

Prevalence of over and under weight among school children in Mosul

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ABSTRAT:

Aim: To evaluate the prevalence of over and under weight in children aged 6-14 years in Mosul city and to observe the important risk factors.

Methods: A cross-sectional study of four governmental primary schools in Mosul city with a total of 2056 child aged 6-14 years were included. Analysis of the data was done by using SPSS and excel computer systems, X^2 test was used for statistical analysis.

Results: The study reveals that the prevalence of under weight is 6.8%; on the other hand the prevalence of over weight and obesity were 11.3% and 9.8% respectively. Also the study shows that about three quarters of over weight and obese students spend three or more hours daily in watching television, and (44.2%) of them eat more than three meals per day.

Conclusions: Overweight and obesity are prevalent problems in Mosul, it is valuable to conduct a study to evaluate the risk factors.

الخلاصة

الهدف: تهدف الدراسة إلى حساب معدل انتشار زيادة ونقصان الوزن عند أطفال المدارس الابتدائية في الموصل.

طريقة الدراسة: دراسة مقطعية.

المشاركون في الدراسة: شملت الدراسة ٢٠٥٦ طفل بعمر ٦-١٤ سنة.

مكان الدراسة: أربعة مدارس ابتدائية في مدينة الموصل.

قياس المحصلة النهائية: تم تحليل النتائج باستخدام برنامجي SPSS و Excel للحاسبة الإلكترونية وقد تم استخدام اختباري Z و X^2 في التحليل الإحصائي.

النتائج: أظهرت الدراسة أن معدل انتشار نقصان الوزن عند الأطفال هو ٦.٨% من جهة أخرى أكدت الدراسة على أن معدل انتشار زيادة الوزن والسمنة عند الأطفال هو ١١.٣% و ٩.٨% بالتعاقب.

الاستنتاج: في ضوء النتائج المستخلصة من الدراسة يمكن الاستنتاج بأن زيادة الوزن والسمنة يشكلان مشكلة لدى الأطفال فمن المجدي إجراء دراسة أخرى لتقييم الأسباب المؤدية إلى ذلك.

Growth monitoring is an essential component of pediatric practice. It is conducted mainly through the use of growth charts; their value resides in helping to determine the degree to which physiological needs for growth and development are met during the important childhood period⁽¹⁾.

Primary school aged children may have no routinely scheduled health care visits during this age range, so preventive care and counseling during this time may need to be incorporated into sick visits or conducted through school surveys. This includes assessment of growth and development and screening for any other abnormalities, in addition to reinforcement of healthful behaviors regarding exercise, sleep, and diet^(2,3).

Obesity is an increasing public health problem in high income countries as well as several low and intermediate income countries^(4,5). During the last 30 years the number of overweight children has almost doubled so prevention during childhood is an essential component of the efforts to combat this global problem^(6,7). Sedentary life style is a very important factor in increasing the risk of obesity in young adults⁽⁸⁾.

Growth monitoring by using different types of growth charts (weight for age, height for age, weight for height, and body mass index for age) is an easily applicable method and should be used by pediatricians, general practitioners, and health workers^(3,9).

Body mass index (BMI) is a relative weight measure; it shows the excess in body weight related to excess body fat, and there is a strong curvilinear relation between BMI and relative body fat mass⁽⁹⁻¹¹⁾. It is a

standard assessment tool in adult and now there is an international support for its use in children^(12,13). The main advantage of BMI is for the assessment of the risk of diseases mainly those which are obesity related and those associated with malnourishment^(11,14).

Body mass index is used differently with children and teens than it is with adults. It is referred to as BMI for age; the most widely used BMI for age charts are those of the centers for disease control and prevention (CDC)⁽¹⁵⁻¹⁸⁾.

The aim of the present study is to measure the point prevalence of under weight, over weight, and obesity among children aged 6-14 years in Mosul, and to estimate the frequency of factors which are associated with over weight in the study population.

Methods

The present study was conducted in Mosul over a three months period from the 10th of October 2006 to the 10th of January 2007.

In this study it was decided to include four governmental primary schools in Mosul. The schools were chosen randomly in 4 different districts inside Mosul City after the approval of the Directorate of Education in Mosul.

A total of 2056 pupils aged 6-14 years were interviewed and examined by one of the investigators. This figure constitutes almost all students who were present in the schools at the time of investigator visits. A questionnaire form was filled for each pupil which contained information regarding age, sex, dietary habits, exercise, and watching television. Pupils' height was measured to the nearest 0.5 cm by using vertical wall

scale and the pupil stood in erect position without shoes.

On the other hand, body weight was measured to the nearest 0.1 kg by using electronic scale using light clothes, and subtraction of the clothes weight (0.5-1.5kg) was done. Body mass index was calculated for all study sample by using the international formula:

$$\text{BMI} = \text{body wt (in kg)} / \text{height}^2 \text{ (in meter)}^{(14)}.$$

Then the BMI for each pupil is plotted on the standard international BMI for age curves of the CDC center⁽¹⁵⁾.

Classification of the study sample was conducted as in the following^(15,17-19):

1. BMI for age < 5th percentile was considered under weight.
2. BMI for age from 5th percentile to <85th percentile was classified as normal.
3. BMI for age from 85th percentile to <95th percentile was classified as over weight.
4. BMI for age above or equal to 95th percentile was classified as obese.

Analysis of the data was conducted by using SPSS and excel computer systems; χ^2 test and z test were used to conduct the statistical analysis.

Results

During data collection a total of 2056 students (1010 males and 1046 females) aged 6-14 years were interviewed and examined with a 100% response rate. Male to female ratio was 0.97:1.

Figure (1) exhibits the trends of point prevalence of underweight, overweight, and obesity in male and female population according to age. In males the highest prevalence of underweight was in the age group 14 years, while overweight was

common among the age group 11 years, similar trend was observed amongst obese. While in female population the highest prevalence's of underweight and overweight was found in the age group 14 years, nevertheless obesity was common among the age group 12 years.

On the other hand, it is evident from Table (1) that the prevalence of under weight in the study population is 6.8% although it is more prevalent in females than in males (8% and 5.5% respectively) the difference is significant ($p < 0.01$).

Over weight constitutes 11.3% with nearly similar prevalences in males and females, while obesity is more prevalent in males than in females (11.8% and 7.9% respectively), the difference is of highly significant value ($p < 0.002$) with overall prevalence of 9.8%.

Table (2) shows that about three quarters of overweight and obese pupils (73.6%) spend three or more hours daily in watching television compared to about one half (49.3%) of the normal weight pupils; the difference is very highly significant ($p < 0.001$). Overweight and obese were almost three times more likely watch TV than normal weight pupils (odds ratio = 2.85, 95% CI = 1.91-4.24).

Table (3) incorporates one of the important dietary habits of study sample. More than forty percent (44.2%) of the over weight and obese pupils use to eat more than three meals per day compared to 35.7% of the normal weight students; the difference is very highly significant ($p = 0.001$), although odds ratio shows no evident risk (odds ratio = 1.42, 95% CI = 1.15-1.75).

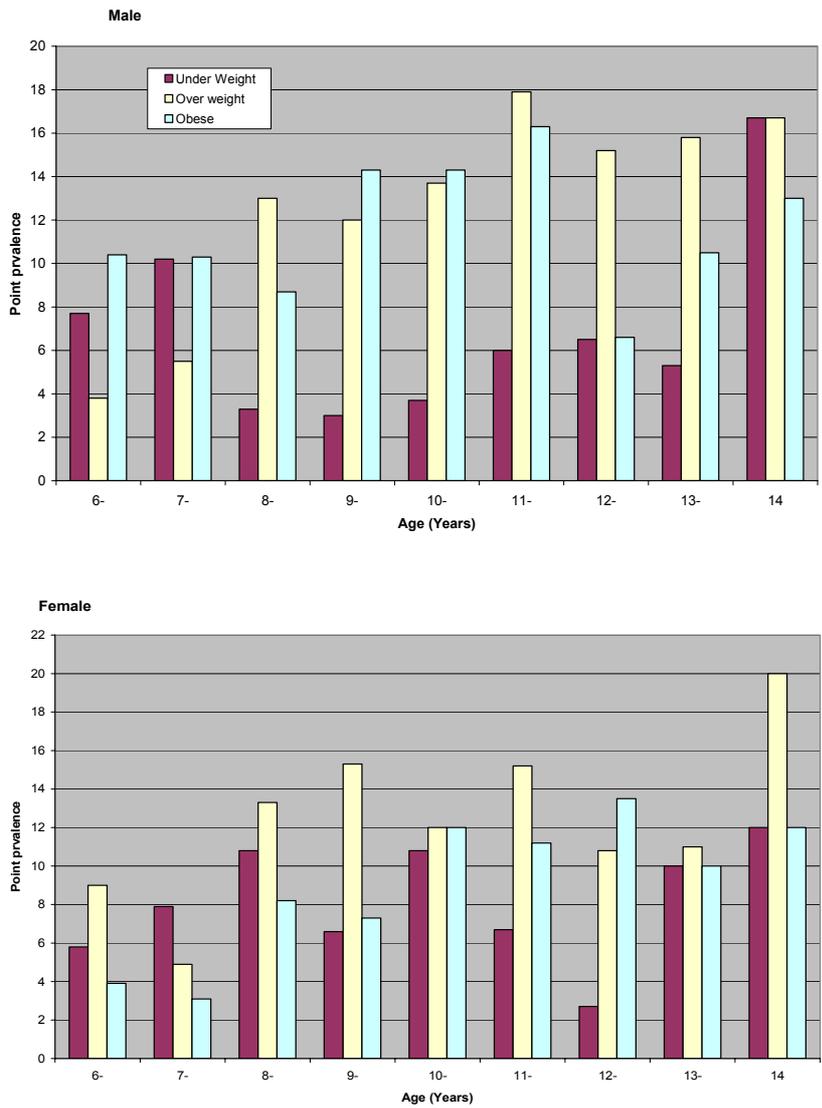


Figure (1) Point prevalence of underweight, overweight, and obesity according to age and gender, Mosul 2007. (NB. Third columns are the obese).

Table (1) Classification of the study population according to BMI for age CDC standards Mosul 2007

BMI	Male		Female		Total	
	No.	%	No.	%	No.	%
Under weight	56	5.5	84	8	140	6.8
Normal	723	71.6	758	72.5	1481	72.1
Over weight	112	11.1	121	11.6	233	11.3
Obese	119	11.8	83	7.9	202	9.8
Total	1010	100	1046	100	2056	100

Table (2) Watching TV (hours/day) among study population by gender and BMI for age. Mosul, 2007

Gender	BMI for age					
	Normal			Over weight and obese		
	TV watching			TV watching		
	<3h\	>=3h\	Total	<3h\	>=3h\	Total
Male	381 (61.1)	342 (48.9)	723 (100)	70 (30.3)	161 (69.7)	231 (100)
Female	383 (48.8)	402 (51.2)	785 (100)	45 (22.1)	159 (77.9)	204 (100)
Total	764 (50.7)	744 (49.3)	1508 (100)	115 (26.4)	320 (73.6)	435 (100)

$X^2=26.15$ $P<0.001$ d.f. = 1 Odds ratio =2.85

Table (3) Dietary habits of the study population by gender and BMI for age. Mosul, 2007

Gender	BMI for age					
	Normal			Over weight and obese		
	No. of meals/day			No. of meals/day		
	≤ 3\ day	> 3\ day	Total	≤ 3\ day	> 3\ day	Total
Male	499 (69)	224 (31)	723 (100)	138 (59.7)	93 (40.3)	231 (100)
Female	471 (60)	314 (40)	785 (100)	105 (51.5)	99 (48.5)	204 (100)
Total	970 (64.3)	538 (35.7)	1508 (100)	243 (55.8)	192 (44.2)	435 (100)

$X^2=10.65$ d.f. =1 $P=0.001$ Odds ratio = 1.42

Discussion:

Most studies that aimed to determine the prevalence of childhood growth parameters used the cross sectional survey design. In this type of study the exposure and disease are assessed at the same time among a defined population⁽²⁰⁻²⁴⁾. It is considered the best study design for obtaining prevalence of a disease in a population; the main advantage of this design is that it is quick and inexpensive⁽²⁵⁾.

Longitudinal studies over the past century have shown growth in height and weight compared to previous generations. Children obesity is now a widespread medical problem in developed and many of the developing countries⁽²⁶⁾.

Regarding the point prevalence of under weight, a higher figure have been found in another study conducted in Mosul in 2006, the prevalence of underweight was 12.02%⁽²⁷⁾. On the other hand, a prevalence of 10.3% was observed in a study conducted in Baghdad in 2005⁽²⁸⁾. These differences might be due to some variations in the demographic and socioeconomic characteristics of the different study populations or differences in the sample size.

The prevalence of overweight was relatively similar to that reported by other studies conducted in Iraq, such as that carried out in Baghdad in 2005 which showed that the prevalence of overweight was 11.4%⁽²⁸⁾. Furthermore another study conducted in Mosul in 2005

observed a prevalence of 14.1%(20). Nevertheless a lower prevalence (6.94%) has been found in a study conducted in the same setting in 2006⁽²⁷⁾.

Regarding the prevalence of obesity, studies conducted in Egypt and Kuwait observed similar figures to that of the present study^(21,29). While two studies conducted in Iraq by Ghazala and Lafta found a lower prevalence of obesity (4.1% and 5.12% respectively) ^(27,28). A much higher prevalence of overweight and obesity (32.7%) was observed in Jordan⁽²⁴⁾, which might be due to increased used of electronic games and internet in addition to the change in dietary habits, which contributes to increase in body weight.

In the present study TV watching was found to be more prevalent in overweight and obese pupils than in normal weight children. The children are spending a long time in watching TV which leads to inactivity and little energy expenditure and at the same time encourage snacking.

Relatively similar results were observed in the study of Ghazala which was conducted in Mosul in 2006 which showed that about three quarters of obese children spend more than three hours daily in watching TV⁽²⁷⁾. A study carried out in USA showed that there was a significant decrease in weight in an intervention group who received a 6 months classroom curriculum to reduce TV use⁽³⁰⁾.

On the other hand, the prevalence of consumption of more than 3 meals per day was higher in overweight and obese children than normal which is another

factor that may lead to caloric overload and might lead to overweight. Similar results have been observed by the study of Ghazala in Mosul in 2006 ⁽²⁷⁾.

The management should not be limited towards controlling food intake only but needs to be family based and focus on limiting the hours spent in watching TV on one hand and encouraging physical exercise as part of daily routine on the other hand⁽³¹⁾. It is highly recommended to disseminate the nutrition education via schools and mass media and encourage children to practice more exercise through an effective systems and programs in the schools.

Conclusions

From the results of the study, one can conclude that the prevalence of overweight and obesity is considerably high in children age 6-14 years of age in Mosul (11.3% and 9.8% respectively). Obesity was found to be more prevalent in males. On the other hand underweight is more prevalent in females. Long duration of TV watching, and consumption of more than 3 meals per day were found to be more frequent in overweight and obese children.

Recommendations

It is recommended to conduct further studies to determine the exact risk factors for overweight. On the other hand, health education about the important causes and complications of obesity is needed. In addition initiation of school programs to encourage more physical exercise among students is highly recommended.

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