Prevalence of Overweight and Obesity in Type 2 Diabetic Patients Visiting PHC in the Dubai Health Authority

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Keywords

Obesity · Type 2 diabetes mellitus · Prevalence

Abstract

Background: Diabetes is a highly prevalent global and local major health problem according to the International Diabetes Federation (IDF) and will double by 2045. A strong relationship between obesity and type 2 diabetes has been found. Both are leading causes of cardiovascular disease and death; thus, understanding the prevalence of obesity in type 2 diabetes is crucial for planning obesity management and preventing complications. **Objectives:** This study aimed to determine the prevalence of obesity and overweight among people with type 2 diabetes attending primary healthcare centers (PHC) in the Dubai Health Authority (DHA). **Methods:** The study sample consisted of type 2 diabetes mellitus patients who attended family medicine clinics in primary healthcare centers in DHA. All cases with type 2 diabetes attending family clinics for their periodic health checkup screening were included in the study. Patients <18 years old, pregnant, and/or those with cancer and/or chronic kidney disease were excluded. **Results:** Our study sample had 9,198 type 2 diabetes mellitus cases with 51.6% males,

69.7% United Arab Emirates nationals, 7.9% who exercised regularly, and 1.8% who followed a healthy diet. Obesity and overweight cases were 49.5% and 35.5%, respectively. **Conclusion:** Without an aggressive obesity management approach, control of diabetes is difficult. The prevalence of obesity and overweight among people with type 2 diabetes is high. Obesity and overweight cases were 49.5% and 35.5%, respectively, among diabetic patients attending PHC. Over 50% (55%) of UAE nationals were obese, while 31.8% were overweight, suggesting that active interventions to control weight gain would be appropriate.

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Introduction

Diabetes is a global issue; it does not respect borders or social class. The epidemic of diabetes is expected to continue, thus representing a continual and expanding drain of national healthcare budgets: ~10% of global health expenditure (USD 760 billion) is spent on diabetes [1]. By early detection of the disease, premature death from cardiovascular disease (CVD) is reduced. This step also reduces the risk for microvascular complications, such as

blindness below the age of 65 years, nontraumatic limb amputation, and kidney failure [2]. According to the latest IDF data of Diabetes 2019 Prevalence in North Africa and the MENA region, 1 in 8 adults has diabetes, a number of 55 million diabetics; this number will rise to 108 million by 2045 if no action is taken [1].

In the UAE, the fast economic growth, sedentary lifestyle, and unhealthy diets increase the risk of obesity and type 2 diabetes. Consequently, the prevalence of type 2 diabetes in the UAE is expected to increase, and the number of cases is expected to double by 2040 to 2.2 million [1]. Gulf countries are especially afflicted. Saudi Arabia, Bahrain, Kuwait, and Qatar are on the list for the top 20 countries globally in diabetes prevalence [1]. Obesity is increasingly becoming a public health challenge; the morbidity and mortality associated with it are due to its link with diabetes, CVD, and certain cancers. Since 1980, the prevalence of overweight and obesity worldwide has doubled, affecting all ages and sexes [3].

According to the WHO, at least 2.8 million people die every year from being overweight or obese. Interestingly, one-third of the world's population is classified as either overweight or obese using BMI as a measure. Between 1980 and 2013, the worldwide percentage of adults with a BMI of 25 kg/m² or greater increased from 28.8% to 36.9% in males and from 29.8% to 38% in females [3]. Gulf countries are no exception to this epidemic. The WHO report shows that Kuwait, Bahrain, KSA (Kingdom of Saudi Arabia), and UAE are now among the top 10 countries globally in terms of obesity prevalence. In KSA, the rate of obesity is 35.2% [4]. Likewise, in the UAE, obesity prevalence among school children was studied using the US 50 centile for BMI. Eight percent of children, both males and females, were obese, having BMI in the >95th percentile. It has also been reported that 16.9% of females and 16.5% of males are overweight [5].

A study using the data from the UAE National Diabetes and Lifestyle Study (UAEDIAB) showed that in expatriate residents, the prevalence of obesity was 32.35% and overweight was 43%. Moreover, the patients with higher BMI, waist circumference (WC), and waist-hip ratio (WHR) were significantly more likely to have diabetes, high cholesterol, and hypertension. Interestingly, when BMI and WC were used, females were more likely to have obesity than males [6].

As mentioned earlier, obesity is a strong risk factor for type 2 diabetes. There is 7-times greater risk of diabetes in obese and 3-times greater risk in overweight subjects than normal weight people [7]. Because of the associated

risk, the prevalence of obesity among type 2 diabetic subjects had been studied in many countries; in the KSA, a study group found that 26% of obese males were diagnosed with diabetes, while 23% of obese females had type 2 diabetes, compared to 8% and 4% of nonobese males and females, respectively [8]. In addition to those studies in Australia, 53% of patients with type 2 DM are obese and 32.8% are overweight [9]. The prevalence of obesity among type 2 diabetes patients in Yemen was higher when compared to other Yemeni populations [10].

Moreover, in Northern Tanzania, the prevalence of obesity in type 2 diabetic patients attending diabetes clinics was high: 40.1% obese patients and 44.9% overweight patients [11]. Interestingly, in a population-based survey in Sudan, the prevalence of obesity among people with type 2 diabetes was 24.5%, while the percentage of overweight was 39.9% [12]. Although many studies were conducted to determine the prevalence of diabetes and prevalence of obesity, there are fewer studies to evaluate the prevalence of obesity among people with diabetes. Diabetes refers to the combination and strong relation between obesity and type 2 diabetes; most people with diabetes are obese or overweight [13]. Therefore, awareness of the prevalence of obesity in type 2 diabetes is crucial to plan the management and prevention of complications. This study aims to determine how prevalent obesity and overweight are among people with type 2 diabetes mellitus in PHC, DHA, and to analyze obesity and overweight in relation to gender, age group, and nationality in the studied sample.

Materials and Methods

Our study is retrospective; the sample size was 9,198 type 2 diabetes mellitus subjects who attended family medicine clinics in PHC in DHA from August 01, 2017, until July 31, 2018, and met the inclusion criteria. The inclusion criteria are subjects who have type 2 diabetes and attended family clinics and had their periodic health checkup screening done during this period. Exclusion criteria are patients aged <18 years old, pregnant, cancer patients, and those with chronic kidney disease. Research was done following the guidelines for human studies and conducted ethically in accordance with the World Medical Association Declaration of Helsinki. The study protocol was approved by the Dubai Scientific Research Ethics Committee, DSREC 10/2019_07, Dated Jan 30, 2020.

The main objective was to determine how prevalent obesity and overweight are among type 2 diabetes mellitus patients attending PHC, DHA. The secondary objective was further analysis of obesity and overweight in relation to gender, age group, and nationality in the studied sample. Data were extracted from electronic medical record systems from PHC (12 health centers across the Emirate of Dubai) through the national periodic health checkup screening program to detect and prevent CVD. At that visit, the

Table 1. Prevalence of overweight and obesity in type 2 diabetic patients in relation to gender, nationality, and age range

	Total, count (%)	Underweight, count (%)	Normal, count (%)	Overweight, count (%)	Obesity, count (%)	<i>p</i> value
Gender, <i>n</i> (%)						<0.001
Male	4,743 (51.6)	21 (0.5)	895 (19.2)	1,978 (42.4)	1,773 (38.2)	
Female	4,455 (48.4)	14 (0.3)	421 (9.7)	1,218 (28.1)	2,678 (61.8)	
Nationality, <i>n</i> (%)						<0.001
UAE	6,409 (69.7)	31 (0.5)	790 (12.7)	1,981 (31.8)	3,429 (55)	
Non-UAE	2,789 (30.3)	4 (0.1)	526 (19.0)	1,215 (43.9)	1,022 (36.9)	
Age range, <i>n</i> (%)						<0.001
18 ≤ 30	288 (3.1)	8 (2.8)	69 (24.2)	64 (22.5)	144 (50.5)	
31 ≤ 40	1,011 (11)	8 (0.8)	158 (15.7)	299 (29.8)	539 (53.7)	
41 ≤ 50	2,290 (24.9)	5 (0.2)	309 (13.6)	814 (35.6)	1,150 (50.6)	
51 ≤ 60	3,038 (33)	5 (0.2)	391 (13)	1,087 (36.1)	1,530 (50.8)	
≥61	2,566 (28)	9 (0.6)	389 (16)	932 (38.5)	1,088 (44.9)	

screening program was conducted by trained healthcare workers using a standardized health risk assessment that included smoking status, physical activity, dietary intake, blood pressure, WC, BMI, blood investigation for blood sugar (HbA1C), lipid profile, and demographic data (age and nationality).

All enrolled diabetes mellitus cases are known diabetic patients taking treatment in PHC, DHA. Regular exercise was considered practicing at least 150 min of physical activity per week. A good diet means the subject is eating 5 portions of fruits and/or vegetables daily; the WC – measured as the midpoint of the distance between the iliac crest (top of the hip) and the bottom of the rib cage (10th rib) – was identified and marked; abnormal measurement was considered for men: >102 cm and women: >88 cm. BMI is a simple index of weight-for-height that is commonly used to classify overweight and obesity in adults. It is defined as a person's weight in kilograms divided by the square of his height in meters (kg/m²): classification of obesity in adults (WHO criteria): underweight <18.5 kg/m², normal weight 18.5–24.9 kg/m², overweight 25–29.9 kg/m², and obese ≥30 kg/m² [13].

Statistical Analysis

Categorical variables were represented as counts and percentages. The χ^2 test was used to correlate overweight, obesity, and other risk factors, such as nationality, gender, and age groups. Data were analyzed using SPSS software program version 21. *p* value <0.05 was the cutoff level of significance.

Results

The study sample consisted of 9,198 diabetic subjects who did their periodic health checkups. The proportion of males was 4,743 (51.6%), and 721 (7.9%) of the sample were regularly exercising. A good diet was only followed in 163 (1.8%) of the studied sample. Almost half (4,451, 49.5%) were obese, 3,196 (35.5%) were overweight, and concurrently high WC was detected in 2,991 (63%).

There are 6,409 (69.7%) UAE nationals and 2789 (30.3%) non-UAE nationals; 3,429 (55%) of the UAE nationals were obese compared to 1,022 (36.9%) among the non-UAE nationals, and 1,981 (31.8%) UAE nationals were overweight compared to 1,215 (43.9%) non-UAE nationals. The age range that reported the highest frequency in obesity was 31–40 years (539, 53.7%), while the highest frequency of overweight was in those >61 years old (932, 38.5%). Additionally, in the correlation between obesity and gender, 2,678 (61.8%) females were obese compared to 1,773 (38.2%) males. More results about the distribution of obesity among the study sample are in Tables 1 and 2.

Discussion

Diabetes care in DHA as structured care started in 2004 when quality improvement projects and annual clinical audits were introduced [14]. However, no previous research was done regarding the prevalence of obesity in people with diabetes in PHC. Therefore, our study was conducted. The study sample consisted of 9,198 diabetic patients who did their periodic health checkup. The study looked at the prevalence of overweight and obesity in people with type 2 diabetes attending PHC in DHA. Results showed most of the patients were UAE nationals (69.7%). There was no evidence to suggest sex differences in the prevalence of diabetes in our study; however, in the correlation of gender and BMI, it showed obese females were 61.8% compared to males (38.2%). At the same time, overweight in males was more prevalent (42.4%) in comparison with females (28.1%). In this

Table 2. Further analysis of different risk factors in type 2 diabetes patients according to nationality

	Total, count (%)	UAE, count (%) (6,409, 69.7%)	Non-UAE, count (%) (2,789, 30.3%)	<i>p</i> value
Gender, <i>n</i> (%)				<0.001
Male	4,743 (51.6)	2,622 (40.9)	2,120 (76)	
Age range, <i>n</i> (%)				<0.001
18 ≤ 30	288 (3.1)	251 (3.9)	37 (1.3)	
31 ≤ 40	1,011 (11)	627 (9.8)	384 (13.8)	
41 ≤ 50	2,290 (24.9)	1,313 (20.5)	977 (35)	
51 ≤ 60	3,038 (33)	1,979 (30.9)	1,059 (38)	
≥61	2,571 (28)	2,239 (34.9)	332 (11.9)	
BMI, <i>n</i> (%)				<0.001
Underweight	35 (0.4)	31 (0.5)	4 (0.1)	
Normal	1,316 (14.6)	790 (12.7)	526 (19)	
Overweight	3,196 (35.5)	1,981 (31.8)	1,215 (43.9)	
Obesity	4,451 (49.5)	3,429 (55)	1,022 (36.9)	
Waist circumference, <i>n</i> (%)				<0.001
Abnormal	2991 (63)	2303 (70.8)	688 (45.9)	
Exercise, <i>n</i> (%)				<0.001
Yes	163 (7.9)	404 (6.4)	317 (11.5)	
No	4,705 (53.4)	3,321 (52.3)	1,545 (55.8)	
Not answered	3,995 (38.7)	2,624 (41.3)	906 (32.7)	
Good diet, <i>n</i> (%)				<0.001
Yes	163 (1.8)	106 (1.7)	57 (2.1)	
No	4,705 (53.1)	3,154 (50.8)	1,551 (58.4)	
Not answered	3,995 (45.1)	2,945 (47.5)	1,050 (39.5)	

study, obesity among people with type 2 diabetes according to BMI was 49.5%, and overweight was 35.5%, which means that 85% of people with diabetes need intervention to reduce their weight.

More than half (55%) of diabetic UAE nationals were obese; this finding is close to other studies in the UAE and the MENA region. Interestingly, a study conducted in the UAE in 2016 had shown that the prevalence of obesity among Emirati diabetic patients was 57% [15]. Similarly, in Saudi Arabia, a study revealed data similar to our study, showing that among diabetic patients, the prevalence of BMI of ≥ 25 was 85.7% compared to nondiabetics (72.5%) ($p < 0.001$). A higher prevalence of obesity (BMI ≥ 25) was seen in females (87.7%) than males (83.1%) [16]. Moreover, a systematic literature review of studies of obesity and hypertension prevalence in people with diabetes in different parts of the world showed that among 44 studies, obesity prevalence rates by BMI were well above 30% in 38 of 44 of the studies. In the same context, prevalence rates of obesity in people with diabetes were reported in Qatar 53.5%, Jordan 58.6%, and in the UK, the prevalence of obesity was 64% among patients with type 2 diabetes [9]. Similarly, in a nationwide Turkish Survey, among people with diabetes, only 10% had normal BMI, while

the percentage of overweight was 31%, and the obese were 59% [17]. A study among people with diabetes in Nepal showed that according to BMI, 51.9% of the total people with diabetes were obese or overweight [18].

Our study showed 63% of subjects had high WC. Most clinical weight loss and exercise training trials have shown a strong relation between WC and obesity-related diseases [19]. Regarding healthy lifestyle, the study showed a significant lack of adherence to healthy practices reflecting the need for an immediate action plan; results showed only 7.9% of people with diabetes are regularly exercising, 6.4% in UAE nationals compared to 11.5% of non-UAE nationals. Meanwhile, only 1.8% of the sample were consuming a good diet, and there was little difference between UAE nationals 1.7% and non-UAE nationals 2.1%.

Limitations and Strengths

Study strength is in the good sample size of 9,198 people with diabetes in Dubai, mostly UAE nationals 69.7%. Limitations of the study are the number of years being diabetic and glycemic control were not recorded and WC was not measured in some subjects although it is a better measure of visceral obesity in type 2 diabetes mellitus which can be considered in future studies.

Conclusion and Recommendation

The prevalence of obesity and overweight in our sample was 49.5% and 35.5%, respectively. The prevalence was even higher in UAE nationals: 55% were obese and 31.8% were overweight.

Given the strong association of diabetes with increased cardiovascular risk, it is essential to stress therapeutic lifestyle interventions, health education, and psychological support as a multidisciplinary team. In addition to these mentioned tools, weight loss antidiabetic medications should be available in PHC to improve diabetes management plans.

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Statement of Ethics

Research was done following the guidelines for human studies and conducted ethically in accordance with the World Medical Association Declaration of Helsinki. The study protocol was ap-

proved by the Dubai Scientific Research Ethics Committee, DSREC 10/2019_07, Dated Jan 30, 2020. In this retrospective study, the DHA Medical Record System, where the data were extracted, used a general consent to permit the use of data for the study.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

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No funding sources were required in the research or data collection or statistical analysis.

Author Contributions

All authors contributed to this research equally.

Data Availability Statement

Data are not available publicly due to privacy and confidentiality. However, they are available upon request from the correspondence author with proper justification.

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