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Research Article

The Prevalence and Determinants of Obesity among Physicians in Primary Health Care Centers in Jeddah

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Abstract

Introduction: Overweight and Obesity are well documented in the literature. Their high prevalence rates and the high risk of developing chronic non-contactable diseases such as cardiovascular diseases, diabetes, hypertension, and hyperlipidemia are also well known. Furthermore, there has been an increase in the prevalence of obesity and overweight in Saudi Arabia in particular. However, there is very limited information about the prevalence of these two terms among healthcare physicians in Jeddah in Saudi Arabia. Therefore, we conducted this study in order to estimate the prevalence of obesity among physicians in Jeddah and to document any significant risk factors.

Materials and Methods: This cross-sectional survey study was conducted from 1st of June to the 1st of September 2018 among non-pregnant physicians of both genders in Jeddah. Eligible individuals were given a self-administered questionnaire to fill. The questionnaire included the body mass index data, diet and food habits, and physical activity in general.

Results: A total of 202 physicians comprised our population. The mean weight was 72.75 ± 18.55 kg, whereas, the mean height was 165.69 ± 8.93 cm. The mean body mass index (BMI) for all physicians was 26.3 ± 5.35 Kg/m^2. The prevalence of obesity was 23% and overweight was 32%. Impaired physical activity was noted in the majority of subjects (82%), while fully active subjects were 18%. From all analyzed risk factors, male gender (P-value = 0.002) and increase in age (P-value = 0.001) were the only significantly correlated factors. Among nutritional items, only soft drinks without sugar was significantly correlated with overweight and obesity (P-value < 0.05). As regards the level of physical activity, no significant correlated with obesity was noted (P-value = 0.83).

Conclusion: There is a high prevalence of obesity among healthcare workers in Jeddah which should be cautiously addressed in further work and prevention programs.

Keywords: *Obesity; Overweight; Physicians; Healthcare; Jeddah*

Abbreviation

BMI: Body Mass Index; CVD: Cardiovascular Diseases; GPPAQ: General Practice Physical Activity Questionnaire; PHCCs: Primary Health Care Centers; SPSS: Statistical Package for Social Science

Introduction

Obesity and overweight are defined as abnormally excessive fat accumulation that may affect an individual's health. In 2016, more than 1.9 billion adults were reported to be overweight, of those more than 650 million were obese. Among the adult population, around 39% (39% of men and 40% of women) were overweight. Overall, about 13% of the world's adult population (11% of men and 15% of women) were found to be obese in 2016. From 1975 to 2016 the prevalence of obesity almost tripled worldwide [1].

In Saudi Arabia, there is an increasing trend in the prevalence of overweight and obesity, which also, in turn, increased the incidence of various diseases [2]. According to the data of World Atlas, Saudi Arabia was ranked fourteen of the most obese countries. Therefore, more efforts and plans should be advised to counter the increasing obesity in Saudi Arabia [3].

Obesity widely known to be linked to many serious health conditions such as hypertension, cardiovascular diseases (CVD), stroke, diabetes, sleep apnea, asthma, osteoarthritis, and various types of cancer [4-8]. Besides its physical effects, obesity increases the risk of depression, and vice versa depression [9].

Obesity is influenced by dietary habits and people who consume a low amount of fruits and vegetables and 3 or more servings of meat per day are more prone it. Individuals with diabetes or hyperlipidemia are more likely to be obese. Among women, the risk of obesity has been reported to increase with age or marital status [10]. Additionally, inadequate sleep appears to be a risk factor for obesity [11].

The control of obesity is not a sole issue of a certain party or governmental institution, however, its responsibility is the issue of the whole process; the educational sector, private sector, and civil society, where all of them should play a role in defending obesity and trying to prevent it accordingly [12]. Obesity is a preventable disease and the physical activity is part of the solution for the ongoing obesity crisis [13].

As regards this issue, current knowledge and studies conducted among physicians, as a target of obesity, in the region of Jeddah remains very limited. Therefore, we conducted this investigation in order to estimate the prevalence and identify the risk factors of obesity among physicians in Jeddah, Saudi Arabia.

Methods

This cross-sectional analytic study was carried out among physician in primary health care centers in the region of Jeddah, Saudi Arabia. Jeddah is considered the second largest city in Saudi Arabia and the biggest city in the Makkah region. It is an important commercial center and the principal gateway to Makkah, the holiest city of Muslims. Jeddah is located along the Red Sea with an estimated population around 4 million individuals. There are 47 primary health care centers (PHCCs) across Jeddah which are further divided into 5 sectors, each sector linked to a governmental hospital. From 1st June 2018 to 1st September 2018, all physicians working at any PHCC in the Ministry of Health in Jeddah were considered eligible for participation into our investigation. All physicians of both genders, all degrees, and all nationalities were included, while physicians who were pregnant at the time of the study were excluded.

Literature shows that the prevalence of overweight and obesity in Saudi Arabia is around 50%. Taking this value into account and using (Raosoft) software program, while knowing that the accepted margin of error is 5% and the confidence level is 95%, the calculated sample size would be (197 samples) and 10% will be added to compensate for not respondents. The selection process of physicians in PHCCs followed a stratified random sampling technique. PHCCs in Jeddah are divided into 5 sectors; therefore, by simple random sampling, we selected 5 centers from each sector. Eligible physicians were interviewed on the day of data collection.

A validated self-administered questionnaire was used to collect related data about obesity and its risk factors from eligible participants. The data collection tool consisted of 3 parts. The first included demographic data, physicians' history of smoking, and chronic diseases such as diabetes, hypertension, bronchial asthma, dyslipidemia, and CVD. The second part was mainly a food-diet frequency questionnaire, while the third part was about general practice physical activity.

The study protocol was approved by the Ethics committee (Institutional Review Board) of the Ministry of Health and Joint Program of Family Medicine. Prior to the collection of any information, participants were informed about the aim of the study and an informed consent form was obtained from each participant. All questions were thoroughly illustrated and made clear to the respondents.

A pilot study was conducted on 10% of the sample size. The purpose was to test the feasibility of the study and the clarity of data collection tools. The data obtained were analyzed and used in applying any necessary modifications prior to finalizing the data collection tools.

Statistical analysis

All data were retrieved from participants and entered into a standardized Excel sheet. Complete data were then entered into Statistical Package for Social Science (SPSS- Version 23) for analysis. For binary categories we used the chi-square test, while for categories more

than two variables we used the Fisher exact test. As regards the correlation between the nutritional habits and overweight and obesity, we used the fisher exact test to evaluate the relationship between nutritional items and the categories of body mass index. A p-value of 0.05 was the cut-off point for statistical significance.

Results

We planned to select the PHCCs randomly, however, that was not feasible because the randomly selected centers had not enough consenting individuals. So, we invited 220 physicians from conveniently selected PHCCs in Jeddah who were fulfilling the inclusion criteria and eventually 202 subjects consented to participate in the survey and completed the questionnaire.

A total of 111 (54.95%) physicians were less than 30 years old; 77 (38.12%) were between 30 and 39 years old; 14 (6.93%) were 40 years old or older. Females represented 51% and males 49%. One hundred sixty-two respondents (62.38%) were married, 70 (34.65%) were single, 5 (2.48%) were divorced and 1 (0.5%) was widow. Regarding citizenship status, the vast majority were Saudis 193 (95.54%). General practitioners were 147 (72.77%), while family medicine specialists and consultants were 45 (22.28%) and dentists were 10 (4.95%).

A total of 184 (91%) participants declared negative history of obesity and any commonly associated comorbidities namely diabetes mellitus, dyslipidemia, hypertension or ischemic heart disease. On the other hand, dyslipidemia was the most frequently reported comorbidity followed by hypertension, diabetes mellitus and ischemic heart disease, respectively. Demographic characteristics of recruited participants are summarized in table 1.

Attribute	Number	%
Study Subjects	202	100%
Age group		
< 30	111	55.0%
30 - 39	77	38.1%
40 - 49	10	5.0%
50 - 59	4	2.0%
Sex		
Male	99	49.0%
Female	103	51.0%
Marital Status		
Single	70	34.7%
Married	126	62.4%
Divorced	5	2.5%
Widowed	1	0.5%
Occupational Status		
GP	147	72.8%
Specialist	40	19.8%
Consultant	5	2.5%
Dentist	10	5.0%
Nationality		
Saudi	193	95.5%
Non-Saudi	9	4.5%
Comorbidities		
Diabetes mellitus	6	3.0%
Dyslipidemia	12	5.9%
Hypertension	7	3.5%
Ischemic heart disease	1	0.5%

Table 1: *Demographic data of study population.*

The mean weight of the participants was 72.75 ± 18.55 kg, whereas, the mean height was 165.69 ± 8.93 cm. The mean body mass index (BMI) for all subjects was 26.3 ± 5.35 Kg/m^2. The highest reported BMI among study population was 45.1 Kg/m^2. Five subjects (2.5%) were found to be underweight. The prevalence of obesity in our study was (23%) and overweight was found to be (32%) (Figure 1). More than half of the participants had abnormally increased body mass index.

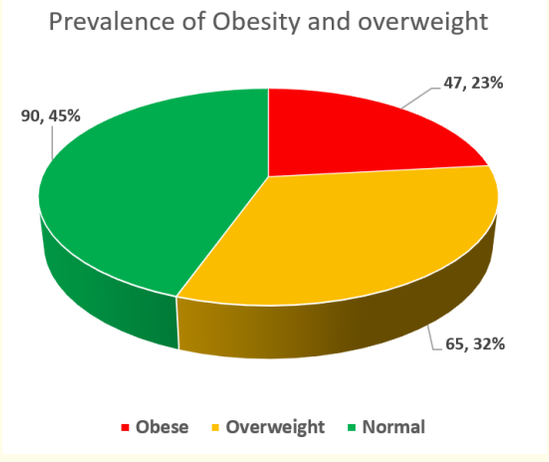

Figure 1: *Prevalence of obesity and overweight among study population. (Normal: < 25 kglm^2; Overweight 25 to < 30 kglm^2; Obese > 30 kglm^2).*

The questionnaire evaluated the nutritional habits of the study participants regarding different liquid or solid food items and the frequency of their consumption. Results are summarized in table 2.

Food Item	Frequency of Consumption				
	Never, n (%)	1 - 3/Month, n (%)	1 - 3/Week, n (%)	4 - 6/Week, n (%)	> 1/Day, n (%)
Full Fat Milk	58 (29)	69 (34)	42 (21)	20 (10)	13 (6)
Low Fat Milk	62 (31)	53 (26)	50 (25)	28 (14)	9 (4)
Semi-Skimmed Milk	143 (71)	37 (18)	16 (8)	4 (2)	2 (1)
Skimmed Milk	146 (72)	24 (12)	21 (10)	7 (3)	4 (2)
Orange Juice	29 (14)	85 (42)	51 (25)	32 (16)	5 (2)
Fruit Drink with Sugar	50 (25)	60 (30)	58 (29)	24 (12)	10 (5)
Fruit Drink without Sugar	66 (33)	67 (33)	45 (22)	18 (9)	6 (3)
Soft Drink with Sugar	57 (28)	54 (27)	47 (23)	32 (16)	12 (6)
Soft Drink without Sugar	102 (50)	37 (18)	27 (13)	27 (13)	9 (4)
Boiled Potatoes	24 (12)	97 (48)	54 (27)	20 (10)	7 (3)
Potato Chips	24 (12)	75 (37)	57 (28)	32 (16)	14 (7)
Vegetables	4 (2)	24 (12)	64 (32)	54 (27)	56 (28)
Fruit	6 (3)	33 (16)	64 (32)	50 (25)	49 (24)
Whole Meal Bread	14 (7)	25 (12)	46 (23)	39 (19)	78 (39)
Fish	15 (7)	106 (52)	61 (30)	14 (7)	6 (3)
Pizza	16 (8)	126 (62)	35 (17)	24 (12)	1 (0.5)
Sweets	7 (3)	56 (28)	66 (33)	27 (13)	46 (23)
Chocolate	6 (3)	41 (20)	69 (34)	36 (18)	50 (25)
Savory Snacks	42 (21)	61 (30)	59 (29)	19 (9)	21 (10)

Table 2: *Nutritional habits of primary healthcare physicians in Jeddah 2018.*

Upon evaluating the participants' level of physical activities using the general practice physical activity questionnaire (GPPAQ) [14], subjects were categorized into 4 main categories accordingly: active group (18% of subjects), moderately active group (27% of subjects), moderately inactive group (23% of subjects) and finally inactive group (32% of subjects). Impaired physical activity was encountered in 166 (82%) subjects defined as either absolute or moderate inactivity or moderately active, whereas fully active subjects were 36 (18%) only.

Based on BMI, we analyzed the prevalence of the different categories against the independent risk factors, nutritional habits, and physical activity index. The only two factors that were significantly correlated to overweight or obesity were male gender (P-value = 0.002) and increase in age (P-value = 0.001). The correlation between overweight and obesity and independent risk factors is illustrated in table 3.

	Normal		Overweight		Obese			
	Number	**%**	**Number**	**%**	**Number**	**%**	**Chi -Square**	**P Value**
Independent Factors	90	100%	65	100%	47	100%		
Sex							12.98	0.002
Male	32	35.6%	36	55.4%	31	66.0%		
Female	58	64.4%	29	44.6%	16	34.0%		
Age group							34.82	< 0.001
< 30	66	73.3%	34	52.3%	11	23.4%		
30 - 39	19	21.1%	29	44.6%	29	61.7%		
40 - 49	4	4.4%	1	1.5%	5	10.6%		
50 - 59	1	1.1%	1	1.5%	2	4.3%		
Marital Status							10.95	0.090
Single	40	44.4%	20	30.8%	10	21.3%		
Married	49	54.4%	43	66.2%	34	72.3%		
Divorced	1	1.1%	1	1.5%	3	6.4%		
Widowed	0	0.0%	1	1.5%	0	0.0%		
Occupational Status							12.07	0.060
GP	75	83.3%	42	64.6%	30	63.8%		
Specialist	12	13.3%	16	24.6%	12	25.5%		
Consultant	2	2.2%	1	1.5%	2	4.3%		
Dentist	1	1.1%	6	9.2%	3	6.4%		
Nationality							1.04	0.595
Saudi	86	95.6%	61	93.8%	46	97.9%		
Non-Saudi	4	4.4%	4	6.2%	1	2.1%		

Table 3: *Association between personal characteristics of primary healthcare centers' physicians and their categories of body mass index.*

As regards the correlation between nutritional items and overweight and obesity, the only significant association was noted with soft drinks without sugar (P-value < 0.05), emphasizing that more overweight and obese respondents consumed such sugar-free soft drink in effort to reduce their carbohydrate intake. Despite such attitude of the previous group, they are still consuming soft drinks with sugar: 66.2% and 72.3% for overweight and obese respondents, respectively (Table 4). On the other hand, a higher percentage of normal re-

spondents consumed more soft drinks with sugar than without. Furthermore, we did not find any significant association between solid food items and body mass index categories (Table 5). As regards the level of physical activity, no significant (P-value = 0.83) association between the level of physical activity and obesity and overweight was noted in our analysis, since only 18% of our population were considered active.

	Normal		Overweight		Obese			
Liquid Food Items	**Number**	**%**	**Number**	**%**	**Number**	**%**	**Chi -Square**	**P Value**
	90	**100%**	**65**	**100%**	**47**	**100%**		
Full-Fat Milk							2.94	0.23
Yes	68	75.6%	47	72.3%	29	61.7%		
Never	22	24.4%	18	27.7%	18	38.3%		
Low-Fat Milk							0.98	0.61
Yes	61	67.8%	48	73.8%	31	66.0%		
Never	29	32.2%	17	26.2%	16	34.0%		
Semi-Skimmed Milk							0.01	0.99
Yes	26	28.9%	19	29.2%	14	29.8%		
Never	64	71.1%	46	70.8%	33	70.2%		
Skimmed Milk							2.82	0.24
Yes	22	24.4%	23	35.4%	11	23.4%		
Never	68	75.6%	42	64.6%	36	76.6%		
Orange Juice							0.69	0.71
Yes	79	87.8%	54	83.1%	40	85.1%		
Never	11	12.2%	11	16.9%	7	14.9%		
Fruit drink with sugar							1.24	0.54
Yes	65	72.2%	49	75.4%	38	80.9%		
Never	25	27.8%	16	24.6%	9	19.1%		
Fruit drink without sugar							0.71	0.70
Yes	59	65.6%	43	66.2%	34	72.3%		
Never	31	34.4%	22	33.8%	13	27.7%		
Soft drink with sugar							0.66	0.44
Yes	68	75.6%	43	66.2%	34	72.3%		
Never	22	24.4%	22	33.8%	13	27.7%		
Soft drink without sugar							7.33	0.03
Yes	35	38.9%	38	58.5%	27	57.4%		
Never	55	61.1%	27	41.5%	20	42.6%		

Table 4: *Association between liquid food items intake of primary healthcare centers' physicians and their categories of body mass index.*

	Normal		Overweight		Obese			
	Number	%	Number	%	Number	%	Chi -Square	P -Value
Solid Food Items	**90**	**100%**	**65**	**100%**	**47**	**100%**		
Boiled Potatoes							2.42	0.30
Yes	82	91.1%	54	83.1%	42	89.4%		
Never	8	8.9%	11	16.9%	5	10.6%		
Potato Chips							0.36	0.84
Yes	80	88.9%	56	86.2%	42	89.4%		
Never	10	11.1%	9	13.8%	5	10.6%		
Vegetables							0.76	0.68
Yes	89	98.9%	63	96.9%	46	97.9%		
Never	1	1.1%	2	3.1%	1	2.1%		
Fruit							1.26	0.53
Yes	86	95.6%	64	98.5%	46	97.9%		
Never	4	4.4%	1	1.5%	1	2.1%		
Whole meal Bread							4.66	0.10
Yes	80	88.9%	62	95.4%	46	97.9%		
Never	10	11.1%	3	4.6%	1	2.1%		
Fish							0.93	0.63
Yes	84	93.3%	61	93.8%	42	89.4%		
Never	6	6.7%	4	6.2%	5	10.6%		
Pizza							3.23	0.20
Yes	86	95.6%	57	87.7%	43	91.5%		
Never	4	4.4%	8	12.3%	4	8.5%		
Sweets							5.21	0.07
Yes	89	98.9%	60	92.3%	46	97.9%		
Never	1	1.1%	5	7.7%	1	2.1%		
Chocolate							1.96	0.38
Yes	89	98.9%	62	95.4%	45	95.7%		
Never	1	1.1%	3	4.6%	2	4.3%		
Savory Snacks							2.16	0.34
Yes	72	80.0%	48	73.8%	40	85.1%		
Never	18	20.0%	17	26.2%	7	14.9%		

Table 5: *Association between Solid food items intake of primary healthcare centers' physicians and their body mass index categories.*

Discussion

Our results show that among PHC physicians in Jeddah, the prevalence of both overweight and obesity was 32% and 23%, respectively. Obesity was more common among males than female physicians (31.3% vs. 15.5%). In the obese group, male to female ratio was 2:1. Our study evaluated the association between independent factors, nutritional habits and physical activity index and obesity. Only three factors were correlated to body mass index categories which were male sex, an increase in age, and intake of soft drinks without sugar. Other food items were consumed in higher frequency among overweight and obese populations, however, our findings did not reach any statistically significant differences concerning the frequency of intake of such nutritional items across different body mass index categories. In general, the level of physical activity was low among the respondents as only 18% of participants were rated as active.

Our results are comparable to that of Alzahrani., *et al* 2016. In their cross-sectional survey study, conducted in the Aseer region, the percentage of overweight was found to be 36%, while a percentage of 23% were found to be obese among family medicine residents. Also, Obesity was higher among males than female residents (31.9% vs. 7.1%) [15].

Data from Al-khoutani cross-sectional study about obesity showed that among sixty family medicine trainees in Makkah Al-Mukarramah City, from 2013 to 2014, showed that (21.7%) were overweight and (26.7%) were obese. Again, obesity was more observed among males than females in a male to female ratio of 4:1 approximately. Only four (15.9%) of the study participants were active and the rest had limited or no physical activity at all [16].

Despite the fact that the medical staff are well educated regarding obesity and its hazards, their behavior still shows some lags regarding their healthy eating habits and physical exercising, which is found to be contrary to the results of Kyle RG., *et al.* where the prevalence of obesity was the least among healthcare professionals 14.4% [17].

In a study in the Hail region, it was shown that among 5000 Saudis selected from 30 PHCCs a total of 63.6% of participants were obese denoting that any action to counteract obesity in the form of education about healthy nutrition or being physically active in primary healthcare centers will impact the physicians and the patients as well. The high prevalence of obesity among those patients implicate the high level of comorbidities among obese patients [18].

Apart from physicians, Obesity is definitely a public health problem in Saudi Arabia as outlined in a series of nationwide epidemiological studies conducted during the last two decades. The results of these studies suggested a prevalence rate ranging from 15.8% up to 36.2%. The prevalence of obesity in females (ranged from 20.3% to 44%) was higher than males (ranged from 15.6% to 28.3%). The variability among the reported prevalence in those studies was impacted by the age groups included [10,19-22].

On the contrary to ordinary women, female physicians seem to be more cautious about their weight, since the prevalence of obesity among public women is higher compared to ordinary men.

Recently, in 2018, Al-Ghamdi S., *et al.* published their results of a public survey including 1019 subjects from Al Kharj population and again the majority of respondents in their study were overweight and obese (54.3%). That implicates a matching prevalence of overweight and obesity for physicians and ordinary population [23].

Since 93% of our sample physicians were of less than forty years old, the occurrence of obesity-associated comorbidities was quite low but it is an important reminder that a serious problem will face our resources of primary health care physicians if no serious actions to combat obesity were taken within the coming decades.

Conclusion

Overweight and obesity are major health problems among primary health care physicians in Jeddah regardless of the educational level. Increasing the awareness of the primary healthcare physicians to promoting a healthy lifestyle at work is of utmost importance in order to prevent and stop obesity and its comorbidities.

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