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OBESITY;
PREVALENCE OF OBESITY IN SCHOOL CHILDREN OF SIALKOT CITY.

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ABSTRACT: Introduction: Obesity has increased in developed countries and is also increasing in the developing countries involving all ages including children. Studies undertaken in metropolitan cities of Pakistan had revealed an increased incidence of obesity in school children. This study was undertaken to know about prevalence of obesity in school children of Sialkot city by measuring body mass index (BMI), an indicator of obesity. **Study Design:** Descriptive cross sectional. **Period:** From November 2017 to January 2018. **Setting:** Two private schools were selected in Sialkot city. One school belonged to lower middle socio economic status (LMSE). **Methodology:** Students of classes 6 to 8, one from lower middle socioeconomic status (LMSE) school and other from higher socioeconomic status (HSE) school were included. Consent was taken, data was collected by questionnaire. Height and weight were measured and BMI was calculated and interpreted according to World Health Organization (WHO) sex specific BMI for age percentile charts. **Results:** 520 students were included in the study. 15.2% were obese, 22.1% were overweight, 5.2% were thin, 2.9% were severely thin and 54.6% were normal. 18.5% of students were obese in HSE School compared to 10.6% in LMSE School. 16.9% (n 52/307) of males and 12.7% (n 27/213) females were obese. Significant association of obesity was found with decreased exercise, increased screen time and consuming energy dense junk foods. **Conclusion:** Obesity and overweight are markedly high in Sialkot as compared to other studies in Pakistan. Stress should be given on prevention by education of students and parents. Healthy dietary habits and healthy living style should be promoted.

Key words: BMI, Obesity, School Children, Sialkot.

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INTRODUCTION

Science has advanced markedly in the last 25 years resulting in changes in life styles as well as dietary habits globally. Similarly body mass index (BMI) has gradually increased resulting in increased prevalence of overweight and obesity involving all ages including children. Obesity is a global public health problem.[1] More people are obese now than underweight. WHO fact sheet which was updated in October 2017 revealed that in 2016, 41 million children under the age of 5 were overweight or obese. 4% of children and adolescents aged 5-19 years were overweight or obese in 1975 and the figure increased to 18% (over 340 million) in 2016. Similarly obesity has increased in this age group from under 1% in 1975 to 6% of girls and 8% of boys in 2016. Moreover 1.9 billion adults (39%) 18 years and older, were overweight or obese in 2016.[2]

Increased prevalence of obesity is seen in developed as well as underdeveloped countries including African and Asian countries. The prevalence of overweight and obesity has also increased in Pakistan especially in urban areas. According to World Health Organization – Diabetes country profiles 2016, 20.8% and 4.8% of population was suffering from overweight and obesity respectively in Pakistan. Overweight and obesity increases the morbidity and mortality in childhood as well as later in life.[3] Obesity in childhood is associated with increased risk of fractures, insulin resistance, hypertension and psychological effects. There are increased chances that these children will grow as overweight and obese adults. Studies have demonstrated that childhood overweight and obesity are associated with increased risk of hypertension, stroke, diabetes mellitus and

ischaemic heart disease later in adult life.[4,5] In adults obesity is associated with increased cardiovascular diseases and musculoskeletal disorders.

The reasons for this increased obesity in children are multiple including changes in eating habits, decreased physical activity, increased use of screen time, increased competition and time on academics, socio economic status, living in rural or urban area as well as genetics. A few studies are carried out on the prevalence and risk factors of obesity in school children in Pakistan in large cities like Karachi, Lahore and Peshawar etc but occasional studies are done in smaller cities on obesity.[6-14]

OBJECTIVE

The objective of this study was to assess the BMI and thus prevalence of obesity/thinness and various related factors in school children of Sialkot.

METHODS

This study was carried from November 2017 to January 2018. Two private schools were selected in Sialkot city. One school belonged to lower middle socio economic status (LMSE) where the monthly fee was 500-1000 rupees and other belonged to well off socioeconomic status (HSE) where monthly school fee was 12000-15000. School administration was approached, aim and study design were discussed with them. Students of classes 6 to 8 were included in the study. Students suffering from chronic illness were excluded from the study. A questionnaire was prepared including bio data, factors related to diet, physical activity, screen time and genetic tendency of obesity in family. Questionnaire along with consent form was sent to the student's home and was collected a week later. Height and weight was recorded by the researcher. BMI was used as indirect measure of adiposity. Weight was recorded with school uniform on and shoes removed to the nearest 0.5 kg. Height was recorded with stadiometer to the nearest 0.5 cm with shoes removed. BMI was measured by dividing the weight in kg by square of height in meter. BMI obtained was plotted on sex and age specific WHO BMI percentile chart. Those with BMI > +1SD and > +2SD percentile were labelled as overweight and obese respectively while thinness was defined as weight < -2SD and severe thinness as weight < -3SD. Data thus obtained was entered and analysed with SPSS 21. A lecture on healthy eating habits and obesity and its hazards were given in both schools.

RESULTS

520 students consented and data was collected from them. Mean age was 12.79 years with standard deviation of 1.53. The mean BMI was 19.80 +/-4.49. According to WHO interpretation of BMI, 15.2% were obese, 22.1% were overweight. Thus 37.3% were obese or overweight according to WHO standard.

Gender wise distribution with respect to WHO BMI classification (6-18 years)

	Obese	Overweight	Normal	Thin	Severe thin	Total
Male	52(10%)	64(12.3%)	164(31.5%)	16(3.1%)	11(2.1%)	307(59%)
Female	27(5.2%)	51(9.8%)	120(23.1%)	11(2.1%)	4(0.8%)	213(41%)
Total	79(15.2%)	115(22.1%)	284(54.6%)	27(5.2%)	15(2.9%)	520

School wise distribution with respect to WHO BMI classification (6-18 years)

	Obese	Overweight	Normal	Thin	Severe thin	Total
LMSE School	23	41	123	22	9	208
% within school	10.6%	18.8%	56.4%	10.1%	4.1%	
% of total	4.4%	7.9%	23.7%	4.2%	1.7%	41.9%
HSE School	56	74	161	5	6	302
% within school	18.5%	24.5%	53.3%	1.7%	2%	
% of total	10.8%	14.2%	31%	1.0%	1.2%	58.1%

LMSE School: lower middle socioeconomic status school, HSE School: upper socioeconomic status school

18.5% of students were obese in HSE school compared to 10.6% in LMSE school with a p value of <0.001. With respect to gender 16.9% (n 52/307) of males and 12.7% (n 27/213) females were obese. In LMSE school 11.2% of males were obese as compared to 9.8% girls, whereas in HSE schools 20.4% of males were obese as compared to 15.3% females.

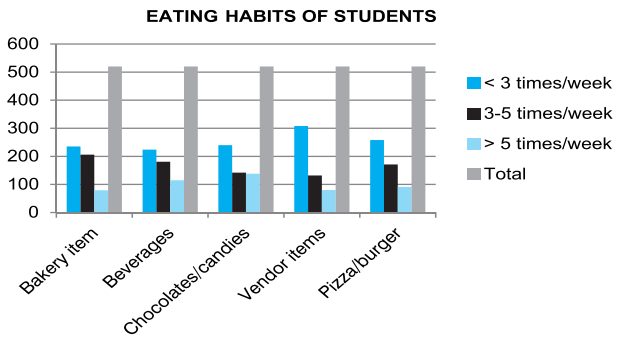
Of the 15.2% (n 79/520) obese children, 12.69% (n 66/520) had family income of >50,000.

10.8% student went to school on foot, 4.2% by cycle and 85% by motor vehicle. Obesity was present in 8.9% (5/56) of students who went to school by walking as compared to 16.1% (71/442) who went by motor vehicle. Thinness was common in students who went on foot (8.9%) as compared to those who went on vehicle (2.3%).

47.9% of students did exercise less than 30 minutes/week while only 12.3% exercised for >150 minutes/week. Out of 15.2% (n 79) obese students, 11.5% (n 60) did exercise for < 30 minutes/week. Only 0.2% (n 1) who exercised for >150 minutes/week, were obese (p<.001).

55.6% students studied for more than three hours at home and obesity was more in this group with p value of 0.008. 38.7% had >3 hours screen time and 35.6% had <1 hour screen time. Obesity was common in students having screen time > 3 hours/day (10.8%) as compared to < 1 hour/day (0.8%) with a p value of <0.001. Obesity was also correlated with eating while watching TV/playing video games/using computer or mobile with a p value of <.001.

Eating habits of students



The intake of bakery items, beverages, chocolates/candies, vendor items and pizza/burger were associated with increased chances of obesity with a p value of <0.001. The importance of balanced diet was highlighted by 90% of parents and 61.3% in school. Family history of obesity was present in 36.3%. Obesity was present in 31.2% (n 59/189) of the students with positive family history of obesity as compared to 6% (n 20/331) with negative family history of obesity with a p value of < .001. The mean sleeping hours were 8.16 hours +/-1.04.

DISCUSSION

37.3% of students were obese/overweight (15.2% obese, 22.1% overweight) in our study. Obesity/overweight was seen in 28.3% and 20% in Karachi and Hyderabad respectively.[6,7] A study in private school of Lahore revealed obesity in 11.9%, overweight in 21.8% of children and another study in Lahore involving all socioeconomic strata revealed 9.5% children were overweight, 7.5% were obese.[8,9] A study by Warriach et al in school children in Karachi using modified BMI criteria for Asian population revealed 6% were obese, 8% were overweight and 52% were underweight.[10] A comparative analysis of the urban component of the National Health Survey of Pakistan (NHSP; 1990–1994) and the Karachi survey (2004–2005) in children 5-14 years revealed BMI >85 centile seen in 3% and 5.7% respectively.[11] A study of class 6-8 students in Islamabad detected >85% BMI in 9.8% of children and <5% BMI in 27.7%.[12] 25.9% of 15-19 years old students were obese/overweight in Islamabad.[13] Obesity was found to be 21% in medical students of Lahore using revised criteria for South Asia.[14]

Prevalence of obesity was 17.8%, overweight was 13.2% and underweight was 29.9% in a study in Bangladesh.[15] In Ghana obesity/overweight was present in 17.3% of students where as 6% were underweight.[16] One third of American children 2-19 years of age are effected by overweight/obesity. In an American study in 2009-10 in age group 6 to 19 years 18.2% were obese.[17] Overweight/obesity prevalence in 6-11 years old American rural children in Mississippi was 37% and in Kentucky was nearly 60%.[18] Over 7 years

follow up obesity/overweight in pre-adolescent increased from 8.2%-20% to 20.4-40% in boys and from 10.6-12% to 13.2-18% in girls in a Portuguese study.[19] In a meta analysis of Portuguese children obesity/overweight stabilised at 30.3% during the last decade.[20]

Prevalence of overweight and obesity is quite high in our study comparing with other Pakistani studies but is comparable to developed countries. Thinness/severe thinness are also less in our study. This study was done in two private schools and no public sector school was included where children from lower socioeconomic status (LSE) usually study. Including public sector school is likely to lower the prevalence of obesity. Sialkot is famous for exporting sports goods and surgical instruments and there are small as well as large industrial units for this purpose which creates better employment opportunities. Socioeconomic status is relatively better as compared to other cities. More over trend of saving is less and more money is spent on eating. In addition to branded eating outlets small eating outlets are available even in mohallahs. More over 47.9% exercised for less than 30 minutes per week and 85% of students going to school by motor vehicle further added to increased prevalence of obesity and decreased thinness.

Thinness/severe thinness was present in 8.1% students in our study. It is less marked as compared to other Pakistani studies in which it ranged from 19.1% to 52%.[8,9,10]

Obesity was more prevalent in HSE schools as compared to LMSE schools i.e.18.5% vs. 10.6% in our study. Similarly severe thinness was less (2%) in HSE schools as compared to LMSE schools (4.1%). This difference prevailed similarly in both genders. The decreased prevalence of obesity in LMSE schools is in spite of the fact that there was no play ground facilities in LMSE schools and 12.9% of male students only had sports period. This trend is consistent with other studies. 25% of students were overweight/obese in upper middle income schools as compared to 4% in lower middle income schools.[6] 70% obese children belonged to higher socioeconomic group.[10] In Ghana, 12.5% of children from private school were obese as compared to 2.5% from public schools. 8.5% children were underweight in public schools as compared to 3.5% in private schools.[16]

Obesity was more prevalent in boys as compared to girls i.e. 16.9% versus 12.7% respectively. 9.8% of girls were thin as compared to 5.2% of males. In study in Hyderabad 15% of the boys were obese as compared to 8% of the girls.[7] 43.6% of of Saudi adolescent males were overweight/obese as compared to 34.8% females.[21] 19.8% males were obese as compared to 16.5% females in 6 to 19 years. The increase in obesity was seen only in males and not in females over 2 years study period.[15] Obesity was more prevalent in boys 22.1% than girls 13.7% in 6 to 13 years old.[15] However in a few studies obesity/overweight was more common in girls than boys (18.9% vs 15.4%) in nortern Ghana.[22] Increased prevalence of obesity in males in our study is consistent with most of local and international studies. Although obesity is more prevalent in boys in most of studies but contrarily it is more common in adult females in Pakistan.[23]

Out of the total 15.2% obese children, 12.7% (n66/377) had family income of >50,000.Obesity was more common in higher socioeconomic class as observed in most of the studies.[6,7,8,15]

Obesity is positively associated with increased intake of energy dense junk foods in our study. This trend is also seen in various local and international studies.

Exercise has been inversely associated with obesity in our study as seen in other studies other studies.[6,8,11] Sialkot is an old city and is deficient in parks and playgrounds as are present in large planned metropolitan cities.

Increased screen time is associated with obesity which is also seen in our study.[6,8,24] Sedentary life style due to increased time spent on studies at home also causes obesity.

CONCLUSION

The 37.3% prevalencoe of overweight and obesity combined is quite high in school children of Sialkot city. Lack of exercise, sedentary life style and unhealthy dietary habits should be discouraged by educating the students and their parents and promoting regular exercise.

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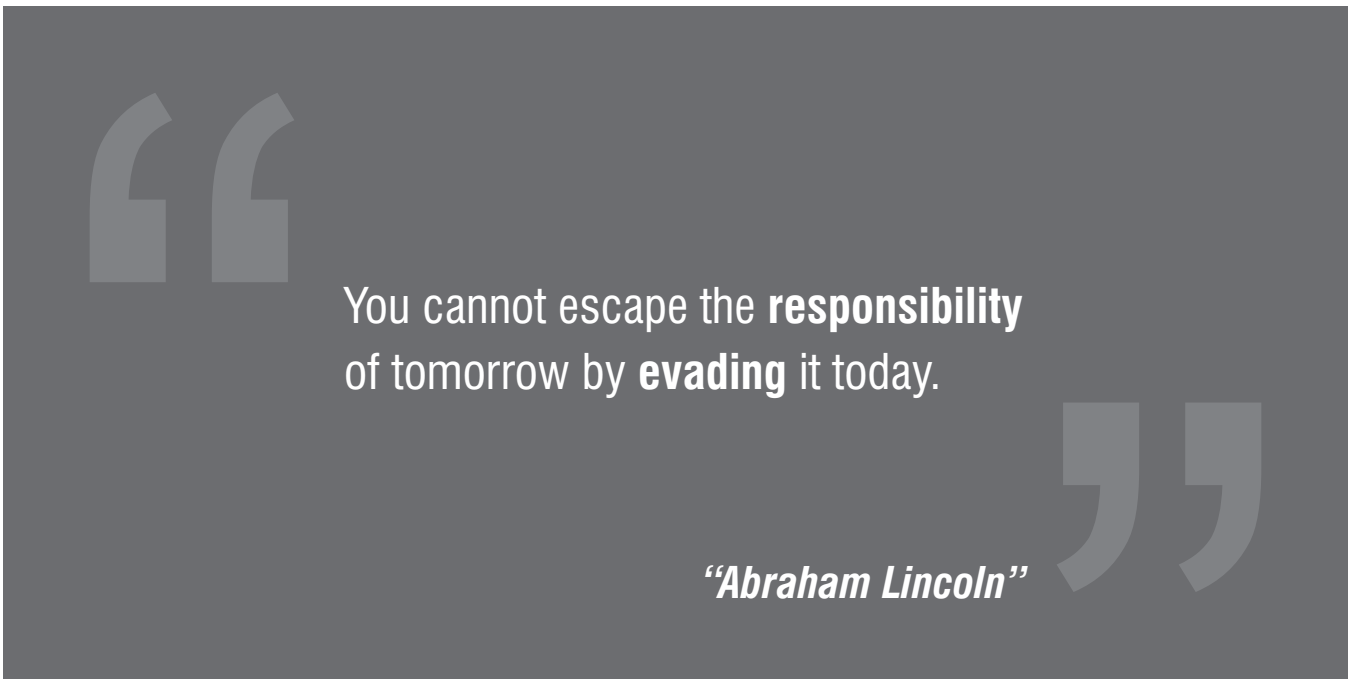

AUTHORSHIP AND CONTRIBUTION DECLARATION

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1	Mazhar Nazir Chattha	Conception of design, result and discussion.	
2	Nafeesa	Data collection.	
3	Rab Nawaz	Data collection.	
4	Muhammad Idris Mazhar	Plagiarism and references.	