

Prevalence of Obesity among a Group of Kirkuk Women

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Abstract

Background: An obese person body suffers from accumulation of a lot of fat that it might have a detrimental effect on their health. A person is considered obese when his body weight is at least 20% higher than it should be; he or she is considered obese. When Body Mass Index (BMI) is between 25 and 29.9 a person is considered overweight. While BMI is 30 or over indicates obesity.

Aim of study: The aim of this study is to detect the prevalence of obesity among a group of Kirkuk women's and its relation with education level, practicing exercise and so on.

Patients and methods: Type of study is cross sectional study. The area chosen for this study was Kirkuk city, samples taken randomly from schools among teachers primary health care visitors and from Azadi teaching hospital (mainly relatives of patients). The age taken was women between 18-66 years old. We exclude pregnant females. Data was coded on questioner. We measured height by tape- measure and weight by scale and then we calculated BMI by this equation $BMI = \text{weight in Kg} / \text{height in meter squared}$.

Result: Our results showed that 40%, 23%, 12% of the studied samples were overweight, obese and morbidly obese respectively. Only around 25% of the sample was of normal weight. About 75% of the women were abnormal.

Discussion: The prevalence of overweight and obesity has shown to be increased with increasing age in our study. This finding might be related to decreasing physical activity with increasing age. About the style of the clothing, it was expected that those persons who wore trousers and skirts would be aware earlier on any change (an increase) in their weight, especially the increase in waist circumference. Prevalence of overweight and obesity increased with the increasing number of cups/glasses of tea drunk during the day. The prevalence of overweight and obesity was greater among lactating women in this study, but the difference was not significant.

Conclusion: 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 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 that the problem to be addressed instantly and more data on this issue to be collected. Large study and large number of cases required to evaluate the prevalence of obesity in Kirkuk city. Encourage the community to change the type of eating and increase exercise with increasing age and not for sedentary life style. Educate the community about the negative effects of obesity and complications of obesity for his or her lives.

Keywords: Obesity; Overweight; Women; Kirkuk

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Introduction

Obesity is globally considered as a pandemic with potentially serious consequences for human health. It was estimated that more than 20% of adults in the UK, and more than 30% in USA, are obese (i.e. Body mass index, BMI ≥ 30 kg/m²). Obesity prevalence has increased threefold within the last 20 years and continues to rise. About the prevalence of obesity in the developing countries, average national rates are not nearly so high, but the real figures show alarmingly high rates of obesity in many urban communities [1].

What is Body Mass Index (BMI)?

The BMI is a measured by dividing the weight on the height square. It is considered to be a good indicator for a person's healthy body weight, but it does not measure the exact percentage of body fat. The BMI measurement can sometimes be misleading a muscular man may have a high BMI but have much less fat than an unfit person whose BMI is lower. However, in general, the BMI measurement is considered to be a useful indicator for the 'average person'.

Etiology

Obesity can result from increased energy intake, decreased energy expenditure, or a combination of the two. The accumulation of excess fat in the body is the consequence of genetic and factors; economic conditions and social factors also represent important influences. So a person's liability to obesity is polygenic in nature, and 30%-50% of the variability in total fat stores is believed to be genetically determined. Monogenic causes of obesity are rare; heterozygous. Mutations of the Melano Cortin receptor 4 (MC4R) are found in a few percent of massively obese children. Secondary causes of obesity include hypothyroidism, hypothalamic injury, hypogonadism, Cushing's syndrome, and some drugs. Insulin-secreting tumors can cause overeating [2]. Obesity, until recently, was considered to be caused directly by sedentary lifestyle plus chronic ingestion of excess calories. Although these factors are surely the principal cause in some cases, evidence for strong genetic influences on the development of obesity is emerging. Adopted children show a clear relationship between their body mass index and that of their biologic parents, but no such relationship is found between these children and their adoptive parents. Twin studies also demonstrate substantial genetic influences on BMI with little influence from the childhood environment. As much as 40%-70% of obesity may be explained by genetic influences [3]. Genetic determinants for certain types of obesity have now been found. Five genes affecting regulation of appetite have been recognized in mice. Mutations of any gene can lead to obesity, and each has a human homolog. One gene codes for a protein expressed by adipose tissue leptin and another for the leptin receptor in the brain [4]. The other three genes affect brain pathways downstream from the leptin receptor. Numerous other candidate genes for human obesity have been identified. Only a small percentage (4%-6%) of human obesity is thought to be due to single gene mutations. Most human obesity is believed to be caused from the interactions of multiple genes, environmental factors, and behavior. Exercise can effectively burn

the calories. In order to lose one kilogram of fat you need to burn 8,000 calories (1 pound of fat=3,500 calories). Brisk walking is a good way to start increasing your physical activity for fat burning if you are obese. Combining both increased physical activity with a good diet will significantly increase your chances of losing weight successfully and permanently. Try to find activities which you can fit into your daily routine. Anything that becomes part of your daily life, weaved into your existing lifestyle, is more likely to become a long-term habit. If you use an elevator, try getting off one or two floors before your destination and walking the rest. You could try the same when driving your car or taking any form of public transport get off earlier and walk that bit more. If any of your regular shops are within walking distance, try leaving your car at home. Several surveys indicated that the majority of urban car trips outside the rush hours are less than a mile long-we can all walk a mile, and should. A health care professional advice is taken if you are very obese and unfit, or have some health problems, before increasing your physical activity.

Pathologic consequences of obesity: Obesity has serious effects on health. Obesity is thought to be associated with an increase in mortality, with a 50%-100% increased risk of death from all causes compared to normal-weight individuals, mostly due to cardiovascular causes. In the United States, obesity and overweight together are the second leading cause of preventable death, accounting for 300,000 deaths per year. As obesity increases mortality rates rise, especially when obesity is associated with increased central (intra-abdominal) fat. A moderately obese individual has life expectancy shortened by 2-5 years, and a 20 to 30-year-old male with a BMI >45 may lose up to 13 years of his life. Genetic factors determine the degree of which obesity affects particular parts of the body [5,6]. Insulin resistance and type 2 diabetes mellitus: Hyperinsulinemia and insulin resistance are common features of obesity, become more and more with weight gain and decreasing with weight loss. Insulin resistance is mainly associated with central (intraabdominal) fat than to the accumulation of fat in other parts of the body. The association between obesity and insulin resistance in tissues such as muscle, fat and liver has been well defined. Major factors under investigation include: Insulin itself, by inducing receptor downregulation; Intracellular lipid accumulation; Free fatty acids, known to be increased and capable of impairing insulin action; and Different circulating peptides produced by adipocytes, including the cytokines TNF-and and IL-6, RBP4, and the "adipokines" adiponectin and resistin, which are released by adipocytes, have altered expression in obese adipocytes, and are can modifying insulin action [7].

Reproductive disorders: Disorders that affect the reproductive axis are associated with obesity in both men and women. Increased adipose tissue is associated with male hypogonadism, and distributed in a pattern more typical of females. Obesity has been associated with menstrual irregularity in women, especially in women with upper body obesity. Common findings are decreased SHBG, increased androgen production, and increased peripheral conversion of androgen to estrogen. Most obese women with oligomenorrhea have the), with its associated anovulation and ovarian hyperandrogenism; 40% of women with

PCOS are obese [8].

Cardiovascular disease: The Framingham study revealed that obesity was an independent risk factor for the 26-year incidence of cardiovascular disease in men and women [including coronary disease, stroke, and Congestive Heart Failure (CHF)]. The waist/hip ratio may be the best predictor of these risks. Obesity can increase the cardiovascular mortality in women at BMIs as low as 25. Atherogenic lipid profile is associated with obesity, especially abdominal obesity, obesity is also associated increased Low-Density Lipoprotein (LDL) cholesterol, very low density lipoprotein, and triglyceride; and with decreased high-density lipoprotein cholesterol and decreased levels of the vascular protective adipokine adiponectin. Obesity is also associated with hypertension [9].

Pulmonary disease: Obesity is associated with a lot of pulmonary abnormalities. These include reduced chest wall compliance, increased work of breathing, increased minute ventilation due to increased metabolic rate, and decreased functional residual capacity and expiratory reserve volume. Severe obesity is believed to be highly associated with obstructive sleep apnea and the "obesity hypoventilation syndrome" with attenuated hypoxic and hypercapnic ventilatory responses.

Gallstones: Obesity can cause increase biliary secretion of cholesterol, super saturation of bile, and an increased incidence of gallstones, particularly cholesterol gallstones.

Cancer: Obesity in males is associated with increased mortality rate from cancer, including esophagus cancer, rectum, colon, liver, pancreas, and prostate; obesity in females is associated with mortality rate from cancer of the bile ducts, gallbladder, breasts, cervix endometrium, and ovaries.

Bone, Joint and Cutaneous disease: Obesity is associated with a higher risk of osteoarthritis, partly due to the trauma of added weight bearing and joint malalignment. Gout prevalence may also be increased [10-12].

Patients and Methods

The area chosen for this study was Kirkuk city, samples taken randomly from schools teachers among primary health care visitors and from Azadi teaching hospital (mainly relatives of patients). The age taken was women between 18-66 years old. We exclude pregnant females. Data was coded on questioner. We measured height by tape- measure and weight by scale and then we calculated BMI by this equation $BMI = \text{weight in Kg} / \text{height in meter squared}$ [13]. We asked about marital status, smoking, eating habit, tea and coffee drinking, using spoon for eating, lactation, home and outside home cloths, presence or absence of chronic disease, practicing exercise or not, education level and finally we asked the opinion of women if she consider herself obese or not and the cause behind her obesity .We took the data in 5 month and sample size is 200 cases [14].

In addition, COVID-19 created major economic difficulties. The COVID-19 pandemic has brought to all countries the need to restrict movements and implemented social distancing. These adjustments have caused food system problems, including

changes in food consumption and physical activity pattern, and remote telework environments that may exacerbate current trends in the prevalence of individuals with obesity.

The relationship between individuals with excessive body fat, particularly visceral adipose tissue; individuals with obesity; major cardio metabolic problems, ranging from hypertension to cardiovascular disease to type 2 diabetes; and a number of cancers is strong. The underlying metabolic and inflammatory factors of individuals with obesity also play a considerable role in the manifestation of pulmonary diseases. Susceptibility to acute respiratory distress syndrome, the primary cause of COVID-19 mortality, is significantly greater among individuals with obesity. Mainly, being an individual with obesity increases the risk of mortality rate.

Results

Our results showed that 40%, 23%, 12% of the studied samples were overweight, obese and morbidly obese respectively. Only around 25% of the sample was of normal weight. 75% of the women were abnormal as shown in **Figure 1**.

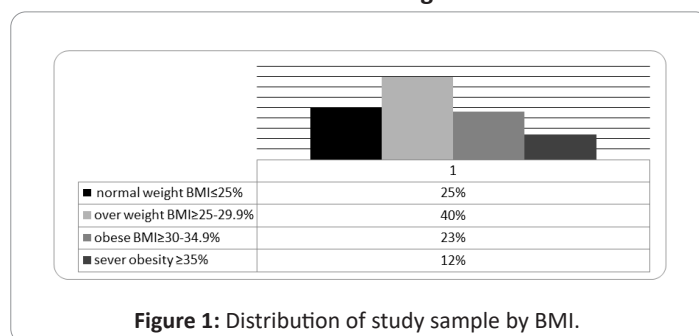


Figure 1: Distribution of study sample by BMI.

Table 1: Show the relation between age and weight and indicate that the proportion of women with overweight, obesity and morbid obesity increased with increasing age.

Classification	BMI	Risk of comorbidities
Underweight	<18.5	Low
Normal	18.5-24.9	Average
Overweight	>25	
Pre-obese	25-29.9	Increase
Obese class 1	30.0-34.9	Moderate
Obese class 2	35.0-39.9	Sever
Obese class 3	>40	Very sever

Tables 2a and 2b shows no significant relation was found between education level of the women and their BMI.

Table 2a: Distribution of the women by age and BMI.

Age years	Total no.	Normal weight BMI <25 kg/m ²	%	Overweight and obese BMI >25 kg/m ²	%
<30	50	25	50	25	50
31-40	47	12	25.5	35	74.5
41-50	56	8	14.3	48	85.7
>50	47	5	10.6	42	89.3
Total	200	50	25%	150	75%

Table 2b: Distribution of the women by age and BMI.

Educational level	Total no.	Normal weight BMI <25 kg/m ²	%	Overweight and obese BMI >25 kg/m ²	%
Illiterate	7	1	14.3	6	85.7

Read and write	23	5	21.8	18	77.2
Primary	32	5	19.4	27	80.5
Intermediate	24	4	16.2	20	84.8
Secondary	41	13	31.8	28	68.2
Institute	23	5	19.04	18	80.9
College	50	17	34	33	66
Total	200	50	25	150	75

Distribution of the women by age and BMI are shown in **Figure 2**.

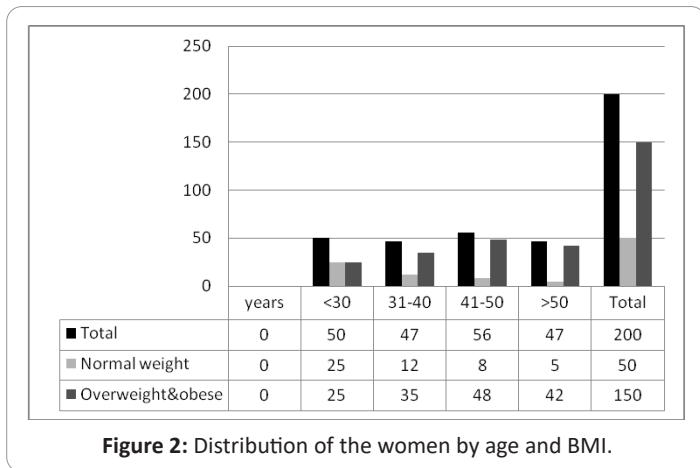


Figure 2: Distribution of the women by age and BMI.

Table 3 shows that most of women (87.6%) who thought that they were overweight or obese really were so; and (72.07%) of the women who did not think that they were overweight or obese were found to be so.

Table 3: Distribution of the women by age and BMI.

Do you think you're obese?	Total no.	Normal weight BMI<25 kg/m ²	%	Overweight & obese BMI>25 kg/m ²	%
Yes	89	11	12.3	73	87.6
No	111	31	27.9	80	72.07

Table 4 shows the causes of overweight or obesity as expressed by the women who said they were the majority of the women thought that the cause of the obesity was pregnancy and delivery. Others linked their status to the eating habit, family history and inactivity.

Table 4: Causes of obesity as expressed by women who considered themselves overweight.

Causes of obesity	No.	%
Don't know	15	16.8
Eating habit	11	12.3
Family history	12	13.4
Pregnancy and delivery	21	23.5
No physical activity	13	14.6
Eating habit with no physical activity	13	14.6
Total	89	

Table 5 summarized the factors studied that might be associated with overweight and obesity. The frequency of overweight and obesity was greater among women who eat more tea and coffee consumption, presence of chronic disease, using one dish for whole family and using spoon for eating. Factors that not found to be associated with overweight and obesity were smoking, lactation, type of clothing worn inside and outside the home, (p=0.100), and exercising.

Table 5: Summarized the factors studied that might be associated with overweight and obesity.

Variable	Total no.	Normal weight BMI<25 kg/m ²	%	Overweight and obese BMI>25 kg/m ²	%	Statistic test (p)
Smoking						0.5
Yes	4	2	50	2	50	
No	196	42	21.4	154	78.5	
Tea & coffee						0.05
Non	27	6	22.2	21	77.7	
1-2	64	16	25	48	75	
3-4	64	12	18.7	52	81.2	
5-6	29	5	17.2	24	82.7	
>7	9	2	22.2	7	77.7	
Eating habit						0.05
One dish for whole family	13	1	7.6	12	92.3	
Each family member has a dish	158	29	18.3	129	81.6	
Both practice	29	11	37.9	18	62.06	
Use spoon for eating						0.001
Yes	199	41	20.6	158	79.3	
No	1	0	0	1	100	
Lactation						0.975
Yes	79	5	6.3	74	93.6	
No	121	34	28.09	87	71.9	

Home cloth							0.1
Pajama	42	15	35.7	27	64.2		
Gown	104	17	16.3	87	83.6		
Bot	62	12	19.3	50	80.6		
Cloth outside home	120	30	25	90	75		0.1
Skirt	80	10	12.5	70	87.5		
Abaa							
Presence of chronic disease							0.02
Yes	61	7	11.47	54	88.5		
no	139	36	25.89	103	74.1		
Exercise							0.1
Yes	13	3	23.76	10	76.9		
NO	187	38	20.3	149	79.6		

Discussion

The prevalence of overweight among our sample was 40%, while for it was 35%, giving a total of 75%. These findings are more or less comparable to the findings of a national study carried out in Jordan. That study has found that the prevalence of obesity was 37.6%, and the prevalence of overweight among women was 32.9% which is nearly equal to our figure. This may be attributed to the comparable eating habits in the neighboring countries, or to the comparable genetic constitution of both communities [15]. The prevalence of obesity found in our study (35%) is much higher (23.16%). It is possible that improved socioeconomic conditions since the lifting of United Nations sanctions on Iraq have contributed to increased overweight [16].

The high prevalence of obesity and overweight that we found is alarming, as normal weight women were only 25%. Obesity is regarded as grave concern in the most parts of the world including the US. A survey carried out in the US and included 16884 adults during the period 1988-94 have revealed that the prevalence of obesity among women was 55%. Another study found a rising prevalence of obesity from 12% in 1991 to 17.9% in 1998. In Brazil it has been found that more than half of women aged 50-69 years old from north-east and south-east regions of Brazil are overweight or obese. On the other hand, studies in Switzerland have found no significant problem, with a stated prevalence of overweight of 26% and obesity of 5% [17]. A study done in Madagascar found that only 6% of the sample was overweight and 2.4% were obese [18]. 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, have found that overweight and obesity were becoming more prevalent in China [19].

The results of our study have showed that the prevalence of overweight and obesity increased with increasing age. This could be related 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. 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, the difference was significant. Another eating habit, the use (or non-use) of a spoon during eating, was also associated with obesity [20].

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 which is significant ($P=0.05$). 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. 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.

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 [21]. The presence of a chronic disease appears 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 [22]. Only 13 women practiced 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 [23-25]. We found no relation between educational level and obesity; while the Jordanian national study revealed a significant inverse relationship with the prevalence of overweight; overweight was more prevalent among illiterate people and those with lower levels of education [26]. A Spanish study also showed an inverse relationship between metabolic syndrome and educational level [27].

Conclusion and Recommendation

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, 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. Large study and large number of cases required to evaluate the prevalence of obesity in Kirkuk city.

Encourage the community to change the type of eating and increase exercise with increasing age and not for sedentary life style. Educate the community about the effect of obesity and complications of obesity for his or her lives.

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