

# Prevalence of and factors associated with overweight and obesity among a group of Iraqi women

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معدل انتشار زيادة الوزن والسمنة والعوامل المرافقة لها في مجموعة من النساء العراقيات  
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**الخلاصة:** قام الباحثون بدراسة معدل انتشار زيادة الوزن والسمنة والعوامل المرافقة لها، في 200 امرأة عراقية غير حامل (< 18 عاماً) واللاتي يُراجعن عيادتين خارجيتين للمرضى في بغداد. وتم سؤال النسوة بواسطة استبيان، كما تم احتساب مُنسب كتلة الجسم فيهن، وكذا النسبة بين الخصر والأرداف. فوجد أن 24٪ من السيدات فقط يتمتعن بوزن عادي، في حين تعاني 39٪ منهن من زيادة الوزن (مُنسب كتلة الجسم 25 – 29.9 كغ/م<sup>2</sup>)، كما تُعاني 25٪ منهن من السمنة (≤ 30 كغ/م<sup>2</sup>) و12٪ منهن من السمنة المرضية (≤ 40 كغ/م<sup>2</sup>) وبالرغم من أن النسبة بين الخصر والأرداف كانت سوية إلا أن متوسط محيط الخصر كان أعلى من السواء. أما العوامل التي ترافق السمنة وزيادة الوزن بنسبة يُعتدُّ بها فتشمل التقدم في العمر، وسوابق فتح البطن، ونمط اللباس (السريال) الذي يتم ارتداؤه داخل المنزل.

**ABSTRACT** We studied the prevalence and factors associated with overweight and obesity among 200 non-pregnant Iraqi women (> 18 years) attending 2 outpatient clinics in Baghdad. The women were interviewed using a questionnaire and had their body mass index (BMI) and waist-to-hip ratio (WHR) calculated. Only 24% of the women were normal weight: 39%, 25% and 12% were overweight (BMI 25–29.9 kg/m<sup>2</sup>), obese (≥ 30 kg/m<sup>2</sup>) and morbidly obese (≥ 40 kg/m<sup>2</sup>) respectively. While the mean WHR was normal, the mean waist circumference was higher than normal. Factors significantly associated with overweight and obesity were older age, history of previous laparotomy and type of clothing worn (gown) inside the home.

## Prévalence du surpoids et de l'obésité et facteurs associés dans un groupe de femmes iraqiennes

**RÉSUMÉ** Nous avons étudié la prévalence du surpoids et de l'obésité et les facteurs qui leur sont associés chez 200 femmes iraqiennes (> 18 ans) non gravides fréquentant 2 services de consultations externes à Bagdad. Ces femmes ont répondu à un questionnaire et l'indice de masse corporelle (IMC) et le rapport taille/hanches (RTH) ont été calculés. Seuls 24 % des femmes présentaient un poids normal, tandis que le surpoids (IMC 25-29,9 kg/m<sup>2</sup>), l'obésité (≥ 30 kg/m<sup>2</sup>) et l'obésité morbide (≥ 40 kg/m<sup>2</sup>) ont été respectivement identifiés chez 39 %, 25 % et 12 % des femmes. Tandis que le RTH moyen est apparu normal, le tour de taille moyen était supérieur à la normale. Les facteurs significativement associés au surpoids et à l'obésité étaient un âge avancé, des antécédents de laparotomie et le type de vêtement d'intérieur porté.

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## Introduction

Obesity is becoming a public health problem worldwide especially in recent years. For instance, globally, there are more than 1 billion overweight adults, at least 300 million of whom are obese [1,2]. The prevalence of excess weight (overweight and obesity) among United Kingdom (UK) adults in 1996 was 59% in men and 49% in women [3], while two-thirds of adults in the United States (US) in the year 2000 were overweight and 30.5% were obese [4].

In Iraq there is no national figure available, but 1 study carried out in Baghdad in 1997 showed that the prevalence of obesity was 23.16% in women aged 25 years old and above [5]. Figures from nearby countries show that the prevalence of obesity among women was 20.26% in Saudi Arabia [6] and 37.6% in Jordan [7].

The reasons behind this "epidemic" could be attributed, on the one hand, to modern lifestyles demonstrated by consumption of a diet rich in fatty foods and energy-dense foods, snacking and declining overall levels of physical activity [3,8]. On the other hand, familial and genetic predisposition, psychological factors, diseases (hypothyroidism, Cushing syndrome) and drugs (steroids, tricyclic antidepressants, sulfonylureas, valproate and contraceptives) may play a role in the etiology of obesity [3,4].

Overweight and obesity are known risk factors for diabetes, coronary heart disease, stroke, hypertension, gall bladder disease, osteoarthritis, sleep apnoea, some forms of cancer and infertility. Obesity is also associated with hyperlipidaemia, pregnancy complications, hirsutism, stress incontinence and increased surgical risk [3,4].

Because of the scarcity of studies and data on overweight and obesity in Iraq, this study aimed to measure the prevalence of overweight and obesity among a group of

Iraqi women attending outpatient clinics in Baghdad and to study some factors that might be associated with obesity.

## Methods

A cross-sectional study was carried out in the outpatient clinic of Al-Kadhimiya Teaching Hospital and in a private clinic involving women who were attending these clinics for different purposes (patients and their families). The study ran from 1 September 2002 until 28 February 2003. Inclusion criteria were women aged 18 years old and over. Exclusion criteria were pregnancy and current treatment for obesity.

A convenience sample of 200 women was selected and each woman was interviewed by one of the investigators using a questionnaire designed by the investigators. The questionnaire sought information on sociodemographic variables and other variables such as: cigarette smoking; eating habits (whether the family use only one dish for eating or each family member has his/her own dish and also if they used utensils for eating or ate by hand); number of cups/glasses of sweetened coffee and tea drunk per day (the type of sweetener was enquired about and all the women reported using sugar); type of clothing worn [trousers, skirts, *aba* (a loose outer garment worn by women over their clothes) or loose gown and whether inside or outside home], and exercise taken (defined as brisk walking at least half an hour per day or doing exercises inside the house for half an hour per day). A short medical and obstetric history was also recorded (presence of chronic disease, history of laparotomy and number of pregnancies and deliveries, whether normal vaginal delivery or by caesarean section). The women were weighed using a standard bathroom scale which was standardized

every week throughout the period of the study. Women were weighed barefoot and dressed in the lightest clothes possible; the weight of the clothes worn during weighing was estimated and deducted from the reading. The height of the women was measured with a standard tape measure fixed to the wall. They were measured barefoot with backs touching the wall. Body mass index (BMI) was calculated as weight (kg)/height<sup>2</sup> (m<sup>2</sup>) [4]. Individuals with a BMI of 25–29.9 kg/m<sup>2</sup> were considered overweight, individuals with a BMI of  $\geq 30$  kg/m<sup>2</sup> were considered obese, and those with a BMI of  $\geq 40$  kg/m<sup>2</sup> were categorized as morbidly obese [9]. The waist and hip circumferences were measured and the waist-to-hip ratio (WHR) was calculated. Women with WHR of  $\leq 0.8$  were considered healthy [10]. Waist circumference for Caucasian women of  $\geq 80$  cm has been found to be associated with increased risk of metabolic complications [11]. Waist circumference was measured by measuring the distance around the smallest area below the rib cage and above the umbilicus, and the hip circumference was measured by measuring the distance around the largest extension of the buttocks [9].

Data were entered into *Epi-Info*, version 6 and statistical analysis was done using *SPSS*, version 10.

## Results

The age of the women ranged from 18 to 67 years. Their mean age and standard deviation (SD) was 31.7 (SD 9.1) years and the median was 30 years. Regarding marital status, 85% of the women were married and 13.5% were single, 1% were divorced and 0.5% were widowed. The majority (82.0%) of women were housewives, 12.5% worked in sedentary jobs, 3.5% worked as manual workers and the rest (2.0%) were students.

Our results showed that 39%, 25% and 12% of the studied sample were overweight, obese and morbidly obese respectively; only around a quarter (24%) of the sample were of normal weight. This means that the BMI of 76% of the women was abnormal (Figure 1). The mean BMI (SD) was 28.7 (5.6) kg/m<sup>2</sup> and the median was 28.6 kg/m<sup>2</sup>. The mean (SD) for waist circumference was 86.5 (10.4) cm with a range of 56–118 cm. The median was also 86.5 cm. The mean

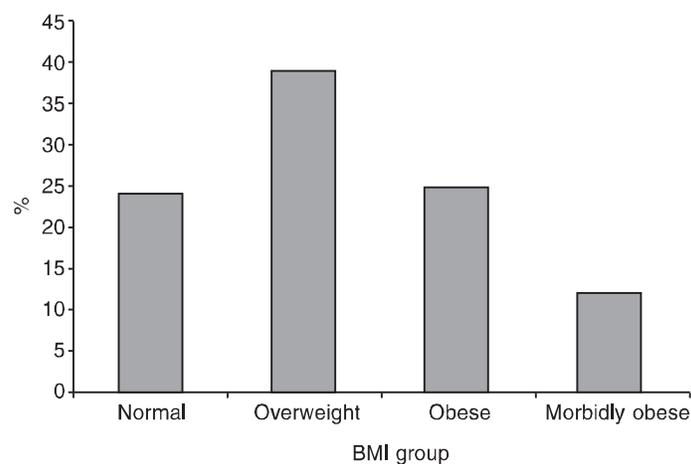


Figure 1 Distribution of the study sample by body mass index (BMI)

(SD) for WHR was 0.81 (0.06) and the median was 0.81 also.

Table 1 shows the relation between weight and age and indicates that the proportion of women with overweight, obesity, and morbid obesity increased with increasing age ( $P = 0.025$ ).

Table 2 summarizes the factors studied that might be associated with overweight and obesity. More obese women (84.4%) had a history of previous laparotomy compared with 70.7% among those without that history ( $P = 0.027$ ). The frequency of overweight and obesity was greater among women who wore gowns at home than those who wore pyjamas ( $P = 0.024$ ). Factors that were not found to be associated with overweight and obesity were smoking, using one dish for the whole family and using utensils to eat, lactation, tea and coffee consumption, type of clothing worn outside the home, presence of chronic diseases and exercising (most of the women, 89.5%, did not practise any physical exercise).

In Table 3, no significant relation was found between educational level of the women and their BMI.

As for women's opinions, 58.5% thought that they were overweight or obese. Table 4

shows that the majority (96.6%) of women who thought that they were overweight or obese really were so; while 39 (47%) women who did not think that they were overweight or obese were found to be so.

Table 5 shows the causes of overweight or obesity as expressed by the women who said they were. Around one-third did not know the cause of their overweight or obesity, others linked their status to eating habits, family history and inactivity, as well as to other causes such as the use of contraceptives, medicines, ageing, gall bladder disease and breastfeeding.

## Discussion

This cross-sectional study was carried out in a relatively short time, with very limited resources. It is a preliminary survey for a national study that will consider a larger sample size gathered from randomly selected locations; however, the current situation in Iraq does not permit performing a national prevalence study for obesity.

Part of the study question was based on the researchers' observations during their medical practice and thus some of the vari-

**Table 1 Distribution of the women by age and body mass index (BMI)**

Age group (years)	Total	Normal weight (BMI < 25 kg/m <sup>2</sup> )		Overweight and obese (BMI ≥ 25 kg/m <sup>2</sup> )	
		No.	%	No.	%
≤ 30	107	33	30.8	74	69.2
30.1–40	67	13	19.4	54	80.6
40.1–50	20	2	10.0	18	90.0
> 50	6	0	0.0	6	100.0
Total	200	48	24.0	152	76.0

For statistical analysis the last 2 rows were combined.

$\chi^2_2 = 7.31$ ,  $P = 0.025$ .

Table 2 Distribution of women by body mass index (BMI) and associated variables

Variable	Total	Normal weight (BMI < 25 kg/m <sup>2</sup> )		Overweight and obese (BMI ≥ 25 kg/m <sup>2</sup> )		Statistical test
	No.	No.	%	No.	%	
<i>Smoking</i>						
Yes	9	2	22.2	7	77.8	Fisher exact test <i>P</i> = 0.629
No	191	46	24.1	145	75.9	
<i>Tea and coffee drinking<sup>a</sup></i>						
Non-drinker	16	7	43.8	9	56.2	$\chi^2_3 = 7.7, P = 0.0527$
1–2 cups/day	119	32	26.9	87	73.1	
3–4 cups/day	48	7	14.6	41	85.4	
5–6 cups/day	9	0	0.0	9	100	
7+ cups/day	8	2	25.0	6	75.0	
<i>Eating habits</i>						
One dish for the whole family	160	36	22.5	124	77.5	$\chi^2_2 = 1.048, P = 0.592$
Each family member has a dish	36	11	30.6	25	69.4	
Both practices	4	1	25.0	3	75.0	
<i>Use spoon for eating</i>						
Yes	190	44	23.2	146	76.8	Fisher exact test <i>P</i> = 0.256
No	10	4	40.0	6	60.0	
<i>Lactating<sup>b</sup></i>						
Yes	147	30	20.4	117	79.6	$\chi^2_1 = 1.99, P = 0.157$
No	24	8	33.3	16	66.7	
<i>History of previous laparotomy</i>						
Yes	77	12	15.6	65	84.4	$\chi^2_1 = 4.86, P = 0.027$
No	123	36	29.3	87	70.7	
<i>Home clothes</i>						
Pyjamas	22	10	45.5	12	54.5	$\chi^2_2 = 7.48, P = 0.024$
Gown	143	28	19.6	115	80.4	
Both	35	10	28.6	25	71.4	
<i>Clothes worn outside the home</i>						
Skirt &/or trousers	51	15	29.4	36	70.6	$\chi^2_1 = 1.1, P = 0.294$
Aba &/or gown	149	33	22.1	116	77.9	
<i>Presence of chronic diseases</i>						
Yes	51	11	21.6	40	78.4	$\chi^2_1 = 0.222, P = 0.638$
No	149	37	24.8	112	75.2	
<i>Practising exercise</i>						
Yes	21	6	28.6	15	71.4	$\chi^2_1 = 0.269, P = 0.604$
No	179	42	23.5	137	76.5	

<sup>a</sup>The last 2 rows were combined during statistical analysis.

<sup>b</sup>Women without children were excluded.

**Table 3 Distribution of the women by body mass index (BMI) and educational level**

Educational level	Total No.	Normal weight (BMI < 25 kg/m <sup>2</sup> )		Overweight and obese (BMI ≥ 25 kg/m <sup>2</sup> )	
		No.	%	No.	%
Illiterate	16	4	25.0	12	75
Read and write	29	5	17.2	24	82.8
Primary	59	19	32.2	40	67.8
Intermediate	35	10	28.6	25	71.4
Secondary	28	3	10.7	25	89.3
Institute	12	1	8.3	11	91.7
College+	21	6	28.6	15	71.4
Total	200	48	24.0	152	76.0

$\chi^2$  is not applicable (2 cells have expected count less than 5).

ables studied were unique to the Iraqi community. Owing to the scarcity of literature on this subject we were unable to compare our results with other studies.

The prevalence of overweight among our sample was 39%, while for obesity it was 37%, giving a total of 76%. These findings are more or less comparable to the findings of a national study carried out in Jordan by Abbas et al. [7]. They found that the prevalence of overweight among women was 32.9% and the prevalence of obesity was 37.6% which is nearly equal to our figure. This may be attributed to the comparable eating habits in the neighbour-

ing countries, or to the comparable genetic constitution of both communities. The prevalence of obesity found in our study (37%) is much higher than that reported by Swiden (23.16%) in 1997 who studied 4563 women in Baghdad [5]. It is possible that improved socioeconomic conditions since the lifting of United Nations sanctions on Iraq have contributed to increased overweight.

The high prevalence of overweight and obesity that we found is alarming as only 24% of the women were of normal weight. Obesity is also of grave concern in other parts of the world including the US. A survey done in the US that included 16 884

**Table 4 Women's opinion about their weight status by actual body mass index (BMI)**

Do you think that you are obese?	Total No.	Normal weight (BMI < 25 kg/m <sup>2</sup> )		Overweight and obese (BMI ≥ 25 kg/m <sup>2</sup> )	
		No.	%	No.	%
Yes	117	4	3.4	113	96.6
No	83	44	53.0	39	47.0

$\chi^2_1 = 65.47$ ,  $P < 0.001$ .

**Table 5 Cause of obesity as expressed by the women who considered themselves overweight**

Cause of obesity	No.	%
Don't know	35	29.9
Eating habits	22	18.8
Family history	13	11.1
Pregnancy and delivery	7	6.0
Eating with no physical activity	7	6.0
Psychological	5	4.3
No physical activity	4	3.4
No activity + family tendency	3	2.6
Other causes	21	17.9
Total	117	100.0

adults during the period 1988–94 showed that the prevalence of obesity among women was 55% [12]. Another study showed an increase in the prevalence of obesity from 12% in 1991 to 17.9% in 1998 [13]. In Brazil it has been reported that over half of women aged 50–69 years old from north-east and south-east regions of Brazil are overweight or obese [14]. On the other hand, studies in Switzerland showed no significant problem, with a reported prevalence of overweight of 26% and obesity of 5% [15]. A study done in Madagascar showed that only 6% of the sample was overweight and 2.4% were obese [16]. A study in China in the mid-1990s involving 42 751 participants found the prevalence of overweight and obesity among females was 21.71% and 3.73% respectively, although much higher rates were found in Beijing and Shandong, and the authors concluded that overweight and obesity were becoming more prevalent in China [17].

Our results showed that the mean WHR was more or less normal, but the mean waist circumference was more than normal

values. Recent evidence suggests that waist circumference alone may provide a more practical correlate of abdominal fat distribution and associated ill health than WHR [11]. The presence of excess body fat in the abdomen is considered an independent predictor of risk factors and ailments associated with obesity [9].

Our results showed that the prevalence of overweight and obesity increased with increasing age. This could be attributed to decreasing physical activity with increasing age. If, for example, this resulted in a body weight increase by only 1 kg per year, weight would increase by 10 kg at the end of 10 years. This relation of weight with age has been reported by other authors [14,17,18].

Some of the factors we looked at were particular to Iraq and some other developing countries, i.e. clothing and eating habits. Regarding types of clothing, we expected that those who wore trousers and skirts would be aware early on of any increase in their weight, especially the increase in waist circumference. This may prompt them to decrease the amount of food eaten in order to decrease their weight. On the other hand, those who wear loose gowns would not notice an increase in weight so readily, and their outward appearance to others would also not change much. Our results were partly consistent with this. The frequency of overweight and obesity was greater among women who wore gowns at home than those who wore pyjamas ( $P = 0.024$ ), but there was not difference with regard to clothes worn outside the home.

Regarding eating habits, when many people share the same dish, the quantity eaten is neither measurable nor limited for each person. This may encourage some individuals to eat more. Our results showed that the prevalence of overweight and obesity among those who shared one dish for

the family was greater than those who had individual plates, but the difference was not significant. Another eating habit, the use (or non-use) of a spoon during eating, was also not associated with obesity, but here the proportion of those who did not use a spoon was small, so a solid inference cannot be reached.

Although in a Medline search we did not find a study linking history of laparotomy with the development of overweight and obesity, our decision to study this factor was based on our observations (before the study) that some patients link their obesity with a history of laparotomies. We did in fact find a significant association ( $P = 0.027$ ).

People in Iraq and in other Arab countries generally put large quantities of sugar (hence more calories) in their tea, which may be one of the determinants of overweight. Our results showed that the prevalence of overweight and obesity increased with the increasing number of cups/glasses of tea drunk during the day. Although not significant ( $P = 0.0527$ ), it was near the level of significance at  $P < 0.05$  and might reach significance level with a larger sample.

It is generally believed in Iraq that lactating women have to eat more in order to produce more milk. We found that the prevalence of overweight and obesity was greater among lactating women but the difference was not significant. This increase in the prevalence could be attributed to this belief or to age (the mean age of lactating women was 33.69 years compared with 27.21 years of non-lactating women). The relation between obesity and lactation has been studied by many authors but no definite conclusion has been found [19,20].

Smoking was not found to be associated with obesity, but because of the small number of smokers in the studied sample we cannot draw any valid conclusions. In the study of Senekal, Sten and Nel on 2100

people, smoking was also not associated with obesity [21]. Another study carried out in the US on 16 587 people showed that smoking cessation was associated with a 1.98 cm gain in waist measurement [22].

The presence of a chronic disease did not appear to be associated with overweight and obesity. However, we did not enquire about the type of the chronic disease nor the drug(s) used for treating it. Furthermore, as this was a cross-sectional study, we cannot be sure that the chronic disease had preceded obesity or it was a result of obesity. Therefore no solid inferences can be reached.

Only 21 women practised any exercise. Although the prevalence of overweight and obesity was lower among those women, the difference was not significant but this may be attributed to the small sample size. The role of physical inactivity has been studied by many authors who have all found an association between inactivity and overweight, and exercise and weight loss [21–23].

We found no relation between educational level and obesity; while the Jordanian national study revealed a significant inverse relationship with the prevalence of overweight [7]; overweight was more prevalent among illiterate people and those with lower levels of education [7]. A Spanish study also showed an inverse relationship between metabolic syndrome and educational level [24].

To conclude, the main finding of the study was that less than one-quarter of the sample studied was of normal weight. Factors associated with obesity were older age, history of previous laparotomy and type of clothes worn inside the home. Although this was a small study in only 2 clinics and the results cannot be generalized, it does sound an alarm and suggests an urgent need for the problem to be addressed and more data on this issue to be collected

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### Healthy food markets

With over half of the world's population now living in urban areas, food markets have become an important source of affordable food for many millions of people. At the same time, however, such markets have been associated with major outbreaks of diseases, including cholera, SARS and avian influenza. As part of its Healthy Cities Programme, WHO has developed an approach to improve that the safety and nutritional quality of foods sold in urban markets. The Healthy Food Markets approach is being used in several pilot projects in cities around the world to coordinate efforts of all stakeholders to achieve incremental, but sustainable improvements in food markets. In addition to improvements to the physical infrastructure and essential services, behavioural changes by various market participants, including primary producers, wholesalers, market vendors, and consumers, are emphasized.

For those interested in undertaking pilot projects in their countries. WHO has issued a promotional brochure and booklet, *A guide to healthy food markets*.

These publications can be downloaded online at:  
[http://www.who.int/foodsafety/publications/capacity/healthymarket\\_guide.pdf](http://www.who.int/foodsafety/publications/capacity/healthymarket_guide.pdf)