

OVERWEIGHT, OBESITY AND ITS ASSOCIATED RISK FACTORS AMONG SCHOOL GOING CHILDREN OF PESHAWAR, KHYBER PAKHTUNKHWA, PAKISTAN

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ABSTRACT

Objective: To compare the overweight and obesity status and associated factors among children of government and private schools in district Peshawar.

Materials and Methods: A cross-sectional analytical study was conducted from February 2020 to October 2022. A sample size of 300 school-going children between ages 6-15 years from 30 different schools of Peshawar using a multistage sampling technique. The data were gathered on a structured questionnaire. SPSS version 24 was used for data analysis.

Results: The mean age of the children ranged from 15.64 ± 0.48 S.D. 125(41.7%) of the children were from Government schools and 175(58.3%) were from Private Schools. Among 300 study participants 16(53%) were males and 139(46%) were females. Overweight and obesity among government and private school children were 9(36.0%), 7 (33.3%) and 16 (64.0%), and 14 (66.7%) respectively (p-value=0.01). Among the Overweight and obese groups respectively there was a positive relationship between the consumption of eggs (r=0.165, p = 0.004), and fried food (r=0.180, p = 0.002). The Duration of Outdoor Sports was inversely related to overweight and obesity (r=-0.333**, P = 0.000).

Conclusion: Comparison between overweight and obesity among both groups shows significant differences due to the mandatory lifestyles of private school children. Both obesity and overweight had an inverse relation with the intensity and duration of physical activities. Effective strategies targeting overweight and obese children are required to make them healthy.

Key Words: Obesity, BMI, Children

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INTRODUCTION

Obesity means having an excess amount of fat, not merely being overweight^{1,2}. The children undergo crucial phases of growth during which there are remarkable changes in physique^{3,4}. Childhood obesity is a major factor for the adult onset of chronic diseases, such as diabetes, high blood pressure, and high cholesterol^{5,6}.

The percentage of overweight children was highest in Latin America and the Caribbean (4.4%), followed by Africa (3.9%) and Asia (2.9%)^{7,8,9}. In India, research in

preschool children showed a low rate of obesity i.e 1.5–1.6%¹⁰. A study in Karachi Pakistan indicates that 6% of school-going children were obese while 19.35% were at risk of developing obesity¹¹. These figures will increase to 2.3 billion for overweight and 700 million for obesity unless drastic measures are taken. Socioeconomic status also affects childhood obesity¹². Obesity and overweight should be controlled from childhood as it leads to adulthood obesity and cause multiple health problems and can overburden the health system of the country^{4,13,15}.

Childhood obesity affects learning ability and cognitive function. Obese children is having low IQ levels as compared to normal children^{16,17}. The present study is therefore very important to know the status of overweight and obesity in school-going children. This study will provide the latest data on school-going age group children and targeted school-based intervention including healthy food provision will be suggested based on study findings.

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MATERIAL AND METHODS

A cross-sectional study was conducted from February 2020 to October 2021. A sample size of 300 was calculated using a 95% confidence interval, desired level of absolute precision as +/-5%, and a proportion of 23% overweight and obesity in school-going children after adding 10% of non-respondents. A multistage sampling technique was used to select schools and students. According to the official data of educational department districts in Peshawar, there are 272 schools from which we selected 30 schools from each Government and public randomly. Students from both public and private schools with ages 10-16 years studying in grades 6 to 10 were selected.

After approval of the synopsis from ASRB, KMU, a list of all public and private schools in Peshawar will be taken from the education department of Khyber Pakhtunkhwa, a prior field visit was done to ensure the appointment, then schools were visited on given dates, permission was taken from principals of respective schools in district Peshawar. Every selected student was approached by Principle Investigator and his team. Data were collected on structured questionnaires which were filled through an interview with the students by the principal investigator or his team. A team of field supervisors (principal investigator) and two research assistants/data collectors were responsible for data collection in the districts. The data was analyzed using SPSS version 24 for windows. Students were categorized as overweight and obese based on BMI cut-off values. Those having a BMI of 24 and below were labeled as normal those between 24-27 were labeled as overweight and above 28 were labeled as obese. The Chi-Square test was applied for the comparison between the groups i.e. normal, overweight and obese where $P \leq 0.05$ was considered significant.

RESULTS

Mean age of the children was 15.64 ± 0.48 (ranged from 6-15 years). Among 300 children 161(53.7%) were male and 139(46.3%) were female. 125(41.7%) of the children were from Government schools and 175(58.3%) from Private Schools. The mean Weight in Kilograms was 147.14 ± 6.0 while the mean Height in centimeters was 147.14 ± 13.02 cm and the mean BMI of 22.74 ± 3.435 . Table 1 shows the educational status of children in government and private schools. When the BMI categories were compared concerning students of public and private schools, the result revealed that a significant difference was seen among students' BMI ($p=0.01$) as shown in table 2. Table 3 shows a comparison of BMI categories based on gender. Associated factors influencing the Body Mass Index (BMI); determinant of obesity:

Table 4 shows the dietary patterns of school children. When BMI is plotted against variables of dietary and physical activity (table 5), there was a positive relationship ($r=0.165$, $p = 0.004$) between BMI and consumption of eggs as food. There more one consumes eggs the more will be BMI which may lead to overweight and obesity. Similarly, the more one used fried food there more his/her BMI ($r=0.180$, $p = 0.002$). however there was a negative relationship between BMI and Taking Snack Food, but this relationship was statistically not significant ($r=0.011$, $p = 0.855$). the Duration of Outdoor Sports was inversely related to BMI, ($r=0.333^{**}$, $P = 0.000$) indicating that the more one exercises there will be lesser the chance of being overweight and obese respectively. There was a positive relationship $r=0.014$, $p=.842$ between BMI and frequency of Taking Fast Food. It was interesting to see that those who used to go for outdoor Duration of Outdoor Sports, were more frequently using protein (egg), fried

Table 1: Comparison of children for their parent's education status

	Type of School		P-Value
	Government School	Private School	
Comparison of students with respect to father's educational status			
Un Educated	1(0.8%)	6(3.4%)	0.0001
Under Matric	4(3.2%)	38(21.7%)	
Matriculate	30 (24.0%)	18(10.3%)	
Intermediate	53(42.4%)	95(54.3%)	
Graduate	9(7.2%)	7(4.0%)	
Post Graduate	28(22.4%)	11(6.3%)	
Comparison of students with respect to mother's educational status			
Un Educated	29(23.2%)	44(25.1%)	0.02
Under Matric	30(24.0%)	19(10.9%)	
Matriculate	16(12.8%)	33(18.9%)	
Intermediate	19(15.2%)	19(10.9%)	
Graduate	18(14.4%)	31(17.7%)	
Post Graduate	13(10.4%)	29(16.6%)	

Table 2: Comparison BMI between of children of public and private school

BMI categories	Type of School		P-Value 0.01
	Government School	Private School	
Normal	95(40.3%)	141(59.7%)	
Overweight	9(36.0%)	16 (64.0%)	
Obese	7 (33.3%)	14 (66.7%)	

Table 3: Comparison of Body mass index (BMI) on the basis of gender

	n	Gender of Student		P-value 0.056
		Male	Female	
Normal Weight	236	131(55.5%)	105(44.5%)	
Overweight	25	7(28.0%)	18(72.0%)	
Obese	21	13 (61.9%)	8(38.1%)	

Table 4: Dietary pattern of student:

Dietary pattern of study participants	Frequency	%
No Time Taking Fast Food last months		
2 times	41	13.7
3 times	89	29.7
4 times	41	13.7
5 times	6	2.0
6 times	37	12.3
7 times	03	1.0
Number of Meals taken per day		
Less than Three	49	16.3
Exactly Three	49	16.3
More than three	103	34.3
Tea in Break Fast		
Yes	168	56.0
No	132	44.0
Cream in Break Fast		
Yes	131	43.7
No	169	56.3

Table 5: Correlation between BMI and food and physical activities related variables

	Weakly Eggs Consumption	Number of times taking fried food	Taking Snack Food	Duration of Outdoor Sports	Number of Times Taking Fast Food
Number of times taking fried food	r= -0.046, p = 0.424				
Duration of Outdoor Sports	r=0.284**, p = 0.005	r=263.-0**, p = 0.003	r=0.323**, p = 0.001		
BMI	r=0.165**, p = 0.004	r=0.180**, p = 0.002	r=0.11.-0, p = 0.855	r=333.-0**, P = 0.000	r=0.014, p=.842

foods, and snacks.

DISCUSSIONS

According to the World Health Organization (WHO), public health is concerned with health promo-

tion, disease prevention, and prolonging life among the population as a whole. The main goal of any healthcare strategy in public health should benefit the population. A Nations Wealth depends on its healthy citizens. A Healthy adult emerges from a healthy child. Early childhood rep-

resents/composes the basis of adult productivity and nutrition is a major determinant of the quality or strength of this foundation. As far as a human being is concerned, the earlier stage of growth and development is the vital factor in determining the 'whole' personality of an individual. Childhood obesity has been increasing in prevalence in Pakistan, causing high levels of public concern. In the present case, school-going children in the district of Peshawar have tackled obesity and associated factors. Using the cross-sectional study design data were collected randomly from 20 selected schools in the district of Peshawar.

Mean weight (kg) was 147.14 ± 6.0 while mean height (cm) was 48.69 ± 6.0 cm which accounted for a mean BMI of 22.74 ± 3.435 respectively. A study conducted in Pakistan (in four provinces, a nationwide study indicates that the height (cms) of children was 139.11 ± 18.44 , average weight (kg) was 33.21 ± 11.25 and average BMI was 16.76 ± 3.22 kg/m² (range from 11.3-41.98), which shows that parameter in the present study is greater, however, the difference is because of the age difference of study participant. In the present study only secondary school children were considered while in the reference study, they included all the school children aged 3 to 16 years. The nationwide study revealed that in the age group 3-5 years, >5-10 years, and >10-16 years; 29 (8.1%), 272 (5.1%), and 363 (5.1%) were found to be obese, respectively. CDC height and weight in the three groups of Pakistani children >3-5 years, >5-10 years, and >10-16 years were at the 10-25 centile¹⁸

Among children, 57(19.0%) father died, out of whom Majority was from government schools 33 (57.9%), which indicate that access to private schools is behind the poor people and there is a lack of equal quality of education. Children whose parents are present in the world are pushed to study in government schools. Thus it means that children are entitled to a free quality basic education could create disparity. The problem in many developing countries is that governments lack either the financial resources or the political will to meet their citizens' educational needs. In response, poor parents in some low-income countries have organized and paid for their children's education themselves. School fees and other user payments are indeed a heavy burden for some parents to bear. But, given the alternative—children receiving no education at all—such payments can represent a temporary, if less than ideal, solution to the problem.¹⁹ Among those children whose parents have a divorces history 17 (77.3%) were from private school. These are alarming factors that may lead to failure in students' performance, and also affect the student-teacher and student-parent relationship, as evident from the literature, these factors harm child performance. Social reasons for the weak performance of students include; living with one parent, parental divorce, and low incom²⁰ however when the fam-

ily is wealthy extra empathy/sympathy could be given as indicated by the result of the present study where among 42 children whose both parent died, majority 37 (88.1%) were from private schools indicating that their other family members supporting them and they had got special votes of empathy/sympathy.

Almost all parents want to educate their children in the best possible educational environment. Their decision to invest in children depends on several social, economic, and cultural factors. Education in Pakistan is offered by both public and private sector educational institutions. It is free of cost in public schools whereas, in private schools, the parents have to bear the financial burden. The factors which motivate parents for admitting their children to private schools include the education level of parents, especially the mother, occupation of the father and mother, the income of parents; staff qualifications, and school performance are major factors that affect parents' choice in the selection of private school.²¹ The same trend is seen in the present study where, among private students, the fathers of a majority of students were government employees while the mothers of both groups of children were housewives. Regarding further education level, The fathers of students from the public sector were more educated but few of them had a government job, which means lacking a continuous source of income. This indicates that only education level cant influence the decision income is a major contributor. The result of the present study indicates that mothers of students in private schools were more educated which again supports the evidence from the above literature that a mother's education status does matter in decision-making about their child's educational career. Among students in government schools, 14 (11.2%) were under weigh as compared to 4(2.3%) of students studying in private schools. Similarly, 9(7.2%) of government school children were overweight and 7 (5.6%) were obese as compared to 16(9.1%) and 14 (8.0%) of children from private schools, indicating that private school children are more prone to overweight and obesity respectively which pose significant ($p=0.01$). although this difference was statistically significant in India this gap is worse as compared to Pakistan, where a study indicates that there was under the weight of 44% of government schools, had no incidence of overweight, on the other hand in private schools there is an incidence of 6.8% of overweight and there is no incidence of underweight. In Gana, both undernutrition and overnutrition were common among the school pupils but overweight appeared largely driven by high SES and urbanization while undernutrition was associated with low SES and rural residency. Interventions targeting school children should aim at reducing poverty and hunger as these factors remain underlying causes of malnutrition in childhood.²²

Comparison of BMI among gender indicates that among males, the proportion of underweight was high as

compared to females, However, among 25 overweight individuals, 18(72.0%) were female and 7(28.0%) were male. while among obese (n=21) majority 13 (61.9%) were male as compared to 8(38.1%) female which accounted significant difference ($p=0.056$). A study from India indicates that more females were underweight while the result was persistence with the present study in the area of overweight and obesity, here they also found that the proportion of females among the overweight group was high and the proportion of males among obese was high as also seen in the present study²³. However, another study by Sunil V. Pawar, indicates that the prevalence of overweight and obesity is high in male students as compared to females²⁴, thus gender is not the only factor to influence the individual BMI. Where the more important factor is the socioeconomic position of students

Regarding the associated factors like dietary habits and physical activities, the result of the present study indicates that there was a positive relationship between BMI and consumption of eggs($r = 0.165$, $p = 0.004$), fried food ($r = 0.180$, $p = 0.002$) and fast foods. The literature also indicated that the intake of egg in breakfast results in slightly changing in insulin and glucose level and hence decrease energy intake, hence leading to an increase in BMI which in turn lead to overweight and obesity the same result was noted in the case of consumption of French fried chips where it was associated with increased BMI²⁵. Another study indicates that using Pasta and eggs creates a 0.70 times higher risk of developing overweight and obesity, especially among females²⁶, the result of the present study is not consistence with the finding of Dhobale RV et al. they found that there was no significant association was seen between consumption of milk and eggs with BMI²⁷

The Duration of Outdoor Sports was inversely related to BMI, ($r=0.333^{**}$, $P = 0.000$) indicating that the more one exercise there will be lesser the chance of being overweight and obese respectively. It was interesting to see that those who used to go for outdoor Duration of Outdoor Sports were more frequently using protein (egg), fried foods, and snacks. Literature is consistent regarding the relationship between physical activities and BMI, it is found that lack of participation in outdoor sports among children could lead to both overweight and obesity³⁸. overall results reveal that the important correlates of overweight/obesity were the father's education, father's occupation, class, children playing outdoor games for less than 30 min, and those consuming fast foods

CONCLUSION

the Current study showed that overweight and obesity in school going children is an emergaing public health issue .Effective public health stratigies are needed to save our young generation from growing epidemic of obesity.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under

- Ghayasuddin S:** Concept, design, data collection
Ali W: Data collection, writing, review
Khalil KUR: Data collection, review, statistical analysis
Ali I: Concept, review
Ahmad S: Data collection, writing, review

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.



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