Research Paper **Medical SCience**

Prevalence of Overweight and Obesity Among First Year Primary School Children In Sulaymaniyah City/Iraq

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ABSTRACT *Obesity is one of the major health problems nowadays in the world. No data on prevalence of childhood obesity are found in the Sulaymaniyah city.*

A cross-sectional descriptive study on 1st stage primary school children in 31 primary schools of Sulaymaniyah city was done; measuring height and weight with socio-demographic data were collected from 1624 pupils. Both World Health Organization (WHO) and International Obesity Task Force (IOTF) were used to find the prevalence of obesity and overweight among them, association between socio-demographic characteristic including child sequencing with obesity were found.

Mean age of participant was 6.27 years, obesity and overweight prevalence among first year primary school children in Sulaymaniyah city is slightly less than other cities of Iraq and neighboring countries , as prevalence of obesity by WHO and IOTF was 17.4% and 14.8%, respectively. With the increase child number and sequence in the family the prevalence of obesity decreases.

KEYWORDS : Obesity, Prevalence, primary school, IOTF

Introduction

Obesity is a serious health problem worldwide [1,2]. Overweight and obesity are linked to more deaths worldwide than under-weight. For example 65% of the world's population live in countries where over-weight and obesity kill more people than underweight [3].

Obesity and overweight are defined by World Health Organization (WHO) as ''abnormal or excessive fat accumulation that presents a risk to health'' [4]. It is a serious health problem worldwide [1,2,5,6]. The prevalence of obesity towards the end of the 20th century had arisen so rapidly that the 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].

Obesity during childhood has important short-term medical consequences, including adverse effects on growth, blood pressure, blood lipids, and glucose metabolism [8,9]. Other complications include respiratory conditions, such as asthma [10].

Furthermore, overweight and obese children are also significantly more likely to become overweight adults [11]. The long-term medical consequences of childhood obesity are also substantial [12,13]. Childhood obesity also has been shown to have important short and long-term psychosocial consequences, such as negative self-image, decreased self-esteem, eating disorders, and lower health-related quality of life [14,15].

Childhood obesity is of higher standard among high socio-economic class families [16-19]. The relationship between socioeconomic status and obesity among children varies by race/ethnicity and age [20,21]. While there is widespread acknowledgement that the etiology of childhood obesity includes a complex interaction of many biological and social factors [22,23]. Measuring students' height, weight, and Body Mass Index (BMI) in schools is an important approach to identify the prevalence of overweight and obesity and then try to reduce it [24-26].

BMI has been recommended by many authors for evaluation of childhood obesity [27] and The American Academy of Pediatrics (AAP) recommend annual assessments of BMI as a strategy for preventing and combating childhood obesity [28]. International obesity task force (IOTF) and center of disease control and prevention (CDC) have defined reference values for different parts of the world [29,30].

The worldwide prevalence of childhood overweight and obesity increased from 4.2% (95% CI: 3.2%, 5.2%) in 1990 to 6.7% (95% CI: 5.6%, 7.7%) in 2010. This trend is expected to reach 9.1% (95% CI: 7.3%, 10.9%), or 60 million, in 2020 [31].

Few studies about prevalence of obesity had done in Iraq, which found that the prevalence of overweight and obesity 32.9% in Baghdad city [19], and 24.1% in Basrah city [18].

The aims of the study is to know the extent of the problem of overweight and obesity among public primary school children in Sulaymaniyah city at the northern part of Iraq and to explore the association between socio-demographic status and obesity.

Method:

Cross-sectional quantitative descriptive study of 1624 pupils from September 2014 till January 2015 was performed. The sample included first stage primary school children upon admission to school. The sample was selected from the target schools by stratified sampling method, the sample size was calculated by Statcalc in Epi Info program (it was nearly 1700 participant) the response rate was 95.5%. A list of all primary schools in Sulaymaniyah Governorate was obtained from School health department in Department of prevention, and then determined sample was selected, with exclusion of Arabic schools & Arabic student to find the prevalence in the Kurdish nation, only.

The pupil data (Height & weight measurement, with socio-demographic states and past medical and surgical history) were received during admitting to school.The needed Excel sheet was designed to collect information from the registered data at target school by direct entering needed information done by researchers.

The children with history of chronic disease were excluded from the study.

The proposal was approved by the ethics committee at Faculty of Medical Science, University of Sulaimani and formal consent were obtained from legally authorized representative.

Measuring variables and the tools for measurement
Socio-demographic variables, pervious medical history, with recorded height and weight were used as studied variables.

Wall mounted height measurement Stadiometer(seca) was used for height measurement & the weight scale (Seca) was used in the health centers for weight measurement**.** Both height & weight were measured by the health center nurses belong to the school, Height and weight was measured without shoes and with thin clothing on.

Statistical analysis
The data was transported into Statistical Package for the Social Sciences (SPSS version21.0) package software program for statistical analysis. The prevalence of obesity and overweight were found using both WHO [32] by percentile and z-score, and IOTF [33] definitions. For WHO percentile, more than 85% was regarded as overweight; more than 97% was regarded as obese.

Descriptive statistics (numbers, percentage, mean, standard deviation…) were calculated for all variables, as well as analytical statistics were conducted to find the relations between variables; by using Chi-square, and analysis of variance (ANOVA). A p-value < 0.05 was considered as significant.

Results
The study included a sample of 1624 first stage primary school children, 730 (45%) girls and 894(55%) boys. The mean age was (6.27 ± 0.29) years.

Table 1 shows mean(age, weight, height, & BMI) of the studied group.

Table 1. Age, Height, weight, and BMI distribution of studied child.

Variables	Mean	S.D
Family number	4.92	1.30
Height	116.85	27.86
Weight	22.73	55.48
BMI	15.45	3.00
Age (years)	6.27	0.29

S.D: standard deviation

The Socio-demographic characteristics of studied groups were shown in Table 2, the parents' educational level were mostly below the university education, and had low economic state.

**Table 2. Socio-demographic characteristic of studied groups**

Socio-demographic characteristics	Frequencies	Percentages
Gender		
Female	730	45.0
Male	894	55.0
Total	1624	100.0
Father education		
Illiterate	192	12.1
Primary	552	34.7
Secondary	569	35.8
University	234	14.7
Higher education	42	2.6
Total	1589	100.0
Mother education		
Illiterate	308	19.4
Primary	527	33.1
Secondary	503	31.6
University	227	14.3
Higher education	25	1.6
Total	1590	100.0
Monthly income		
Low	1129	87.2
Medium	143	11.0
High	23	1.8
Total	1295	100.0

The prevalence of both overweight & obesity according to WHO and IOTF definitions were17.4% and 14.8%, respectively. The prevalence of obesity according to WHO z-score was significantly higher than that with IOTF definition (p value= <0.001). (Table 3)

Table 3. Prevalence of overweight and obesity by WHO and IOTF

Measurements	Frequencies	Percentages
WHO (z-score)		
Normal	1084	67.2
Overweight	147	9.1
Obese	133	8.3
Under weight	177	11.0
Sever thin	71	4.4
Total	1612	100.0
IOTF		
Thinness grade 3	36	2.2
Thinness grade 2	82	5.1
Thinness grade 1	263	16.3
Normal	1006	62.3
Overweight	137	8.5
Obesity	57	3.5
Morbid obesity	34	2.1
Total	1615	100.0

According to WHO & IOTF cut-off values obesity and overweight prevalence were decreased with increase in number of sibling and family size. The prevalence was higher among nearly 2nd child sequence in the family and with increase in the number of siblings the prevalence was decreased and prevalence of underweight increased(p value= 0.031). The association of childhood obesity with child sequence in the family was demonstrated in Figure 1.
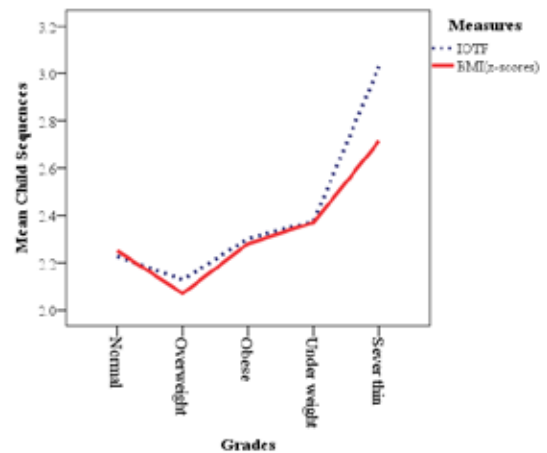
Figure 1. IOTF and WHO z-score measurements in relation with child sequence number in the family

Overall, general overweight (including obesity) was more prevalent among females compared with males according to IOTF tool, but the difference statistically insignificant (P value=0.054). No gender difference in prevalence of overweight (including obesity) were found using WHO definition, (p value =<0.001) as shown in Table 4.

Generally there was not significant association between parent education and economic status with prevalence of overweight and obesity (Table 4).

Table 4. Gender distribution according to the WHO and IOTF measures

Measures	Gender	
	Female N(%)	Male N(%)
WHO (z-scores)		
Normal	567(78.5)	517(58.1)
Overweight	68(9.4)	79(8.9)
Obese	58(8.0)	75(8.4)
Under weight	21(2.9)	156(17.5)
Sever thin	8(1.1)	63(7.1)

BMI(Percentiles)		
Less than 3rd	35(4.9)	24(2.7)
3-15	106(14.9)	56(6.3)
15-50	258(36.3)	456(51.4)
50-85	191(26.9)	198(22.3)
85-97	54(7.6)	86(9.7)
More than 97	67(9.4)	68(7.7)
IOTF		
Thinness grade 3	18(2.5)	18(2.0)
Thinness grade 2	26(3.6)	56(6.3)
Thinness grade 1	109(15.0)	154(17.3)
Normal	465(64.1)	541(60.8)
Overweight	59(8.1)	78(8.8)
Obesity	33(4.6)	24(2.7)
Morbid obesity	15(2.1)	19(2.1)

Discussion

Prevalence of overweight and obesity among childhood was studied in different cities of Iraq, but the present study is the first study on the prevalence of obesity in Sulaymaniyah city children (among Kurdish nation).

Using the WHO(z-score) cut-off, the prevalence of overweight and obesity among the six years old children in this study was (17.4%, 9.1% and 8.3% respectively).

Nearly the same prevalence result 17.8%(13.6:10.5%) among children of age less than eight years was found in the study done in Basrah city [18] and 17.3% in the study of N. Amidu et al [34] at Tamale Metropolis.

Higher prevalence of overweight and obesity (32%, 16.7%:15.3%) was found in Baghdad city (the capital of Iraq) among 7 years old primary school children [19], but he used different growth chart (CDC percentile) in his study.

Using IOTF values, overweight and obesity were 8.5% and 5.6% (8.1% & 6.7% in girls and 8.8% & 6.7% in boys) in our study, the result was higher than what was found in Kurdish ethnicity of iran [35] in which the prevalence of overweight & obesity was 5%, 2.5% in girls & 4.4, 1.5% in boys, respectively. Although they used the same ethnic group but their geographical area was different and the mean age was slightly higher (7 years old).

Although a study at Geneva [36] used the same age group, lower prevalence found, but they used different growth chart for evaluation of obesity and overweight in their study.

Our obesity prevalence was lower than what was found in neighboring country of Jordan (In Irbid, in the north of Jordan)which was 25.0% (19.4% overweight: 5.6% obese) [37], But our result was higher than a study done in Qatar [38] in which prevalence was 9.5% (6% overweight: 3.5% obese).

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.

Comparing both method, the prevalence of overweight and obesity according to WHO z-score was higher than the IOTF cut-off values with the difference of 0.6% for overweight and 2.5% for obesity. This goes in consistence with the previous studies [17,39,40] which found that the use of IOTF typically results in lower prevalence estimate than other standards.

No significant gender difference in obesity prevalence was found in this study, like several previous studies[18,41-43].In some studies girls showed a higher prevalence of overweight and obesity [36].They stated that: it might be due to the fact that boys participate in outdoor physical activities & sports much more than girls. While boys showed significantly higher BMI in other studies [19,35].

According to WHO & IOTF cut-off values there was higher prevalence of obesity and overweight among 2nd child in the family but with increase in the child sequence number and number of siblings the prevalence decreased. This also found in some other studies. In an Iraqi study which includes primary school children age 7 to 13 years,

significant associations between overweight, age, number and order of the children were reported [41].

In the study that was done in Saudi School children[44] they observed significant association between students' obesity and lower family size, also. While in a study done in Turkey, the number of siblings was identified as an obesity-related risk factor.

There was no significant association of parental education with obesity in this study.While previous studies described significant association between high parental educations with obesity[18,46].Health education is poor in our country, regardless of the level of education of the parents, this explain insignificant association of education with obesity in our study.

We also found no significant association with family income, in concordance to the study of Suadad 2014[19]. In other studies[17,18,37,43,46] higher family income was directly associated with obesity. While in some studies to [7,47] family income inversely proportional to child's BMI in developed countries and directly proportional in developing ones.

Conclusion

Obesity and overweight prevalence in first year primary school children in Sulaymaniyah city is slightly less than other cities of Iraq and around the world. There is significant difference in the finding prevalence of obesity by using different growth charts, the WHO z-score definition of obesity shows higher prevalence of overweight and obesity than IOTF cut-offs. Overall with the increase child number and sequence the prevalence of obesity decreased and prevalence of underweight increased.

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