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Research Article

High Frequency of Overweight and Obesity in Saudi Community. A Cross Section, Single Centre Study

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Abstract

Objective

The problem of obesity extends globally. We designed this study to determine the frequency of overweight and obesity among Saudis.

Methods

Cross section study for patients older than 12 years old at the department of endocrinology at King Fahad Armed Forces Hospital between January 2018 to December 2019.

Results

We included 4920 patients. There were 1486 (30.2%) male and 3434 (69.8%) female. There was an increase in the body mass index (BMI) with age in both gender, up to the age of 59 years, with a

decrease occurring thereafter. BMI was lower in males below 20 years of age. BMI in females older than 50 years old was higher than in males of corresponding ages. There was a statistically significant correlation between age and BMI (r=0.2, P<0.0001). There were several differences in the prevalence of obesity (BMI ≥ 30) and overweight (BMI = 25-29.9) in the different age groups.

The frequency of BMI ≥ 25 was 81.4%. The frequency of BMI ≥ 25 was higher in females compared to males, 83.5% and 77.3% respectively, p<0.0001. The frequency of BMI ≥ 30 was 54%. The frequency of BMI ≥ 30 was higher in females compared to males, 46.3% and 57.4% respectively, p<0.0001. The frequency of overweight was higher in males compared to females, whereas the reverse was true for obesity, where 69.2% of the total female population was obese compared to 60.1% of male population.

Conclusion

The prevalence of overweight and obesity is high among Saudis and might represent a public health problem.

Introduction

Obesity, and overweight are both defined as excessive accumulation of fat in the body [1,2]. Recent publications have shown that obesity has progressively higher morbidity and mortality and it is a major medical and public health problem world-wide and ultimately may cause several health conditions like type 2 diabetes mellitus, insulin resistance, hyperlipidemia, cardiovascular and cerebrovascular diseases, hypertension, gallbladder disease and nonalcoholic steatohepatitis [3-6]. Obesity is an epidemic all around the world. The rising trend is not confined to the developed world, and it is predicted that a majority of adult population would be either obese or overweight by 2030 [7]. There was a significant increases in the prevalence of overweight and obese individuals in developing countries including Saudi Arabia [8-18]. Over the past few decades, Saudi Arabia has one of the highest obesity and overweight prevalence rates [19]. Obesity in Saudi Arabia is a major cause of concern, where 70% of people are experiencing the problem. A variety of factors influence the rate of obesity including age, socioeconomic factors and a lack of physical activity [20,21]. It was argued that data on obesity related to Saudi Arabia is non-existent [6]. Our understanding of such issues will help us to plan for improving our abilities to manage such cases. We designed a cross-sectional study to estimate the frequency of overweight and obesity in Saudi population in Jeddah, West province of Saudi Arabia.

Methods

We conducted a cross section study between January 2018 to December 2019 at the endocrinology department of King Fahad Armed Forces Hospital, Jeddah, Saudi Arabia. Patients were older than or equal 20 years old. Weight (kg) and height (cm) were measured by registered nurses. Overweight and obesity were defined as Body Mass Index (BMI) 25-29.9 and ≥ 30.0kg/m^2 respectively [22]. The total number of subjects were separated on basis of age values into 6 groups; <20 years, 20 - 29 years, 30 - 39 years, 40 - 49 years, 50 - 59 years and ≥60 years. The study was approved by the ethical board of King Fahad Armed Forces Hospital.

Statistical Analysis

Continuous variables were described using means and Standard Deviations. Univariate analysis of demography between and within groups was accomplished using unpaired t-test and Chi square test were used for categorical data comparison. Pearson correlation was used for correlation between variables. P value <0.05 indicates significance. The statistical analysis was conducted with SPSS version 22.0 for Windows.

Results

4920 patients were included. There were 1486 (30.2%) male and 3434 (69.8%) female. The males and females were categorized according to age into different groups and the mean and standard deviation of BMI were calculated, table 1. An increase in BMI of both gender with age, up to the age of 59 years, with a decrease occurring thereafter. BMI was lower in males younger than 20 years old. BMI in females older than 50 years old was higher than in males. The age curves separated after the age of 30 and persisted thereafter, figure 1. There was a statistically significant correlation between age and BMI (r=0.2, P<0.0001), figure 2.

Table 1: *Body mass index (mean ± Standard Deviation) of patients stratified by age and gender*

Age (years)	Total		Male		Female		P
	Number	BMI	Number	BMI	Number	BMI	
<20	279	23.0 ± 7.4	138	21.9 ± 6.9	141	24.1 ± 7.8	0.01
20-29	381	26.6 ± 7.1	75	26.4 ± 8.0	306	26.7 ± 6.9	0.7
30-39	782	31.2 ± 7.2	140	30.7 ± 5.7	642	31.4 ± 7.1	0.3
40-49	884	32.2 ± 6.9	236	31.5 ± 7.1	648	32.4 ± 6.7	0.08
50-59	985	32.6 ± 6.3	309	31.2 ± 5.4	676	33.3 ± 6.6	<0.0001
≥60	1609	31.8 ± 6.1	588	30.1 ± 5.5	1021	32.7 ± 6.1	<0.0001
Total	4920	31.0 ± 7.1	1486	29.6 ± 6.8	3434	31.6 ± 7.1	<0.0001

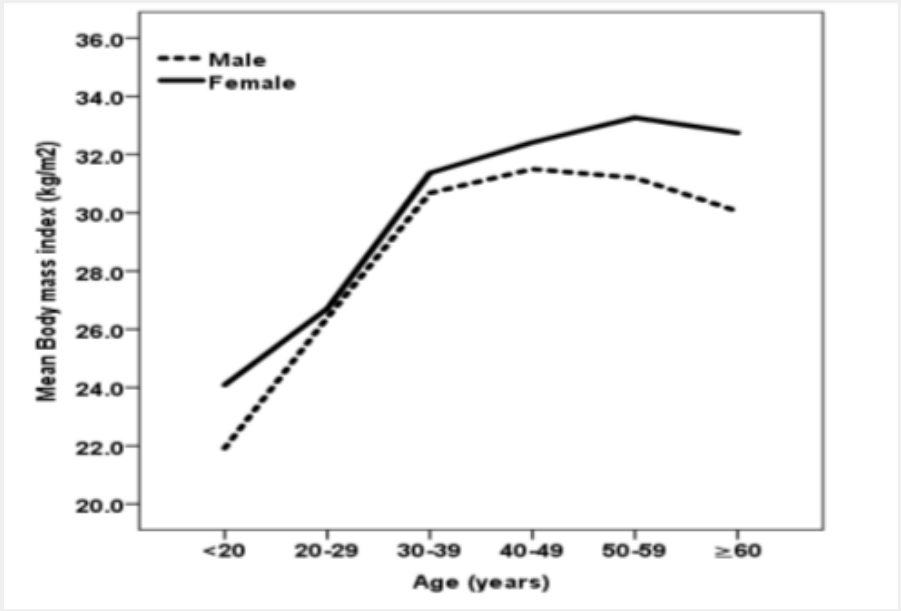

Figure 1: *Mean body mass index and different age groups*

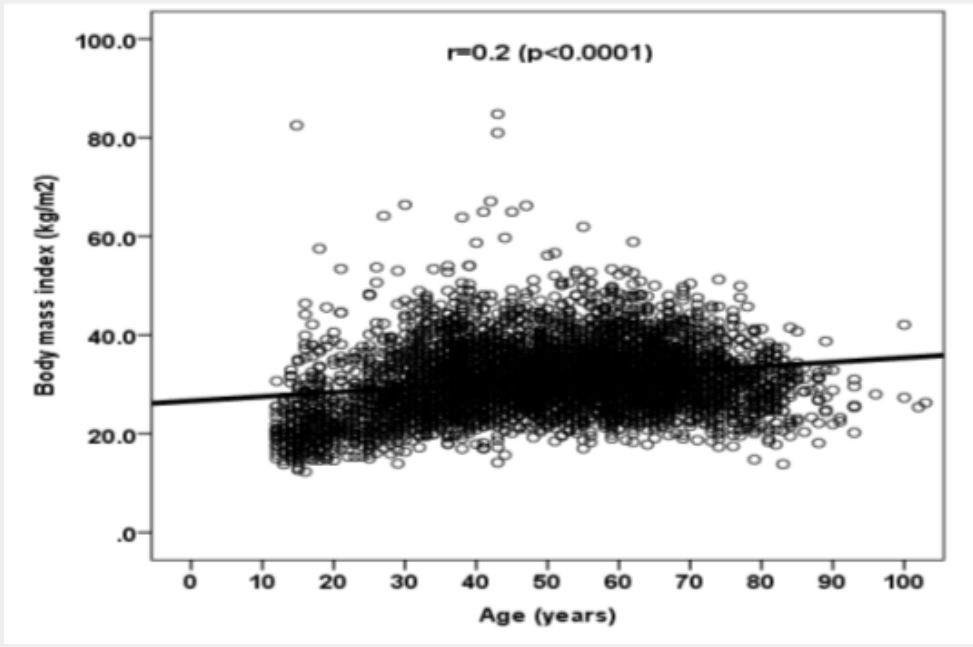

Figure 2: *Correlation of body mass index to age*

There were several differences in the prevalence of obesity (BMI ≥ 30) and overweight (BMI = 25-29.9) in the different age groups, table 2. In most of the areas, overweight and obesity were more common in the females compared to males.

Table 2: *Prevalence of patients (%) stratified by body mass index categories to age and gender*

	Age groups (years)						Gender		
Body mass index	<20	20-29	30-39	40-49	50-59	≥60	Male	Female	Total
<18.5	68(24.4)	28(7.3)	5(0.6)	7(0.8)	2(0.2)	9(0.6)	56(47.1)	63(52.9)	119(2.4)
18.5-24.9	130(46.6)	148(38.8)	158(20.2)	86(9.7)	94(9.5)	181(11.2)	284(35.6)	513(64.4)	797(16.2)
25-29.9	47(16.8)	108(28.3)	215(27.5)	266(30.1)	251(25.5)	458(28.5)	458(34.1)	887(65.9)	1345(27.3)
30-34.9	16(5.7)	51(13.4)	186(28.3)	276(31.2)	327(33.2)	524(32.6)	418(30.3)	962(69.7)	1380(28.0)
35-39.9	12(4.3)	31(8.1)	120(15.3)	163(18.4)	193(19.6)	277(17.2)	179(22.5)	617(77.5)	796(16.2)
≥40	6(2.2)	15(3.9)	98(12.5)	86(9.7)	118(12.0)	160(9.9)	91(6.1)	392(11.4)	483(9.8)
Total	279	381	782	884	985	1609	1486	3434	4920

The frequency of BMI ≥ 25 was 81.4%. The frequency of BMI ≥ 25 was higher in females compared to males, 83.5% and 77.3% respectively, p<0.0001. The frequency of BMI ≥ 30 was 54%. The frequency of BMI ≥ 30 was higher in females compared to males, 46.3% and 57.4% respectively, p<0.0001. The frequency of overweight was higher in males compared to females, whereas the reverse was true for obesity, where 69.2% of the total female population was obese compared to 60.1% of male population, figure 3.

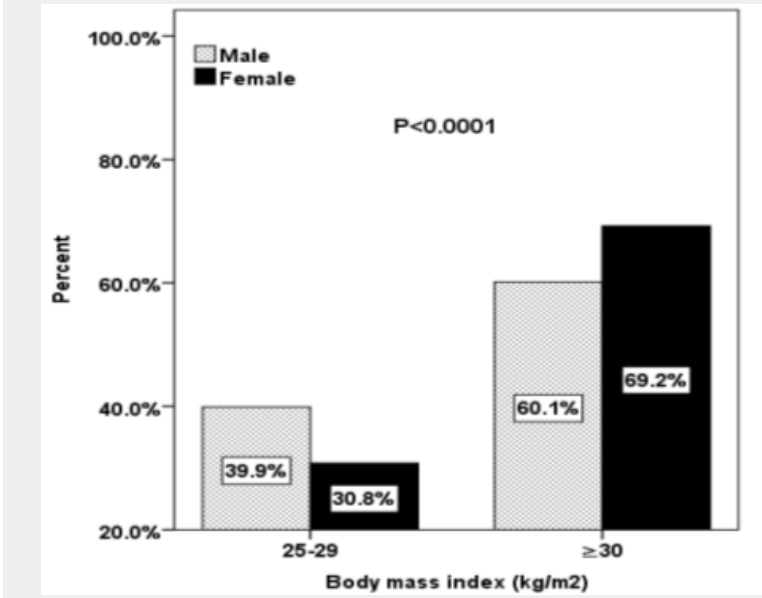

Figure 3: *Frequency of overweight and obesity to gender*

Discussion

We showed that overweight and obesity are prevalent among Saudis. There is a gradual increase in BMI with age in consistent with other studies [23-25]. The increase in overweight and obesity levels with age is of concern, as it has been shown that obese elderly are more likely to present with major chronic health conditions [25].

We have shown that obesity were more prevalent among females than males and the difference was evidently more in patients older than 30 years old. The Asia Pacific Cohort Studies Collaboration reports prevalence rates ranging from less than1% to higher than 20% for countries in the Asia-Pacific region [26]. According to National Health and Nutrition Examination Survey of the United States, the prevalence of obesity in individuals aged 20-74 years was 34% in females and 31.7% in males [27]. The corresponding figures in Australia were 19% and 17%, respectively [28]. In the United Kingdom, the prevalence of obesity was estimated to be 24.2% in females and 23.7% in males [29]. The results from most of our neighboring countries, including Oman, 23.8% in females and 16.7% in males [30]. Lebanon, 18.8% in females and 14.3% in males [31], Turkey as well, the prevalence of obesity is higher in females 24.6% vs. 14.4% in males [32] and Iran, the prevalence of obesity to be 22.3% among Iranian adults (30.6% in females and 14.2% in males [33]. In Saudi Arabia, the National Epidemiological survey among Saudi subjects over the age of 15 years in different regions of Saudi Arabia showed the prevalence of overweight among male subjects was significantly higher than for female subjects (29% vs. 27%), and the prevalence of obesity among female subjects was significantly higher than for male subjects (24% vs. 16%).17 A community-based national epidemiological health survey, conducted by examining Saudi subjects in the age group of 30-70 years of selected households over a 5-year period between 1995 and 2000 showed that the prevalence of obesity was 35.6% and females are significantly more obese with a prevalence of 44% than males 26.4% [18].

The results of this study have three important implications for national obesity prevention and management programs. First, it appears that overweight and obesity prevalence rates will continue to rise in the Saudis over the next decade. Even if incidence rates were flat or declining, prevalence rates would continue to rise. This means that the health care should start preparing to provide the prevention and support services. These include healthy life programs, dietary counseling services, and enhanced infrastructure at the community level. Second, population-based primary prevention programs need to be implemented. Because obesity appears to be closely related to the adoption by people of many aspects of the modern lifestyle including diet and low levels of physical activity, prevention programs that draw upon. Third, the reason for the higher prevalence of obesity in Saudi women observed in this study also needs to be better understood.

Results of our investigation must be interpreted in light of some limitations such as the cross-sectional design, which does not let to establish any causal relation with respect to overweight and obesity state and only provides mere associations. Considering the goal population, a larger cohort would have probably provided a greater power of the statistical analyses

Conclusion

In conclusion, we have demonstrated an epidemiological information on the extent of obesity as a health problem and the value of having accurate population-based information on the epidemiology of overweight

and obesity in our population in the future. By providing information on the trajectory and the geography of the overweight and obesity in our population, it provides important clues as to the magnitude and structure of the primary and secondary intervention programs that will be required to effectively manage this disease.

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