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The association between obesity/overweight and demographical characteristics in Northern Saudi Arabia

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ABSTRACT

Background: Many factors have been claimed to contribute to the increased rates of obesity/overweight in Saudi Arabia. Therefore, the present study aimed to assess the association between obesity/overweight and demographical characteristics in Northern Saudi Arabia. *Methodology:* This is a cross-sectional survey that included 315 volunteers living in the city of Hai'l, Northern Saudi Arabia were included during October 2020. Both Saudi and non-Saudi civilians were included in the study. The participants were randomly selected by a simple random method regardless of age, gender, or other demographical characteristics. *Results*: The present study investigated 315 volunteers (281 males and 34 females) aged 17 to 56 years with a mean age± STD= 21.2±6.1. The body mass index (BMI) ranged from 14.9 to 47.88with a mean of 26.12 ±6.3. Obesity and overweight represented 75/315(24%), and 109/315(35%) in this order, as shown in Fig 1. About 65/381(23%), and 100/281(36%) of the males were obese and overweight, respectively, whereas, 10/34(29.4%) and 9/34(26.5%) were obese and overweight in that order. *Conclusion:* Obesity/overweight still prevalent in Northern Saudi Arabia. Living in urban areas, being married, educated, having a high family income, and an employee is a risk of gaining weight (Obesity/overweight).

Keywords: Obesity, overweight, Saudi Arabia, demographical, BMI

1. INTRODUCTION

Obesity/overweight represents a global health burden due to its association with multifarious comorbidities that afflict the health system worldwide (Yusuf et al., 2020; Di Cesare et al., 2019). In Saudi Arabia, the prevalence rates of obesity and overweight are on a continuous rise, particularly among the young generation. Many factors have been claimed to contribute to the increased rates of obesity/overweight including food intake habits, physical inactivity, and other habitual determinant factors (Alreshidi et al., 2020).Several studies from Saudi Arabia showing low rates of physical activities, which is believed to be an effective way of reducing miscellaneous comorbidities including type 2 diabetes mellitus, cardiovascular diseases, hypertension, hypercholesterolemia, and other diverse obesity-associated diseases (Alreshidi et al., 2020).

The perception of the Saudi people towards the means of healthy weight management is relatively poor, particularly among women. Women were more prominent in earnings of weight than men were. Still, there is a gap concerningaperson's body weight contributing factor, which imposes to be addressed at a public level (Ahmed et al., 2020). Therefore, the present study aimed to assess the association between obesity/overweight and demographical characteristics in Northern Saudi Arabia.

2. MATERIALS AND METHODS

In this cross-sectional survey, 315 volunteers living in the city of Hai'l, Northern Saudi Arabia were included during October 2020. Both Saudi and non-Saudi civilians were included in the study. The participants were randomly selected by a simple random method regardless of age, gender, or other demographical characteristics. Females' response was poor due to social restrictions and wariness. Each participant was interviewed to obtain the demographical identification data, then the weight and height were measured. Body Mass Index (BMI) Kg/m^2 was categorized into: <18 = underweight; 18-24.9 = Normal weight; 25-29.9 = Overweight; 30-34.9 = Obese class 1; 35+ = Obese class 2.

Data analysis

Data were analyzed using SPSS software. Frequencies, percentages, cross-tabulations, relative risk, and chi-square test were obtained. A P-value of less than 0.05 was considered statistically significant.

3. RESULTS

The present study investigated 315 volunteers (281 males and 34 females) aged 17 to 56 years with a mean age± STD= 21.2±6.1. The body mass index (BMI) ranged from 14.9 to 47.88 with a mean of 26.12 ±6.3. Obesity and overweight represented 75/315(24%), and 109/315(35%) in this order, as shown in Fig 1. About 65/381(23%), and 100/281(36%) of the males were obese and overweight, respectively, whereas, 10/34(29.4%) and 9/34(26.5%) were obese and overweight in that order.

The majority of the cases of (obesity & overweight) were identified in age groups, 19-20, 21-25, and ≤18 years, constituting (38&67), (17&20), (10&11), in that order. On computing, the percentages within entire age groups values change as shown in Fig 2.

About 8/11(73%) of the non-Saudi were overweight or obese compared to 176/304(58%). Moreover, 42/44(95.5%) of the outside Hai'l residents were obese/overweight compared to 158/271(58%) of the Hai'l city residents. The relative risk (RR) and 95% confidence interval (95% CI) for the association between obesity/overweight and living outside Ha'il city, RR (95%CI) = 1.6372 (1.4527 to 1.8452), P < 0.0001.

About 21/24(87.5%) of the married participants were obesity/overweight compared to 163/291(56%) of the non-married (single), the risk of obesity/overweight among married individuals, RR (95%CI) = 1.5621 (1.3018 to 1.8745), P < 0.0001, z statistic = 4.796, as indicated in Table 1, Fig 2.

Table 1. Distribution of the BMI by gender, age, nationality, residence, and marital status

Variable	BMI					
	<18	**18-24**	**25-29**	**30-35**	**36+**	**Total**
Gender						
Males	18	98	100	38	27	281
Females	2	13	9	6	4	34
Total	20	111	109	44	31	315
Age range						
≤18 years	5	31	11	7	3	57
19-20	10	61	67	22	16	176
21-25	5	15	20	8	9	57
26-35	0	4	4	3	0	11
36+	0	0	7	4	3	14
Nationality						
Saudi	20	108	106	40	30	304
Non-Saudi	0	3	3	4	1	11
Residence						
Hai'l city	18	95	94	35	29	271
Outside Hai'l city	2	16	15	9	2	44
Marital status						
Married	0	3	12	6	3	24
Single	20	108	97	38	28	291

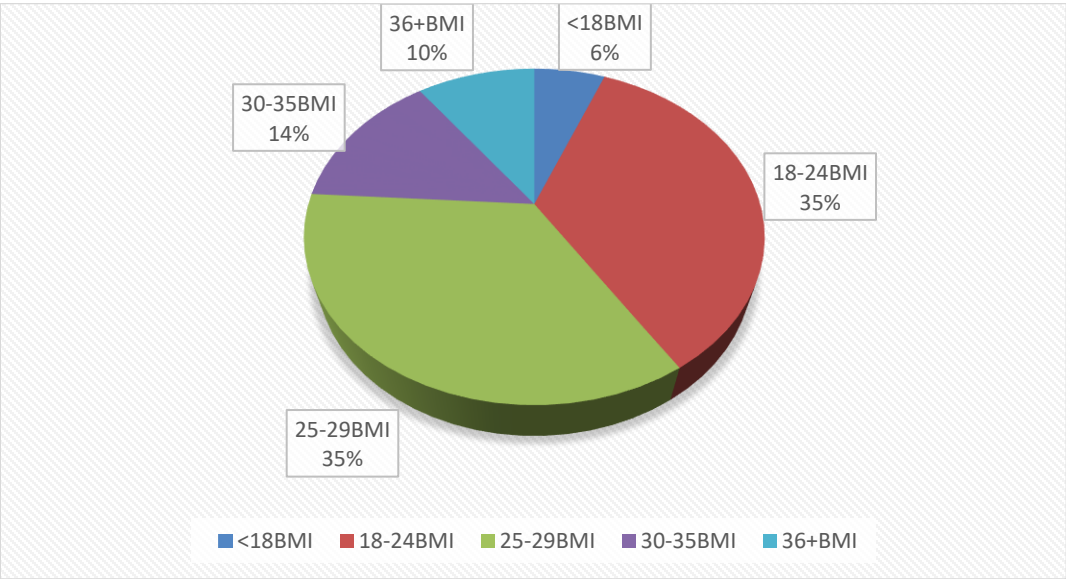

Figure 1. Description of the study population by BMI

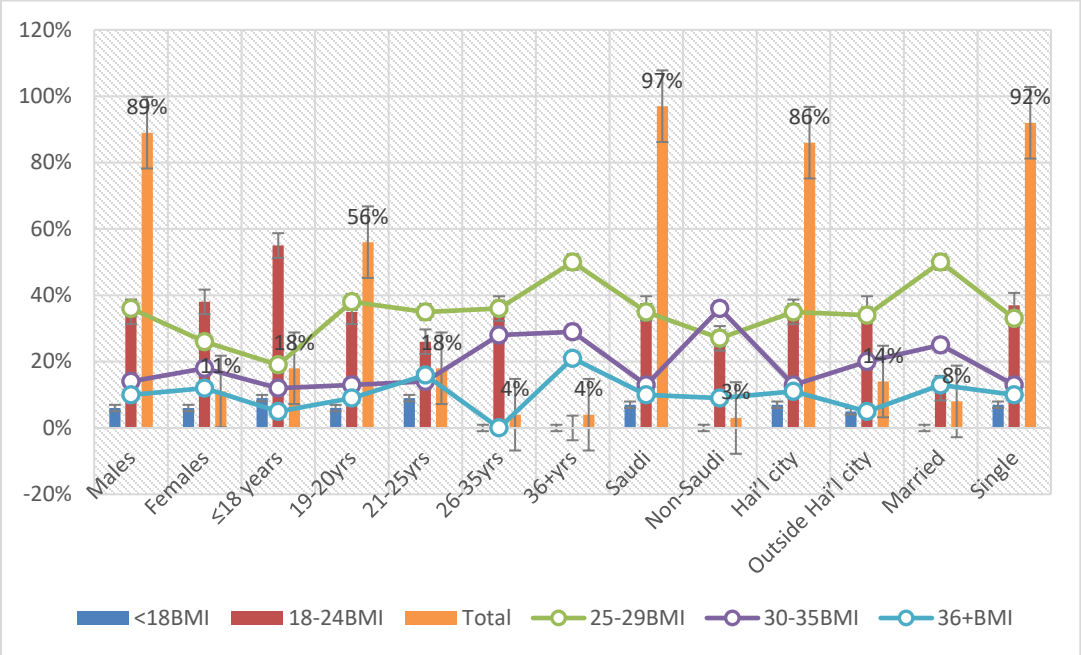

Figure 2. Description of the BMI by demographical characteristics

Table 2, Fig 3 summarized the distribution of the BMI by education, occupation, and monthly income (Saudi Riyals (SAR)). Most of the obesity/overweight were those with the university level of education 174/184(95%). Moreover, obesity/overweight was more frequent among students, and employees, representing 160/184(87%), and 13/187(7%), correspondingly. Obesity/overweight was more frequent among those with a monthly income of >10000 SAR followed by 7000-10000 SAR, constituting 87/184(47%), and 50/184(27%) respectively. However, calculation within the entre variable group showed different proportions as indicated in Fig 3.

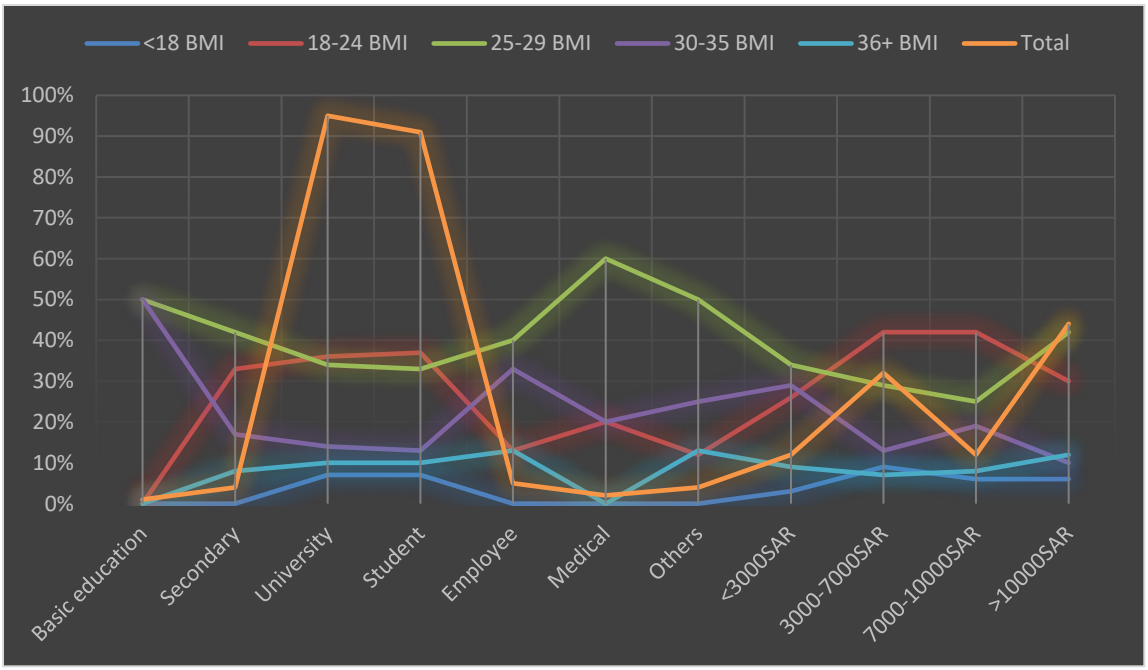

Figure 3. BMI by education, occupation, and monthly income

Table 2. Distribution of the BMI by education, occupation, and monthly income (Saudi Riyals (SAR))

Variable	BMI					
	<18	18-24	25-29	30-35	36+	Total
Education						
Basic education	0	0	1	1	0	2

Secondary	0	4	5	2	1	12
University	20	107	103	41	30	301
Total	20	111	109	44	31	315
Occupation						
Student	20	107	96	36	28	287
Employee	0	2	6	5	2	15
Medical	0	1	3	1	0	5
Other	0	1	4	2	1	8
Monthly income						
<3000 SAR	1	9	12	10	3	35
3000-7000	9	43	30	13	7	102
7000-10000	2	15	9	7	3	36
>10000	8	41	57	14	16	136

4. DISCUSSION

Comorbidities associated with obesity and overweight embody an enormous burden on the health care system in Saudi Arabia. The exact factors are contributing to this escalating in the prevalence rates of obesity/overweight unclear. Thus the present study was focusing on the demographical characteristics of the Saudi community as possible causal factors.

In the present study, the prevalence rates of obesity and overweight were 24% and 35%, respectively. Such high prevalence rates were previously reported from the northern part of Saudi Arabia in a comprehensive survey. The study has shown that the prevalence of obesity/overweight was 63.6% (56.2% in males and 71% in females) (Ahmed et al., 2014). Our study had shown less prevalence rates, which might be due to our small sample size or might be a reduction in the prevalence rates of obesity/overweight.

Though the number of non-Saudi participants was non-representative, the prevalence rates of obesity/overweight were higher among the non-Saudi compared to Saudi participants. What's more, the prevalence rates of obesity/overweight were significantly higher ($P < 0.0001$) among people living in towns and villages outside Ha'il city. This might be attributed to a lack of physical activity and awareness.

Nevertheless, the risk of obesity/overweight among married individuals, RR (95%CI) = 1.5621 (1.3018 to 1.8745), $P < 0.0001$. Studies have shown that marriage is more frequently associated with an increase in BMI. Spouse obesity risk is likely doubles an individual's risk of getting obese (Cobb et al., 2016; Arbel et al., 2020).

In the present study, about 95% of the obesity/overweight persons were identified among those with university level of education. This section of people has better income and without strict bodyweight management, there is an increased tendency of getting obesity/overweight. Available reports are showing inverse findings, particularly among women (Chung and Lim, 2020).

The findings of the present study showed a high prevalence of obesity/overweight among students, which might be due to an increased number of students in the study.

Obesity/overweight was more frequent among those with a monthly income of >10000 SAR followed by 7000-10000 SAR, constituting 87/184(47%), and 50/184(27%) respectively. Several studies have shown that obesity is strongly elevated by family income especially for women, children, and adolescence (Fan et al., 2019; Nam et al., 2020; Mireku et al., 2020).

Although the present study has made available some important data for researchers and health decision-makers, it has some limitations including its cross-sectional setting and small sample size.

5. CONCLUSION

Obesity/overweight is still prevalent in Northern Saudi Arabia. Living in urban areas, being married, educated, having a high family income, and an employee is a risk of gaining weight (Obesity/overweight). Interventions at the community level are highly recommended to control the increasing rates of obesity/overweight in Northern Saudi Arabia.

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Conflict of interest

Authors declare no conflict of interest.

Informed consent

Written & Oral informed consent was obtained from all individual participants included in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this manuscript.

Ethical approval for human

All procedures performed in studies involving human participants were per the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards (ethical approval number EC-0140a/CM/UOH.01/19).

Data and materials availability

All data associated with this study are available upon request to the corresponding author.

Peer-review

External peer-review was done through double-blind method.

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