

Prevalence of Obesity in Primary School Children in Kirkuk

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Abstract

Introduction: obesity and overweight represent a public health problem.

Aim: To estimate the prevalence of overweight and obesity among primary school children in Kirkuk, aged from 6 to 12 years, and to identify any variation as per age , gender and associated factors.

Methods: It's a cross-sectional study that was included 150 primary school children. The demographic characteristics were gathered using a questionnaire. The sample of anthropometric variables includes body height, body weight and body mass index, as well as nutrition status that were presented based on BMI standardized categories: underweight, normal weight, overweight, and obesity. The Statistical Package for Social Science (SPSS), version 20 was utilized for the purpose of statistical analysis of the data.

Result: The study shows that overweight was 25.3% while obesity was 28.7% , the underweight rate was 2.7% while the normal weight was 43.3%. The overweight and obesity was found in 57.8% in female students and was higher to that in male students (46.2%). Some risk factors show a significant association with overweight and obesity in our studied population.

Conclusion: The study shows a high rate of overweight and obesity in primary school children and a significant influence of some risk factors such as student class, crowding index, eating biscuits, computer use, milk and soft drinks consumption.

Keywords: Obesity, Children, Primary school children, BMI, Underweight, Overweight, Kirkuk.

1. Introduction

Obesity is recognized as a top public health issue, it is the 5th leading cause of death worldwide. World Health Organization (WHO) projected that 30% of death worldwide will be due to lifestyle diseases in 2030, which may, possibly, be controlled by suitable identification of the related risk factors along with behavioural strategies. Therefore, discovering and identifying obesity, as early as possible, is important [1]. The WHO defined obesity as an excessive or abnormal fat accumulation which may impair health, and stated that “the fundamental cause of obesity and overweight is an energy imbalance between calories consumed and calories expended” [2].

Obesity is frequently measured as a weight per height, considering gender, ethnicity and age; commonly, obesity is expressed by body mass index (BMI) for scientific purposes. The BMI is a well-defined and reliable marker to study obesity and its related diseases [3, 4]. The obesity guidelines and classification systems defined healthy weight, overweight, and obesity as BMI 18.5 - 24.9 kg/m², 25.0 - 29.9 kg/m², and ≥ 30 kg/m² respectively, in adult individuals; and for adolescents and children, the American Centers for Disease Control and Prevention body mass index-for-age percentile growth charts for girls and boys defined overweight as a body mass index ≥ 90 th percentile of standard weight, while the obesity is described as a body mass index >95 th percentile of standard weight [5].

Obesity is the state of positive energy balance leading to the interaction between genetic, environmental and behavioural factors [6]. Subsequent changes in lifestyle, economic growth, and urbanization are the most common and major factors leading to the rise of obesity epidemic prevalence's globally. Moreover, the rapid economic development and westernization of lifestyle in the middle east and Arabian countries, especially the Gulf region, were additional factors which worsened the epidemic of obesity in this region [7].

Obesity is usually resulting from excess energy consumption (i.e., dietary intake) compare with energy expenditure (the energy loss through physical and metabolic activity). The aetiology of obesity is extremely complex and can include economic, genetic, environmental, social, psychological, physiologic, along with political aspects which interact at different levels to promote the development of obesity [8].

The official reports indicated that the obesity prevalence among the Iraqi population is increasing, mostly since 2003. The 2005-2006 survey, conducted with the support of the WHO stepwise approach, was carried out in Iraq and revealed that the prevalence of overweight /obesity was 66.9% [9]. In Baghdad city, Al-Tawil and his coworkers [10] demonstrated that 37% were obese, and a further 39% were overweight among non-pregnant women attending the outpatient clinics. Whereas Mansour and his coworkers [11] carried out research in the southern Iraqi province of Basrah between 2003-2010, it reveal that 55.1% were obese and overweight. Additionally, in Baghdad, the obesity prevalence was 35.2% amongst female relatives of the primary care attendants [12]. The 2015 survey, established the prevalence of obesity was 33.9%, overweight was 31.8%, whilst obesity and overweight were 65.7% [13]. In 2017, in Erbil, a city in northern Iraq, the overall prevalence of obesity and overweight was 74,3% (40.9% obese and 33.4% overweight) [14].

Among samples of Iraqi college students at the University of Kerbala, AlGhabban et al. [15] revealed that the obesity and overweight prevalence's were 5.6% and 22.9% respectively; While Sahib et al. [16] reported that the total prevalence of obesity and overweight among the university students at Kerbala University was 83% and 62% respectively. Moreover, Abdulkareem et al. [17] found that the obesity and overweight prevalence among university students was 6.6% and 27.9% respectively. Additionally, at Wasit University 15% of the students were overweight and only 3.1% of them were obese [18].

The worldwide data indicate that the prevalence of overweight and obesity is higher among men than women in some regions [20]. Prior research has tended to either assess obesity regardless of gender or in females only; men's obesity has not been a common topic for research. Though the prevalence of obesity among men is increasing, also, males seem reluctant to contribute to weight-loss programs regardless of confirmed relationships between obesity with health-related disorders; Such attitude can reflect the general failure to identify gender issues regarding obesity [21]. In general, males are less concerned about their body weight than females, moreover, they lack nutrition knowledge [22].

Worldwide data reveals that 34% of men and 35% of women had overweight, however, the prevalence of obesity in men was 10%, in women 14% and 12% in both sexes [23]. Badran and Laher demonstrated that the obesity prevalence has risen at an alarming rate, in Arabic-speaking countries, and this seems more overwhelming in females [24]. In 2005, the WHO reported that the obesity prevalence for the Iraqi population was 8.3% for males and 19.1% for females [19]. Globally, obesity prevalence in adults is increasing, specifically among reproductive-aged women. Based on the Iraqi Ministry of Health report, obesity prevalence was 38.2% in reproductive-aged women in 2006 [9]. Additionally, in Baghdad between 1997 to 2007, the obesity prevalence among reproductive-aged women increased from 23.6% to 25% [10]. In 2008, a report by Al-Hilaly et al revealed that obesity affects nearly 30 % of the adult population, with a higher rate in women [25]. Another research was performed in Baghdad in 2009 on premenopausal and postmenopausal women to assess obesity prevalence. The research established that the obesity prevalence was 29.7% in premenopausal women and 36.5% in postmenopausal women [25]. Al-Ghabban demonstrated that overweight/obesity prevalence among Karbala University students was more common amongst male students (27.4%) in comparison with females (18.9 %) and there was no relationship between obesity and gender [15]. Thus this study was conducted to determine the prevalence rate in primary school children in Kirkuk.

Materials and methods

A cross-sectional prospective study was performed to study the obesity in a primary school children with age of 6 – 12 years. A sample was gathered from multiple schools in Baghdad Street. The sample size was calculated and the minimum required sample for the study was 150. Thus, the target population was 200 primary school children in order to get the proper sample population. The information collected using a specific questionnaire. Weight was measured with a well-calibrated digital scale. Weight was measured in kilograms

and height was measured in centimeters. The criteria for classification of overweight and obese as illustrated in Table 1.

Table 1. Definition of overweight and obesity according to body mass index [43]

Age (years)	BMI (overweight)		BMI (obesity)	
	Male	Female	Male	Female
7	17.9	17.8	20.6	20.5
8	18.4	18.3	21.6	21.6
9	19.1	19.1	22.8	22.8
10	19.8	19.9	24.0	24.1
11	20.6	20.7	25.1	25.4
12	21.2	21.7	26.0	26.7

Risk factors were assessed by means of a questionnaire that included specific questions. Type of feeding during infancy was recorded, including breast-feeding or bottle-feeding. Other questions assessed current dietary pattern (number of meals/ day), eating outside the house (school, restaurant), eating between meals, current pattern of physical activity (playing outside the house more than 2 hours /day), watching TV (more than 3 hours/day), working after school time, and the educational levels of the parents. The demographic characteristics of study population are shown in Table.2.

Table.2. Demographic characteristics of study population.

Variable		Number [percent]
Sex	Male	65 [43.33]
	Female	85 [56.67]
	Total	150 [100]
Mean age in year		9.05 ± 2.31
Age in years	6 and 7	51 [34]
	8	13 [8.7]
	9	16 [10.7]
	10	16 [10.7]
	11	17 [11.3]
	12	36 [24]

Results and discussion

Table-1- shows the frequency distribution of primary school students BMI according to age. The study indicated that underweight ranged from 0 to 7.7% and was not found in the age groups 10 and 11 years, while the higher rate was found in age of 8 years. The normal

weight range in the studied population was 7.7% (Age 8 years) to 64.7% (Age 11 years). While overweight was lower in children with age of 6 and 7 years (9.8%), while the highest rate (33.3%) in the age of 12 years.

The obese rate was higher in age of 8 years (69.2%) , followed by age group of 9 years (43.7%). The pattern of obesity was reduced with age increase, as reduced from 69.2% in age of 8 years to 11.11% in the age of 12 years. The overall underweight rate was 2.7% , while the normal rate was 36.7% , overweight was 20.7% and obesity in 40% of the studied population. Thus age influences the primary school children.

Comparison of the present study results with other studies is difficult due to variation in study design , sample size and cut-off values of BMI for group classification of overweight and obesity.[25-49] However, the rate of overweight and obesity as this study indicated was higher to that reported by others [34,36,37,41,42,44-49] in Iraqi population. The prevalence rate of overweight and obesity range was from 12% to 47.3% [25-49]. The underweight frequency rate was lower (2.7%) to that reported by Jassim et al [49] in Basrah (11.2%) primary school children.

Table. 2. Frequency distribution of primary school students BMI according to age:

Age in years	Underweight No.(%)	Normal weight No.(%)	Overweight No.(%)	Obese No.(%)	Total
6&7	1(2)	21 (41.2)	12 (23.5)	17 (33.3)	51
8	1(7.7)	1 (7.7)	2 (15.4)	9 (69.2)	13
9	1(6.3)	6 (37.5)	3 (18.7)	7(43.7)	16
10	0(0)	7 (43.7)	5 (31.3)	4 (25)	16
11	0(0)	11 (64.7)	4 (23.5)	2 (11.8)	17
12	1(2.8)	19 (52.8)	12 (33.3)	4 (11.11)	36
Total	4(2.7)	65 (43.3)	38 (25.3)	43 (28.7)	150

When the data analyzed on the sex strata, the results indicated that the overall prevalence rate of underweight was 7.3%, while the normal weight was in 44.7%, overweight and obese was found in 47% of the studied group. A findings that was consistent with analysis on age strata, Tables 2 and 3.

The underweight prevalence was more (10.6%) in female as compared to male (3.1%). Normal weight was higher in male (50.8%), while it was 40% in female. The overweight and obesity was found in 57.8% in female students, which was higher to the prevalence in male students (46.2%), Table.3. Thus the sex was with influence on the frequency distribution of overweight and obese in the studies population. This finding was in agreement with that reported by others [44, 46]. However, other studies not reveal a differences in prevalence of overweight and obese between male and female [34,47]. In contrast, two studies indicated a

higher rate of overweight and obese in male as compared to female [41,49]. Additionally, a systematic review and meta- analysis performed in Iran indicated that sex was significantly associated with the prevalence of overweight and obesity [50].

Table.3. Frequency distribution of primary school children BMI according to sex.

Sex	Underweight No. (%)	Normal weight No. (%)	Overweight No. (%)	Obese No. (%)	Total
Male	2 (3.1)	33 (50.8)	17 (26.2)	12 (20)	65
Female	9 (10.6)	34 (40)	23 (35.4)	19 (22.4)	85
Total	11 (7.3)	67 (44.7)	40 (26.7)	32 (21.3)	150

Table.4. Risk factors Bivariate analysis

Risk factor	X ²	P value
Sleeping time	76.2	0.0001
Student class	57.6	0.001
Crowding index	35.8	0.001
Drinks	22.5	0.012
Computer use	22.5	0.013
Biscuits	22.5	0.016
Milk	22.1	0.025
Walking to school	98.14	> 0.05
Breakfast	20.4	> 0.05
Lunch	11.29	> 0.05
Dinner	10.5	> 0.05
Fruits	20.6	> 0.05
Sweets	19.9	> 0.05
Physical activity	20.1	> 0.05
TV watch	21.5	> 0.05
Xbox use	20.9	> 0.05

In a Bivariate analysis, the present study indicated that student class, crowding index, eating biscuits, computer uses, milk and soft drinks consumption were significantly ($P= 0.025 - 0.001$) associated with prevalence of overweight and obesity, Table.4. While, dinner, lunch, breakfast, walking to school, fruits, sweets, physical activity, TV watch and Xbox use did not show a significant association. This none significant association may be attributed to sample size and accuracy of the information gathered in the questionnaire. Sleeping time demonstrated a highly ($P=0.0001$) significant association with overweight and obesity in our study population. Thus, lifestyle was associated with the prevalence of obesity in primary

school children [28,51]. The number of TV screen in house were positively associated with childhood obesity [52].

Different studies illustrated a variable findings and this may be attributed to differences in a study design, sample size included in the studies, target population, and method of BMI classification in children used in the studies and logistic arrangement. In the countries of the Gulf region, a systematic review shows that the obesity and overweight rate amongst 10–18 years age adolescents, which was greater than the rate in USA [26]. AL-Dabbagh & Mohammed [27] found in a study conducted in Duhok, Iraq, that the prevalence obesity was 7.9%, overweight was 8.3%. While the prevalence rate for Babil Governorate was lower than that for Duhok (6% and 1.3%) [28]. The rate of childhood obesity alone has been higher than that of 3 other studies performed in Iraq (4.1% in Mosul, 4.1% in Baghdad and 4.5% in Duhok) [29, 30, 31].

In 2014 in the Sulaimani governorate, the obesity prevalence was 11.3% and overweight was 20.6% [32]. While in 2016, school-aged obesity rate was 12.1%, and a rate of 15.2% as overweight [33]. The prevalence of overweight and obesity in Iraqi community during the period 2010 and 2011 was similar to that reported for Jordanian adolescents. Additionally, in Iraq, the prevalence rate of overweight and obesity was 24.1 % of children and the sex not significantly influences prevalence rate of overweight and obesity.[34]. Moreover, Subhi observed that 7.3 % of school students in Baghdad, aged between 6–12 years were obese [35].

Various studies were conducted in Iraq to measure the prevalence of childhood obesity among primary schoolchildren which reported a rapid increase in the prevalence of obesity and overweight. The prevalence of obesity increased with time and it was 25.6% in 2019 [36], however, previous study found obesity prevalence of 30.3 % in 2014 [37]. Differently, in 2005 Lafta and his team revealed that the prevalence of overweight was 12.4% and obesity was 4.1% (29). Between (2006-2007), the prevalence of obesity and overweight in Fawzi & Yassen's study was 9.8% and 11.3% respectively; the factors that determine these differences are physical inactivity, snacking, and consumption of fast foods [38]. Sex influence on obesity in Iraqi community varied between studies, for example, Khalid et al study, found that obesity more in boys, while others studies show that obesity prevalence rate was more in girls [29, 37, 38] . This could be related to males participating in sports more likely than females who tend towards a more sedentary lifestyle [39]. Whereas in Al-Nasiriya between 2015-2016 the percentages of obesity and overweight among children aged 6-60 months were almost equal for both females and males [40]. Studies conducted in other Iraqi Governorates reported an overweight of 15.4% and obesity rate of 13.3% in Ramadi city [41], while in Baquba city, the obesity prevalence rate was 9.4% and overweight prevalence rate of 14.3% [42].

The present study included a limitations such as: short time of study performance, unacceptability of school managers for research performance, students uncompliance, transport availability, and the major constrains is school managers acceptance and perception of research as a method for health care delivery improvement.

Conclusion.

The study shows a high rate of overweight and obesity in primary school children and significant influence of some risk factors such as: student class, crowding index, eating biscuits, computer uses, milk and soft drinks consumption.

Recommendations.

From the findings of the present study the following recommendation may be addressed:

1. High rate of overweight and obesity in the studies population clarify an alarm of public health problem that must be considered seriously by health care managers and Kirkuk Education Authority.
2. There a need to improve the primary health care management and care delivery, specifically, Health Education Programs and physical activity performed in schools.
3. It is difficult to generalized the study findings on the regional and national levels as the sample size is small in relation to primary school children, thus a large scale study is warranted.

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Ethical approval: The proposal for the study subjects was approved by the Ethical Committee of the Kirkuk University College of Medicine, and Kirkuk Education Authority. Confidentiality was used with each subject under the study. Informed consent was taken from each participant before his/her enrollment in the study.

Conflict of interest: We have no conflict of interest to declare.

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