Prevalence of Overweight and Obesity among Public Primary School Children in Basrah City

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Abstract:
Background: Prevalence of obesity among children is increasing in both developed and developing countries, but at very different speeds and in different patterns.
Objective: to study the extent of the problem of overweight/obesity among public primary school children in Basrah city in the southern part of Iraq.
Methods: descriptive cross-sectional study conducted on a sample of pupils who attended public schools during the first school term (between the 1st of December 2010 and 31st of January 2011). A total of 1466 pupils were included in the study, 737 males and 729 females. The Body Mass Index was used as indicator for overweight/obesity.
Results: The study found that the prevalence of overweight / obesity among primary school children in Basrah city was 24.1% (13.6% were overweight and 10.5% were obese). The prevalence was nearly the same for males and females; however, it consistently increased with the increase in child's age. The study also found that the prevalence of overweight/obesity among primary school children in Basrah city was directly proportional to socioeconomic status (SES) of their families. This was demonstrated by the consistent increase in the prevalence with the increase in parental education, and the increase in family per-capita income. In addition, the prevalence of overweight/obesity was higher among children whose fathers were involved in professional job, and among children of working mothers.
Conclusion: the prevalence of overweight and obesity is relatively high among children in Basrah city.
Key words: obesity, overweight, school children, Basrah.

Introduction:

Obesity and overweight are defined by WHO as "abnormal or excessive fat accumulation that presents a risk to health". [1]

Obesity is a serious health problem worldwide [2-6]. The prevalence of obesity towards the end of the 20th century had arisen so rapidly that the World Health Organization (WHO) had described it as a 'global epidemic'. [6] The prevalence of obesity among children is increasing in both developed and developing countries, but at very different speeds and in different patterns. [7] The rapid global increase in obesity included children of all ages. [8]

Childhood obesity is one of the most serious public health challenges of the 21st century. It has a considerable impact on children's health in the future. Overweight children are likely to become obese adults. They are more likely than non-overweight children to develop diabetes and cardiovascular diseases at a younger age, which in turn are associated with a higher chance of premature death and disability.[5] Obesity increases morbidity of chronic diseases such as cardiovascular disease, type 2 diabetes, hypertension, dyslipidemia, osteoarthritis, reproductive malfunction and some kinds of cancers.[9,10] Globally, 44% of diabetes, 23% of ischaemic heart disease and 7–41% of certain cancers are attributable to overweight and obesity.[3,5] Therefore, the present study was carried out to study the extent of the problem of overweight/ obesity among public primary school children in Basrah city in the southern part of Iraq.

Methods:

A descriptive cross-sectional study was conducted in Basrah city center. The study was conducted on a sample of pupils who attended public primary schools during the first school term (between the 1st of December 2010 and 31st of January 2011).

A multistage stratified random sampling method was adopted to select the sample for the present study. The sample involved 8 primary schools, including 4 primary schools for boys and 4 schools for girls. All the pupils in class A in the chosen schools were included. The sample size was estimated according to the following equation: [11]

$$n = \frac{1.96^2 X (1-p)}{p X \varepsilon^2}$$

Where:

n **:** sample size.

1.96^2: is statistical parameter corresponding to the confidence level of 95%. ([11])

p**:** is the expected prevalence (6%). [12]

ε **:** Relative precision = 0.2. [11]

So the total sample size required according to the equation was **1505** pupils. The total number of pupils eligible for the study in the eight selected schools was **1501** pupils which are very close to the required sample size.

The data relevant to the study purpose were obtained through a special questionnaire form designed for the purpose of the study.

The questionnaire has two sections; the first section was filled in the classroom by one of the authors. It included personal information: name, grade, gender, date of birth, in addition to anthropometric measurements. The second section was filled by the parents and it included the following information: family income, parental occupation, and education.

A total of **1501** questionnaires were distributed to the selected pupils in the chosen schools.

Only **1472** questionnaires were returned. In addition six forms were excluded because they were returned unfilled by the parents, leaving a total of **1466** pupils to be included in the study (729 girls and 737 boys).

The age of the pupils involved in the study ranged between 6 and15 years.

Weight was measured with a well-calibrated digital scale (Seca type).

All boys and girls were wearing minimal clothing and were barefooted. Weight was measured in kilograms with an accepted error of 0.1 kg. Height was measured in centimeters with a suitable plastic tape meter scale, fixed on the wall (Seca type), with an accepted error of 0.1 cm.

The body mass index (BMI= Quetelet's index) was estimated from the equation: BMI=WT (kg)/HT^2 (m^2). [13, 14] Overweight and obesity were determined by international cut off points (2007 WHO references). [15, 16]

The data were analyzed using the Statistical Package for the Social Sciences (SPSS) version 17. Significance was tested using Chi-squared test.

Results:

Prevalence of overweight and obesity

The overall prevalence of overweight and obesity in the study sample was 24.1% (13.6% were overweight, 8.1% were obese and 2.4% were severely obese).

Table 1 the prevalence rates of overweight and obesity were nearly similar for girls and boys (14% & 10.2% of boys compared to 13.2% and 10.8% of girls were overweight and obese respectively).

Table 2 However, a consistent increase in the prevalence of overweight/obesity with the increase in age was observed. The association between body weight categories and age was statistically significant (P=0.000). Table 3.

The prevalence of overweight/obesity significantly increased with the increase in parental education (P=0.017 and P=0.000 for fathers' and mothers' education respectively). Table 4.

Similarly, mother's employment and father's occupation were significantly associated with pupils' BMI (P=0.000 and P=0.024 respectively). Children of working mothers and those of fathers involved in professional job showed higher prevalence of overweight/obesity. Table 5. A significant positive association was also found between monthly per-capita income and BMI (P=0.032). Table 6.

Table (1): Prevalence of overweight and obesity among public primary school children in Basrah

Nutritional status	**No**	**%**
Underweight (<−1 SD)	314	21.4
Normal (±1 SD)	799	54.5
Overweight(> + 1SD)	199	**13.6**
Obese(> + 2SD)	119	**8.1**
Severe Obesity(> + 3SD)	35	**2.4**
Total	**1466**	**100.0**

Table (2): Prevalence of overweight and obesity according pupils' gender

Nutritional status	**Male**	**Female**	**Total**
	No. (%)	**No. (%)**	
Underweight (<−1 SD)	166 (22.5%)	148 (20.3%)	314 (21.4%)
Normal (±1 SD)	393 (53.3%)	406 (55.7%)	799 (54.5%)
Overweight (> + 1SD)	103 (14.0%)	96 (13.2%)	199 (13.6%)
Obese (> +2SD)	75 (10.2%)	79 (10.8%)	154 (10.5%)
Total	**737 (100.0%)**	**729 (100.0%)**	**1466 (100.0%)**

χ^2 = 1.550 df =3 P= 0.671

Table (3): Prevalence of overweight/obesity according to pupils' age

Age	**BMI /No. (%)**			**Total**
	Underweight <−1 SD	**Normal ±1 SD**	**Overweight and Obese > +2SD**	
≤ 8 years	82 (18.4%)	284 (63.8%)	79 (17.8%)	445 (100.0%)
9-10 years	118 (23.7%)	265 (53.2%)	115 (23.1%)	498 (100.0%)
≥ 11 years	114 (21.8%)	250 (47.8%)	159 (30.4%)	523 (100.0%)
Total	**314 (21.4%)**	**799 (54.5%)**	**353 (24.1%)**	**1466 (100.0%)**
χ^2 = 30.929 df =4 P=0.000				

Table (4): Prevalence of overweight/obesity according to parents' education

Parents' education	BMI /no. (%)			Total
	Underweight <−1 SD	Normal ±1SD	Overweight and Obese > +1 SD	
1.Father's education				
Primary or less	76 (24.1%)	179 (56.8%)	60 (19.1%)	315 (100.0%)
Intermediate and Secondary	137 (22.2%)	340 (55.1%)	140 (22.7%)	617 (100.0%)
Higher education	101 (18.9%)	280 (52.4%)	153 (28.7%)	534 (100.0%)
Total	**314 (21.4%)**	**799 (54.5%)**	**353 (24.1%)**	**1466 (100.0%)**
χ^2 =12.036 df= 4 P=0.017				
2. Mother's education				
Primary and Less	124 (25.2%)	270 (54.9%)	98 (19.9%)	492 (100.0%)
Intermediate and Secondary	145 (22.1%)	355 (54.0%)	157 (23.9%)	657 (100.0%)
Higher education	45 (14.2%)	174 (54.9%)	98 (30.9%)	317 (100.0%)
Total	**314 (21.4%)**	**799 (54.5%)**	**353 (24.1%)**	**1466 (100.0%)**
χ^2 =20.887 df= 4 P=0.000				

Table (5): Prevalence of overweight/obesity according to Mother's employment and Father's occupation

Parents' occupation	BMI /no. (%)			Total
	Underweight <−1 SD	Normal ±1 SD	Overweight and obese > +1 SD	
1. Mother's employment				
Housewife	286 (23.1%)	672 (54.3%)	279 (22.6%)	1237 (100.0%)
Employed	28 (12.2%)	127 (55.5%)	74 (32.3%)	229 (100.0%)
Total	**314 (21.4%)**	**799 (54.5%)**	**353 (24.1%)**	**1466 (100.0%)**
χ^2 =18.4 df= 2 P= 0.000				
2. Father's occupation				
Professional	17 (13.7%)	61 (49.2%)	46 (37.1%)	124 (100.0%)
Governmental employee	125 (22.7%)	300 (54.4%)	126 (22.9%)	551 (100.0%)
Self employed	156 (22.03%)	391 (55.23%)	161 (22.74%)	708 (100.0%)
Others	16 (19.3%)	47 (56.6%)	20 (24.1%)	83 (100.0%)
Total	**314 (21.4%)**	**799 (54.5%)**	**353 (24.1%)**	**1466 (100.0%)**
χ^2 =14.525 df= 6 P=0.024				

Table (6): Prevalence of overweight/obesity according to monthly family per-capita income

Per-capita income(Iraqi Dinars)	BMI /no. (%)			Total
	Underweight <−1 SD	Normal ±1 SD	Overweight and Obese >+1 SD	
< 50000	56 (25.1%)	120 (53.8%)	47 (21.1%)	223 (100.0%)
50000 <100000	83 (23.5%)	190 (53.8%)	80 (22.7%)	353 (100.0%)
100000 <150000	41 (17.08%)	142 (59.17%)	57 (23.75%)	240 (100.0%)
≥ 150000	37 (18.4%)	99 (49.3%)	65 (32.3%)	201 (100.0%)
Total	**217 (21.3%)**	**551 (54.2%)**	**249 (24.5%)**	**1017 (100.0%)**
χ^2 =13.785 df= 6 P=0.032				

* Family per-capita income for 449 was missing.

Discussion:

Childhood obesity is a serious public health problem with a rapidly increasing prevalence worldwide. In Basrah previous studies suggested that the prevalence of childhood overweight and obesity has markedly increased.[17] This was confirmed by the results of the present study which found that the overall prevalence of overweight and obesity among primary school children was 24.1% (13.6% overweight and 10.5% obese). On the other

hand, although the prevalence of underweight was slightly lower than that of overweight/obesity, it was still relatively high at 21.4%. The higher prevalence of overweight /obesity compared to that of underweight, may suggest that Basrah is in a transitional state of increasing childhood overweight and obesity. This is similar to what is happening in countries of the Eastern Mediterranean Region due to urbanization and to the changes in the lifestyle in recent years. [18]

Although the prevalence of overweight and obesity among primary school children in Basrah was relatively high , it is still lower than that reported for several neighboring countries like Kuwait 45.3% (30.7% were overweight and 14.6% were obese)[19], Iran 29% (21.1% were overweight and 7.9% were obese)[20], Kingdom of Saudi Arabia, 45% (18.0% were overweight and 27.0% were obese).[21] On the other hand the prevalence of overweight and obesity in the present study was similar to or higher than that reported for other neighbouring and Arab countries like in Irbid, in the north of Jordan, 25.0%(19.4% were overweight and 5.6% were obese)[22], Nablus 19.84% (13.42% were overweight and 6.42% were obese)[23], and Qatar 9.5% (6% were overweight and 3.5% were obese).[24]

The differences seen in the results of the different studies may be attributed partially to the effect of genetic, lifestyle and environmental factors. In addition, part of the differences may be due to the variations in the age groups included, study methods and definitions of obesity and overweight across various studies.

Some studies had shown that boys have a higher rate of obesity than girls.[23,25,26] Others showed that female gender was a risk factor for obesity with a higher prevalence of obesity among females compared to males.[19-22,24] In the present study the prevalence of overweight and obesity was the same among boys and girls. This result was in agreement with that reported in another Iraqi study and with an Italian study. Both studies showed no sex difference in prevalence of overweight and obesity. [12, 27]

It has been suggested that the prevalence of overweight and obesity increases with age. This may give the impression that obesity is a progressing phenomenon that once present, tends to increase with time. [28] The present study demonstrated that the prevalence of overweight and obesity increased with age. It increased from 17.8% at age 8 years and less reaching 30.4% at the age of 11 years and above. These results are consistent with those reported in another Iraqi study[12] and in several other studies in both the developed[28,29], and in the neighboring countries.[21,22,30] In a study in the United Kingdom the prevalence of obesity almost doubled in the oldest age, compared with youngest one.[29] However, the results of Nablus study[23] and those of a Costa Rican study[26] found the highest prevalence was in younger age group(7-9 years).

Socioeconomic status (SES) has been described as inversely related to obesity in many studies.[31-33] Several studies have found that lower educational level of parents[8,12,27] and non working parents are associated with greater risk of overweight and obesity[30]. Furthermore, family income is inversely proportional to child's BMI in developed countries and directly proportional in developing ones. [7, 8, 34] Low family incomes and nonworking parents were found to be associated with greater calorie intake. [30]

The present study showed a consistent increase in prevalence of overweight and obesity with the increase in parental education, a result which is consistent with the results of the Nablus study [23] and with that of a Polish study [35]. Both studies showed a significant correlation between children's obesity and mother's level of education. While a study involving 1458 school girls in Wroclaw, Poland indicated that overweight and obesity had no significant association with educational level of the parents. [36]

The present study showed that children of working mothers and those of fathers involved in professional job showed higher prevalence of overweight and obesity. This result is similar to the results of a study conducted in Al-Riyadh in which children of working mothers were most likely to be obese compared to those whose mother's were housewives.[21]

On the other hand, in a Kuwaiti study, an unemployed father was found to be significantly associated with higher risk of overweight and obesity.[30] While the results of Nablus study, mother's profession was not having significant correlation with student's BMI.[23]

With respect to family income, in the present study the prevalence of overweight and obesity has increased with the increase in family percapita income. These results are in agreement with the results of a Jordanian study which found that the total monthly family income was significantly associated with increased prevalence of overweight and obesity. [22]

While in Nablus study, family monthly income was not having significant correlation with student's BMI.[23] On the other hand, in Al-Riyadh study, there was a negative correlation between monthly family income and the mean caloric intake of the subjects. [21]

In conclusion, based on the results of the present study, we can conclude that the prevalence of overweight and obesity was relatively high among school children in Basrah city.

Therefore, there is an urgent need to spread awareness about obesity, its consequences, and ways and means of prevention especially among school children. In addition, nutrition and physical education programmes in schools are recommended

to promote healthy life styles and healthy dietary habits among school children and their families. In addition, further studies are needed to find out the causes of obesity in Basrah.

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