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Prevalence and associated risk factors of overweight and obesity among adult population in Dubai: a population-based cross-sectional survey in Dubai, the United Arab Emirates

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ABSTRACT

Objective To study the prevalence of overweight and obesity and determine the associated risk factors among adults in Dubai.

Design and setting A cross-sectional survey with a multistage, stratified random sampling design was conducted in the Emirate of Dubai in 2019.

Participants The study included 2142 adults aged 18+ years in the Emirate of Dubai.

Results The overall prevalence of obesity, which was defined as body mass index (BMI) ≥30 kg/m^2, was 17.8%. The highest obesity rates were reported among women (21.6%) and the United Arab Emirates (UAE)-nationals (39.6%). Moreover, 39.8% of the population was overweight (BMI ≥25–29.9 kg/m^2). Multivariate logistic regression showed associations between obesity and age, sex, nationality, hypertension and occupation. Obesity increases with age, with the highest risk at age group 50–59 years (OR 4.30; 95% CI 1.57 to 11.78) compared with the reference group (18–24 years). Females had a higher risk of obesity than males (OR 1.62; 95% CI 1.10 to 2.38). Compared with those in the reference group (Western and others), UAE nationals, other Arabs and Asians were more likely to be obese ((OR 2.08; 95% CI 1.18 to 3.67), (OR 3.61; 95% CI 2.41 to 5.44) and (OR 1.98; 95% CI 1.12 to 3.50), respectively). Clerical and service workers (OR 4.50; 95% CI 2.54 to 8.00) and elementary and unskilled occupation categories (OR 2.57; 95% CI 1.56 to 4.25) had higher risks of obesity than the reference group (professionals), p<0.01). Hypertensive individuals had a higher risk of obesity than normotensive individuals (OR=3.96; p<0.01).

Conclusions Obesity and overweight are highly prevalent among adults in Dubai and are remarkably associated with sociodemographic and behavioural risk factors. Comprehensive strategic initiatives are urgently needed to control obesity in the high-risk populations in the Emirate of Dubai.

STRENGTHS AND LIMITATIONS OF THIS STUDY

⇒ This is the first study to address the prevalence of overweight and obesity, as well as their associated factors, using a sampling technique that represents the total adults in Dubai.
⇒ Methodology of complex designed and measurement methods were carried out following international standards through the WHO World Health Surveys.
⇒ This is a cross-sectional study, therefore, temporality between predictors and obesity could not be established.
⇒ Some behavioural risk factors and dietary intake variables were not assessed in the primary study, consequently not considered in the logistic regression.
⇒ This study was limited to the adult population in Dubai hence generalisability of the results cannot be applied to the general population in the United Arab Emirates.

INTRODUCTION

Obesity and overweight are significant global public health challenges associated with adverse burden on quality of life, morbidity and mortality. Obesity is estimated to be the fifth-leading risk factor for death worldwide.[1 2] The global prevalence of overweight and obesity has surged substantially over the past few decades.[3] Globally, overweight is prevalent in 1.9 billion adults, more than a half-billion of whom are clinically obese. The available data demonstrate that 13% of adults aged ≥18 years were obese in 2016.[1] Reportedly, no country has been able to reverse this increasing obesity trend.[4] The current trends suggest that the global obesity rates will reach 18% in men and 21% in women by 2025.[5]

While Western countries are most affected by the obesity epidemic, Eastern Mediterranean Countries have reported the largest increase in the number of obese and

overweight individuals in the few past years.[5] In particular, the Arabian Gulf region has witnessed a markedly increase in the prevalence of obesity in adults, with prevalence estimates of 17%–48% in women and 8%–36% in men.[6] For instance, the United Arab Emirates (UAE) has reported a high prevalence of obesity, and it ranked 26th worldwide in terms of obesity prevalence in 2016.[5] Studies have reported that almost two-thirds of the adult population in the UAE has excess body weight, with 42% and 28% of them being overweight and obese, respectively.[7]

Various factors, such as environmental factors, physical inactivity and unhealthy diets, are associated with overweight and obesity.[8] Moreover, genetic, psychological and socioeconomic factors have been reported as risk factors for overweight and obesity.[9] In many developing nations, including the Gulf, socioeconomic transitions and increased life expectancy exacerbate the burden of non-communicable diseases (NCDs).[10] In the Gulf region, the oil discovery resulted in rapid urbanisation and socioeconomic development that have been associated with a rising prevalence of many chronic conditions, including obesity.[11] In the UAE, luxurious sedentary lifestyle, including physical inactivity and unhealthy eating habits, and some negative health behaviours like social gatherings that are mainly based on food feasts have greatly infiltrated the culture.[12] Similarly, in the Emirate of Dubai, the overall picture of health and disease has changed tremendously over the last two decades.[13]

As part of the continuous monitoring of the health of the population, the Dubai Health Authority has been conducting the Dubai Household Health Survey (DHHS) on a regular basis. This survey aims to measure several aspects of the population's health status, including service accessibility, satisfaction with care, health-related behaviours and chronic disease.

Currently, the prevalence of overweight and obesity is increasing at an alarming rate in Dubai. However, there is a paucity of knowledge to guide future policies and of research to bridge the gaps in the obesity epidemic in the adult population of Dubai. Therefore, this study aimed to assess the prevalence of overweight and obesity and determine the associated risk factors among adults in Dubai, UAE, using data from the DHHS 2019.

METHODOLOGY

Study setting and design

This was a cross-sectional study consisting of a secondary analysis of data from the latest version of the DHHS (2019). This population-based survey used a stratified multistage cluster sampling design. The sample population of the survey included all residents of Dubai. The survey design and methodology were adapted from the World Health Survey of the WHO after minor modifications. Randomly selected clusters were used as the primary sampling units in each population stratum. Within each stratum, a three-stage cluster sampling method was implemented. Families were randomly reached by withdrawing a specified number of initial units in each stratum in the first stage, and a specific number of households were withdrawn from each enumeration unit in the second stage. Each participant was assigned a sampling weight that was inversely proportional to the selection probability. The exact details of the survey methodology have been described and published elsewhere.[14]

The DHHS included 2247 families. The target population of this survey included Emirati and non-Emirati families. Only adults aged ≥18 years who underwent physical measurements were included in the present analysis. The total sample size included in this analysis was 2142 adults (+18 years). Individuals were interviewed to complete the questionnaire related to household sociodemographic information, health history and behavioural risk factors.

Variables

Standard operational definitions of the variables were adopted from internationally recognised standard practices. Outcome measurements were performed according to international standards using the WHO STEPwise approach for NCD examinations.[15] Robust inclusion and exclusion criteria were strictly applied to avoid potential biases. The sociodemographic variables analysed included age, marital status, nationality, education, occupation and work status. Marital status was classified as single or ever-married. Nationality was categorised into four groups: UAE-nationals, other Arabs (Arabs excluding UAE-nationals), Asians and Western combined with any other nationalities not classified earlier. Educational level was classified into three groups: less than secondary, completed secondary or high diploma, and university bachelor's degree or above. Occupations were classified based on the international standard classification of occupations and grouped into three major categories that include professionals, skilled and service workers and elementary or unskilled occupations.[16]

In addition, the study inquired about health behaviour risk factors, including smoking, physical activity status and alcohol use. Sufficient fruit and/or vegetable consumption was considered if the individuals consumed at least five servings/day. Physical activity status was defined as active or inactive according to the WHO recommendations of at least 30 min of regular, moderate-intensity physical effort for at least 5 days a week, totaling to 150 min.[17] The respondents were asked if they had used any type of tobacco in the past 30 days. Alcohol consumption was defined as any alcohol use during the month preceding the survey. The above-mentioned behavioural risk factors were then dichotomised as yes/no depending on the presence/absence of the risk factor in question.

Measures

Body weight was measured to the nearest 10 g, with the participants in a standing position without shoes and with light clothing using a digital electronic foot scale. Similarly, height was measured to the nearest 0.1 cm, with the participants in an upright position and the head in the

Table 1 Distribution of background characteristics and medical conditions among BMI categories for the adult population in Dubai

	Normal n (%)*	Overweight n (%)*	Obese n (%)*	P value†
Age group (years)				
18–29	415 458 (65.3)	154 370 (24.3)	636 144 (10.4)	<0.001
30–30	336 396 (39.4)	355 168 (49.4)	161 208 (18.9)	
40–49	139 024 (27.4)	250 989 (49.4)	117 963 (23.2)	
50–59	61 496 (28.0)	113 203 (51.6)	44 847 (20.4)	
60+	18 428 (24.8)	37 599 (50.6)	18 332 (24.7)	
Mean age in years (±SD)	33.22 (±10.1)	39.3 (±10.5)	39.6 (±10.9)	
Sex				
Male	722 049 (41.9)	715 868 (41.5)	286 000 (16.6)	<0.001
Female	248 754 (43.9)	195 460 (34.5)	122 664 (21.6)	
Nationality groups				
UAE-nationals	36 115 (30.6)	35 082 (29.8)	46 646 (39.6)	<0.001
Other Arabs	73 790 (30.7)	99 830 (41.6)	66 609 (27.7)	
Asians	779 090 (44.7)	707 924 (40.60)	254 821 (14.6)	
Western and other	81 808 (42.9)	68 492 (35.9)	40 587 (21.3)	
Education level				
less than secondary school	235 133 (41.2)	249 830 (43.8)	85 609 (15.0)	
Completed secondary school or earned a high school diploma	367 995 (48.8)	252 608 (33.5)	13 338 (17.7)	<0.001
Bachelor's degree and above	37 674 (38.1)	408 890 (42.3)	189 718 (19.6)	
Marital status				
Single	422 000 (63.1)	172 744 (25.8)	74 377 (11.1)	<0.001
Ever-married	548 803 (33.8)	738 584 (45.5)	334 288 (20.6)	
Current work status				
Not working	6759 (21.0)	11 646 (36.2)	13 770 (42.8)	<0.001
Working	11 380 (29.2)	23 733 (61.0)	3788 (9.7)	
Occupation				
Professionals	191 720 (31.4)	282 813 (46.3)	135 939 (22.3)	<0.001
Clerical and service workers	282 690 (42.6)	274 819 (41.4)	106 689 (16.1)	
Elementary and unskilled occupations	377 629 (53.5)	255 268 (36.1)	73 355 (10.4)	
Waist circumference (cm)				
Male	1 017 333 (80.72)	243 114 (19.28)		<0.001
Female	212 945 (62.91)	125 515 (37.09)		
Diabetes mellitus				
No	837 129 (47.5)	643 600 (36.5)	283 424 (16.1)	
Yes	133 674 (25.4)	267 728 (50.8)	125 240 (23.8)	<0.001
Hypertension				
No	728 854 (49.3)	569 756 (38.5)	181 097 (12.2)	
Yes	241 948 (29.8)	341 572 (42.1)	227 567 (28.1)	<0.001
Self-reported other chronic morbidities				
No	878 849 (44)	802 822 (40.2)	317 374 (15.9)	
Yes	91 954 (31.5)	108 506 (37.2)	291 751 (31.3)	<0.001
Total prevalence	723 736 (42.4)	678 940 (39.8)	302 244 (17.8)	

*The results are presented as weighted numbers and proportions for categorical variables.
†χ^2 test; BMI, p<0.05.
BMI, body mass index; UAE, United Arab Emirates.

Frankfort plane. Body mass index (BMI) was calculated by dividing the body weight in kilograms by the squared height in metres (kg/m^2). Obesity and overweight were defined according to the WHO standards.[18] Overweight was defined as a BMI ≥25.0 kg/m^2 and <30 kg/m^2. Obesity was defined as BMI ≥30 kg/m^2. Waist measurements were performed using a non-stretchable plastic tape. Waist circumference (WC) was measured at the midpoint

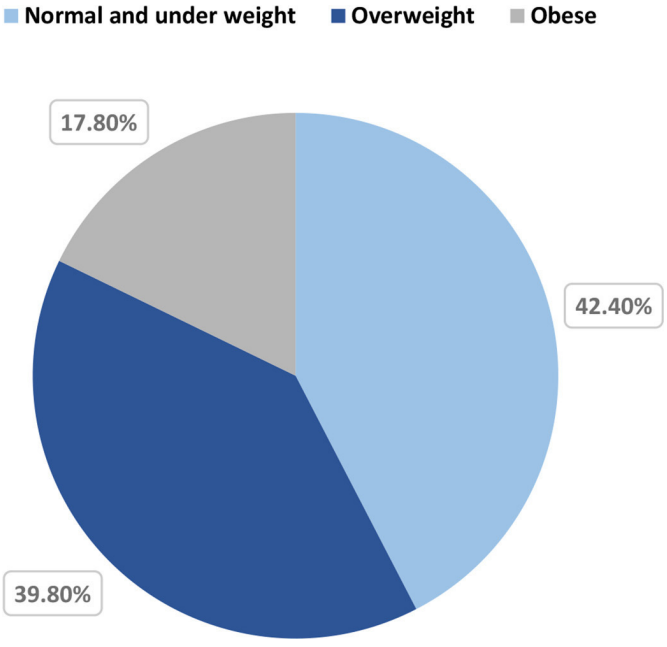

Figure 1 Distribution of body mass index categories among the adult population in Dubai.

between the lower margin of the lowest palpable rib and the top of the iliac crest. WC was defined as normal (<102 cm in men and <88 cm in women) or overweight/obese (≥102 cm in men and ≥88 cm in women).[19] Blood pressure (BP) was measured three times at 10 min intervals, with the readings being taken on the right arm in a sitting position using an electronic BP reader. The average of the three readings was used in the latest analysis. Hypertension was defined according to the latest American College of Cardiology definition.[20] Systolic BP ≥140 mm Hg was considered to be indicative of hypertension or high BP. Diastolic BP ≥90 mm Hg was considered to be indicative of hypertension. Hypertension was defined as self-reported high BP and/or newly diagnosed hypertension measured during the survey. Diabetes mellitus (DM) status was determined using a haemoglobin A1c (HbA1c) test. The cut-off values for the test were defined according to the WHO criteria, and HbA1c levels ≥6.5% indicated DM.[21] Individuals with self-reported DM were considered to have DM. Occupations were classified based on the international standard classification of occupations and were then regrouped into the professional group, skilled and service workers' group, elementary and unskilled occupations, and others group.[22] Taking the previously mentioned cut-offs, hypertension, DM and chronic diseases were then dichotomised as having/ not having the condition in question.

Statistical analysis

Data entry, coding, cleaning, weighing and analysis were performed using IBM-SPSS for Windows V.25.0 (SPSS). Using weighted methods, the percentage and central tendency±dispersion (mean±SD) were calculated as descriptive statistics for categorical and continuous variables, respectively. The Kolmogorov-Smirnov test was used to test the normality of continuous variables. Correlation coefficients were calculated to test the linear correlation between two continuous variables. Cross-tabulation was used to examine the independence between two categorical variables. Statistical analyses were performed using the χ^2 and Fisher's exact tests, when appropriate, for testing associations. Analysis of variance was used to compare the means of continuous data among the BMI categories. The Kruskal-Wallis test was used for data that were abnormally distributed. Binary logistic regression was used to predict factors that explain obesity among the studied population. The adjusted proportional OR with 95% CI was used to evaluate the strength of the statistical association between the explanatory and outcome variables. All tests were two sided, and statistical significance was set at $p<0.05$. A binary logistic regression model was fitted to test the research hypothesis regarding the relationship between the likelihood that obesity is explained by the analysed predictors, including sex, age, nationality, educational level, occupation and hypertension. The fitness of the model was approved as the omnibus for the test of the model, which produced a χ^2 statistic of 232.8 (df=13) and a $p<0.001$.

Patients and public involvement

No patients involved.

RESULTS

The study sample included 2142 adults who met the inclusion criteria (mean age=36.8±10.8 years, 61.2% male). Approximately half of the participants (52.3%) were Asian, nearly one-third (31.6%) were UAE-nationals, 8.6% were Arabs and the remaining were of Western/other nationalities (7.5%).

Table 1 and figure 1 show the distribution of the background characteristics and medical conditions by BMI category in the adult population of Dubai. The overall prevalence rate of obesity and overweight among adults in Dubai was 17.8% and 39.8%, respectively. Univariate analysis revealed that the prevalence rate of overweight and obesity was significantly different among different age groups, sex, nationality, marital status, educational attainment and occupation (all p values <0.001). Notably, a higher prevalence of obesity was observed in women than in men (21.6% vs 16.6%). Overweight was more prevalent in men (41.5%) than in women (34.5%). A trend towards a higher prevalence of obesity with increasing age was noted. Obesity was more prevalent among the older respondents (23.2% in the 40–49 years age group and 24.7% in the +60 years age group vs 10.4% in the 18–29 year (youngest) age group). The proportion of overweight individuals increased from 24.3% in the youngest age group (18–19 years) to 50.6% in the elderly age group (60+ years). Figure 2 illustrates the distribution of age groups by BMI categories and sex, showing an increase in the prevalence rate of obesity in females compared with that noted in males after 40 years of age.

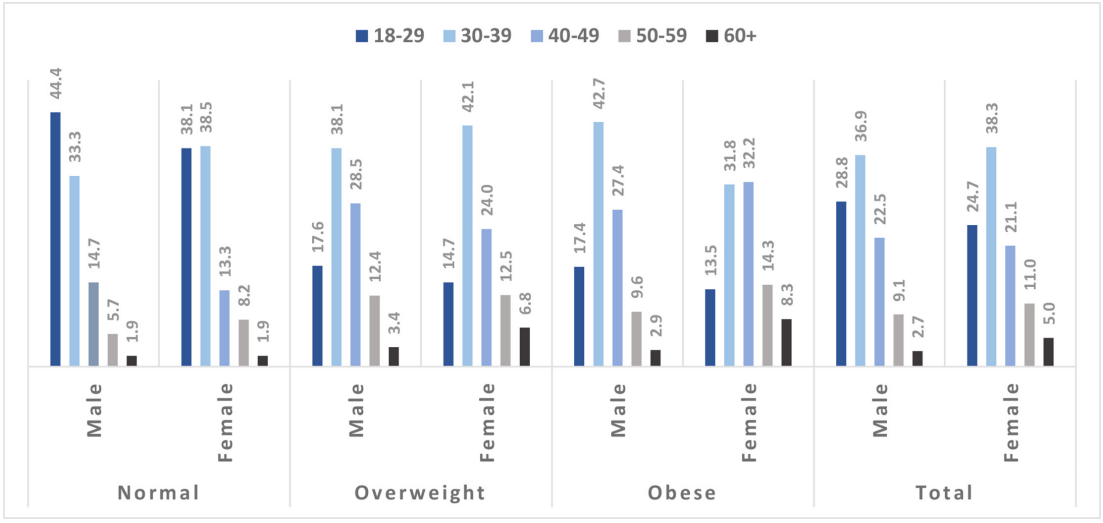

Figure 2 Distribution of age groups by body mass index categories and sex (%).

Notably, UAE-nationals reported the highest frequency of obesity (39.6%). However, Arabs non-nationals had the highest frequency of overweight (41.6%) among adults of all other nationality groups. Ever-married individuals had a higher prevalence of both overweight (45.5%) and obesity (20.6%) than single individuals. Individuals who were currently working had significantly lower obesity rates than non-workers (9.7% vs 41.0%), and among individuals currently working, professionals reported the highest prevalence of both overweight and obesity (46.3% and 22.3%, respectively). A trend towards a greater prevalence of obesity with increasing educational attainment was noted (15% in lower secondary education vs 19.6% in bachelor's degree and higher). Additionally, the proportion of overweight and obese individuals, as defined by WC, was significantly higher among women than among men (38.0% and 19.3%, respectively).

Among those with DM in this survey, 50.8% were overweight and 23.8% were obese. Hypertensive subjects were more likely to be overweight (42.1%) and obese (28.0%) than normotensive subjects. Individuals who self-reported any chronic morbidities were twice as likely to be obese as those who did not report chronic morbidities (31.3% and 15.9%, respectively). The associations between medical conditions and different BMI categories were significant (p<0.001).

The behavioural risk factors by BMI categories are shown in table 2. Univariate analysis was performed to analyse tobacco consumption, sufficient consumption of fruits and vegetables, alcohol consumption and physical activity by BMI categories. Significant association between the behavioural risk factors and the prevalence of overweight and obesity were noted among the adults in Dubai (p<0.001).

Table 2 Behavioural risk factors by BMI categories among the adult population in Dubai

	Normal weight n (%)*	Overweight n (%)*	Obese n (%)*	P value†
Current tobacco consumption				
No	19 579 (37.5)	16 798 (32.2)	15 834 (30.3)	
Yes	194 880 (47)	141 444 (34.1)	78 339 (18.9)	<0.001
Alcohol				
No	762 722 (42.1)	722 159 (39.8)	328 013 (18.1)	
Yes	204 099 (43.2)	187 741 (39.7)	80 651 (17.1)	<0.001
Sufficient fruits and vegetables				
No	676 884 (43)	619 735 (39.4)	277 264 (17.6)	
Yes	293 919 (41)	291 593 (40.7)	131 400 (18.3)	<0.001
Physical activity				
No	243 866 (41.6)	235 588 (40.2)	106 421 (18.4)	
Yes	726 936 (42.6)	675 740 (39.6)	302 244 (17.8)	<0.001

*The results are presented as the weighted number and proportion for categorical variables and as the mean and SD for continuous variables.
†χ^2 test; BMI, p<0.05.
BMI, body mass index.

Table 3 Logistic regression analysis of the risk factors associated with obesity compared with normal weight

	Adjusted OR (95% CI)	P value*
Age group (years)		
18–29	Reference	
30–39	1.26 (0.46 to 3.50)	0.651
40–49	3.38 (1.27 to 9.05)	0.015
50–59	4.30 (1.57 to 11.78)	0.004
60+	3.94 (1.34 to 11.62)	0.013
Sex		
Male	Reference	
Female	1.62 (1.10 to 2.39)	0.014
Nationality group		
Western and other nationalities	Reference	
UAE nationals	2.09 (1.19 to 3.68)	0.011
Other Arabs	3.62 (2.41 to 5.44)	0.019
Asians	1.98 (1.12 to 3.50)	<0.001
Educational attainment		
Less than secondary school	Reference	
Completed secondary school or earned a high school diploma	1.33 (0.76 to 2.33)	0.314
Bachelor's degree and above	1.31 (0.87 to 2.00)	0.198
Occupations		
Professionals	Reference	
Clerical and service workers	4.50 (2.54 to 8.00)	<0.001
Elementary and unskilled occupations	2.57 (1.56 to 4.25)	<0.001
Hypertension		
No	Reference	
Yes	3.96 (2.86 to 5.65)	<0.001

*p<0.05.
UAE, United Arab Emirates.

Multivariate logistic regression analysis indicated that advanced age, female sex, nationality, hypertension and occupation of the individuals were significantly associated with obesity (compared with normal weight), as shown in table 3. The model revealed that 65% of obesity was explained by nationality, education, occupation, and hypertension after being adjusted for age and sex. Compared with individuals in the reference group (18–29 years), those aged 40–49 years, 50–59 years and 60+ years had a greater risk of obesity ((OR 3.38; 95% CI 1.26 to 9.04), (OR 4.30; 95% CI 1.57 to 11.78) and (OR 3.94; 95% CI 1.33 to 11.61), respectively). Women had a slightly higher prevalence of obesity than men (OR 1.62; 95% CI 1.10 to 2.38). In terms of nationality groups, UAE-nationals, other Arabs and Asians were more likely to be obese than those in the reference group of Western/any other nationalities not classified earlier ((OR 2.08; 95% CI 1.18 to 3.67), (OR 3.61; 95% CI 2.40 to 2.40) and (OR 1.98; 95% CI 1.12 to 3.50), respectively). Clerical and service workers and elementary and unskilled workers had a higher risk of obesity than professionals ((OR 4.50; 95% CI 2.53 to 7.99) and (OR 2.57; 95% CI 1.56 to 4.24), respectively). Hypertensive individuals had a fourfold higher risk of obesity than normotensive individuals (OR 3.96; 95% CI 2.85 to 5.64). Educational attainment was not significantly associated with obesity.

DISCUSSION

Prevalence of overweight and obesity

The findings of our study highlight the significant burden of overweight and obesity among adults in Dubai. We found that nearly 6 in every 10 adults in Dubai (57.6%) were either overweight or obese (BMI ≥25 kg/m^2), out of them, 17.8% were obese (BMI ≥30 kg/m^2). In addition, females had higher rates of obesity than males, and the highest obesity rates were reported among UAE-nationals (39.6%), followed by Arabs (27.7%). Notably, the proportion of overweight and obese adults in Dubai was lower than the national average proportion for the UAE population (67.9% and 27.8%, respectively).[23] This might be due to the different dynamics, demographics and lifestyles of the Dubai population compared with the populations in other parts of the UAE.[24] In terms of population dynamics, Dubai has a unique population structure with a skewed ratio of males to females (approximately 75% of the population being male workers).[25] In addition, Dubai is one of the fastest-growing cities in the world, with a quite young age structure of its migrant population.[24]

The obesity rates of our population are comparable with those reported for populations in other countries for example the USA, China and some European countries.[5 6 26–28] Remarkably, the prevalence of obesity among adults in Dubai was lower than the latest WHO estimates (range: 22.9%–37%) in the neighbouring Gulf states, including Kuwait, Saudi Arabia, Qatar and Oman.[29] The differences observed in the obesity rates between our study and the populations analysed in the previously mentioned studies can be explained by variations in dietary or lifestyle factors, and cultural and socioeconomic differences. In addition, a direct comparison of obesity rates in Dubai with those of other population groups is hampered by the use of different data types (eg, measured vs self-reported) and the methodologies applied. Moreover, the prevalence of overweight in Dubai was higher than the WHO global average prevalence in 2016 (39%). However, the present figures for overweight in Dubai were found to be much lower than the published estimates (range: 69.0%–72.1%) for some neighbouring Gulf States, including Kuwait, Qatar, and Saudi Arabia.[30] Prevalence data are important for physicians, researchers and policy makers interested in screening and developing cost-effective interventions for at-risk populations.

The findings of our study demonstrate that the proportion of overweight and obese individuals, as defined by WC thresholds, was significantly higher among women than among men (38.0% vs 19.3%). The discrepancy between these measures and the obesity rates detected by BMI might indicate the need for more ethnicity-specific WC thresholds.[31] Future studies are needed to address the agreement between overweight and obesity

classifications by BMI categories and the WC thresholds in the adult population of Dubai. Evidence suggests that the WC increases beyond what is anticipated according to BMI category across populations.[32]

Risk factors associated with obesity

After adjusting for confounding variables, a significant association between obesity and older age, female sex, nationality groups, hypertension and occupation categories was shown in this study. In our study population, age was significantly associated with obesity compared with the reference population, especially in the age groups of 40–60+ years. The literature has shown that obesity rates have increased in all age groups, although the prevalence of obesity is generally greater in older people.[27 33–36] Data on the decreased weight among the eldest are controversial[37]; however, this relationship could not have been studied in our population due to data limitation. Hormonal changes, a decrease in metabolism and a less active lifestyle associated with the ageing process would increase the risk of obesity in elderly people.[38] The present data indicate that the female sex is significantly associated with obesity. The sex difference in obesity has been widely observed in previous studies.[37 39 40] The reason for the high obesity rate among females is related to many factors, including pregnancy, hormonal and less physical activity among females than among males. This was also confirmed by our finding of the sustained higher rates of obesity in women compared with men in those 40+ years.[40 41] Therefore, preventive efforts need to focus on female groups to address this gap.

After adjusting for confounding variables in the present analysis, we observed that UAE nationals, Arab non-nationals and Asians had a higher risk of obesity than Westerns and those of any other nationalities. A milestone UAE-based survey conducted in 2013 revealed high prevalence rates of overweight and obesity (43.0% and 32.3%, respectively) among expatriate residents, with the highest proportion of obesity being in other Arabs (non-UAE nationals).[22] A strong association between ethnicity and obesity has been reported in other studies,[40 42–44] lending further support to our results. A wide-scale USA national survey that examined different racial and ethnic groups found large ethnic disparities in obesity prevalence among their population. The results of the survey revealed that African Americans (36.1%) and Latinos (33.6%) had a three-time higher prevalence of obesity than Asians (9.8%). While obesity was prevalent in one-fifth (22.0%) of Americans with white ethnic backgrounds.[45] Additionally, Hiuge-Shimizu *et al* observed that the rate of visceral fat accumulation differs according to the ethnic background and sex of individuals which can be due to the genetic predisposition to obesity.[46] Evidence exists supporting this finding in several nations; those of higher socioeconomic status tend to have higher rates of obesity.[47–49] Further longitudinal research is needed to study the association between ethnicity and obesity among the Dubai population.

The present study supports the higher prevalence of obesity among hypertensive participants. In agreement with our findings, results from international and regional studies have confirmed the association between obesity and hypertension.[50–54] An explanation for this association is that excessive atherosclerotic changes and visceral adiposity associated with obesity may play a major role in the occurrence of hypertension.[55 56] It is worth mentioning that, in the present analysis with a fully saturated logistic regression model, DM was masked by the effect of hypertension (because of the comorbidity status). DM status was omitted from the model because of the comorbidity of hypertension.

The present findings unexpectedly revealed that clerical and service workers, and elementary and unskilled workers had a higher risk of obesity than professional workers. There is inconsistency in research findings on the relationship between job categories and overweight or obesity.[57 58] Research has shown that job categories have different characteristics which might be associated with gaining weight.[59] In favour of our findings, studies have shown that physical strain, working hours and other work conditions are associated with overweight and obesity.[58 60 61] Our results can also be explained by the fact that, within Dubai population, those who work in more professional positions usually earn a higher income, and they may adopt a healthier lifestyle than those in other groups of workers.

The strength of the present study lies in the novel data collected under the close monitoring and quality control procedures applied in conducting this survey. Furthermore, this is the first study to address the prevalence of overweight and obesity, as well as their associated factors, using a sampling technique that represents the total adults in Dubai. These data and the results from this study can be used in the future to conduct a trend analysis and monitor the health status of the Dubai population.

However, it is important to acknowledge the limitations of this study. The temporality between predictors and obesity could not be established because of the cross-sectional design of the study. Furthermore, some important associated factors, such as dietary intake and cholesterol level, were not assessed in this study. There may be under-reporting of some behavioural risk factors, such as smoking status and alcohol consumption, due to cultural reasons. As this study was based on secondary data from the DHHS and was limited to the adult population in Dubai, we cannot generalise the results to the general population in the UAE.

CONCLUSIONS

The findings of this study provide important insights into the burden of overweight and obesity in the Dubai population and contribute to the limited available research in this field. These results will help in establishing targeted policies and prevention programmes to combat obesity in certain segments of the Dubai population. Enhancing

the quality of existing programmes or launching new programmes relevant to the targeted population is recommended. A comprehensive strategic initiative to control obesity, which might include nutrition, exercise and increasing community awareness, needs to be prioritised in the governmental health agenda. We recommend performing a prospective study that includes an analysis of all dietary and lifestyle factors to assess their direct associations with overweight and obesity. Furthermore, investigating the pattern of obesity and its associated risk factors among UAE nationals is crucial and recommended in future studies, as they bear a much higher burden of obesity than other nationalities.

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