

Prevalence of obesity and overweight among the female students in basic school levels in Omdurman- Sudan

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Abstract:

This study attempts to define obesity and overweight in Sudanese basic academic schoolgirl levels in Omdurman – Sudan.

The participants were 80 female students, age 5-13 years from grade 1st; 4th; 5th; and 7th during the academic year 2006-2007. Data was collected by direct interview with school girls and a consent form was given to their parents to allow their daughters to participate in the study. Body weight in kilograms and height in meters were taken to determine body mass index (BMI). Also, percentile of obesity was determined using a suitable growth reference for age and sex. Data was analyzed using statistical package for social science (SPSS) and presented in the form of tables.

Results revealed that the percentage of students at risk of obesity and overweight were particularly high (37.5%). Also, this percentage was close to the percentage of normal weight (55%). The prevalence of underweight was 7.5%. Also, the results showed that the prevalence of obesity and overweight was found significantly changed ($p < 0.01$) in female children according to age. The percentage of obesity and overweight among school girls were 26.32%, 39.47% and 43.48% in age groups of 5-7 years, 8-10 years, and 11-13 years respectively.

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Introduction:

The prevalence of childhood obesity has been increasing at unsettling rates across the globe [1]. In addition to striking the developed world, this pattern has also been noted in developing countries undergoing rapid epidemiological transitions, including those in East Africa [2]. In Sudan, a study of children in secondary school in the capital Khartoum found that rates of overweight and obesity were 28.5% and 5.6% respectively [3]. Rates of obesity for younger schoolchildren in East Africa remain unclear,

though obesity at younger ages may carry greater importance because younger children possess improved potential for early intervention [4]. The global prevalence of obesity in children aged 5-17 years is approximately 10%, but this is unequally distributed, with the prevalence ranging from less than 2% in sub-Saharan Africa to over 30% in the Americas [5]. The prevalence of childhood obesity is high in the Middle Eastern, Central and Eastern European countries [6]. Iran has been reported to be one of the seven countries with the highest prevalence of

childhood obesity [7]. In Saudi Arabia, one in every six children aged 6-18 years old is obese [8]. Childhood obesity and adolescent prevalence rate have steadily increased in industrial countries in the last 20 years [9]. Obesity means deposition of excess fat in the body [10].

Obesity in children -mean BMI- for age as at or above the 95th percentile and overweight at or above 85th percentile [4,11]. There are serious problems that can come from being obese as a child, including high cholesterol, liver problems, hip and other bones problems, early puberty, sleep-apnea, reproductive problems and some types of cancer. Overweight children may also be prone to low self-esteem that stems from being teased, bullied, or rejected by peers [12].

Materials and methods:

Study area: This study was carried out in Amena Bent Wahab School which is one of the primary basic school level for girls in Omdurman – Khartoum state – Sudan.

Study subjects and study design: The study was conducted on 80 girls. Their ages ranged between 5-13 years. The participants were sampled out of four classes (grades), first, fourth, fifth, and seventh classes. The age, weight, height and number of participants from each class were recorded. Consent forms were given to parents to allow their daughters to participate in the study. Meeting between head master and students was arranged to discuss aims and methods of research.

Data collection and calculations:

Measurement of weight and height: Normal balance was used to measure child's weight in

kilograms and meters were used to measure height. Height was measured in light clothes. The weighing scale was calibrated daily before the first measurement was taken. Height and weight were measured with the child's shoes removed.

Calculation of body mass index: Body mass index was computed using the standard formula $BMI = \text{weight in kilograms} / \text{height square in meters}$. Measurement of body mass index is calculated as reported by Dehghan et al [4].

Calculation of obesity percentile: From the calculated value of BMI, the child's BMI percentile for age and sex were calculated on growth curves published and distributed by the National Center for Chronic Disease Prevention and Health Promotion in America for female ages from 2-20 years. School girls were classified as obese or overweight, normal and under weight based on their body mass index. European researchers classified overweight as at or above 85th percentile and obesity as at or above 95th percentile of BMI [4].

Statistical analysis: A completely randomized design was selected for this study. The data had been presented in tables. The data were analyzed using the statistical program for Social Sciences (SPSS). Statistical significance was set at $p < 0.05$ and $p < 0.01$. The correlation was used to identify the relation between age with obesity and overweight.

Results:

General information about the studied population, were shown in table 1. The mean and standard deviation for age, height, weight and number of participants in each class were given.

Table 1: The Studied population:

Class	Age	Height	Weight	Number
First	6 ± 0.46	1.11 ± 00.06	19.8 ± 4.13	19
Fourth	8.73 ± 0.69	1.32 ± 0.08	32.36 ± 24.70	22
Fifth	10.2 ± 0.51	1.4 ± 0.08	37.8 ± 9.73	20
Seventh	12.11 ± 0.45	1.49 ± 0.05	43.84 ± 12.32	19

Categories of obesity and corresponding percentile were shown in table 2.

Table 2: Categories and percentile of obesity:

Case	Percentile
Obese	More than 95 th
Overweight	More than 85 th
Normal	More than 5 th
Underweight	Less than 5 th

Prevalence of obesity, overweight, normal and underweight among studied population and frequencies were presented in table 3. The percentage of students at risk of obesity and overweight was particularly high (37.50%). Also this percentage was close to the percentage of normal weight (55%).

Table 3: Distribution of weight status among studied population:

Study Population	Frequency	Percentage	P value
Obese	15	18.75%	<0.05
Overweight	15	18.75%	
Normal	44	55%	
Underweight	6	7.5%	
Total	80	100%	

Table 4 showed the prevalence and distribution of weight status in each class. The summation of frequency of obesity and overweight in each class was very close to the normal frequency of weight in each studied class.

Table 4: Distribution of weight status in each class:

Class	Obese	Overweight	Normal	Underweight	Total	P value
First	3	2	13	1	19	<0.05
Fourth	6	3	11	2	22	
Fifth	3	6	11	-	20	
Seventh	3	4	9	3	19	

Prevalence of obesity and overweight in studied population according to age were presented in table 5. The percentage of obesity and overweight among school girls were 26.32%, 39.47%, and 34.48% for in age groups of 5-7 years, 8-10 years, and from 11-13 years respectively.

Table 5: Distribution of obesity and overweight according to age:

Age (years)	Number	Frequency	Percentage	P value
5-7	19	5	26.32 %	<0.05
8-10	38	15	39.47 %	
11-13	23	10	43.48 %	
Total	80	30	100 %	

Table 6 showed the distribution and prevalence of obesity and overweight in each class. Percentage of obesity and overweight were 30% in the fourth and fifth classes. While it was 23.33% and 16.67% in the seventh and the first classes respectively.

Table 6: Distribution of obesity in each class:

Class	Frequency	Percentage	P value
First	5	16.67 %	<0.05
Fourth	9	30.00 %	
Fifth	9	30.00 %	
Seventh	7	23.33 %	
Total	30	100 %	

Table 7: Correlation between BMI and age:

Factor	Age
BMI/Pearson Correlation	0.546**

**The correlation is significant at the 0.01 level (2-tailed).

Discussion:

Our study revealed that the combined prevalence of obesity and overweight is 37.50% (18.75% in each case) among the included subjects .The prevalence of obesity and overweight among female children is increasing and is comparable to that found in the developing countries^[2,3].

The present study showed that the prevalence of obesity and overweight in female students of basic school level were significantly increasing with age. This is similar to the result obtained by Osama and Enayat ^[3] and also agreed with Bose et al ^[5] in their study on obese children.They found that there was a significant increase in the rate of overweight with increasing age.

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