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REVIEW ARTICLE

The effect of knowledge, attitude and practice on obesity and its related complications in medical students

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Abstract:

Background: Obesity, being a widespread epidemic, affects individuals of all age categories, spanning from children, teenagers, and adults, to the elderly. The swift escalation of obesity cases is giving rise to an increasing array of ailments, thus evolving into a significant health dilemma. Globally, vitamin D insufficiency stands out as a prevalent issue, ranking high among common conditions that are preventable. Hence, it becomes crucial to survey the depths of public consciousness and perceptions regarding this deficiency, pinpointing areas where daily routines could potentially hinder the maintenance of adequate vitamin D levels within their systems.

Aim of the study: The aim of this cross-sectional research was to explore the knowledge, attitude, and practice (KAP) related to obesity as well as vitamin D among medical school students in Adiwaniyah Province, Iraq.

Patients and methods: This cross-sectional university-based study enrolled 350 medical students belonging to the College of Medicine/University of Al-Qadisiyah during the period from January 2024 through July 2024. The age was ranging from 17 to 26 years. A questionnaire regarding knowledge, attitude, and practice with respect to obesity and vitamin D was formulated and adopted in this study. Anthropometric measures included weight, height, BMI, and waist circumference.

Results: Regarding body mass index (BMI), the range was between 20.36 and 49.33 kg/m² and the mean was 29.83 ± 4.20 kg/m². Normal BMI was reported in 9.4%, overweight was seen in 48.9%, and obesity was recognized in 41.8%, which was further subdivided into 30.9%, 8.6%, and 2.3% as class I, II, and III obesity. With respect to waist circumference, the range was between 78 and 131 cm, and the mean was 102.46 ± 14.05 cm. The distribution of students based on waist circumference was as follows: 8 (2.3%), 90 (25.7%), 119 (34%), and 133 (38%) as underweight, normal weight, overweight, and obese, respectively. The mean score of knowledge was 1.91 ± 0.29, and it ranged between 1 and 2. A high knowledge score was seen in 90.9% and a low knowledge score was reported in 9.1% of cases. The mean score of attitude was 2.38 ± 0.66, and it ranged between 1 and 3. A high attitude score was seen in 47.4%, a moderate score was seen in 42.9%, and a low score was reported in 9.7% of cases. The mean score of practice was 2.63 ± 0.59, and it ranged between 0 and 3. High practice scores were seen in 68.9%, moderate scores were seen in 26%, and low scores were reported in 5.1% of cases. Attitude score was significantly and positively correlated to height and BMI. Mean practice score was higher in males in comparison with females, 2.71 ±0.51 versus 2.58 ±0.64, respectively (p = 0.045).

Conclusion: Knowledge, attitude, and practice of students toward obesity and its related aspects were encouraging; however, two key points were noticed. The first was that most students were either overweight or obese.

Keywords: knowledge, attitude, practice, obesity, vitamin D

Introduction

The Obesity is a permanent health issue of our time that causes constant anxiety and is a heavy burden on those afflicted with it due to its effects on their psychological and aesthetic appearance and the permanent risks it poses to health and life (Lazarus and Ays, 2022). Obesity is an increase in body weight of more than 20% of the ideal weight or body mass index, that is, weight (kg) divided by square height (m) and is expressed in units of kg/m² (29).

Scientifically, we can say that obesity is a nutritional disorder that is represented by an excessive accumulation of fat that may affect the entire body, including its internal organs. Such as blood vessels and kidneys, but it is mainly concentrated in areas that act as fat stores in the body. The mechanism of fat

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metabolism is under insulin effect, which is responsible for the metabolism and fat storage process (14). It is a manifestation of certain imbalances, and as a definite fact, it expresses a state of major imbalance in the metabolic process occurring in the human body and the occurrence of an increasing accumulation of fat in the storage areas of the body (26). The high rate of obesity contributes to the growing epidemic of insufficient vitamin D because obese people have lower levels of serum 25-hydroxyvitamin D. Differences in vitamin D levels are likely due to age, gender, geographic location, skin color, traditional clothing, and exposure to sunlight, among other factors, and its most important food sources are fish, egg yolks, liver, and fortified milk (13). Studies proved for the first time in 1971 that there is a relationship between obesity and vitamin D, and they attributed this to the retention and storage of the soluble vitamin in adipose tissue (9). It was also stated that obesity and vitamin D have a significant inverse relationship, indicating that low levels of vitamin D are linked to large fat mass. In addition to a study conducted in 1985 for a possible relationship between obesity and vitamin D, the results showed that serum level was lower in obese people than non-obese people (Bell et al., 1985). There are also possible mechanisms and hypotheses for the decrease in the concentration of 25-hydroxyvitamin D in obese people, including decreased intake of vitamin D in obese people compared to non-obese people, as well as decreased synthesis of the vitamin by the skin, as obese people tend to cover their bodies and not expose them to radiation. the sun. It is also attributed to the synthesis of 25-hydroxyvitamin D. Obese individuals absorb it through the liver at a slower pace than those of normal weight. (32)

There are three patterns of learning: the first is cognitive (knowledge or ability), the second is affective (attitude), and the third is psychomotor (practice or skill). Knowledge, attitude, and practice (KAP) generally is a learning process, which means any relatively permanent change in behavior that occurs as a result of practice or experience; it means acquiring something new, such as new knowledge, a new technique, a new skill, new experiences, etc. (15). The researcher believes that medical college students play an important role in society because they know healthy habits and how they prevent chronic diseases such as obesity.

Patients and methods

This cross-sectional university-based study enrolled 350 medical students belonging to the College of Medicine/ University of Al-Qadisiyah during the period from January 2024 through July 2024. The age was ranging from 17 to 26 years. A questionnaire regarding knowledge, attitude, and practice with respect to obesity was formulated and adopted in this study. Anthropometric measures included weight, height, BMI, and waist circumference. The study was approved by the committee of ethical consideration in the College of Medicine/University of Al-Qadisiyah. All participating students were informed to give written consent in order to be enrolled in this study.

The current survey was based on targeting the population of students in the College of Medicine at the University of Al-Qadisiyah. The population size was 1725 students. The response rate was 350 out of 1725 (20.2%). The participating 350 students answered all provided questions. Those students who did not complete all the questionnaires were excluded from the study. The study was based on a questionnaire form that was formulated following a literature review and a thorough search of available published articles concerning knowledge, attitude, and practice of obesity. The questionnaire form included the following domains: sociodemographic, knowledge, attitude, and practice. The scoring of knowledge, attitude, and practice was based on Bloom's cut-off points as 80.0–100.0% (high level, 12–15 points), 60.0–79.0% (medium level, 9–11 points), and ≤59.0% (low level, 0–8 points) (11).

Statistical analysis

Data were collected, summarized, analyzed, and presented using Statistical Package for the Social Sciences (SPSS) version 23 and Microsoft Office Excel 2010. Qualitative (categorical) variables were expressed as number and percentage, whereas quantitative (numeric) variables were first evaluated for normality distribution using the Kolmogorov-Smirnov test, and then, accordingly, normally distributed numeric variables were expressed as mean (an index of central tendency) and standard deviation (an index of dispersion). The following statistical tests were used: The chi-square test was used to evaluate the association between any two categorical variables provided that less than 20% of cells have an expected count of less than 5. One-way analysis of variance (ANOVA) was used to evaluate differences in the mean of numeric variables among more than two groups, provided that these numeric variables were normally distributed. An independent samples t-test was used to compare means between any two groups. Correlation of variables was done using the Spearman correlation test. The level of significance was considered at a P-value of equal to or less than 0.05.

Results

Sociodemographic characteristics and anthropometric measurements of students enrolled in this study

The sociodemographic characteristics of students enrolled in this study were shown in table 1. The age was ranging between 17 and 26 years and the mean age (±standard deviation) was 21.20 ±1.91 years. The study included 153 (43.7 %) males and 197 (56.3 %) females. According to year of study, the students were distributed as following: 49 (14 %), 50 (14.3 %), 50 (14.3 %), 50 (14.3 %), 53 (15.1 %), and 98 (28 %) from first, second, third, fourth, fifth and sixth years, respectively. Based on residence, most of students were form urban areas accounting for 310 (88.6 %) and the rest minority of students were from rural areas accounting for 40 (11.4 %). Regarding anthropometric measures, the results were outlined in table 2. With respect to weight, the range was between 55 -124 kg and the mean was 81.21 ±12.57 kg. With respect to height, the range was between 150 -197 cm and the mean was 165.15 ±11.16 cm. Regarding body mass index (BMI), the range was between 20.36 -49.33 kg/m2 and the mean was 29.83 ±4.20 kg/m2. Normal BMI was reported in 9.4 %, overweight was seen in 48.9 %, and obesity was recognized in 41.8 % which was further subdivided into 30.9 %, 8.6 % and 2.3 % as class I, II and III obesity. With respect to waist circumference, the range was between 78 -131 cm and the mean was 102.46 ±14.05 cm. The distribution of students based on waist circumference was as following: 8 (2.3 %), 90 (25.7 %), 119 (34 %) and 133 (38 %) as underweight, normal weight, overweight and obese, respectively.

Knowledge, attitude and practice concerning obesity

Knowledge concerning obesity : Knowledge about the definition

and measurement of obesity was presented in Table 3. Knowledge about factors leading to obesity is shown in Table 4. Knowledge about diseases and complications caused by obesity is demonstrated in table 5. Knowledge about preventing and controlling obesity is shown in table 6.

Attitude concerning obesity

Attitude of students concerning obesity is shown in table 7.

Practice concerning obesity

Practice of students concerning obesity is shown in table 8.

Scores of knowledge, attitude and practice of students toward obesity

Descriptive statistics of scores of knowledge, attitude, and practice of students toward obesity are shown in table 9. The mean knowledge score was 34.13 ± 0.97. 100% of the students reported a high knowledge score. The mean attitude score was 4.92 ± 0.28. 92.6% reported a high attitude score, while 7.4% reported a moderate score. The mean practice score was 5.00 ± 0.00. 100% reported high practice scores.

Table 10 shows the correlations of knowledge, attitude, and practice scores toward obesity to age and anthropometric measurements. Only the attitude score showed a positive and significant correlation with weight and waist circumference. Table 11 compares the mean scores of knowledge, attitude, and practice toward obesity based on sex, year of study, and residency. The study reported no significant difference ($p > 0.05$).

Table 4.1: Sociodemographic characteristics

Characteristic	Result
Number of cases	350
Age (years)	
Mean ±SD	21.20 ±1.91
Range	17 -26
Sex	
Male, n (%)	153 (43.7 %)
Female, n (%)	197 (56.3 %)
Year	
First, n (%)	49 (14 %)
Second, n (%)	50 (14.3 %)
Third, n (%)	50 (14.3 %)
Fourth, n (%)	50 (14.3 %)
Fifth, n (%)	53 (15.1 %)
Sixth, n (%)	98 (28 %)
Residence	
Urban, n (%)	310 (88.6 %)
Rural, n (%)	40 (11.4 %)

n: number of cases; SD: standard deviation

Table 2: Anthropometric measurements

Characteristic	Result
Weight (kg)	
Mean ±SD	81.21 ±12.57
Range	55 -124
Height (cm)	
Mean ±SD	165.15 ±11.16
Range	150 -197
BMI (kg/m²)	
Mean ±SD	29.83 ±4.20
Range	20.36 -49.33
Normal weight, n (%)	33 (9.4 %)
Overweight, n (%)	171 (48.9 %)
Class I obese, n (%)	108 (30.9 %)
Class II obese, n (%)	30 (8.6 %)
Class III obese, n (%)	8 (2.3 %)
Waist circumference (cm)	
Mean ±SD	102.46 ±14.05
Range	78 -131
Underweight, n (%)	8 (2.3 %)
Normal weight, n (%)	90 (25.7 %)
Overweight, n (%)	119 (34 %)
Obese, n (%)	133 (38 %)

BMI: body mass index; n: number of cases; SD: standard deviation

Table 3: Knowledge about definition and measurement of obesity

Characteristic	n	%
Q1: Definition of obesity is the over-accumulation of fat in the body		
Yes, n (%)	307	87.7
No, n (%)	43	12.3
Q2: Obesity is measured by estimating serum lipids		
Yes, n (%)	314	89.7
No, n (%)	36	10.3
Q3: Obesity is measured by estimating waist circumference		
Yes, n (%)	310	88.6
No, n (%)	40	11.4
Q4: Obesity is measured by estimating body mass index (BMI)		
Yes, n (%)	307	87.7
No, n (%)	43	12.3
Q5: Females has more proportion of fat than males		
Yes, n (%)	350	100
No, n (%)	0	0.0

n: number of cases

Table 4: Knowledge about factors leading to obesity

Characteristic	n	%
Q1: Hypothyroidism		
Yes, n (%)	344	98.3
No, n (%)	6	1.7
Q2: Aging process		
Yes, n (%)	340	97.1
No, n (%)	10	2.9

Q3: Eating more calories than energy needed		
Yes, n (%)	335	95.7
No, n (%)	15	4.3
Q4: Psychological such as stress and anxiety		
Yes, n (%)	339	96.9
No, n (%)	11	3.1
Q5: Genetic and hereditary causes		
Yes, n (%)	346	98.9
No, n (%)	4	1.1
Q6: Chronic use of some medications		
Yes, n (%)	343	98
No, n (%)	7	2
Q7: Eating too much highly refined carbohydrates such as sugar and bread		
Yes, n (%)	341	97.4
No, n (%)	9	2.6
Q8: Eating too much sweets		
Yes, n (%)	331	94.6
No, n (%)	19	5.4
Q9: Drinking too much water		
Yes, n (%)	341	97.4
No, n (%)	9	2.6
Q10: Drinking alcohol		
Yes, n (%)	346	98.9
No, n (%)	4	1.1

n: number of cases

Table 5: Knowledge about diseases and complications caused by obesity

Characteristic	Yes		No	
	n	%	n	%
Q1: Backache				
	349	99.7	1	0.3
Q2: Heart attach				
	350	100	0	0.0
Q3: Atherosclerosis				
	347	99.1	3	0.9
Q4: Gallstone				
	347	99.1	3	0.9
Q5: Diabetes				
	349	99.7	1	0.3
Q6: Hypertension				
	347	99.1	3	0.9
Q7: Breast cancer				
	347	99.1	3	0.9
Q8: Liver cirrhosis				
	347	99.1	3	0.9
Q9: Depression				
	349	99.7	1	0.3
Q10: Difficulty in breathing				
	348	99.4	2	0.6
Q11: Osteoarthritis				
	344	98.3	6	1.7
Q12: Otitis media				
	349	99.7	1	0.3
Q13: Polycystic ovarian syndrome				
	349	99.7	1	0.3
Q14: Obstetric complications				
	345	98.6	5	1.4
Q15: Reflux esophagitis				
	349	99.7	1	0.3

Table 6: Knowledge about preventing and controlling obesity

Characteristic	n	%
Q1: Practicing regular exercise		
Yes, n (%)	347	99.1
No, n (%)	3	0.9
Q2: Reducing sweet consumption		
Yes, n (%)	346	98.9
No, n (%)	4	1.1
Q3: Reducing carbohydrate consumption		
Yes, n (%)	345	98.6
No, n (%)	5	1.4
Q4: Reducing water intake		
Yes, n (%)	345	98.6
No, n (%)	5	1.4
Q5: Eating too much fruit		
Yes, n (%)	348	99.4
No, n (%)	2	0.6

Table 7: Attitude of students concerning obesity

Characteristic	n	%
Q1: Obesity is indicative of good health and nutrition		
Yes, n (%)	6	1.7
No, n (%)	344	98.3
Q2: Obese individuals are more intelligent than others		
Yes, n (%)	343	98
No, n (%)	7	2
Q3: If I was fat, I wound be shame of my appearance		
Yes, n (%)	344	98.3
No, n (%)	6	1.7
Q4: I hate that my weight is less than that of my colleagues		
Yes, n (%)	344	98.3
No, n (%)	6	1.7
Q5: I am not satisfied with my current body weight		
Yes, n (%)	348	99.4
No, n (%)	2	0.6

Table 8: Practice of students concerning obesity

Characteristic	n	%
Q1: Do you regularly check your weight		
Yes, n (%)	350	100
No, n (%)	0	0.0
Q2: Do you regularly change your eating habits and daily activities to keep your fitness		
Yes, n (%)	350	100
No, n (%)	0	0.0
Q3: Do you try to reduce your fast food meals		
Yes, n (%)	350	100
No, n (%)	0	0.0
Q4: Do you regularly practice exercise such as brisk walking for 30 minutes 2 to 3 times a week?		
Yes, n (%)	350	100
No, n (%)	0	0.0
Q5: Do you often include vegetables in your meals?		
Yes, n (%)	350	100
No, n (%)	0	0.0

Table 9: Descriptive statistics

Characteristic	Result
Knowledge	
Mean ±SD	34.13 ±0.97
Range	31 -35
High, n (%)	350 (100 %)
Moderate, n (%)	0 (0.00 %)
Low, n (%)	0 (0.00 %)
Attitude	
Mean ±SD	4.92 ±0.28
Range	3 -5
High, n (%)	324 (92.6 %)
Moderate, n (%)	26 (7.4 %)
Low, n (%)	0 (0.00 %)
Practice	
Mean ±SD	5.00 ±0.00
Range	5 -5
High, n (%)	350 (100 %)
Moderate, n (%)	0 (0.00 %)
Low, n (%)	0 (0.00 %)

Table 10: Correlations of knowledge, attitude and practice scores toward obesity to age and anthropometric measurements

Characteristic		Knowledge score	Attitude score	Practice score †
Age (years)	r	-0.05	0.013	
	p	0.351	0.803	
Weight (kg)	r	0.023	0.108	
	p	0.666	0.044*	
Height (cm)	r	0.040	0.056	
	p	0.456	0.299	
BMI (kg/m2)	r	-0.013	0.055	
	p	0.811	0.306	
Waist circumference (cm)	r	0.007	0.111	
	p	0.892	0.037*	

†: we were not able to calculate correlation statistics because practice score was constant in all participants; *: significant at $p \leq 0.05$

Table 11: Comparison of mean scores of knowledge, attitude and practice toward obesity based on sex, year of study and residency

Characteristic	Knowledge score	Attitude score	Practice score †
Sex			
Male	34.16 ±0.97	4.95 ±0.22	5.00 ±0.00
Female	34.11 ±0.97	4.90 ±0.31	5.00 ±0.00
p	0.666 I NS	0.14 I NS	---
Year			
First	34.14 ±1.14	4.88 ±0.39	5.00 ±0.00
Second	34.14 ±0.88	4.94 ±0.24	5.00 ±0.00
Third	34.12 ±0.98	4.94 ±0.24	5.00 ±0.00
Fourth	34.18 ±1.04	4.94 ±0.24	5.00 ±0.00
Fifth	34.26 ±0.79	4.92 ±0.27	5.00 ±0.00
Sixth	34.03 ±0.98	4.92 ±0.28	5.00 ±0.00
p	0.824 O NS	0.864 O NS	---
Residence			
Urban	34.13 ±0.99	4.92 ±0.28	5.00 ±0.00
Rural	34.15 ±0.80	4.93 ±0.27	5.00 ±0.00
p	0.898 I NS	0.959 I NS	---

5. Discussion

Obesity, being a widespread epidemic, affects individuals of all age categories, spanning from children, teenagers, and adults, to the elderly (24). The swift escalation of obesity cases is giving rise to an increasing array of ailments, thus evolving into a significant health dilemma (7). Information sourced from the World Health Organization revealed that the count of individuals grappling with obesity across the globe in 2016 surged to triple the figure recorded in 1975. During 2016, approximately 1.9 billion individuals aged 18 and above grappled with excess weight, with over 650 million falling under the obese category. In Switzerland, 11% of males and 9% of females are classified as obese (6). Across Europe as a whole, the occurrence of obesity among females and males stands at 23% and 20%, respectively (6).

Obesity poses various risks to one's well-being. An instance of this is that individuals with excessive weight are more prone to developing cardiovascular issues (Ardahan and Konal, 2019). The condition of obesity compromises the functionality of the digestive system and heightens the chances of encountering cancer (33). Furthermore, obesity brings about numerous inconveniences to individuals' daily routines and could potentially lead to negative impacts on their mental health (25).

The factors contributing to obesity encompass elements from the societal environment (30), the human psyche (40), and one's genetic makeup (37). The surge in obesity rates finds its roots in various sources. Initially, the enhancement of lifestyle quality has spurred a notable surge in the consumption of high-fat sustenance. Additionally, a larger segment of occupations now demands less physical vigor owing to urban development (22). Moving closer, a diminished resting metabolic pace stands as the primary culprit behind obesity (26).

A positive mindset plays a vital role in addressing obesity, as noted by Kim et al. (2019). Thus, embracing nutritious eating habits and engaging in physical exercises are key to weight management. The aim of this cross-sectional research was to explore the understanding, perspective, and behavior (UPB) related to obesity among medical school students in Adiwaniyah Province, Iraq. This investigation revealed that many students were unaware of the existence of obesity.

The sociodemographic characteristics and anthropometric measurements of students enrolled in this study

This study included 350 medical students from various years, aged between 17 and 26 years, with an average age of 21.2 years; slightly more females participated than males, at 56.3% compared to 43.7%, and most students resided in urban areas.

With respect to the mean BMI of all enrolled students, it was 29.83 ± 4.20 kg/m², which is in the overweight range, and most of the students were within overweight or obese intervals since normal BMI students accounted for a minority (9.4%). In addition, according to waist circumference, most of the participants were either overweight or obese, accounting overall for 72%. Indeed, these findings reflected the magnitude of obesity among students in the college of medicine, despite the fact that medical students should be among the most educated sectors of the population about the health consequences and complications in association with obesity.

In clear contrast with the current study, (10) reported that overweight and obesity were determined among 21.0% and 15.5%, respectively, and that 7.3% of people were underweight; thus, the prevalence rate of obesity and overweight in our students is far more than that reported in the (10) study. However, our results are somewhat similar to those reported by (2) in Saudi Arabia, in which it resulted in 13.5%, 53.6%, 20.1%, and 12.9% being underweight, normal, overweight, and obese, respectively. The prevalence rates of overweight and obesity displayed a diverse range among different regions and nations, yet remained in alignment with findings from related research. American and European countries stand out as the leaders in the prevalence of overweight and obesity (8).

The spike in overweight and obesity cases has surged dramatically across numerous Asian nations in recent decades, showing varying levels from country to country (12). A study found that 48.3% of individuals from Asian and Midwestern countries were affected by overweight and obesity, with Bangladesh reporting the lowest at 19.4% and Egypt the highest at 67.5% (2022). In the Eastern Mediterranean region, the prevalence of overweight and obesity rose to 49.6% and 19.6%, respectively (38). Discrepancies in overweight and obesity rates between men and women exist both within and among countries, with a general trend of higher obesity rates among women than men (16). Recent research indicates similar levels of obesity in both males and females. The reasons behind obesity among college students are multifaceted, including poor dietary choices like fast food, processed meals, and sugary drinks. Additionally, factors such as physical inactivity, stress, and sleep deprivation contribute to unhealthy eating patterns.

According to the conclusions of this research, a study carried out in South Africa revealed that a sporadic intake of breakfast during weekdays was linked to a heightened possibility of overweight and obesity among students (19). Individuals who indulge in afternoon tea or late-night snacks alongside the usual three daily meals might experience a surge in obesity rates. Moreover, the consumption of sugary treats has the potential to elevate the body's sugar levels, consequently contributing to obesity (24).

To regulate the BMI index of college students, it is crucial for some individuals to break free from the tendency of excessive eating. Indulging in constant overeating can disrupt one's dietary patterns, thus hindering the maintenance of a sound physique. Moreover, those who frequently indulge in oily treats without adequate physical activity are likely to experience a rapid surge in body fat levels. The importance of dietary well-being is further highlighted by the requirement that some college students stop eating inflated foods and unhealthy snacks. Last but not least, the young people should place a high value on physical activity and maintain their physical fitness by following a regular weekly schedule.

Knowledge, attitude, and practice concerning obesity

Knowledge concerning obesity

In the present study, overall, the knowledge about the definition and measurement of obesity was encouraging because true responses to almost all questions were the rule; however, the response to the second question, "Obesity is measured by estimating serum lipids," witnessed the least true response of 10.3%. This is a reflection of students' misunderstanding of the difference between dyslipidemia and the concept of obesity. (10) assessed the comprehension of students regarding the origins, diagnosis, complications, and prevention of obesity. The mean level of understanding achieved was at its peak (70.6%) and predictably rose with age; nonetheless, we observed no discernible link between knowledge and the students' ages. These results suggested that students of both obese and normal weight possessed comparable levels of knowledge, hinting at the existence of other determining factors for obesity and overweight. These results align with a recent study by O'Brien and Davies (2007).

On the other hand, students in this study were able to identify the true definition of obesity and the utilization of BMI and waist circumference in measuring obesity. In one Chinese study, university students have insufficient knowledge about the definition of obesity (39), probably because of the inclusion of non-medical students.

In addition, students in the current research were familiar with factors that can lead to obesity, including hypothyroidism, the aging process, Eating more calories than energy needed Psychological factors such as stress and anxiety, genetic and hereditary causes, and chronic use of some medications Eating too many highly refined carbohydrates such as sugar and bread, eating too many sweets, and drinking alcohol, but unfortunately they considered drinking too much water as a factor leading to obesity.

In the current work, students' knowledge about diseases and complications caused by obesity was encouraging, as they agreed that backache, heart attack, atherosclerosis, gallstones, diabetes, hypertension, breast cancer, liver cirrhosis, depression, difficulty in breathing, osteoarthritis, otitis media, polycystic ovarian syndrome, obstetric complications, and reflux esophagitis are all possible complications of obesity. Students' knowledge about preventing and controlling obesity was also acceptable, as they identified that practicing regular exercise, reducing sweet consumption, and reducing carbohydrate consumption are effective measures to reduce the incidence of obesity, but unfortunately they considered that eating too much fruit and reducing water intake are among these measures, and this is clearly not the case. In this study, the mean knowledge score was 34.13 ± 0.97, and this mean is very close to the optimum knowledge score of 35, and this finding was further augmented by the finding that a high knowledge score (> 80% of the optimum score) was reported in 100% of cases.

Attitude concerning obesity

In general, in the current study, a positive attitude was the rule, and the range of positive attitude was 98% to 99.4%. Students were not satisfied with their weight, and they described a desire to have a normal BMI in the future… ……

In accordance with recent research (39), it was revealed that the majority of respondents displayed a favorable outlook on upholding a balanced weight, with many students expressing their readiness to manage their weight for the sake of staying in shape. Nevertheless, this positive mindset did not consistently manifest in their actual BMI and waist size. Given this scenario, it is imperative for authorities and academic institutions to implement appropriate strategies to translate this mindset into tangible actions.

They rejected the idea that good health is linked to obesity, and they also denied feeling ashamed about weighing less than other students or believing that intelligence contributes to obesity. In this research, the students' mean attitude score was 4.92, which is very close to the optimum score of 5, and this finding again was solidified by finding that a high attitude score was prevailing (reported in 92.6%) and that the rest of the students (who are a minority) reported a moderate score (7.4%).

In accordance with the latest research findings, (10) disclosed the following: the students exhibit a strong positive outlook towards combatting obesity in the research. Their displayed stance aligns with the depth of their knowledge. Within this analysis, 77.9% of the participants acknowledged obesity as a medical condition, and 79.3% recognized it as a grave health issue. Among all the participants, 28.3% identified themselves as obese, whereas the actual prevalence stood at 15.5% among them. The majority of students expressed their readiness to manage their weight for maintaining fitness. Nevertheless, this mindset did not translate into their actions.

A previous exploration (3) scored the respondents' outlook on overweight and obesity at 69.12%, which was considered moderate. Conversely, Shahid et al. (2020) discovered in Faisalabad, Pakistan, that 98% of medical students harbored a commendable attitude. This percentage surpassed that of our research (77.5%). (21). also noted a positive inclination among respondents at the College of Horticulture, Bengaluru, standing at 84%. An examination conducted in Kuala Lumpur among young adults revealed a positive mindset, which was evident through their confidence in achieving their ideal weight and satisfaction with their current weight (Kasirye et al., 2020). The current study showcased respondents exhibiting a constructive attitude toward embracing a healthy lifestyle, mirroring the observations made by (1). The level of education and experiences of the participants in this study significantly influenced their perspectives on weight management. Young adults in Kuala Lumpur (Kasirye et al., 2020) and adolescents in Turkey (1) have reaped the benefits of tailored health education initiatives and cultural norms that advocate for a positive stance on weight management and overall well-being. These findings underscore the necessity for ongoing endeavors to foster optimistic attitudes and behaviors concerning weight management and healthy living among students.

Practice concerning obesity.

It is indeed astonishing that students claim to engage in perfect practices for maintaining a healthy weight, such as regularly checking their body weight, changing their eating habits, keeping active daily, attempting to reduce fast food consumption, brisk walking for 30 minutes two to three times a week, and including vegetables in their meals; however, the high prevalence of obesity and overweight among these students clearly contradicts these claims.

In the present study, the mean practice score was 5.00 ± 0.00, which is the optimum score, and that high practice score was the only reported score. In addition, the attitude score was correlated to weight and waist circumference positively and significantly.

The research conducted by (9) revealed a lackluster average practice score of 36.7%, trailing behind knowledge and attitude. A noticeable disparity in practice levels was observed among various age brackets, with older students displaying more consistent dedication than their younger counterparts. The practice assessments encompassed topics such as maintaining a balanced diet, engaging in physical activities, and implementing strategies to prevent obesity. While 90.0% professed concern for their physique, merely 27.4% acknowledged monitoring their calorie intake. Furthermore, a mere 34.5% of the participants disclosed adhering to a regular exercise routine. Approximately 24.4% of all respondents confessed to consuming fast food at least biweekly. Among the total cohort, 44.6% acknowledged indulging in electronic gaming during their leisure hours. Thus, the above findings reflect clear variations when contrast-

ed to current study findings.

Few teaching resources on obesity are currently accessible to healthcare students in training programs worldwide (27). It has been proposed that undergraduate healthcare education should offer more insights on obesity to ensure optimal care for obese individuals. Although students may possess knowledge of nutritional needs and the health impact of poor diet, it is deemed inadequate for fostering and upholding healthy behaviors (36). Nevertheless, cultivating healthy eating habits that resonate with students' personal values like self-governance, social justice, and peer relationships may yield greater effectiveness (Bryan et al., 2016). Students are bombarded with extensive junk food advertising, promoting excessive consumption by associating positive emotions with such foods (5). Advocating for healthy eating has been proposed as a strategic approach to combat the misleading and unethical marketing strategies of the food industry. Consequently, students' engagement with unhealthy food advertisements decreased, leading to enhancements in their nutritious choices (5).

Conclusion: Knowledge, attitude, and practice of students toward obesity and its related aspects were encouraging; however, two key points were noticed. The first was that most students were either overweight or obese.

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