Journal of Health, Population and Nutrition

RESEARCH

Open Access

Evaluation of clinical aspects of obesity among undergraduate healthcare students-a cross-sectional study at King Saud University, Riyadh, Kingdom of Saudi Arabia

Safiya Salem Bakarman[1], Saeed Asiri[2], Adel Bashatha[2*], Wajid Syed[3] and Mahmood Basil A. Al-Rawi[4]

Abstract

Background Obesity among healthcare students (HCs)is a growing concern that needs to be addressed. The purpose of this study was to evaluate the knowledge, awareness, perceptions, practice, and preparedness of obesity, and associated factors among undergraduate HCs.

Methods A cross-sectional study was conducted from December 2023 to March 2024 using an online prevalidated questionnaire, to assess clinical aspects of obesity.Simple random sampling was applied for data collection from nursing, emergency medical services (EMS), and pharmacy students at Saudi University, Riyadh Saudi Arabia. All data were analyzed using statistical package for social science (SPSS).

Results A total of 456 HCs participated in this study. Among those 68% believed eating high carbohydrates, fats, and sugars leads to obesity. At the same time, 52.2% and 57.2% were aware that smoking and stress can contribute to obesity. On the other hand, 41.9% live a healthy lifestyle and 38.65% engage in physical activity to control their obesity. The demographic variables such as age ($p=0.0001$), gender ($p=0.0001$), professional classification ($p=0.0001$), presence of chronic diseases ($p=0.0001$), history of weight loss treatment ($p=0.0001$) and body mass index (BMI) ($p=0.0001$) were significantly associated with knowledge of obesity($p=0.001$). Similarly, students' age ($p=0.001$), presence of chronic diseases ($p=0.004$) history of weight loss treatment ($p=0.0001$), BMI ($p=0.001$), and active status ($p=0.0001$) were significantly associated with the perception of the obesity.

Conclusion Undergraduate HCs possess a good understanding of the clinical prospects of obesity. They know its causes, risks, and treatment options. Additionally, they are well-prepared to support individuals in managing their weight through lifestyle modifications and psychological counseling.

Keywords Obesity, Weight loss, Undergraduate, Weight management, Saudi Arabia

*Correspondence:
Adel Bashatha
abashatah@KSU.EDU.SA
[1]Department of Community and Mental Health Nursing, College of Nursing, King Saud University, Riyadh 11451, Saudi Arabia
[2]Department of Nursing Administration and Education, College of Nursing, King Saud University, Riyadh 11451, Saudi Arabia
[3]Department of Clinical Pharmacy, College of Pharmacy, King Saud University, Riyadh 11451, Saudi Arabia
[4]Department of Optometry, College of Applied Medical Sciences, King Saud University, Riyadh, Saudi Arabia

© The Author(s) 2024. **Open Access** This article is licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 International License, which permits any non-commercial use, sharing, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if you modified the licensed material. You do not have permission under this licence to share adapted material derived from this article or parts of it. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit http://creativecommons.org/licenses/by-nc-nd/4.0/.

Background

Obesity is a widespread health issue that has attracted significant attention in recent years. World Health Organisation (WHO) defined obesity as an unusual or excessive buildup of fat that poses a health risk." Obesity is a global problem that affects millions of people, posing immediate and long-term hazards to their health and well-being [1]. The causes of obesity are complex and varied, influenced by a combination of genetic, environmental, and behavioral factors. Obesity has far-reaching consequences on an individual's health. Some of the health risks associated with obesity include cardiovascular disease, metabolic syndrome, gastrointestinal issues, mental health disorders, and joint problems [2]. Eating habits, physical activity levels, and sleep patterns can all contribute to excess weight gain. A person's health is also influenced by social determinants, genetics, and medications [3]. According to literature estimates suggest that more than 650 million people worldwide are obese [4]. Furthermore, Saudi Arabia (SA) ranks eighth globally in terms of obesity prevalence, with the global obesity observatory estimating that it affects 38.3% of males in SA [5].

The prevalence of obesity among adults (≥15 years old) is 23.7%, according to Health Determinants Statistics Publication 2023 [6]. Although the prevalence of obesity was increasing among university tudnets [7–10], for instance, a study among medical students reported a prevalence of 31.67% [8], among health science students it was 34.7% [10], in southwestern SA the prevalence of 21.9% of overweight and 14.6% of obesity was reported among medicals tudnets [11].In European medical students, the prevalence of overweight was 12% and obesity was 2.3% being male [12] and smokers [12], use of junk food [13] are significant positive predictors of overweight and obesity [12].

Earlier studies among college students revealed a lack of knowledge of obesity, although studies show positive attitudes of students towards obesity [13, 14]. Weight management is a critical component of sustaining overall health and wellness. Developing healthy habits such as frequent exercise, balanced nutrition, and adequate hydration are essential components of an effective weight management strategy [15]. It is critical to set realistic goals and make long-term lifestyle improvements rather than relying on fad diets or drastic tactics. Monitoring food consumption, exercising portion control, and being attentive to emotional eating are all crucial methods for successful weight management [16]. Furthermore, getting assistance from healthcare professionals, such as dietitians or personal trainers, can provide vital information and motivation on the path to achieving and maintaining a healthy weight [16]. Individuals who take a comprehensive approach to weight management can improve their physical health, boost their confidence, and enhance their entire quality of life [16].

Lack of awareness about obesity and its causes, as well as other risk factors such as genetics, family history, food, radiation exposure, and environmental variables, may be contributing to the increasing number of obesity cases globally. Every healthcare professional, including students, is expected to know and comprehend the basic concepts of obesity. There was a lack of obesity awareness and practice among undergraduate HCs in SA [10, 17–20]. HCs, with their high understanding of obesity concerns, are frequently regarded as promising educators who can deliver credible information to their patients and customers about their perceptions and practices [10, 19]. Furthermore, due to the rapid rise in obesity, there has been a constant need to assess the present clinical view of the diseases. The purpose of this study was to evaluate knowledge, awareness, perceptions, practice, and preparedness of obesity, and associated factors among undergraduate HCs.

Methods

A cross-sectional study that complied with the Declaration of Helsinki guidelines for human research was conducted between December 2023 to March 2024 among students attending a university in Riyadh, SA. The data was collected after obtaining approval from the Institutional Review Board (IRB) at King Saud University (KSU), Riyadh, SA. Students who belong to the College of Pharmacy, nursing, and Emergency Medical Services (EMS), students who are regular to the college, a Saudi nationals able to complete the questionnaire by providing informed consent were included. While students who did not meet the inclusion criteria were excluded from the study. The ability to withdraw from the study at any moment was given to the participant. Further informed consent was obtained from all students, and confidentiality was ensured to maintain privacy.

Similar to previous studies [21–23] the required sample size for this study was calculated using a Raosoft sample size calculator at a 5% margin of error (ME) and 95% confidence intervals(CI), the required sample size for this study is 385. However to avoid missing responses or to overcome the sampling bias and to provide strength to the study we approached 500 healthcare students HCs.

A self-administered questionnaire on obesity was prepared using similar studies published elsewhere [24, 25]. The questionnaire consists of 33 questions divided into several sections. Section one covers demographics and behavioral characters with 7 items, including age, gender, presence of chronic disease, physical activity status, body mass index, history of obesity treatment, and risk factors of obesity (Fig. 1). Section two covers the student's knowledge of obesity with 6 items, section three

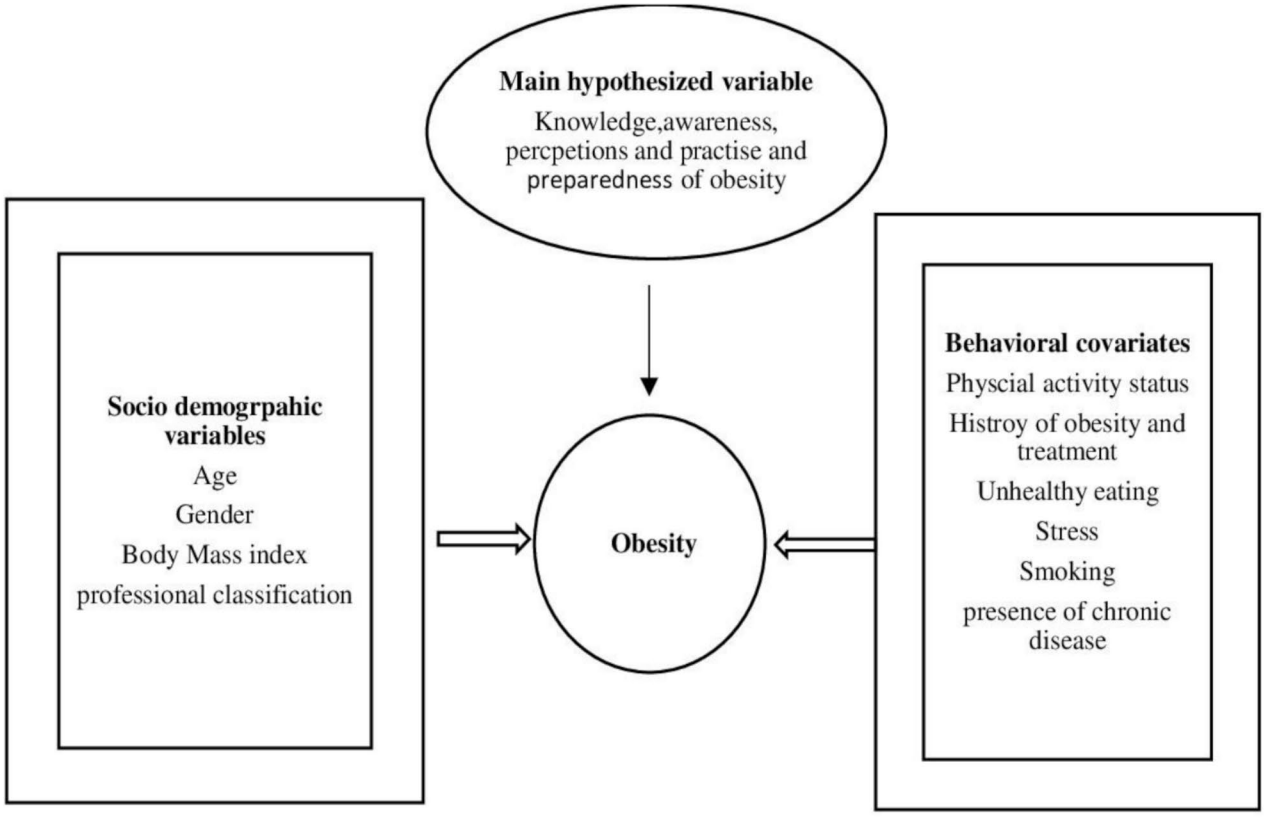

Fig. 1 Diagrammatic presentation of the conceptual framework

about the perception of the HCs with a total of 10 items, and section four about awareness of obesity management, consisted of 4 items and the last section covers the practice 6 items. The Knowledge, awareness, and weight management practice of obesity was assessed using a three-point scale (Yes/No/I don't know), while the perceptions were measured on a 5-point Likert scale ranging from agreeing to strongly disagree.

Figure 1 Conceptual framework for the Knowledge, awareness, perceptions practice, and preparedness of obesity and its associated factors among university students in Saudi Arabia, adapted from different sources after reviewing different kinds of literature [13, 26].

The questionnaire was subjected to pilot testing among randomly selected students ($n=30$), and the pilot responses were statistically evaluated. The reliability test findings in a pilot sample survey revealed a Cronbach's alpha coefficient of 0.69, suggesting that the questionnaire is reliable for performing the study. Cronbach's alpha coefficient for perceptions, knowledge, Awareness, and weight management practice is shown in Fig. 2.

Each domain of the study questions was computed for the scores (Knowledge, perceptions, and practice). For example, to prepare the overall score for the perceptions, a score of 5 was given to strongly agree, 4 for agree, 3 for neutrals, 2 for the response 'disagree', and a score of 1 to strongly disagree. Similarly, the practice scores were calculated by assigning a score of 1 for each correct answer and a wrong answer a score of 0, then all the practice items were computed to the obtained overall mean practice. The total practice was further divided into good, who scored > 50% in the practice, while poor considered as individuals who scored < 50% in the practice items.

In this study Body mass index (BMI) was defined as the weight in kilograms divided by the square of the height in meters (kg/m2) [27]. While any bodily movement produced by skeletal muscles that requires energy expenditure is known as physically active [28–30].

The data collection involves simple random and convenience sampling, the questionnaire was distributed to the targeted HCs using WhatsApp and emails as the main platform, to collect the responses, and the contact details of each student were obtained from the group leader of the class and further from academic unit from the each college. The data collection was followed by a researcher and all the students were informed that the data would be used only for the research purpose and confidentiality would be maintained throughout the study, students could withdraw from the study at any point in time. The researcher has identified the targeted population and sent invitations containing the electronic link of the questionnaire to the HCs, for achieving a maximum

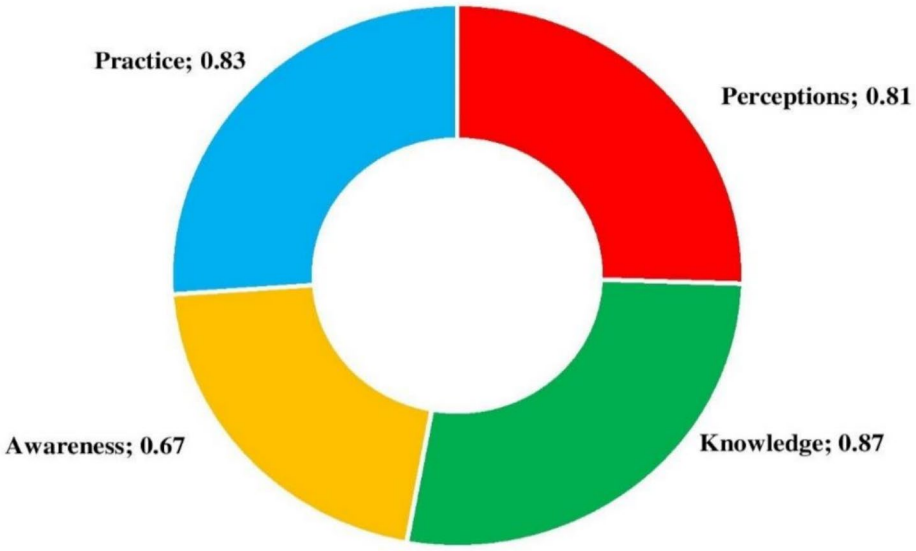

Fig. 2 Cronbach's alpha coefficient

number of responses, continuous emails and reminders were sent. The detailed steps in the study methodology are presented in Fig. 3.

Data analysis

Data obtained from the study were recorded and documented using SPSS, version 27. Descriptive statistics were used to analyze the data obtained from the survey questionnaire. These included frequencies and percentages. To find out the association between variables Chi-square or Fisher exact test was used. When significant differences were found, the multiple comparisons were performed using Bonferroni correction to avoid type I errors (false positives). Similarly to find out the difference between knowledge, and perceptions of obesity with two groups student *t*-test was used while for variables with more than two groups, ANOVA test was used. All statistical tests were performed at a significance level of $\alpha = 0.05$.

Results

Description of the research population

Four hundred fifty-six HCs responded, yielding a 91.2% response rate ($n = 500$). The bulk of the HCs were males, 282 (61.8%), aged 20 to 22 years (39%). Most of them were 201 (44.1%), from EMS, followed by nursing 159 (34.9%). In addition, 53.5% of the nursing, 45.8% of EMS, and 34.4% of the pharmacy students are not obese, only 13.9% and 11.3% of the EMS and nursing students have undergone obesity treatment. However, the detailed responses of the HCs according to their professional classification are presented in Table 1.

More than two-thirds 66%($n = 301$) of the HCs were aware of obesity and a similar percentage believed that eating a diet rich in carbohydrates, fats, and sugars can contribute to obesity 68% ($n = 310$). On the other hand, 57.2%($n = 261$) of the HCs knew that stress and smoking 52.2% ($n = 238$) were the risk factors of obesity (Figure 4).

However, the findings revealed that 65.8%($n = 300$) of the HCs reported that maintaining good physical activity and a healthy diet, helps in managing obesity as shown in Table 2.

53% of the HCs (53%) believed that healthy people can eat both nutritious and unhealthy meals. While 44.9% said they could cease engaging in physical activity after they obtained a normal BMI. Almost 40% of HCs believe that obese people should learn more about self-care management to lower their risk of obesity consequences. Furthermore, 43.6%, 42.4%, and 37.3% of HCs disagreed with the claim that weight loss surgery, drugs, and dietary supplements are beneficial. The detailed perceptions of HCs toward obesity are presented in Table 3.

Furthermore, 312 (68.4%) of the HCs considered that utilizing weight loss medications could create negative effects as shown in Table 4.

In terms of weight control practice, 42.5% of HCs avoid excessive caffeine consumption, while 38.6% engage in physical activity and 41.9% live a healthy lifestyle. When asked about smoking or using tobacco products, more than half of 57.7% of HCs said they don't smoke or use E-cigarettes. While 42.1% of them do not eat unhealthy fast food. Finally, a significant majority of HCs (56.9%) do not use any FDA-approved anti-obesity drugs for obesity management. Table 5 presents detailed information about weight management practices.In this study54.6% of

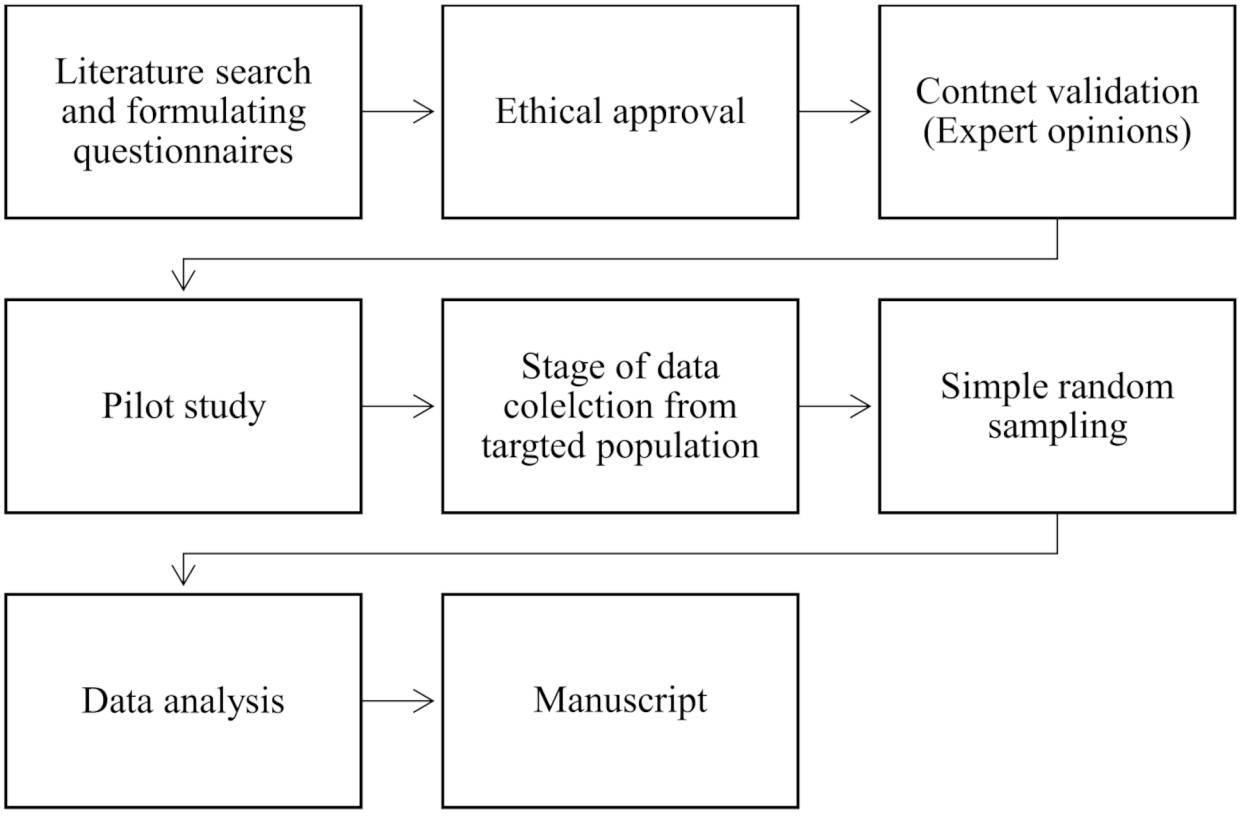

Fig. 3 Flow diagram of the study

Table 1 Distribution of demographic and behavioral characters according to professional classification ($n=456$)

Variables		Professional classification		
		EMS ***n*** **(%)** **201 (44.1%)**	**Nursing** ***n*** **(%)** **159 (34.9%)**	**Pharmacy** ***n*** **(%)** **96 (21.1%)**
Gender	Male	146(72.6%)	108(67.9%)	28(29.2%)
	Female	55(27.4%)	51(32.1%)	68(70.8%)
Age	20–22	56(27.9%)	111(69.89%)	11(11.5%)
	23–25	79(39.3%)	35 (22.0%)	36(37.5%)
	26–27	66(32.8%)	13(8.2%)	49 (51.0%)
Active in sports	Yes	155(77.1%)	121(76.1%)	56(58.3%)
	No	46(22.9%)	38(23.9%)	40(41.7%)
Chronic disease	Yes	22(10.9%)	43(27%)	18(18.8%)
	No	179(89.1%)	116(73)	78(81.3%)
History of obesity treatment	Yes	28(13.9%)	18(11.3%)	7(7.3%)
	No	81(40.3%)	56(35.2%)	56(58.3%)
	I am not obese or overweight	92(45.8%)	85(53.5%)	33(34.4%)
BMI* (Body mass index) weight	Under (< 18.5)	41(20.4%)	60(37.7%)	11(11.5%)
	Normal (18.5–24.9)	104(51.7%)	62(39%)	47(49%)
	Over= (25–29.9)	45(22.4%)	28(17.6%)	34(35.4%)
	Obese(BMI of 30 or greater)	11(5.5%)	9(5.7%)	4(4.2%)

the studnets reported good practice of obesity as shown in Figure 5.

The mean knowledge score of the obesity was found to be 9.5(SD=3.68), (Range 0–12) while the score of the mean perception was 29.04(SD=8.62) (Range 0–31). The demographic variables such as age, gender, professional classification, presence of chronic diseases, history of weight loss treatment, and BMI ($p=0.000$) were significantly associated with the knowledge score of obesity while PA was not significantly associated with

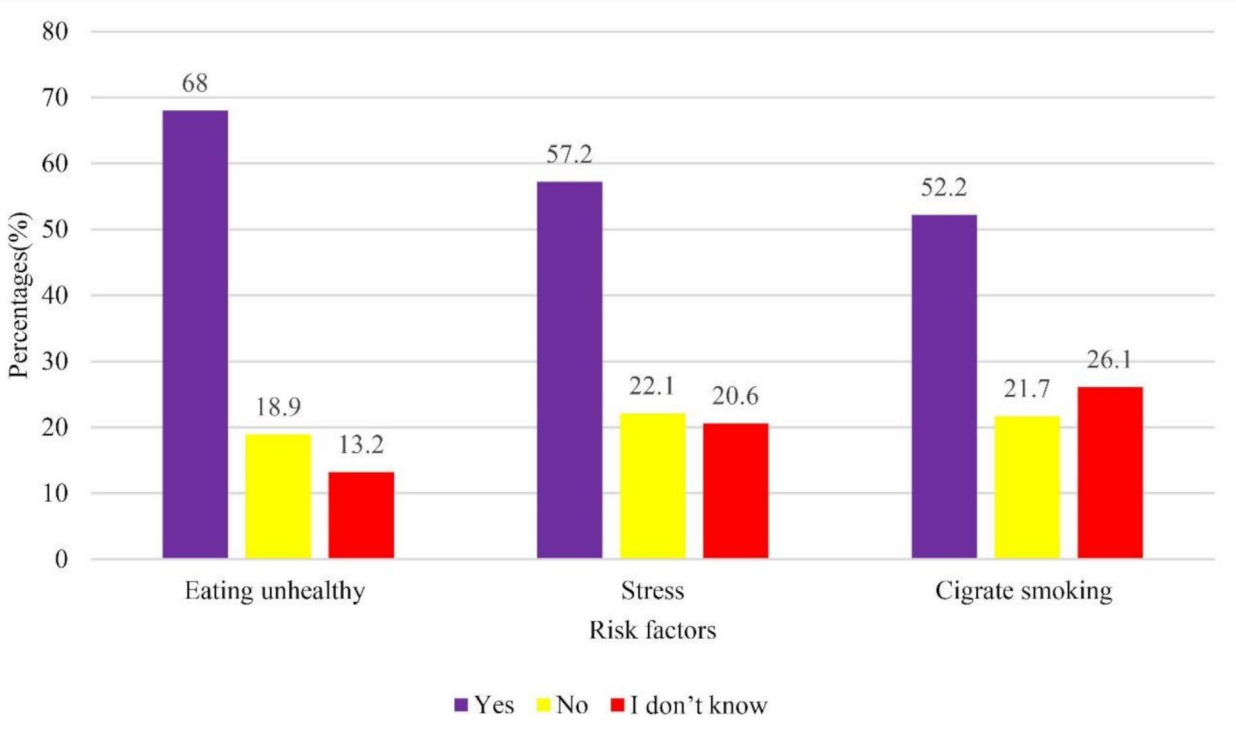

Fig. 4 Risk factors for obesity

Table 2 Awareness of obesity and managing techniques among Healthcare Students

Variables	Frequency (*n*)	Percentage (%)
Are you aware of obesity?		
Yes	301	66.0
No	99	21.7
I don't know	56	12.3
Adequate physical activity with a healthy diet helps to manage obesity.		
Yes	300	65.8
No	73	16.0
I don't know	83	18.2
Do know there are USFDA-approved obesity medications that help in weight loss?		
Yes	237	52.0
No	97	21.3
I don't know	122	26.8

the knowledge score. (p=0.168). Additionally, the perception score was not significantly associated with HC's gender (p=0.012) and professional classification (p=0.22). Similarly, HC's age (p=0.001), presence of chronic diseases(p=0.004 history of weight loss treatment (p=0.000), BMI (p=0.001), and physical activity (p=0.000) were significantly associated with perception scores of obesity. Table 6 shows the detailed association between Knowledge and perception scores and Healthcare students' characteristics.

In this study, 54.6% of HCs were found to have good practice, while 45.4% reported poor practice for weight management (Fig. 4).

Table 7 illustrates the relationship between demographic characteristics and weight management practice. Results showed that professional classifications (p=0.0001), had undergone any history of weight loss treatment (p=0.0001) and BMI (p=0.004)had a significant association with two levels of practice (p=0.001) According to the data presented, the two-level scores regarding weight management practice were not significantly associated with gender (p=0.21), age (p=0.20), Presence of chronic disease (p=0.274) and physical activity (p=0.752).

Table 3 Perceptions of the Healthcare students towards obesity

Questionnaire item	Strongly agree *n* (%)	Agree *n* (%)	Neutral *n* (%)	Strongly disagree *n* (%)	Disagree *n* (%)
Individuals in good health can eat both healthy and unhealthy food.	170 (37.3)	75 (16.4)	82(18)	20 (4.4)	109 (23.9)
Once BMI is within normal range, one can cease engaging in regular physical exercise.	151(33.1)	54(11.8)	72(15.8)	60(13.2)	119(26.1)
To lower the risk of obesity and associated problems, people should learn more about managing their weight.	68(14.9)	119(26.1)	87(19.1)	142(31.1)	40(8.8)
Exercise and a nutritious diet are the best ways to manage obesity; anti-obesity medicines are neither safe nor helpful in this regard.	222(48.7)	97(21.3)	94(20.6)	10(2.2)	33(7.2)
After you achieve a healthy weight, you can discontinue eating a balanced diet.	161(35.3)	70(15.4)	68(14.9)	65(14.3)	92(20.2)
I believe that weight loss surgical procedures work.	30(6.6)	105(23)	122(26.8)	151(33.1)	48(10.5)
I believe that dietary supplements work well for obesity	66(14.5)	116(25.4)	104(22.8)	130(28.5)	40(8.8)
Exercise and vigorous training are effective.	293(64.3)	44(9.6)	69(15.1)	13(2.9)	37(8.1)
Weight loss medications are effective.	32(7)	93(20.4)	138(30.3)	148(32.5)	45(9.9)
Counseling by dieticians is effective for the management and treatment of obesity.	275(60.3)	75(16.4)	71(15.6)	10(2.2)	25(5.5)

Table 4 Healthcare student's awareness of obesity treatments and procedures

Variables	Frequency (*n*)	Percentage (%)
Are you aware of the surgical procedures for obesity?		
Yes	278	61.0
No	101	22.1
I don't know	77	16.9
Are you aware of the use of lipid suction and sleeve gastrectomy to lower the fat associated with obesity?		
Yes	285	62.5
No	107	23.5
I don't know	64	14.0
Are you aware of the drugs used in the treatment for weight reduction?		
Yes	279	61.2
No	177	38.8
Do you think using weight reduction medications could cause side effects?		
Yes	312	68.4
No	144	31.6

Table 5 Healthcare students 'weight management practices

Variables	Yes *n* (%)	No *n* (%)	I don't know *n* (%)
Do you overindulge in coffee-flavored beverages?	192(42.1)	194(42.5)	70(15.4%)
Do you currently manage your obesity through physical exercise?	176(38.6)	210(46.1)	70(15.4)
Do you use electronic or tobacco cigarettes for smoking?	109(23.9)	263(57.7)	84(18.4)
Do you eat more than five meals a week that consist primarily of unhealthy fast food that is high in fats and carbohydrates?	177(38.8)	192(42.1)	87(19.1)
Have you adopted a healthy lifestyle to overcome becoming obese?	191(41.9)	173(37.9)	92(20.2)
Do you take any FDA-approved anti-obesity medications	90(19.7)	287(62.9)	79(17.3)

Discussion

Individuals have become more aware of metabolic illnesses since their occurrence has increased in recent years [31]. Obesity is one of the most well-known of these illnesses and rising in SA and around the world [31]. However, literature is scarce on students' knowledge of obesity, both nationally and internationally [13, 32, 33]. This study helps in designing interventions, to overcome the prevalence and associated complications of obesity among students and individuals, further helps professionals in reducing the risk of predisposing factors of obesity by creating awareness of risk factors as well as developing methods to raise the level of awareness and education about obesity.

In the present study, 46.7% of HCs had a normal body mass index, while 23.5% and 5.3% of them were overweight or obese, and 24.6% of them were underweight. A previous study among a large sample of university

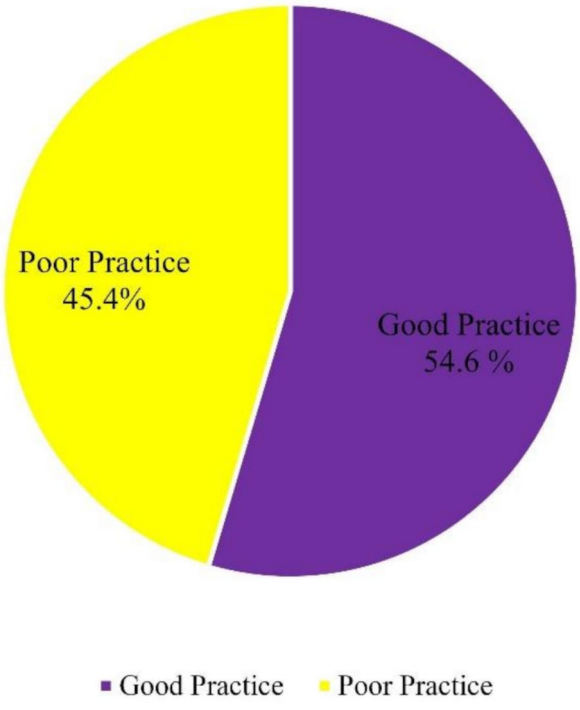

Fig. 5 Levels of weight management practice among HCs

students revealed that 65.44% of students had normal BMI and 12.14% were overweight and obese [34]. Suggesting the high prevalence of overweight and obesity among Saudi students compared to previous studies among Chinese university students [34]. Similarly, another study in Ghana reported that 31% and 15% of university students were classified as overweight. However, only 2.4% of male students and 8.0% of female students were classified as obese [35]. However, the prevalence of obesity and overweight was higher in this study compared to a similar study conducted in SA, where Elsafi et al. revealed that 7.3%, 56.1%, 21%, and 15.5% of those studied were underweight, normal weight, overweight, or obese [13].

Our study revealed that more than two-thirds of the students were aware of weight loss surgery in the management of obesity and the use of lipid suction and sleeve gastrectomy to lower the fat associated with obesity. A previous study in SA found that 22.7% of HCs weren't aware of obesity surgeries [36]. Another study in SA found that 51% of respondents believed obesity could be treated most effectively with surgical interventions [37]. A Study by Diao x et al. revealed approximately 30% of the students did not accept the safety and effectiveness of surgery treatment for obesity management [34]. While our study revealed that 68.4% of the students believed that weight reduction agents could cause side effects. Although the current findings show that HCs in Saudi universities were more aware of surgical interventions and management of obesity more concern is needed to educate about various treatment and management methods of obesity among Saudi students is needed.

As a result, having appropriate knowledge, perceptions, and practice toward weight management is critical in minimizing the chances of obesity and its consequences and saving patients' lives. Students in Health care are expected to be knowledgeable, have a positive attitude, and be proficient in presenting information on obesity. Diet and lifestyle play a crucial role in the development of obesity. Unhealthy eating habits, portion sizes, and lack of physical activity are all factors that contribute to excessive weight gain. A nutritious diet that includes minimal fat has long been advocated as the key to a healthy weight and a healthy body. Our findings revealed that 68% of the HCs believed that eating a diet rich in carbohydrates, fats, and sugars could contribute to obesity whereas a study on medical students concluded that 72% are on a diet that contains carbohydrates as the main component in their diet. Furthermore, this study confirms that maintaining weight requires a diet that contains a relatively large amount of carbohydrates [19]. On the contrary, our finding also revealed that 65.8% of HCs think that obesity can be managed by a healthy diet and by good physical activity. Furthermore, 43.8% of the HCs thought that exercising regularly was the best way to cure obesity.

In this study, the mean knowledge score of obesity among students was 9.5(SD=3.68), (Range 0–12), while 54.6% of the students were observed to have good practice. While previous to Diao et al. 80% of Chinese university students reported a high knowledge of the common causes and complications of obesity [34]. These results point to the need for better strategies and guidelines for enlightening knowledge related to various aspects ibn managing obesity using diet and a healthy lifestyle. It is known that the predominance of different weight categories is significantly influenced by diet and activity.

Weight loss treatment using medicine and surgical procedures for obesity can be life-changing for individuals who are genetically obese and have been unable to achieve significant weight loss through traditional methods and has become a generally acknowledged way to treat various illnesses [38]. Reducing co-morbidities and improving quality of life as well as all-cause mortality are the ultimate benefits of losing weight [39]. The underutilization of weight reduction surgery and limited access to it pose significant obstacles to the effective management of obesity [38]. Sleeve gastrectomy (SG) and Roux-en-Y gastric bypass (RYGB) are the two most often used weight loss operations; taken combined, they make up the great majority of initial bariatric surgical procedures. As outlined in 'Vision 2030,' reducing obesity and

Table 6 Association between mean knowledge and perception scores and healthcare student characteristics

	Knowledge				Perception			
Participants Characteristics	**Mean(SD)**	***F* Value**	***t-Value****	***p*-value**	**Mean(SD)**	***F* Value****	***t*-*Value***	***p*-value**
Gender			-2.801				2.526	0.012*
Male	9.93(3.92)			0.005*	28.25(8.45)			
Female	8.94(3.17)				30.33(8.75)			
Age								
20–22	10.46(4.36)				28.46(7.91)			
23–25	8.81(3.00)	9.51		0.000**	27.76(9.25)	6.884		0.001**
26–27	9.17(3.08)				31.36(8.39)			
Professional classification								
EMS	8.70(2.97)				27.83(8.91)			
Nursing	10.76(4.33)	14.83		0.000**	29.71(7.58)	3.872		0.022**
Pharmacy	9.35(3.34)				30.48(9.31)			
Chronic disease?								
Yes	11.84(4.94)				31.50(5.54)			
No	9.05(3.13)		-6.52	0.000*	28.50(9.08)		-2.89	0.004*
Physically active?								
Yes	9.70(3.89)		-1.38	0.168*	27.38(8.88)			
No	9.16(3.03)				33.49(5.95)		7.08	0.000*
Weight loss treatment								
Yes	8.86(3.79)				30.00(6.65)			
No	8.87(2.90)	9.58		0.000**	32.44(7.39)	35.986		0.000**
Not obese or overweight	10.36(4.12)				25.69(8.85)			
Body Mass Index (BMI)								
Underweight (< 18.5)	9.39(3.43)				27.50(9.54)			
Normal weight (18.5–24.9)	9.16(3.21)				33.00(6.46)	5.276		0.001**
Overweight (25–29.9)	8.50(2.64)	9.03		0.000**	29.90(7.98)			
Obese (> 30)	10.96(4.59)				30.32(7.11)			

*studnets t test ; ** ANOVA test

improving access to support and treatment are important goals of transforming the healthcare system [40].

Education and career in healthcare can be challenging and stressful [41]. It is critical to recognize that stress contributes to obesity by causing poor eating habits, a lack of exercise, and drug addiction [19, 42]. Regarding the risk factors, our findings revealed that more than half of the students believed that smoking and consistent stress are the risk factors for obesity. However, contrary to this, earlier studies indicated that smoking and mental stress a risk factors for obesity [43–45]. These findings suggested the implementation of awareness programs of the adverse events associated with smoking, managing techniques to control stress which ultimately leads to a healthy lifestyle, furthermore by participating in various social and physical activities, which calm the mind and body by giving a relaxed feeling is crucial to manage stress. Since today's healthcare students are tomorrow's professionals, possessing adequate knowledge and practice towards obesity helps them at their practice site, therefore it is advisable to enhance the academic curriculum by adopting various obesity and weight management content in nursing, pharmacy, and emergency medicine courses. Education on the social consequences of obesity and issues faced by obese individuals in the community, and how these issues are addressed is needed.

Limitations

The study has several limitations. Firstly recall bias, which is a characteristic of a self-administered questionnaire, Furthermore, because the survey was cross-sectional and only covered one point in time, from a single university student, it is difficult to generalize the conclusion to all Saudi HCs. Another drawback is that the students' food habits were not investigated, which is one of the probable causes of overweight and obesity and is significantly linked to obesity. Furthermore, self-reported responsibility may contribute to under- and over-reporting, resulting in undesirable responses among students, which could be another constraint. Future studies involving all HCs are recommended. Furthermore, the sample size of the study is small. Therefore in the future with larger sample size including all HCs is needed to better interpret the findings.

Table 7 Association between weight management practice and demographic characteristics of Healthcare students

Healthcare students characters	No healthcare students	Weight management practice levels		*p*-value*
		Good Practice	Poor Practice	
Gender				
Male	Healthcare students	154	128	
	% within gender	58.9%	41.1%	0.21
	% within two levels	66.7%	56%	
Female	Healthcare students	95	79	
	% within gender	47.7%	44%	
	% within two levels	33.3%	52.3%	
Age				
20–22	Healthcare students	97.2	80.8	
	% within a year of study	62.4%	37.6%	
	% within two levels	44.6%	32.4%	
23–25	Healthcare students	81.9	68.1	0.20
	% within a year of study	52%	48%	
	% within two levels	31.3%	34.8%	
26–27	Healthcare students	69.9	58.1	
	% within a year of study	46.9%	53.1%	
	% within two levels	24.1%	32.9%	
Professional classification				
Emergency medical services	Healthcare students	109.8	91.2	
	% within a professional classification	45.8%	54.2%	
	% within two levels	36.9%	52.7%	0.01
Nursing	Healthcare students	86.8	72.2	
	% within a professional classification	69.8%	30.2%	
	% within two levels	44.6%	23.2%	
Pharmacy	Healthcare students	52.4	43.6	
	% within a professional classification	47.9%	52.1%	
	% within two levels	18.5%	24.2%	
Chronic disease?				
Yes	Healthcare students	45.3	37.7	
	% within chronic disease	60.2%	39.8%	
	% within two levels	20.1%	15.9%	
No	Healthcare students	203.7	169.3	0.274
	% within chronic disease	53.4%	46.6%	
	% within two levels	79.9%	84.1%	
Physically active?				
Yes	healthcare students	181.3	150.7	
	% within physical activity	55.1%	44.9%	
	% within two levels	73.5%	72%	
No	healthcare students	67.7	56.3	0.752
	% within physical activity	53.2%	46.8%	
	% within two levels	26.5%	28%	
History of weight loss				
Yes	Healthcare students	28.9	24.1	
	% within undergone weight loss	34%	66%	
	% within two levels	7.2%	16.9%	
No	Healthcare students	105.4	87.6	0.01
	% within undergone weight loss	45.1%	54.9%	
	% within two levels	34.9%	51.2%	
Not obese or overweight	Healthcare students	114.7	95.3	
	% within undergone weight loss	68.6%	31.4%	
	% within two levels	57.8%	31.9%	
Body Mass Index (BMI)				
Underweight (< 18.5)	Healthcare students	61.2	50.8	
	% within BMI	62.5%	37.5%	
	% within two levels	28.1%	20.3%	

Table 7 (continued)

Healthcare students characters	No healthcare students	Weight management practice levels		*p*-value*
		Good Practice	Poor Practice	
Normal weight (18.5–24.9)	Healthcare students	116.3	96.7	0.008
	% within BMI	58.2%	41.8%	
	% within two levels	49.8%	43%	
Overweight (25–29.9)	Healthcare students	58.4	48.6	
	% within BMI	40.2%	59.8%	
	% within two levels	17.3%	30.9%	
Obese (> 30)	Healthcare students	13.1	10.9	
	% within BMI	50%	50%	
	% within two levels	4.8%	4.8%	

*Chi-Square

Conclusion

In conclusion, more than two-thirds of the students were aware of obesity and how to control it. In addition, 54.6% demonstrated appropriate practices toward obesity, while only 48% reported having adequate knowledge. Obesity is a significant health concern that affects individuals of all ages and backgrounds. Understanding the causes, risks, and consequences of obesity is crucial for promoting healthy weight management and preventing the associated health problems. By adopting healthier lifestyles and making informed choices, individuals can take the first steps towards a more active lifestyle and a healthy weight.

Recommendations

Undergraduates should be educated about obesity in the future to strengthen their knowledge and practice. This can be done by attending various metabolic disease seminars, extracurricular activities, and awareness programs. The majority of HCs were positive about dieting and exercising as ways of preventing obesity. In addition, physical activity such as brisk walking, running, swimming, or playing for at least 150 to 300 min a week is required to control the chances of getting diseases including obesity. Adequate nutrition plans with balanced diets that are calorie-controlled and recommended by medical professionals are recommended for managing overweight. Drinking water to stay hydrated at all times and staying away from fizzy and sugar-filled beverages are warranted. Furthermore, health programs for obesity management and education on the negative effects of obesity are also required. This can be accomplished by developing policies and initiatives to implement, spread, and sustain Healthy weight programs among individuals. Among students, it is advised to provide additional resources in the unviersities and colleges concerning the negative consequences of obesity that are linked to various metabolic diseases.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s41043-024-00651-y.

Supplementary Material 1

Acknowledgements
The authors of this study extend their appreciation to Researchers Supporting Project (RSPD2024R1099), King Saud University, Riyadh, Riyadh, Saudi Arabia.

Author contributions
S.B. and S.A wrote the main manuscript text and A.B and W.S, M.B.A prepared figures and tables . All authors reviewed the manuscript."

Funding
The authors of this study extend their appreciation to Researchers Supporting Project (RSPD2024R1099), King Saud University, Riyadh, Saudi Arabia, for supporting this study and funding the work.

Data availability
The datasets used and analyzed during the current study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate
Before the data collection study study protocol, was approved by the institutional review board at King Saud University Human Research Ethics committee (KSU-HE-23-852), further informed consent was obtained from all students, and confidentiality was ensured to maintain privacy.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

Received: 1 August 2024 / Accepted: 4 October 2024
Published online: 14 October 2024

References

1. Beyene ET, Cha S, Jin Y. Overweight and obesity trends and associated factors among reproductive women in Ethiopia. Global Health Action. 2024;17(1):2362728.
2. Fan K, Lv F, Li H, Meng F, Wang T, Zhou Y. Trends in obesity and severe obesity prevalence in the United States from 1999 to 2018. Am J Hum Biology. 2023;35(5):e23855.
3. Pujol-Rafols J, Carmona-Maurici J, Felsenreich D, Shikora S, Prager G, Di Lorenzo N, De Luca M, Uyanik O, Mazzarella M, D'Arco S. Indications and Coverage of metabolic and bariatric surgery: a Worldwide IFSO Survey comparing different National guidelines. Obes Surg. 2024;34(5):1395–404.
4. Stoś K, Rychlik E, Woźniak A, Ołtarzewski M, Jankowski M, Gujski M, Juszczyk G. Prevalence and sociodemographic factors associated with overweight

and obesity among adults in Poland: a 2019/2020 nationwide cross-sectional survey. Int J Environ Res Public Health. 2022;19(3):1502.
5. Althumiri NA, Basyouni MH, AlMousa N, AlJuwaysim MF, Almubark RA, BinDhim NF, Alkhamaali Z, Alqahtani SA. Obesity in Saudi Arabia in 2020: prevalence, distribution, and its current association with various health conditions. Healthcare: 2021. MDPI; 2021. p. 311.
6. statistics Gaf: Health Determinants Statistics Publication. 2023. In. Saudi Arabia Saudi National Health Survey; 2023.
7. Chenji SK, Rao CR, Sivanesan S, Kamath V, Kamath A. Cross-sectional analysis of obesity and high blood pressure among undergraduate students of a university medical college in South India. Family Med Community Health. 2018;6(2):63–9.
8. Aryal V, Ghimire D, Kandel S, Majumder A, Manna S. Obesity among medical students of a Medical College: a descriptive cross-sectional study. JNMA: J Nepal Med Association. 2022;60(255):943.
9. Verma A, Chauhan S, Lazarus A, Kale S. A cross-sectional assessment of obesity among medical students of central India. Asian J Med Sci. 2024;15(5):168–72.
10. Makkawy E, Alrakha AM, Al-Mubarak AF, Alotaibi HT, Alotaibi NT, Alasmari AA, Altamimi T. Prevalence of overweight and obesity and their associated factors among health sciences college students, Saudi Arabia. J Family Med Prim care. 2021;10(2):961–7.
11. Mahfouz AA, Alsaleem SA, Alsaleem MA, Ghazy RM. Prevalence of obesity and Associated Dietary habits among Medical students at King Khalid University, Southwestern Saudi Arabia. Medicina. 2024;60(3):347.
12. Ilić M, Pang H, Vlaški T, Grujičić M, Novaković B. Prevalence and associated factors of overweight and obesity among medical students from the Western Balkans (South-East Europe Region). BMC Public Health. 2024;24(1):29.
13. Elsafi SH, Al-Dossari RH, Al-Shaqi RA, Fakirah WE, Al-Dossari RF, Al-Sharif OJ, Maawadh RM, Al Musallam LD, Alaohali A, Abu Hassan AM. Obesity-related knowledge and practice among the Healthcare professions students in Saudi Arabia. Diabetes Metabolic Syndrome Obes 2024:427–34.
14. Xue B, Zhang X, Li T, Gu Y, Wang R, Chen W, Ren X, Liu X, Chen G, Lin Y. Knowledge, attitude, and practice of obesity among university students. Annals Palliat Med. 2021;10(4):4539546–4534546.
15. Committee DGA, Prevention HHS, Promotion OD. H, USDA, Promotion CfNP: dietary guidelines for americans 2015–2020. Government Printing Office; 2015.
16. Kayode OO. Diet and obesity. Psychol Pathophysiological Outcomes Eat 2021:237.
17. Al-Rethaiaa AS, Fahmy A-EA, Al-Shwaiyat NM. Obesity and eating habits among college students in Saudi Arabia: a cross sectional study. Nutr J. 2010;9:1–10.
18. Baig MH, Kausar MA, Husain FM, Shakil S, Ahmad I, Yadav BS, Saeed M. Interfering PLD1-PED/PEA15 interaction using self-inhibitory peptides: an in silico study to discover novel therapeutic candidates against type 2 diabetes. Saudi J Biol Sci. 2019;26(1):160–4.
19. Bashir AI, Althagafi AH, Alduheim MA, Alshaikhi AM, Alqwayee MN, Ginawi IA, Ginawi TA, Shahid S, Ahmed MQ, Kausar MA. The prevalence of obesity and the relationship of food intake in the body weight of medical students of Hail University–Northern Saudi Arabia. Egypt Acad J Biol Sci C Physiol Mol Biology. 2019;11(2):31–6.
20. Girish H, Koppad RS. A cross-sectional study on prevalence of overweight & obesity among the medical students at Kannur, Kerala. J Evol Med Dent Sci. 2014;3(8):1905–10.
21. Syed Snr W, Bashatah A, Al-Rawi A. MB: Evaluation of knowledge of food–drug and alcohol–drug interactions among undergraduate students at king Saud University–an observational study. J Multidisciplinary Healthc 2022:2623–33.
22. Qadhi OA, Albothi GK, Fallatah R, Anazi M, Al-Rawi MBA, Syed W. Navigating health literacy and practices: a cross-sectional study on nursing undergraduates in Riyadh, Saudi Arabia. Med Sci Monitor: Int Med J Experimental Clin Res. 2023;29:e941632–941631.
23. Alghamdi A, Syed W, Samarkandi OA, Albalawi MM, Alsulaihim IN, Almutairi SM, Al-Rawi MBA. Exploring the Educational Social and Physical activities among Health Care Undergraduates–a cross-sectional study among Saudi students. Med Sci Monitor: Int Med J Experimental Clin Res. 2024;30:e943399–943391.
24. Alluhidan M, Alsukait RF, Alghaith T, Shekar M, Alazemi N, Herbst CH. Overview: challenges and opportunities for obesity prevention in Saudi Arabia. 2022.
25. Alshehri FS, Alorfi NM. Saudi adults' understanding and views of Weight Management practices and obesity. Diabetes Metabolic Syndrome Obes 2023:3513–31.
26. Alqassimi S, Elmakki E, Areeshi AS, Aburasain ABM, Majrabi AH, Masmali EMA, Refaei EAI, Mobaraki RAA, Qahtani RMA, Oraibi O. Overweight, obesity, and Associated Risk factors among students at the Faculty of Medicine, Jazan University. Medicina. 2024;60(6):940.
27. Malnutrition. in women [https://www.who.int/data/nutrition/nlis/info/malnutrition-in-women#:~:text=BMI%20%3C18.5%3A%20underweight,BMI%20%E2%89%A530.0%3A%20obesity.].
28. Strain T, Flaxman S, Guthold R, Semenova E, Cowan M, Riley LM, Bull FC, Stevens GA. National, regional, and global trends in insufficient physical activity among adults from 2000 to 2022: a pooled analysis of 507 population-based surveys with 5· 7 million participants. Lancet Global Health. 2024;12(8):e1232–43.
29. Guthold R, Stevens GA, Riley LM, Bull FC. Global trends in insufficient physical activity among adolescents: a pooled analysis of 298 population-based surveys with 1· 6 million participants. Lancet Child Adolesc Health. 2020;4(1):23–35.
30. Bashatah A, Qadhi OA, Al Sadoun A, Syed W, Al-Rawi MBA. Evaluation of young adults' physical activity status and perceived barriers in the Riyadh region of Saudi Arabia. J Multidisciplinary Healthc 2023:557–69.
31. Jullien S, Carai S, Weber MW. Addressing the growing burden of obesity, diabetes and asthma in children and adolescents: the role of primary health care and the WHO Pocket book in Europe for a healthy future. Global Pediatr. 2024;9:100186.
32. Sanni TA, Elegbede OE, Adewoye KR, Durowade KA, Ipinnimo TM, Alabi AK, Ojo JO, Agbana RD, Raji MM, Aderinwale OA. Nutritional status of primary school children and their caregiver's knowledge on malnutrition in rural and urban communities of Ekiti State, Southwest Nigeria. PLoS ONE. 2024;19(5):e0303492.
33. Elmskini FZ, Bouh A, Labyad A, Elghoulam N, Iraqi H, Mehdad S, Madkour A, Moufid A, Aabi M, Boutayeb S. Increased nutrition knowledge and adherence to the Mediterranean diet are associated with lower body mass index and better self-rated general health among university students. Hum Nutr Metabolism. 2024;35:200240.
34. Diao X, Gao L, Yang Y, Chen X, Gong J, Qian Y, Yang W, Obesity C, Collaborative MS. Knowledge and attitudes towards obesity and bariatric surgery in university students: a national survey. Obes Surg. 2022;32(9):2869–79.
35. Obirikorang C, Adu EA, Anto EO, Afum-Adjei Awuah A, Fynn ANB, Osei-Somuah G, Ansong PN, Boakye AO, Ofori-Boadu I, Obirikorang Y. Prevalence and risk factors of obesity among undergraduate student population in Ghana: an evaluation study of body composition indices. BMC Public Health. 2024;24(1):877.
36. Altaf A, Abbas MM. Public perception of bariatric surgery. Saudi Med J. 2019;40(4):378.
37. Alfadhel SF, Almutairi HS, Al Darwish TH, Almanea LT, Aldosary RA, Shook AH. Knowledge, attitude, and practice of bariatric surgery among adult Saudi community, Saudi Arabia, 2019. J Family Med Prim Care. 2020;9(6):3048–52.
38. Nudel J, Sanchez VM. Surgical management of obesity. Metabolism. 2019;92:206–16.
39. Wolfe BM, Kvach E, Eckel RH. Treatment of obesity: weight loss and bariatric surgery. Circul Res. 2016;118(11):1844–55.
40. Alghamdi S, Dixon N, Al-Senani F, Al Aseri Z, Al Saif S, AlTahan T. Effects of a team quality improvement method in a national clinical audit programme of four clinical specialties in Ministry of Health hospitals in Saudi Arabia. Int J Qual Health Care. 2024;36(1):mzad107.
41. Johnson J, Simms-Ellis R, Janes G, Mills T, Budworth L, Atkinson L, Harrison R. Can we prepare healthcare professionals and students for involvement in stressful healthcare events? A mixed-methods evaluation of a resilience training intervention. BMC Health Serv Res. 2020;20:1–14.
42. Kumar R, Rizvi MR, Saraswat S. Obesity and stress: a contingent paralysis. Int J Prev Med. 2022;13(1):95.
43. Guo X, Gong S, Chen Y, Hou X, Sun T, Wen J, Wang Z, He J, Sun X, Wang S. Lifestyle behaviors and stress are risk factors for overweight and obesity in healthcare workers: a cross-sectional survey. BMC Public Health. 2023;23(1):1791.
44. van den Berge M, van der Beek AJ, Türkeli R, van Kalken M, Hulsegge G. Work-related physical and psychosocial risk factors cluster with obesity, smoking and physical inactivity. Int Arch Occup Environ Health. 2021;94:741–50.

45. Sun M, Jiang Y, Sun C, Li J, Guo X, Lv Y, Yu Y, Yao Y, Jin L. The associations between smoking and obesity in northeast China: a quantile regression analysis. Sci Rep. 2019;9(1):3732.

Publisher's note

Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.