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Research Article

Prevalence of Obesity and Overweight among Primary School Children in Khartoum, Sudan

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Abstract

Background: Widespread trends of accelerating child obesity and overweight were reported in developing countries, which needs effective approaches. Obesity and overweight are getting a threat to public health worldwide. This study aims to assess the prevalence of obesity and overweight among Sudanese primary school children.

Method: Descriptive descriptive-cross sectional, institutional based study-sectional study design was used. The participants were 323 primary school children. Data was collected by direct interview analyzed by SPSS consent was obtained from parents.

Results: The prevalence of overweight and obesity of males was 4.4% and 6.1%, respectively, while females 6.0% and 7.2%, respectively. The results showed females were found to be overweight and obese quite than males study indicated a robust positive association between obesity, overweight, and gender (P. Value = 0.008).

Conclusion: The study concluded the prevalence of overweight and obesity problem was higher among girls than boys. There was a robust positive association of economic status, educational level of oldsters, parental case history of obesity and overweight. Health education regarding nutritional and dietary habits among school children is essential.

Keywords: *Obesity; Overweight; Grade School; Children; Sudan*

Introduction

Widespread trends of accelerating child obesity and overweight are reported in developing countries. Obesity may be a health problem that needs effective approaches. The prevalence is becoming a threat to public health worldwide, affecting both developed and developing nations. Obesity and overweight represent a rapidly growing risk to the health of individuals in an increasing number of countries with many developing countries [1]. The Prevalence of obesity continues to extend the prevalence of overweight. Children 6 - 18 years old have increased more than fourfold from 4% to over 18% 2012 in 1965 [2]. Childhood obesity has quite doubled in children and quadrupeds

quadruple in adolescents in the past 30 years, the share of children aged 6 - 11 years in the United State who were obese increases from 7% 1980 to nearly 18% 2012 [3]. The prevalence of obesity in children rose worldwide by 47.1% between 1980 and 2013. Currently, it's estimated that 32% of children overweight and obese, an estimated 300,000 deaths a year, and a minimum of $147 billion in health costs are associated with 68% of Americans who are obese and about 30 million Indians children are obese. it's predicted to double in the next five years [4].

Obesity and overweight, which were previously considered problems affecting mainly the affluent, are now markedly on the rise in low- and middle-income countries, in developing countries like India, especially in urban populations, childhood obesity is emerging as a serious health problem particularly in urban areas [5].

Globalization, improving economic conditions and changing dietary habits in developing countries are purported as liable for the rapid increase in obesity. This increase is related to a lack of supportive policies in sectors such as health, agriculture, transport, urban planning, environment, food processing, distribution, marketing and education [6].

Methodology

This is a descriptive cross-sectional study with school-based design conducted on primary school children of Omdurman locality Salha-al Giaa district. Ethnic groups and foreigners, different tribes, cultural, traditional and believed different socioeconomic levels. Learn in Nor-eldaim Primary school for boys and girls. Their age between 6 to 16 years of old, males and females in grade1 to grade 8 and living at Omdurman are included in the study. Children with 17 years of age and above and those from private schools are excluded from the study, the total group consisted of 1693 children (716 boys and 977 girls) from one public school. Sample size calculated by the formula n= N/1+N (d) 2, n: sample size, N: study population (children in Nor-eldaim Primary school for boys and girls). Hence, sample size is equal: 1693/1+1693(0.05*0.05) = 323. In that case, the sample size in this study equaled 323 students, a multistage sampling technique was adopted to withdraw the desired sample size.

All sample schools should be visited from Monday to Thursday in a week, during school hours the relevant data of the study were collected using a structured questionnaire. The information collected included, in addition to the personal data, determinant factors, and body mass index chart for age, the measuring tape and electronic weighing scale were checked and documents by pen and pencil in a sheet Body height was measured, using a measuring tape, with the informed child standing on a flat floor against a wall with heel, buttocks, shoulders and occipital touching the wall.

Weight was measured to the nearest 0.1 kilogram using an electronic scale with the child wearing light clothes and with no shoes. After calculation, BMI (weight in kilograms divided by height in meters squared (kg/m^2), measurements were plotted on the 2000 BMI charts of Centers for Disease Control and Prevention (CDC) for boys and girls. BMI varies with age and sex. The CDC defines underweight as BMI for age less than the 5^{th} percentile, childhood obesity as a BMI greater than the 95^{th} percentile.

Data analysis was carried out by the Statistical Package for Social Science (SPSS) version 20.0: measures include: percentage and mean, and the binary outcome variable was created. Graphical presentation includes bar graphs and pie graphs. The level of significance selected for this study was a p-value equal to or less than (0.05). The study proposal was ethically cleared by the Ethical Committee of Al-Neelain University and a written agreement was taken from the Ministry of Primary Education of the Omdurman locality administration of al-Salam Education and the principals of the selected schools.

The list of primary schools presents in Omdurman locality used for sampling was obtained from the Director of Education Office.

Interview children were given to school head teachers. Each respondent gave written consent before participating in the study. All participants and their parents were aware of their right to refuse to answer any question and measure weight and height.

Results

Variable	Frequency	Percentage %
Age		
6 - 8 years	46	16.60
9 - 11 years	115	40.30
12 - 15 years	120	42.70
More than 15 years	2	0.70
Total	283	100
Gender		
Male	115	40.6
Female	168	59.4
Total	283	100
BMI category		
Underweight	19	6.7
Normal	230	81.3
Overweight	17	6.0
Obese	17	6.0
Total	283	100

Table 1: *Demographic variables of the study sample (n = 283).*

Age	Obese	Overweight	Total
6 - 8 years	1 (2.1%)	0 (0%)	48
9 - 11 years	6 (5.4%)	9 (8%)	112
12 - 15 years	10 (8.3%)	8 (6.6%)	121
More than 15 years	0 (0%)	0 (0%)	2
Total			283

Table 2: *Relationship between obesity/weight and age.*
P. value 0.006.

	Level of mother education					
BMI categories	**Illiterate**	**Primary education**	**Secondary education**	**University**	**Above university**	**Total**
Obesity	1 (6.3%)	7 (5%)	5 (6.6%)	4 (10.9%)	0 (0%)	
Overweight	1 (6.3%)	9 (6.3%)	4 (5.3%)	3 (8.1%)	0 (0%)	
Total	16	142	76	37	12	283

Table 3: *Relationship between obesity/overweight and educational level of mother.*
p. value 0.003.

	Eating chocolates and sweets				**Total**	**P-value**
		Yes	**No**			
	Obese	17 (6.0%)	0 (0%)			
	Overweight	6 (6.0%)	0 (0%)			
BMI categories		278	5		283	0.001
	Drinking carbonated beverage					
		Yes	**No**		**Total**	
	Obese	16 (6.0%)	1 (5.5%)			
BMI categories	Overweight	16 (6.0%)	1 (5.5%)			
		265	18		283	0.018
	Participate in sport					
		Yes	**No**		**Total**	
	Obese	11 (5.3%)	6 (7.7%)			
	Overweight	15 (7.3%)	2 (2.6%)			
BMI categories		206	77		283	0.005
	Sitting in screen devices				**Total**	
		Yes	**No**			
	Obese	17 (6.6%)	0 (0%)			
	Overweight	16 (6.2%)	1 (4.4)			
BMI categories		259	23		283	0.007
	Means of transport				**Total**	
		On foot	**By public transport**	**By private car**		
	Overweight	13 (5.9%)	3 (6.7%)	1 (12.5%)		
	Obese	12 (5.4%)	4 (7.5%)	1 (12.5%)		
BMI categories		222	53	8	283	0.019
	Consume fast meals outside the home					
		Yes	**No**	**Total**		**p-value**
	Overweight	12 (7.1%)	5 (4.4%)			
BMI categories	Obese	9 (5.2%)	(87.1%)			
		170	113	283		
				0.014		

Table 4: *Association between BMI categories and some dependent variables.*

Discussion

Regarding to the prevalence of obesity, overweight and among different age groups, the rate of obesity was the highest at the age of 12 - 15 years, 8.3% compared with those at the age of 9 - 11 and 6 - 8 and increased with the increase in age to be the highest at the age

of 9 - 11 and 12 - 15, while the rate of overweight was the highest at the age group 9 - 11 years 8% and decrease with an increase in age. The results indicated a significant association between obesity and overweight and age (P. value 0.006). The present study is disagreeing with previous Egyptian studies that showed a prevalence of overweight and obesity of 11% and 3.8% respectively, among children of governmental schools [14]. Other studies using WHO criteria reported 3.6% obese and 11.4% overweight among school children aged 13 - 15 years from Sudanese children [7]. The result showed the prevalence of normal or Healthy Weight, Underweight, overweight, Obese was 71.3%, 15.9%, 6.2%, 6.7% respectively.

Another study was conducted in India [8]. Was disagree with the present study, the results in our study show the prevalence of obesity and overweight was the highest rate than the study in India.

Regarding to the distribution of gender among the study population, 40.6% of study population were males, while more than half (59.4%) were females, the results show that the most of study participants were female.

In present study the prevalence of obesity and overweight of males 4.4% overweight and 6.1% obese, while the prevalence of obesity and overweight of females was 7.2% and 6.0% respectively. The results showed female were found to be overweight and obese than males. The study indicated a strong positive association between obesity/overweight and gender (P. Value= 0.008). The present study is agreeing with previous conducted in seven African countries, the results found females had a higher overweight prevalence in five countries [9].

Regarding to the frequency of obesity and overweight among different school classes. The rate of obesity was the highest at class eight 16.6% and class third 10.3% compared with children in class 7, while the rate overweight was the highest at class 5, 6 and 7. The results indicated an association between obesity and overweight and school classes. The similar study conducted in Omdurman- Sudan at the same classes which makes to compare [10].

Regarding to association between obesity/overweight and mother's level of education, the prevalence of obesity and overweight in illiterate level was 3.6%, respectively. While the prevalence of obesity and overweight in primary level was 5%, 6.3%, respectively, 6.6% obese. 5.3% overweight was among secondary level, while percentage among university level was 10.9%, 8.1% respectively, 0% of obese and overweight children that Mother's level of education was postgraduate level.

The highest prevalence of prevalence of obesity and overweight was among university level. Results indicated that there were significant differences for data on mother's level of education with obesity and overweight (P-value = 0.003).

The present study findings are supported by a study in India [8] and in Ethiopia [11].

Regarding the dietary habits of children, more than half 62.3% of children had consumed breakfast outside the home, 9.2% once per week, 10.2% consumed twice per week, majority of children consumed breakfast outside the home more than twice per weeks 43.0%, while 39.8% to not consume breakfast outside the home. Half of children consume sugars, Pies, 32.4% and 17.6% pizza.

Regarding to the association between obesity/overweight and fast meals, the frequency of obesity and overweight was more among children consumed fast meals outside the home 5.2%, 7.1% respectively. About types of fast meals, the prevalence of obesity and overweight were highest among children consumed chickens 10%, 13.3% respectively. This study was agreed with study carried out in Saudi Arabia [12].

Regarding to the relationship between obesity/overweight and consuming chocolates and sweets, children who consume chocolates And sweets were more obese and overweight 16%, 16% compared with children do not consume chocolates and sweets 0%. The results indicated that significant association between BMI category and consuming chocolates and sweets (P. value 0.001). Regarding too number of times, the prevalence of obesity and overweight was highest among school children who consume chocolates and sweets once per week. Frequency of obesity and overweight among children consume chocolates and sweets more than twice per week was same. Mimic in findings could be explained by similarity in the culture of Ethiopia [11] societies and the result showed that Children who preferred

sweetened foods were almost two times more likely to be overweight or obese as compared to those who did not prefer sweetened foods. Another study conducted in conducted in Tanzania [13] was likewise the present study. The finding of the present study was lower in magnitude of overweight and obesity compared to a study done in Tanzania.

Concerning with link b/w, obesity and overweight and drinking carbonated beverages, prevalence of obesity and overweight was slightly highest among children who drink carbonated beverage 6.6%, 6.6%, compare with obesity and overweight of children who do not drink carbonated beverages 5.5%. The study indicated strong linking between carbonated beverage and obesity and overweight (P. value 0.018). the study conducted in conducted in India was likewise the present study.

Other dietary factors are fresh juices, majority of school children drink fresh juices, 73%, 27% of children do not drink fresh juices.

The relationship between sport activities and obesity and overweight, frequency of obesity was highest among children doing not participating in sport 7.7%, frequency of overweight was highest among children participating in sport. The results indicated that significant association between obesity and overweight and sport practice at P. value 0.005. Our present study is disagreed with the previous study found in Egypt [14].

More than half of school children sitting toward screen more than two hours per day, 51.2%, percent of school children sitting toward screens less than an hour per day was 29.2, the fewest percent was from hours to two hours per day 10.9%.

The results indicated a significant association between obesity and overweight and sitting in the screen (P. Value = 0.007).

About the way or means of transport to school, most school children go to school with feet 82.4%, while 14.8% go by public transport, the percentage go by private car 2.8%.

The prevalence of obesity and overweight was greater among children go to school by private care compared with those who go on foot 5.9%, 5.5% and public transport 6.7%, 5.7%. The results showed a strong positive association between obesity and overweight and means of transport P. value = 0.019. The present study is the same as study carried out in Indi and Ethiopia [8,11].

Conclusion

The study concluded the prevalence of overweight and obesity problem was higher among girls than boys. There was a robust positive association of economic status, educational level of oldsters, parental case history of obesity and overweight, and means of transport to high school with obesity and overweight.

Recommendation

Health education regarding nutritional and dietary habits among school children is essential and increased student awareness about adverse of obesity and overweight.

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Conflicts of Interest

The authors declare that there are no conflicts of interest.

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