaining them

		5–7 times a week	3–4 times a week	1–2 times a week	Less than once a week
1. How often do you eat poultry and meat?	%	20.1	42.0	32.1	5.8
	Count	59	123	94	17
2. How often do you use dairy and milk products?	%	48.5	31.4	15.7	4.4
	Count	142	92	46	13
3. How often do you eat fruits?	%	53.2	32.4	11.6	2.7
	Count	156	95	34	8
4. How often do you eat vegetables?	%	21.8	44.4	25.6	8.2
	Count	64	130	75	24
5. How often do you eat grains and cereals?	%	50.5	34.1	13.0	2.4
	Count	148	100	38	7
6. How often do you eat beans and pulses?	%	3.1	25.6	47.8	23.5
	Count	9	75	140	69
7. How often do you eat snacks?	%	31.4	35.8	24.9	7.8
	Count	92	105	73	23
8. How often do you eat sweets?	%	23.5	34.5	32.1	9.9
	Count	69	101	94	29

Sixty-three (21.5%) children mentioned that their parents' attitude towards outdoor activates was discouraging, 125 (42.7%) said it was neutral and only 105 (35.8%) stated it as being encouraging.

Amongst parents of obese children, 60% were found to have little or no influence on their children's food intake at school, whereas 22.9% parents of obese children never advise them against 'eating junk food'. Of the children in the normal BMI for age percentiles, only 13.2% of the parents never reminded their child 'not to indulge in junk food consumption'.

Out of the obese children, 34.3% did not have breakfast daily but 65.7% of them had regular breakfast compared to 24.55% of the normal children not taking breakfast daily. Out of all, 146 (49.8%) had no definite schedule for eating meals in their house.

Table-4: Comparison between sexes for obesity and thinness

			BMI-for-age						
			More than 97th percentile	85th–97th percentile	50th–85th percentile	15th–50th percentile	3rd–15th percentile	Less than 3rd percentile	Total
Sex	Male	Count	14	32	23	32	17	13	131
		% within Sex	10.7%	24.4%	17.6%	24.4%	13.0%	9.9%	100.0%
		% within BMI-for-age	40.0%	50.0%	31.5%	49.2%	50.0%	59.1%	44.7%
	Female	Count	21	32	50	33	17	9	162
		% within Sex	13.0%	19.8%	30.9%	20.4%	10.5%	5.6%	100.0%
		% within BMI-for-age	60.0%	50.0%	68.5%	50.8%	50.0%	40.9%	55.3%

Out of parents of all the children 209 (71.3%) think that time their child spends on TV/computer/video games affect time they could spend on physical activities while 21(7.2%) replied as not sure. When asked from parents, 122 (41.6%) children were found to eat snacks daily while watching TV while 71 (24.2%) ate snacks occasionally. The parents of 141 (48.1%) children think that watching TV/using computer affects the weight of their child while 75 (25.6%) replied as not sure. 191 (65.2%) parents think that promotion of various food products by popular TV/movie/sports characters encourages their child to eat unhealthy foods while 35 (11.9%) were not sure. 220 (75.1%) parents think that ban on advertisements promoting unhealthy foods would reduce obesity in children while 49 (16.7%) were not sure. 245 (83.6%) parents think that use of popular TV/movie /sports characters in promoting healthy foods and exercise can help in preventing obesity while 33 (11.3%) were not sure.

DISCUSSION

We have studied children from age 10–15 in two private schools of Lahore. Majority (47.1%) fall in normal category of BMI-for-age (between 15th and 85th percentile), 11.9% were obese and 21.8% were overweight while 19.1% (11.6% thinness and 7.5% severe thinness) were below normal range. Other studies from Pakistan and neighbouring countries like India also show the prevalence of childhood obesity in this region[18,21,22]

Some researchers have suggested that childhood obesity is largely the result of a decline in regular physical activity.[23] There is an inverse relation between childhood obesity and physical activity as it can be clearly seen from our study. A review of other literature suggests that overweight among preschool children, as well as older children, may be associated less with increased energy intake and more with low physical activity.[24]

All children age 2 and older should participate in at least 30 minutes of enjoyable, moderate-intensity physical activities every day that are developmentally appropriate and varied. If children don't have a full 30-minute activity break each day, try to provide at least two 15-minute periods or three 10-minute periods in which they can engage in vigorous activities appropriate to their age, gender and stage of physical and emotional development.[25]

Children spend a major portion of their time watching television. Researchers have hypothesized that watching television cause obesity by one or more of three mechanisms: (1) displacement of physical activity, (2) increased calorie consumption while watching TV; caused by the effects of advertising, and (3) reduced basal metabolism.[26] According to our study we also found a weak positive association between childhood obesity and TV viewing. Many of the studies have found relatively weak, positive associations, but others have found no associations or mixed results; however, the weak and variable associations found in those studies may be the result of limitations in measurement.[26]

Many researchers suspect that the food advertisements children are exposed to through the media may contribute to unhealthy food choices and weight gain. According to an international study done over the same period in which childhood obesity has increased so dramatically, research indicates that the number of advertisements children view has increased as well. The most recent estimates are that children now see an average of more than 40,000 TV ads a year.[27]

Experimental studies have demonstrated that even a brief exposure to food commercials can influence children's preferences.[28] Some researchers believe that TV advertisements may also contribute to children's misconception about the relative health benefits of certain foods.[29] Some promotions involve popular characters/cartoon heroes that are included in the food packages or offered in conjunction with fast food meals.[30]

The respondents were also made to choose frequency ranges of consumption (days of consumption per week) from different food groups, using a weekly food chart. Such a food chart has its own limitations as it does not represent the true food intake, gives a much generalized view about eating trends and no particular association can be established

from it. However it is noted that most of the children are consuming poultry, meat and dairy products adequately. Low intake of vegetables beans and pulses while mix trend in fruits, grains and cereals consumption is seen.

Children and adolescents who are breakfast eaters (whether school breakfast or breakfast elsewhere) are less likely to be overweight.[31,33] The effect of participation in School Breakfast Program on obesity has also been studied by some researchers in USA. Participation has never been shown to increase the risk of obesity. And, at least among food-insecure girls, participation in School Breakfast Program and other food assistance programs is associated with a 68% reduction in the risk of getting overweight.[34] The paradoxical relationship between breakfast eating and lower risk of obesity may be driven by the effect of breakfast on total energy intake. Studies attempting to quantify this relationship have not, however, consistently shown a lower daily energy intake among breakfast eaters. However, breakfast eating has been associated with greater total physical activity[33,35,36] and decreased time spent watching television,[37,38] either of which may contribute to a desirable energy balance. We also found a weak inverse association between breakfast and obesity. Moreover, according to our results, following of a definite eating schedule is associated with decreased obesity.

Parents' 'not so' encouraging attitude towards physical activities and unawareness about deep role of media in relation to obesity is also becoming a major factor in prevalence of childhood obesity.

CONCLUSION

There is high prevalence of obesity and overweight children in private schools of Lahore. There is a direct relationship between obesity and physical inactivity and relationship with other factors like watching TV, role of media and breakfast.

Parents' negative attitude towards outdoor physical activities and their lack of dietary control on a child's obesity should be addressed with proper counselling of parents. Moreover parents' perception about role of media in both promoting and decreasing childhood obesity is alarming. Further studies are yet needed to project the role of type, quality and quantity of food on obesity.

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