Prevalance of overweight, obesity and diabetes in undergraduate medical students at Qassim University

Prevalencia de sobrepeso, obesidad y diabetes en estudiantes de pregrado de medicina en la Universidad de Qassim

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Abstract

Background: Obesity is a public health issue and a worldwide epidemic linked to several major ailments, including diabetes, cancer, and cardiovascular disease. Saudi Arabia has one of the highest rates of overweight and obesity globally, posing a severe threat to the country's public health.Objectives: To assess the prevalence of overweight, obesity, and high blood sugar among Qassim University medical students. Methods: This cross-sectional study involved medical students at Qassim University, in Saudi Arabia. Results: the prevalence of overweight (27.1%), obesity (14%), sedentary lifestyle (78.8%), poor diet (68.7%), increased weight associated with genetics stood (11.1)%, and hyperglycemia among obese medical students (12.1%). Family history of obesity (adjOR = 5.95, 95% CI: 2.94-12.06; p < 0.001), and diet (adjOR = 2.60, 95% CI: 1.27-5.33; p = 0.009), were significantly associated with obesity. Conclusions: A change in sedentary lifestyle and healthy dietary intake is recommended among medical students as a significant association between obesity and diet has been established.

Keywords: Hyperglycemia, Medical students, Obesity, Overweight, Saudi Arabia

Resumen

Antecedentes: la obesidad es un problema de salud pública y una epidemia mundial vinculada a varias dolencias importantes, como la diabetes, el cáncer y las enfermedades cardiovasculares. Arabia Saudita tiene una de las tasas más altas de sobrepeso y obesidad a nivel mundial, lo que representa una grave amenaza para la salud pública del país. Objetivos: Evaluar la prevalencia del sobrepeso, la obesidad y el nivel alto de azúcar en la sangre entre los estudiantes de medicina de la Universidad de Qassim. Métodos: Este estudio transversal involucró a estudiantes de medicina de la Universidad de Qassim, en Arabia Saudita. Resultados: se mantuvo la prevalencia de sobrepeso (27,1%), obesidad (14%), sedentarismo (78,8%), mala alimentación (68,7%), aumento de peso asociado a la genética (11,1%) e hiperglucemia entre estudiantes de medicina obesos (12,1%). %). Los antecedentes familiares de obesidad (adjOR = 5,95, IC del 95 %: 2,94-12,06; p < 0,001) y la dieta (adjOR = 2,60, IC del 95 %: 1,27-5,33; p = 0,009), se asociaron significativamente con la obesidad. Conclusiones: Se recomienda un cambio en el sedentarismo y la ingesta dietética saludable entre los estudiantes de medicina, ya que se ha establecido una asociación significativa entre la obesidad y la dieta.

Palabras clave: hiperglucemia, estudiantes de medicina, obesidad, sobrepeso, Arabia Saudita

Background

The World Health Organization (WHO) defines obesity as "abnormal or excessive fat accumulation that may impair health." When a person's body mass index (BMI) is 25 kg/m2 or above, they are considered overweight, and when their BMI is 30 kg/m2 or higher, they are considered obese[1]. Obesity has been identified as a public health issue and a worldwide epidemic. Obesity has been linked to several major ailments, including diabetes, cancer, and cardiovascular disease. Saudi Arabia has one of the highest rates of overweight and obesity globally, posing a severe threat to the country's public health. Doctors are considered role models for good health. Doctors should model healthy behaviour and appear fit and healthy to promote a healthy lifestyle among their patients. Medical students are future healthcare professionals. With this in mind, we were curious about the dietary habits, physical activity levels, weight status, and other aspects of medical students in our setting[2].

Since the 1960s, the number of overweight and obese persons has continued to rise, a trend that shows no signs of slowing down[3]. Overweight and obesity affect more than 1.9 billion persons worldwide, 38 million children under the age of five, and more than 340 million children and adolescents aged 5 to 19 years[4]. Obesity affects around 28 percent of males and 44 percent of females in Saudi Arabia[5]. Obesity has been linked to a variety of factors in Saudi Arabian women, including their lifestyle, lack of exercise, and household activities, as well as the type of leisure activity they engage in (TV and internet)[1]. Obesity is linked to a higher risk of chronic diseases such as hypertension, type 2 diabetes, heart disease, stroke, gallbladder disease, and breast, prostate, and colon cancer[3]. Due to their sedentary lifestyle, lack of exercise, disordered eating habits due to a lack of leisure time, increased stress, and wide topics to learn, medical students are more prone to obesity. As a result, individuals are at risk for issues associated with obesity, such as hypertension, dyslipidemia, and impaired glucose tolerance. However, despite the dangers, it is frequently overlooked[6]. Obesity is exacerbated by our lifestyle and surroundings, including less physical exercise paired with high-calorie, low-cost foods[3]. Obesity has been linked to more than 30 medical disorders, with scientific evidence indicating a strong link with at least 15 of them[3]. Obesity, according to research by the RAND Corporation, is more harmful to one's health than smoking, excessive alcohol consumption, or poverty[3]. In the next section, the literature review highlights obesity, overweight, and risk factors such as sedentary behaviour, genetics, unhealthy dietary habits, and family history among medical students in Saudi Arabia.

Literature Review

Obesity and overweight

A study by Inam [7] conducted among male medical students at the Qassim University in Saudi Arabia reported the prevalence of overweight at 29.9% and obesity at 16.6%. A study conducted by Nyombi et al.,[8] in Uganda, among medical students at Makerere University reported that obesity and overweight combined were 9.4%. A study by Ibrahim et al.,[9] among clinical years medical students at King Abdul-Aziz University in Saudi Arabia reported the prevalence of overweight at 19.1% and obesity at 12.7%. The prevalence of overweight/obese was 26.8% among females and 47.2% among males. In another study in Saudi Arabia, a prevalence of 29.1% was reported among females from four colleges of Dammam University[10]. Allam, Taha[2] study among selected medical students at Taibah University, Madinah in Saudia Arabia, reported the prevalence of overweight at 34.5% and obesity at 10.3%. A study conducted among medical students in the faculty of medicine, Northern Border University, Ar'ar, in Saudi Arabia reported the prevalence of overweight at 21.7% and obesity at 8.4%[11]. A study among healthy medical students of JN medical college reported a prevalence of obesity at 59.17%[12]. Alodhayani, Alshaikh[13] study among medical students at King Khalid University Hospitals, Riyadh, Saudi Arabia, reported a prevalence of overweight at 27.2% and obesity at 34.8%. Makkawy, Alrakha[14] study among health sciences college at Dar Al Uloom University (DAU), Saudi Arabia, reported the prevalence of overweight at 23.7% and obesity at 11%. In the study Mirghani and Saleh[15] among medical students at the medical college, University of Tabuk, Saudi Arabia, reported a prevalence of obesity at 21.3% and overweight at 26.6%. A study by Saeed et al.,[5] conducted among medical students at King Saud university reported the prevalence of obesity at 13.7%, which was higher among males than females. The prevalence of obesity (56.2%) and overweight (38%) were reported among medical students in the medicine and medical sciences college within the Arabian Gulf University in Bahrain[16]. A cross-sectional study Majeed [17] conducted among female medical students at the University of Dammam in Saudi Arabia reported the prevalence of overweight at 11.6% and obesity at 6%.

Furthermore, a cross-sectional study among medical students in Malaysia found that Out of 290 students who participated in the study, 45.2% were males. In the study, 14.8% were found to be overweight (BMI 23-24.9 kg/m2); 13.7% of males and 15.7% of females. Pre-obese students (BMI 25-29kg/m2) accounted for 15.9% of the total (males 18.3% and females 13.8%). 5.2% were found to be obese (BMI > 30 kg/m2): males 9.2% and females 1.9%. Also 14.8% were found to be underweight (males 12.2% and females 17.0%)[6].

Thereafter, a cross-sectional study done to explore the association between obesity and the development of impaired glucose tolerance (IGT) in Bahamian among 861 adolescents, 15.0% were classified as overweight, 15.2% as obese and 7.9% as severely obese. The overall cumulative prevalence of IGT based on HbA1c levels was 16 100 cases per 100 000 adolescents and was greater in males than in females. A higher percentage of overweight and obese students were identified as having IGT compared with their normal-weight counterparts. An analysis of

covariance with post hoc analyses revealed that severely obese males and females, respectively, were almost 26 (OR = 25.54, 95%CI 9.92, 65.77) or 23 (OR = 22.96, 95% CI9.81, 53.73) times more likely to develop IGT than their normal-weight counterparts ($p < 0.005$)[18].

Also, a cross-sectional study was conducted with a total of 501 college students aged 18–26 years (383 males and 118 females) from the Colleges of Medicine and Nursing at the King Saud bin-Abdelaziz University for Health Sciences. Applying BMI, 21.9 % and 20.6% of students were classified as overweight and obese. Central obesity was prevalent in 26.9% and 42.2% of students based on WC and WHtR, respectively. Other metabolic abnormalities were hypertension (23.6%) and abnormal FPG level (22.6%)[19].

On the other hand, Al Bshabshe obesity prevalence study among 560 medical students at King Khalid University, in Abha, Kingdom of Saudi Arabia study reported underweight in 16% of the participants, normal weight in 55%, overweight in 21%, and obese in 8%. The study represented 54.8% females and 45.2% males. The mean ± standard deviation was 22.05±1.8. The body mass index was calculated from the weight (kg) and height (m2) of the participants. The study concluded that the prevalence of overweight and obesity was found to be high (21% overweight and 8% obese) among medical students at the College of Medicine, King Khalid University, particularly among female students[1].

Comparatively, Between March and June 2012, a cross-sectional survey was conducted at four medical colleges in Lahore, Pakistan, on 244 medical students (85 males, 159 females) with a median age of 20 years (range: 18–25). The study assessed high-calorie diet intake and physical profile using a self-reported questionnaire. The relationships between obesity indices (body mass index [BMI], waist-to-hip ratio) and the studied dietary and physical activity factors were investigated and correlated. The study found that 30.5 percent of males and 16 percent of females had a BMI of less than 25.0 kg/m2, affecting 21 percent of total medical students[20].

Sendentary behaviour

A study by Ibrahim, Mahnashi[9] in Saudi Arabia reported the prevalence of non-practising physical exercise as 57.9%. The study associated the increase in the prevalence of obesity with sedentary behaviours: playing computer games and watching TV. Allam, Taha[2] reported the prevalence of inactivity among medical students at 64.4%. A study Saeed, Assiri[5] conducted among medical students at King Saud university reported a non-significant association between physical activity and obesity.

Genetics

A genetics study Makkawy, Alrakha[14] conducted among female students at Taibah University reported a prevalence of 24.5% of the allele gene (A), a risk factor, and 98% of the students had the heterozygous obesity-risk allele (AT) responsible for greater energy intake.

Unhealthy dietary habits

Ibrahim, Mahnashi[9] study among medical students reported the prevalence of daily fast food consumption at 13.1%. On the contrary, Makkawy, Alrakha[14] study among health sciences college at Dar Al Uloom University (DAU), Saudi Arabia, did not find any statistically significant association between the consumption of dinner, soft drinks, fast food and sweets consumption. A study Ahmed, Alnasir[16] conducted in among medical students in the college of medicine and medical sciences within the Arabian Gulf University in Bahrain, reported the prevalence of consumption of fast foods at 56.2%. The study further notes that the main reasons for consuming fast foods were lack of time to cook healthy food, pleasant taste, and family and friends' influence. A cross-sectional study Majeed[17] conducted among female medical students at the University of Dammam in Saudi Arabia reported that 70% of the participants believed their dietary habits as average/fair/poor.

Furthermore, a cross-sectional survey of 330 medical students[6] aged 18–25 years was conducted at a government medical college in Kottayam, Kerala. Height, weight, and waist circumference were all considered, and the BMI (body mass index) was determined. Physical activity was measured using an international physical activity questionnaire. Dietary behaviours such as regular/irregular diet, vegetarian/non-vegetarian, eating speed, frequency of fried snack intake, fast food consumption, and sleep duration were all evaluated. The study also investigated the risk of comorbidities based on waist circumference and discovered a higher prevalence of overweight/obesity (30.6%) among medical students.

Family history of obesity

A study conducted among medical students in the faculty of medicine, Northern Border University, Ar'ar, in Saudi Arabia reported the prevalence of obesity associated with family history at 34.3%[11]. Makkawy, Alrakha[14] study among health sciences college at Dar Al Uloom University (DAU), Saudi Arabia, reported that the students with a family history of obesity predicted higher odds of being obese. A study Saeed, Assiri[5] conducted among medical students at King Saud university reported family history of obesity was significantly associated with obesity. A cross-sectional study Majeed[17] conducted among female medical students at the University of Dammam in Saudi Arabia reported that the prevalence of obesity as a result of family history was 16.35%.

Blood sugar

In their study Mirghani and Saleh[15] among medical students at the medical college, University of Tabuk, Saudi Arabia reported the prevalence of high blood sugar at 9.5%.

A cross-sectional study by Salehb[21] involved 169 medical students from the Medical College of the University of Tabuk in Saudi Arabia. Age, BMI, central adiposity, fruit and vegetable consumption, physical activity if discovered to have high blood pressure or blood sugar, and family history of diabetes mellitus were all included in the ques-

tionnaire. According to the study, obesity and overweight were discovered in 21.3 and 26.6 percent of 169 students: 68 percent of whom had a family history of diabetes, 45.6 percent had central adiposity, more than half did not exercise daily, and 60.4 percent did not consume fruits and vegetables daily. A large proportion (9.5 percent) had high blood sugar and high blood pressure (4.7 percent). In 16% of the students, the risk score of diabetes was high or moderate. Diabetes mellitus was prevalent among Tabuk City medical students. Obesity, overweight, central adiposity, physical inactivity, and a lower intake of fruits and vegetables were all related significantly to the risk[21].

In general, many studies have been done worldwide about obesity. And there are quite a several studies on this problem in Saudi Arabia. However, these studies are lacking in the Qassim region and specifically regarding medical students. We plan to conduct a study in the Qassim region to assess the prevalence of overweight, obesity, and high blood sugar in Qassim university medical students. Furthermore, we plan to assess the relationship between obesity and several factors. Also, encourage the competent authorities to undertake necessary actions to raise awareness of this problem.

Materials and methods

Study design and setting

This study was based on a quantitative approach and a cross-sectional study among medical students at Al-Qassim university. The study targeted medical students in medical college, Al-Qassim university.

Study duration

The study was conducted from September 2021 to May 2022

Sample size

The Sample size was calculated using the formula:

$$n = \frac{z^2 p(1-p)}{d^2}$$

With a 95% confidence level and 5% margin of error. Where n= 133, z= 1.96, p= 0.5, d=0.04. The sample was drawn from medical students doing their clinical clerks. The sample size consisted of 221 male medical students.

Sampling technique (with inclusion and exclusion criteria)

The sampling technique was based on convenience sampling. The study focused on male medical students from the first year to the fifth year, excluding female medical students and medical interns due to limitations in acquiring data. However, the participation of the male was limited to their agreement on the informed consent.

Data collection methods

The following instruments were used to gather data: a self-administered questionnaire and a glucometer. Anthropometric measurements were measured and recorded.

Data management and analysis plan

The data was analysed using IBM SPSS version 24 software. Descriptive statistics were performed, and the continuous variables were expressed as median and range. The categorical variables were expressed as frequencies and proportions. The statistical significance between groups was tested using the χ^2-test or Fisher's exact test for categorical variables. The independent t-test was performed for continuous variables.

Ethical considerations

The study sort ethical approval from the Regional Ethical Board in Qassim. Informed consent was given to participants explaining the aim of the research, the importance of agreeing to the study, and voluntary participation. Equally, the responses were anonymous, and the participants were free to withdraw from the study without penalty.

Results

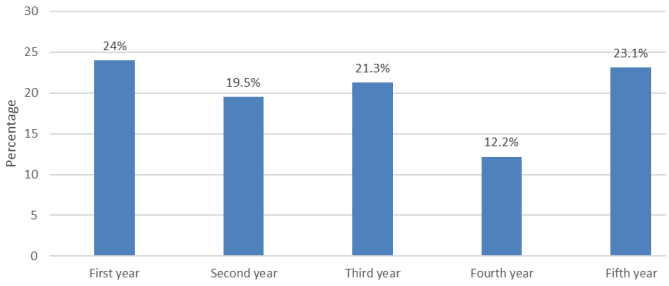
Socio-demographic characteristics

Most of the students (n=140;63.3%) who participated in the survey belong to the 21-23 age category. Based on the distribution of the academic year, most participants were in the first years, then fifth years, third years, second years and fourth years in that order (see Figure 1). A family history of obesity was recorded among 72 students (32.6%), which is rather high. For more social demographic variables and other measured comorbidities, see Table 1.

Table 1: Socio-demographic characteristics of medical students (n=221)

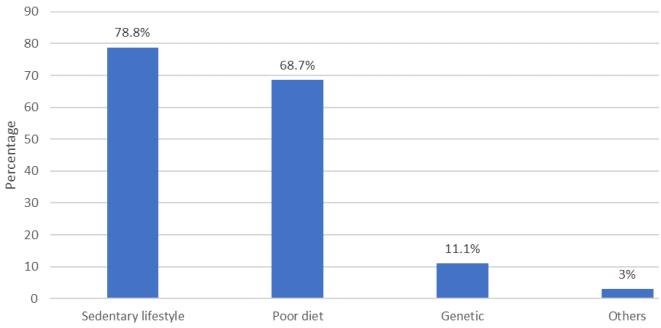
Study Data	N (%)
Age group	
18 – 20 years	47 (21.3%)
21 – 23 years	140 (63.3%)
≥24 years	34 (15.4%)
Family history of obesity	
Yes	72 (32.6%)
No	149 (67.4%)
Diagnosed with diabetes	
Yes	04 (01.8%)
No	217 (98.2%)
Type of diabetes (n=4)	
Type 1	01 (25.0%)
Type 2	03 (75.0%)
Treatment for diabetes (n=4)	
Oral medications	01 (25.0%)
Injected insulin	03 (75.0%)
Family history of diabetes	
Yes	100 (45.2%)
No	121 (54.8%)
Regular physical exercise	
Daily	14 (06.3%)
Every other day	23 (10.4%)
Weekly	71 (32.1%)
Not exercising	113 (51.1%)
How healthy is your diet?	
Mostly healthy (Diet with balanced carb, protein, & fat)	63 (28.5%)
Mostly unhealthy (Junk food & soda)	152 (68.8%)
Special diet (Ketogenic, vegetarian, low carb diet, other ….)	06 (02.7%)
Smoking	
Yes	14 (06.3%)
No	207 (93.7%)
If yes, how many cigarettes you take per day? (n=14)	
1-5 cigarettes per day	01 (07.1%)
6-10 cigarettes per day	01 (07.1%)
11-15 cigarettes per day	04 (28.6%)
16-20 cigarettes per day	02 (14.3%)
More than 20 cigarettes per day	01 (07.1%)
Other type of cigarettes	05 (35.7%)
When was your last meal?	
1-5 hours ago	83 (37.6%)
6-10 hours ago	75 (33.9%)
11-15 hours ago	47 (21.3%)
More than 15 hours ago	16 (07.2%)
What is the random blood sugar result?	
Hypoglycemic (< 70)	06 (02.7%)
Normoglycemic (70 – 140)	194 (87.8%)
Hyperglycemic (>140)	21 (09.5%)

Figure 1: Distribution of academic year level



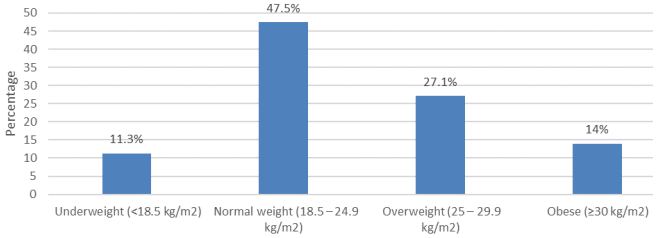
The average BMI level for most participants was 18.5-24.9 kg/m^2, indicating normal weight. However, 27.1% of the participants were measured as overweight, while 14% were considered obese (see figure 2).

Figure 2: Level of BMI



The study assessed the perceived reasons and noted that sedentary lifestyle was the main cause of increased body weight. This was followed by poor diet, genetics, and other reasons (see figure 3).

Figure 3:Perceived reason related to increasing weight



The body mass index (BMI) level was stratified into two categories (normal/underweight vs overweight/obese). The association between the level of BMI and the socio-demographic characteristics of the medical students was measured using cross-tabulations and using the Chi-square test (see Table 2). The baseline for interpretation of the findings was set at 95% confidence level. Significant associations were recorded between level of BMI and academic year level (χ^2 (11.377) = , p = 0.023; family history of obesity χ^2 (22.744) = , p < 0.001; and healthy diet χ^2 (7.706) = , p = 0.006. The finding shows that the fifth years recorded the highest cases of overweight or obese, followed by the fourth years. It is worth noting that most of the medical students (in their beginning years of medical studies) had normal weight, which gets compromised as they advance towards their final years. The findings also showed a significant association between overweight and family history of obesity, where 50.5% of the student with a family history of obesity were also overweight or obese. Equally, it is worth noting that unhealthy diet uptake was associated with both overweight or obese and normal or underweight (see Table 2).

Table 2: Association between the level of BMI according to the socio-demographic characteristics of medical students (n=221)

Factor	Level of BMI		X^2	P-value §
	Overweight or Obese N (%) (n=91)	Normal or Underweight N (%) (n=130)		
Age group				
18 – 20 years	19 (20.9%)	28 (21.5%)	0.015	0.993
21 – 23 years	58 (63.7%)	82 (63.1%)		
≥24 years	14 (15.4%)	20 (15.4%)		
Academic year level				
First year	24 (26.4%)	29 (22.3%)	11.377	0.023 **
Second year	14 (15.4%)	29 (22.3%)		
Third year	12 (13.2%)	35 (26.9%)		
Fourth year	16 (17.6%)	11 (08.5%)		
Fifth year	25 (27.5%)	26 (20.0%)		
Family history of obesity				
Yes	46 (50.5%)	26 (20.0%)	22.744	<0.001 **
No	45 (49.5%)	104 (80.0%)		
Family history of diabetes				
Yes	48 (52.7%)	52 (40.0%)	3.511	0.061
No	43 (47.3%)	78 (60.0%)		
Regular physical exercise				
Daily	07 (07.7%)	07 (05.4%)	5.845	0.119
Every other day	07 (07.7%)	16 (12.3%)		
Weekly	23 (25.3%)	48 (36.9%)		
Not exercising	54 (59.3%)	59 (45.4%)		
How healthy is your diet?				
Mostly healthy	19 (20.9%)	50 (38.5%)	7.706	0.006 **
Mostly unhealthy	72 (79.1%)	80 (61.5%)		
Smoking				
Yes	04 (04.4%)	10 (07.7%)	0.980	0.322
No	87 (95.6%)	120 (92.3%)		
When was your last meal?				
1-5 hours ago	38 (41.8%)	45 (34.6%)	1.243	0.537
6-10 hours ago	28 (30.8%)	47 (36.2%)		
>10 hours	25 (27.5%)	38 (29.2%)		
What is the random blood sugar result?				
Hypoglycemic (< 70)	01 (01.1%)	05 (03.8%)	2.593	0.273
Normoglycemic (70 – 140)	79 (86.8%)	115 (88.5%)		
Hyperglycemic (>140)	11 (12.1%)	10 (07.7%)		

§ P-value has been calculated using Chi-square test.
** Signficant at p<0.05 level.

All significant associations were further investigated using multivariate regression analysis. The academic year level had no significant findings. Family history of obesity had significant finding (adjOR=5.95, 95% CI: 2.94-12.06; p < 0.001). This meant that students with a family history of obesity were 5.95 times more likely to develop obesity than students with no family history background. The students fond of consuming an unhealthy diet (adjOR=2.60, 95% CI: 1.27-5.33; p = 0.009) were 2.6 times more likely to develop obesity than healthy foods.

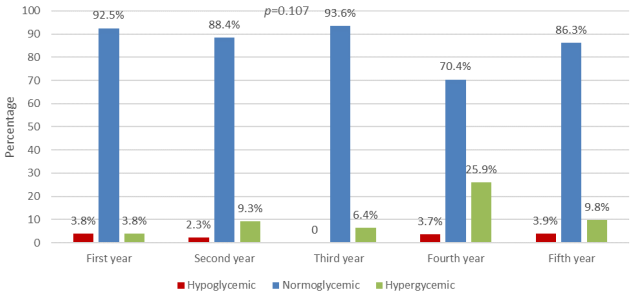
Table 3: Multivariate regression analysis to establish the effect of overweight and obesity on the selected socio-demographic characteristics of medical students (n=221)

Factor	AOR	95% CI	P-value
Academic year level			
First year	Ref		
Second year	0.929	0.380 – 2.269	0.871
Third year	0.2442	0.890 – 6.695	0.083
Fourth year	2.273	0.866 – 5.966	0.095
Fifth year	0.710	0.220 – 2.290	0.567
Family history of obesity			
Yes	5.952	2.939 – 12.057	<0.001 **
No	Ref		
How healthy is your diet?			
Mostly healthy	Ref		
Mostly unhealthy	2.601	1.270 – 5.329	0.009 **

AOR – Adjusted Odd Ratio; CI Confidence Interval.
** Signficant at p<0.05 level.

Blood sugar levels were higher among students at higher medical education levels than beginners in medical school. However, there was a significant association between blood sugar level and academic year (see figure 4).

Figure 4: Blood sugar level according to academic year level



The relationship between the level of random blood sugar and the socio-demographic characteristics had no significant findings, as shown in Table 4.

Table 4: Relationship between the level of BMI according to the socio-demographic characteristics of medical students (n=221)

Factor	Level of random blood sugar			P-value §
	Hypoglycemia N (%) (n=6)	Normoglycemia N (%) (n=194)	Hyperglycemia N (%) (n=21)	
Regular physical exercise				
Daily	0	14 (07.2%)	0	0.180
Every other day	0	23 (11.9%)	0	
Weekly	04 (66.7%)	60 (30.9%)	07 (33.3%)	
Not exercising	02 (33.3%)	97 (50.0%)	14 (66.7%)	
How healthy is your diet?				
Mostly healthy	01 (16.7%)	66 (34.0%)	02 (09.5%)	0.052
Mostly unhealthy	05 (83.3%)	128 (66.0%)	19 (90.5%)	
Smoking				
Yes	01 (16.7%)	12 (06.2%)	01 (04.8%)	0.556
No	05 (83.3%)	182 (93.8%)	20 (95.2%)	
When was your last meal?				
1-5 hours ago	03 (50.0%)	70 (36.1%)	10 (47.6%)	0.733
6-10 hours ago	02 (33.3%)	66 (34.0%)	07 (33.3%)	
>10 hours	01 (16.7%)	58 (29.9%)	04 (19.0%)	

§ P-value has been calculated using Chi-square test.
** Signficant at p<0.05 level.

The current study assessed the prevalence of overweight, obesity and high blood sugar among medical students at Qassim University.

The prevalence of overweight (25-29.9 kg/m^2) among medical students was 27.1%. This figure was the highest of the other factors that described the BMI. This finding had almost similar results to overweight reported by Inam et al.,[7] (29.9%); Koura et al.,[10] (29.1%); Alodhayani, Alshaikh[13] (27.2%); and Mirghani and Saleh[15] (26.6%). On the contrary, the finding had lower results than Allam, Taha[2] (34.5%); and Ahmed et al.,[16] (38%). Equally, the findings of the current study were slightly higher compared with Ibrahim et al.,[9] (19.1%); Mehmood et al.,[11] (21.7%); Makkawy, Alrakha[14] (23.7%) and Majeed[17] (11.6%).

The prevalence of obesity (>30 kg/m^2) was 14%. The current study reported a prevalence of obesity at 14%. These findings had almost similar results to obesity reported by Inam[7] (16.6%); Ibrahim et al.,[9] (12.7%); Allam, Taha[2] (10.3%); Makkawy, Alrakha[14] (11%); and Saeed et al.,[5] (13.7%). On the contrary, the findings were slightly higher than those of Mehmood et al.,[11] (8.4%) and Majeed[17] (6%). Equally, it is worth noting that the findings of the current study were remarkably lower than those reported in the studies by Teli et al.,[12] (59.2%); Alodhayani, Alshaikh[13] (34.8%); Mirghani and Saleh[15] (21.3%); and Ahmed et al.,[16] (56.2%).

A probe into why most students were overweight discovered that a sedentary lifestyle was the leading cause of increased body weight. A sedentary lifestyle involves little or no physical activity. Thus, most of the time is spent watching television, playing video games, reading or using computer/mobile phones. The current study found that 113 students (51.1%) acknowledged that they did not exercise, while 71 (32.1%) only exercised weekly. In the current study, the prevalence of a sedentary lifestyle was 78.8%. This finding was higher than those reported by Ibrahim, Mahnashi[9] (57.9%); and Allam, Taha[2] (64.6%). Equally, the current study did not find any significant association (p=0.119) between lack of exercise and obesity. A similar finding was reported by Saeed, Assiri[5] study among medical students at King Saud University.

Poor diet and genetics were also associated with increased overweight. Most young people are now not keen on what they eat. Due to their busy schedule, they prefer having fast food from fast joints. These foods are unhealthy as they are junk with lots of calories. The current study found this phenomenon is true as 152 students (68.8%) acknowledged consuming junk food and soda. The lack of regular exercise and the consumption of junk food is the main recipes of overweight and obesity among medical students at Qassim University in Saudi Arabia. The lack of exercise leads to excess sugars being converted to fats, thus predisposing someone to the risk of becoming overweight or obese. In the current study, the prevalence of poor diet was reported at 68.7%. This finding was similar to those reported by Majeed[17] (70%), and slightly higher than Ahmed, Alnasir[16] (56.2%). The current study's finding was extremely higher than what was reported by Ibrahim, Mahnashi[9] (13.1%). On the contrary, the finding of the current study reported a significant association between obesity and diet (p=0.006), which is against the finding of Makkawy, Alrakha[14] study that did not find any statistically significant association between overweight the consumption of dinner, soft drinks, fast food and sweets consumption.

Genetics also plays a significant role in overweight or obesity as students with a family history of obesity are likely to develop obesity. In the current study, the prevalence of increased weight associated with genetics stood at 11.1%. This finding is backed by laboratory findings from the Makkawy, Alrakha[14] study conducted among female students at Taibah University. The study was able to identify the prevalence of 24.5% of the allele gene (A), a risk factor, and 98% of the students had the heterozygous obesity-risk allele (AT) responsible for greater energy intake. Equally, family history is also genetically influenced. In the current study, the prevalence of obesity-associated with a family history of obesity was 45.2%. This finding was higher than that reported by Mehmood et al.,[11] (34.3%), although the finding was significantly higher than what was reported by Majeed[17] (16.4%). It is worth noting that the prevalence of family history was statistically and significantly associated (p<0.001) with obesity. This finding agrees with Saeed, Assiri[5] and Makkawy, Alrakha[14] studies that reported family history has a statistically significant association with obesity.

The current study reported the prevalence of hyperglycemia among obese medical students at 12.1%. This finding was almost similar to 9.5% reported in the Mirghani and Saleh[15] study among medical students at the medical college, University of Tabuk, Saudi Arabia. High blood sugar levels could result from unhealthy dietary intake. The prevalence of hyperglycemia can be associated with the large intakes of junk foods and soda with large quantities of unprocessed sugars. Cakes, biscuits and carbonated fizzy drinks have high levels of sugar. However, it is crucial noting that hyperglycemia was not significantly associated with overweight or obesity among medical students at Qassim University.

Conclusions

The current study assessed the prevalence of overweight, obesity, and high blood sugar among Qassim University medical students. The study reports the prevalence of overweight (27.1%), obesity (14%), sedentary lifestyle (78.8%), poor diet (68.7%), increased weight associated with genetics stood (11.1)%, and hyperglycemia among obese medical students (12.1%). A change in sedentary lifestyle and healthy dietary intake is recommended among medical students as a significant association between obesity and diet has been established. The study conclude that family history is statistically and significantly associated with obesity and that hyperglycemia was not significantly associated with overweight or obesity at Qassim University.

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