ORIGINAL ARTICLE

Evaluating Medical Interns' Knowledge and Attitudes About Metabolic and Bariatric Surgery

Background: Recently, Bariatric and Metabolic Surgery (MBS) has received much attention for weight loss and treatment of obesity-related comorbidities. Since attitudes about health care are often formed during medical education and the level of knowledge about MBS among general practitioners is still not satisfactory, there is a need to improve general practitioners' awareness. This study aimed to investigate the knowledge and attitude of medical internship students of Islamic Azad University, Mashhad Medical Sciences Unit, towards MBS in 2022.

Method: All medical interns of Islamic Azad University, Mashhad Medical Sciences Unit, were included in this cross-sectional study. A researcher-made questionnaire including 15 questions, was used. This questionnaire was first translated into Persian. To check the content validity and reliability of the questionnaire, a working group consisting of seven academic surgeons was formed, and the items were reviewed and modified, and after confirming the reliability and validity the questionnaires were provided to the students using Google Forms, and the data were analyzed through SPSS version 16.

Results: 105 participants with an average age of 26.49 ± 8.8 years were included, of which 31 were men and 74 were women. The level of knowledge about MBS in interns was favorable. The attitude of interns towards MBS according to gender and body mass index and passing the surgical course did not show any significant difference (p-value>0.05).

Conclusion: This research showed that medical interns' knowledge and attitude regarding the characteristics and complications of MBS are generally favorable.

Keywords: Attitude, Knowledge, Metabolic and Bariatric Surgery, Medical Students, Medical Intern

Mozhdeh Mojtahedi[1], Tooraj Zandbaf[2], Narges Mesbah[3], Mohammad Javad Ghamari[2], Seyed Mohammad Ali Raisolsadat[2], Ali Mirsadeghi[2], Yalda Ravanshad[4,*]

[1]Innovative Medical Research Center, Faculty of Medicine, Mashhad Medical Sciences, Islamic Azad University, Mashhad, Iran
[2]Department of General Surgery, Faculty of Medicine, Mashhad Medical Sciences, Islamic Azad University, Mashhad, Iran
[3]Student Research Committee, Faculty of Medicine, Mashhad Medical Sciences, Islamic Azad University, Mashhad, Iran
[4]Department of Community Medicine, Faculty of Medicine, Mashhad Medical Sciences, Islamic Azad University, Mashhad, Iran

[*]Dr. Shahin Far Faculty of Medicine, Islamic Azad University
Bazarche Sarab, Imam Khomeini 14 St.
Mashhad, 9133736351
Iran

Tel: +985132250041
Email: yalda.ravanshad@gmail.com

تقييم معارف ومواقف المتدربين الطبيين تجاه جراحة الأيض وجراحة السمنة

الخلفية: حظيت جراحة السمنة والتمثيل الغذائي (MBS) مؤخرًا باهتمام كبير لإنقاص الوزن وعلاج الأمراض المصاحبة للسمنة. ونظرًا لأن المواقف تجاه الرعاية الصحية غالبًا ما تتشكل خلال فترة التعليم الطبي، ولأن مستوى المعرفة بجراحة السمنة والتمثيل الغذائي بين الأطباء العامين لا يزال غير مُرضٍ، فهناك حاجة إلى تحسين وعيهم. هدفت هذه الدراسة إلى دراسة معارف وسلوكيات طلاب التدريب الطبي في جامعة آزاد الإسلامية، وحدة العلوم الطبية في مشهد، تجاه جراحة السمنة والتمثيل الغذائي في عام ٢٠٢٢.

الطريقة: شملت هذه الدراسة المقطعية جميع أطباء الامتياز في جامعة آزاد الإسلامية، وحدة العلوم الطبية في مشهد. استُخدم استبيان من إعداد الباحث، مكون من ١٥ سؤالاً. تُرجم هذا الاستبيان أولاً إلى اللغة الفارسية. للتحقق من صحة محتوى الاستبيان وموثوقيته، شُكِّل فريق عمل من ٧ جراحين أكاديميين، ورُوِّجت بنوده وعُدِّلت. وبعد التأكد من موثوقيته وصلاحيته، وُزِّعت الاستبيانات على الطلاب باستخدام نماذج جوجل، وحُلِّلت البيانات باستخدام برنامج SPSS الإصدار ١٦.

النتائج: شملت الدراسة ١٠٥ مشاركين بمتوسط عمر ٢٦,٤٩ ± ٨,٨ سنة، منهم ٣١ رجلاً و٧٤ امرأة. كان مستوى معرفة المتدربين بجراحة السمنة المفرطة إيجابياً. ولم يُظهر موقف المتدربين تجاه جراحة السمنة المفرطة، وفقاً للجنس ومؤشر كتلة الجسم واجتياز الدورة الجراحية، أي فرق ذي دلالة إحصائية (القيمة الاحتمالية> ٠,٠٥).

الاستنتاج: أظهر هذا البحث أن معرفة وسلوكيات أطباء الامتياز تجاه خصائص ومضاعفات جراحة السمنة الأيضية إيجابية بشكل عام.

الكلمات المفتاحية: الموقف، المعرفة، جراحة الأيض والسمنة، طلاب الطب، أطباء الامتياز

ارزیابی دانش و نگرش کارورزان پزشکی در مورد جراحی متابولیک و چاقی

زمینه و هدف: اخیراً جراحی متابولیک و چاقی (MBS) برای کاهش وزن و درمان بیماری‌های مرتبط با چاقی مورد توجه قرار گرفته است. از آنجایی که نگرش در مورد مراقبت های بهداشتی اغلب در طول آموزش پزشکی شکل می گیرد و سطح دانش در مورد MBS در بین پزشکان عمومی هنوز رضایت بخش نیست، نیاز به ارتقاء آگاهی پزشکان عمومی وجود دارد. این مطالعه، با هدف بررسی آگاهی و نگرش دانشجویان کارورزی پزشکی دانشگاه آزاد اسلامی، واحد علوم پزشکی مشهد نسبت به MBS در سال ۱۴۰۱ انجام شد.

روش: در این مطالعه مقطعی کلیه کارورزان پزشکی دانشگاه آزاد اسلامی، واحد علوم پزشکی مشهد وارد مطالعه شدند. از پرسشنامه محقق ساخته شامل ۱۵ سؤال استفاده شد. این پرسشنامه ابتدا به فارسی ترجمه شد. برای بررسی روایی و پایایی محتوای پرسشنامه، با تشکیل کارگروهی متشکل از هفت جراح دانشگاهی، موارد مورد بررسی و اصلاح قرار گرفت و پس از تأیید پایایی و روایی، پرسشنامه ها با استفاده از فرم های گوگل در اختیار دانشجویان قرار گرفت. داده ها با SPSS نسخه ۱۶ تجزیه و تحلیل شد.

یافته‌ها: ۱۰۵ شرکت‌کننده با میانگین سنی ۸/۸ ± ۲۶/۴۹ سال وارد مطالعه شدند که از این تعداد ۳۱ نفر مرد و ۷۴ نفر زن بودند. سطح دانش در مورد MBS در کارورزان مطلوب است. نگرش کارورزان نسبت به MBS بر حسب جنس و شاخص توده بدنی و گذراندن دوره جراحی تفاوت معنی داری نشان نداد (p-value>0.05).

نتیجه‌گیری: آگاهی و نگرش کارورزان پزشکی در خصوص ویژگی‌ها و عوارض MBS به طور کلی مطلوب است.

واژه های کلیدی: نگرش، آگاهی، جراحی متابولیک و چاقی، دانشجویان پزشکی، کارورز پزشکی

میٹابولک اور باریٹرک سرجری کے بارے میں میڈیکل انٹرنز کے علم اور رویوں کا جائزہ

پس منظر: حال ہی میں، بیریاٹرک اور میٹابولک سرجری (MBS) نے وزن میں کمی اور موٹاپے سے متعلق امراض کے علاج کے لیے بہت زیادہ توجہ دی ہے۔ چونکہ طبی تعلیم کے دوران صحت کی دیکھ بھال کے بارے میں رویہ اکثر تشکیل پاتا ہے اور جنرل پریکٹیشنرز کے درمیان MBS کے بارے میں معلومات کی سطح اب بھی تسلی بخش نہیں ہے، اس لیے جنرل پریکٹیشنرز کی آگاہی کو بہتر بنانے کی ضرورت ہے۔ اس مطالعہ کا مقصد ۲۰۲۲ میں ایم بی ایس کی طرف اسلامی آزاد یونیورسٹی، مشہد میڈیکل سائنسز یونٹ کے میڈیکل انٹرن شپ کے طلباء کے علم اور رویے کی چھان بین کرنا تھا۔

طریقہ: اسلامی آزاد یونیورسٹی، مشہد میڈیکل سائنسز یونٹ کے تمام میڈیکل انٹرنز کو اس کراس سیکشنل اسٹڈی میں شامل کیا گیا تھا۔ ایک محقق کا تیار کردہ سوالنامہ استعمال کیا گیا جس میں ۱۵ سوالات شامل تھے۔ اس سوالنامے کا سب سے پہلے فارسی میں ترجمہ کیا گیا۔ سوالنامے کے مواد کی درستگی اور وشوسنییتا کو جانچنے کے لیے، ۷ اکیڈمک سرجنز پر مشتمل ایک ورکنگ گروپ تشکیل دیا گیا، اور آئٹمز کا جائزہ لیا گیا اور ان میں ترمیم کی گئی، اور وشوسنییتا اور درستگی کی تصدیق کے بعد گوگل فارمز کا استعمال کرنے والے طلباء کو سوالنامے فراہم کیے گئے، اور SPSS ورژن ۱۶ کے ذریعے ڈیٹا کا تجزیہ کیا گیا۔

نتائج: ۱۰۵ شرکاء جن کی اوسط عمر ۲۶٫۴۹ ± ۸٫۸ سال تھی، جن میں سے ۳۱ مرد اور ۷۴ خواتین تھیں۔ انٹرنز میں ایم بی ایس کے بارے میں علم کی سطح سازگار تھی۔ جنس اور باڈی ماس انڈیکس کے مطابق ایم بی ایس کی طرف انٹرنز کا رویہ اور سرجیکل کورس پاس کرنے میں کوئی خاص فرق نہیں دکھایا گیا (p-value>۰٫۰۵)۔

نتیجہ: اس تحقیق نے ظاہر کیا کہ MBS کی خصوصیات اور پیچیدگیوں کے بارے میں میڈیکل انٹرنز کا علم اور رویہ عام طور پر سازگار ہوتا ہے۔

مطلوبہ الفاظ: رویہ، علم، میٹابولک اور باریٹرک سرجری، میڈیکل طلباء، میڈیکل انٹرن

INTRODUCTION

Obesity is a significant public health challenge. It is associated with higher mortality rates, reduced quality of life, and increased healthcare costs. The World Health Organization defines obesity as a body mass index exceeding 30kg/m^2. In 2021, approximately 1.2 billion people worldwide were estimated to be obese. This represents 30% of the global population. The global obesity rate has tripled since 1975, with over 3 million people dying annually due to obesity-related causes. In Iran, the prevalence of obesity is 25.8%, ranking it 13th among the most obese countries in the world (1-3). A variety of weight loss methods are used to treat obesity and its complications, including diet, exercise, medication, and surgery. Metabolic and Bariatric Surgery (MBS) has gained attention for its effectiveness in achieving significant and sustainable weight loss while reducing complications and associated costs (4-9).

Even though obesity significantly affects patient care in all medical fields, there is limited education for physicians and medical students on this topic (10, 11). These gaps in education might leave doctors unprepared to meet the needs of this sizable and growing patient population. Some physicians don't view obesity as a chronic disease, while others acknowledge it as such but opt not to address it due to time constraints (12). The level of understanding about MBS among general practitioners, who are more aware of the risks of various diseases in their patients, is still inadequate, and few studies have looked into the reasons behind physicians ' perceptions of obesity and its treatment. To adequately equip physicians to address obesity, they need to have a comprehensive background in biology and pathophysiology (6, 13, 14).

Due to the increasing obesity and more willingness to use MBS among people in society, this study was conducted to investigate the knowledge and attitude of medical interns at Islamic Azad University, Mashhad Medical Sciences Unit, towards MBS in 2022.

METHODS

In 2022, a cross-sectional study was carried out on 109 medical internship students at the Islamic Azad University, Mashhad Medical Sciences Unit, after obtaining the necessary permission and code of ethics (IR.IAU.MSHD.REC.1401.015). The inclusion criteria were participation in the 2022 internship, and the exclusion criteria were incomplete questionnaire completion and known psychiatric disorders. The study was based on the work of Navawi et al. (15). The questionnaire was divided into two parts: the first part included demographic information, while the second part consisted of 15 questions related to MBS. The questionnaires were made accessible through a Google Form. After collecting the responses, the data were entered into the statistical software SPSS version 16 for analysis.

Questionnaire

The research used a questionnaire developed by Navawi et al (15). (Appendix 1). This questionnaire comprises 15 questions, with the first nine focusing on knowledge and the next six on attitude. The knowledge questions are designed to have one correct answer, while the attitude questions are based on the Likert scale. The questionnaire was initially translated into Farsi and then adapted to fit the country's social, cultural, and geographical context. To ensure the questionnaire's validity and reliability, a panel of seven academic surgeons familiar with the research topic reviewed and modified the items. Validity was confirmed after the questionnaire was reviewed by the panel of experts and 15 individuals from the population for clarity and comprehensibility.

Content Validity Ratio

The Content Validity Ratio (CVR) was calculated by asking an expert panel to review each item and categorize it as necessary, useful but not necessary, or not necessary. The formula to calculate CVR was (n - N/2) / N/2, where n was the number of experts who chose the necessary option, and N was the total number of experts. The obtained CVR value was then compared with Lashe's table (1975). If the calculated value is greater than the table value, the content is considered valid. In the evaluation, a score of 0.99 was obtained for each item, which is acceptable according to the standards.

Content Validity Index

The Content Validity Index (CVI) was calculated for each item by having an expert panel assess the relevance of that item. This was done by dividing the number of responses ranking it as 3 or 4 by the total number of respondents. The mean CVI, which was the scaled CVI, was then obtained. The acceptance of each item was determined based on the CVI score: a score less than 0.70 meant the item was unacceptable and should be removed, a score between 0.70 and 0.79 meant the item was questionable and needed to be modified, and a score higher than 0.79 meant the item was considered appropriate (16). In the present evaluation, all items scored above 0.80 was found to be appropriate.

Data Analysis

The present researchers represented quantitative variables using mean and standard deviation, and qualitative variables using percentages in tables. Also, an independent t-test was used to compare two quantitative variables and a chi-square test was used to compare two qualitative variables. Statistical analysis was conducted using SPSS version 16, with a significance level of less than 5% for the tests.

RESULTS

109 medical internship students initially participated in this study,105 of them completed the questionnaire. Among the participants, 31 individuals (29.5%) were men, and the remaining were women. Additionally, 49 students (46.7%) had passed the surgery course. The average body mass index (BMI) of the participants was 23.98 $\pm$ 3.48 kg/m^2. Details regarding the height, weight, and BMI of the interns, as well as the duration of their internship in months, are presented in Table 1.

The medical interns showed a good level of knowledge about MBS, with over 80% of them answering all the questions correctly. However, only 18% answered question 5 correctly, and 69% answered question 8 correctly. When it came to the question about early complications of MBS (anastomosis

leakage), there was a significant difference (P=0.045) between individuals with normal and abnormal BMI, with a higher percentage of those with a normal BMI choosing the correct answer. Additionally, there was a significant difference in the correct answer to this question between those who had passed the surgery course and those who had not (P=0.032) (Table 2).

In general, there was no statistically significant difference in the knowledge and attitude of medical interns towards MBS based on gender, BMI, and completion of the surgical course (Table 3).

DISCUSSION

The present study showed that medical interns have a good level of knowledge about MBS, with over 80% of them answering all the questions correctly. In general, there was no statistically significant difference in the knowledge and attitude of medical interns towards MBS based on gender, BMI, and completion of the surgical course.

The 1991 NIH consensus statement has been used as a standard for selecting MBS patients. A BMI of more than 40 kg/m^2 or a BMI of more than 35 kg/m^2 along with obesity-related diseases was considered an indication of MBS, which was universally accepted (17). With increasing global experience in MBS, long-term studies have proven these surgeries to be an effective and durable treatment for severe obesity and its comorbidities. Long-term studies published in the decades since the NIH cohort statement in 1991 have consistently shown that MBS results in better weight loss than nonsurgical treatments. In several studies, significant improvements in metabolic diseases and also reduction of mortality after MBS have been reported. At the same time, the safety of MBS was widely studied and mortality after surgery was reported to be very low between 0.03 and 0.2%. Therefore, it is unsurprising that MBS has become one of the most common surgical procedures.

Table 1. Demographic characteristics of medical student

Variables	Number	The most	The least	Mean (SD)
Height(cm)	105	189	150	168.65(2.83)
Age (year)	105	45	23	26.49(8.8)
Weight(kg)	105	112	46	68.74(14.6)
BMI (kg/m^2)	105	34.75	17.91	23.98(3.48)
Elapsed time of internship	104	24	1	9.17(6.15)

Table 2. Analysis of the statistical significance of interns' knowledge regarding bariatric surgeries, categorized by gender, body mass index, and completion of the surgical course

Variable		Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9
		P-value	P-value	P-value	P-value	P-value	P-value	P-value	P-value	P-value
Gender	**Man**	0.296	1	0.304	0.523	0.484	0.781	0.867	0.380	0.861
	Woman									
BMI	**Normal**	0.618	0.861	0.705	0.637	0.443	0.331	0.722	0.612	0.045
	Abnormal									
Passing the Surgery Course	**Yes**	0.497	0.915	0.410	0.458	0.61	0.852	0.893	0.188	0.032
	No									

Table 3. Analysis of the statistical significance regarding interns' attitudes towards bariatric surgeries, categorized by gender, body mass index, and completion of the surgical course

Variables		Q10	Q11	Q12	Q13	Q14	Q15
		P-value	P-value	P-value	P-value	P-value	P-value
Gender	**Man**	0.095	0.649	0.966	0.975	0.609	0.548
	Woman						
BMI	**Normal**	0.474	0.707	0.111	0.988	0.651	0.672
	Abnormal						
Passing the Surgery Course	**Yes**	0.126	0.296	0.372	0.298	0.321	0.163
	No						

Currently, the predominant MBS procedures are sleeve gastrectomy and RYGB, which account for approximately 90% of all procedures performed worldwide. Other bariatric surgeries include adjustable gastric banding, biliopancreatic diversion with duodenal switch, and single-anastomotic gastric bypass. In case of failure to treat obesity and obesity-related comorbidities such as type 2 diabetes, high blood pressure, dyslipidemia, obstructive sleep apnea, cardiovascular disease (such as coronary artery disease, heart failure, or atrial fibrillation), asthma, fatty liver disease, Non-alcoholic steatosis, chronic kidney disease, polycystic ovary syndrome, infertility, gastroesophageal reflux, pseudotumor brain or bone and joint diseases, MBS also should be considered for suitable people with class one obesity. Due to the existence of high-quality scientific data on the safety, effectiveness, and cost-effectiveness of MBS in improving survival and quality of life in patients with a BMI greater than 35 kg/m^2, MBS should be strongly recommended in these patients, regardless of the presence or absence of obesity-related diseases. In the Asian population, the prevalence of diabetes and cardiovascular diseases is associated with a lower BMI than in the non-Asian population. Therefore, in high-risk areas, the BMI should be set at a threshold of 25-27.5 kg/m^2 to determine obesity. (18)
The number of studies evaluating the benefits of training for the management and treatment of morbid obesity is limited, despite changes and updates in bariatric surgery guidelines. A previous systematic review revealed that most medical students have a negative bias toward patients with obesity and most medical schools do not have integrated obesity medical education (19). 845 medical students participated in a study conducted by Özgol et al. (2023) in Turkey, titled "Impact of bariatric and metabolic surgery education program on the knowledge and attitude of medical students". The results revealed that medical students who received training about bariatric surgery in their medical school had a higher level of knowledge and comparable risk perception about MBS (20). This finding is consistent with the present study.
In Fan et al.'s study titled "Knowledge and Attitudes towards Obesity and Bariatric Surgery in Chinese Nurses," 4878 nurses in China participated. The study found that while nurses were generally well-informed about obesity, cardiovascular diseases, and type 2 diabetes, their knowledge about other relevant aspects such as the link between obesity and cancer, gastric reflux, and psychological disorders was lacking. This suggests the need for greater emphasis on educating healthcare professionals about the potential complications of bariatric surgery (21). The results of this study, which involved a different group of people from the health system, were similar to the present study. The lowest response rate from students in the recent study was related to cancer. This indicates that in the field of education related to obesity and bariatric surgery, more attention needs to be focused on the complications of MBS.
In 2017, Nawawi et al. conducted a study in Saudi Arabia titled "An Evaluation of Knowledge Regarding Surgical Treatment of Obesity Among Final Year Medical Students and Recent Graduate Physicians from King Abdulaziz University." The study included 298 medical students and recently graduated doctors from King Abdulaziz University. The results showed a low level of awareness about the potential of MBS in treating morbid obesity (15). With the increasing prevalence of MBS, medical graduates need to have adequate knowledge in the field of MBS. Our research findings revealed that the majority of students have sufficient information in this field. This difference may be attributed to the presence of highly specialized professors in bariatric surgeries and the provision of adequate training at the aforementioned university.
Stanford et al.'s study in 2015 was conducted in the United States under the title "The Role of Obesity Training in Medical School and Residency on Bariatric Surgery Knowledge in Primary Care Physicians." The study found that young doctors who had obesity or had received obesity education courses in medical school were more likely to answer bariatric surgery knowledge questions correctly (22). Matlock et al.'s study was conducted in Poland in 2015 under the title "The knowledge of Polish medical students about surgical treatment of obesity". The results indicated that the students had limited knowledge of bariatric surgery but were willing to improve their understanding. A majority of students reported that they had not received adequate training in bariatric surgery (23). In the United States, Jay et al.'s 2010 study titled "From the patient's perspective: the impact of training on resident physician's obesity counseling" found that doctors with postgraduate education in bariatric medicine feel more comfortable when treating obese patients (24).

CONCLUSION

The research findings indicated that medical students generally have a favorable attitude toward Metabolic and Bariatric surgery and possess knowledge about its features and complications. However, given the rising number of bariatric surgeries, there is a need for additional training in this area.

ACKNOWLEDGEMENT

This article is based on Dr. Mozhdeh Mojtahedi's thesis titled "Evaluation of the Knowledge and the Attitude of Medical Internship Students at Islamic Azad University of Mashhad, medical sciences branch, toward bariatric surgeries in 2022". This thesis was conducted as part of the general medicine program and has been approved by the Islamic Azad University, Mashhad Medical Sciences Branch.

Ethical Considerations: Ethical issues including plagiarism, informed consent, misconduct, data fabrication and/or falsification, double publication and/or submission, redundancy, etc. have been completely observed by the authors.

Financial Support: None
Conflict of Interest: The authors declare that there are no conflicts of interest.

REFERENCES

1. Templin T, Cravo Oliveira Hashiguchi T, Thomson B, Dieleman J, Bendavid E. The overweight and obesity transition from the wealthy to the poor in low-and middle-income countries: A survey of household data from 103 countries. PLoS med. 2019;16(11): e1002968.
2. Lin X, Li H. Obesity: epidemiology, pathophysiology, and therapeutics. Front Endocrinol. 2021; 12:706978.
3. Behrouz B, Bavali F, Heidarizadeh N, Farhadi M. The effectiveness of acceptance and commitment therapy on psychological symptoms, coping styles, and quality of life in patients with type-2 diabetes. Journal of Health. 2016;7(2):236-53. Persian.
4. Schwartz MB, Vartanian LR, Nosek BA, Brownell KD. The influence of one's own body weight on implicit and explicit anti-fat bias. Obesity. 2006;14(3):440-7.
5. Maddah M. The Factors associated with adult obesity in Iran: A review. Iranian J Nutr Sci Food Technol . 2012;7(1):0-0. Persian.
6. Hammond RA, Levine R. The economic impact of obesity in the United States. Diabetes Metab Syndr Obes. 2010:285-95.
7. Sjöström L. Bariatric surgery and reduction in morbidity and mortality: experiences from the SOS study. Int J Obes. 2008;32(7): S93-S7.
8. Rubio-Almanza M, Cámara-Gómez R, Hervás-Marín D, Ponce-Marco JL, Merino-Torres JF. Cardiovascular risk reduction over time in patients with diabetes or pre-diabetes undergoing bariatric surgery: data from a single-center retrospective observational study. BMC Endocr Disord. 2018;18(1):1-8.
9. Memarian E, Carrasco D, Thulesius H, Calling S. Primary care physicians' knowledge, attitudes and concerns about bariatric surgery and the association with referral patterns: a Swedish survey study. BMC Endocr Disord. 2021; 21:1-10
10. Miguel DS, Ramos P, Oliveira J, Ferreira C, Cruz F. OS-MRS as a predictor of hospital length of stay-a retrospective audit of patients submitted to elective gastric bypass surgery. Anaesthesia, Pain & Intensive Care. 2020;24(1):54-8.
11. Ng M, Fleming T, Robinson M, Thomson B, Graetz N, Margono C, et al. Global, regional, and national prevalence of overweight and obesity in children and adults during 1980-2013: a systematic analysis for the Global Burden of Disease Study 2013. The lancet. 2014;384(9945):766-81
12. Bergman RN, Kim SP, Hsu IR, Catalano KJ, Chiu JD, Kabir M, et al. Abdominal obesity: role in the pathophysiology of metabolic disease and cardiovascular risk. Am J Med. 2007;120(2):S3-S8.
13. Miller F, Pozniak C, Walsh G. Neuronal life and death: an essential role for the p53 family. Cell Death Differ. 2000;7(10):880-8.
14. Van Kruijsdijk RC, Van Der Wall E, Visseren FL. Obesity and cancer: the role of dysfunctional adipose tissue. Cancer Epidemiol Biomarkers Prev. 2009;18(10):2569-78.
15. Nawawi A, Arab F, Linjawi H, Fallatah H, Alkhaibari R, Jamal W. An evaluation of knowledge regarding surgical treatment of obesity among final year medical students and recent graduate physicians from King Abdulaziz University. MedEdPublish. 2017;6.
16. Shrotryia VK, Dhanda U. Content validity of assessment instrument for employee engagement. Sage Open. 2019;9(1):2158244018821751
17. Gastrointestinal Surgery for Severe Obesity. NIH Consens Dev Conf Consens Statement 1991; 9(1):1-20.
18. Eisenberg D, Shikora SA, Aarts E, Aminian A, Angrisani L, Cohen RV, et al. 2022 American Society of Metabolic and Bariatric Surgery (ASMBS) and International Federation for the Surgery of Obesity and Metabolic Disorders (IFSO) indications for metabolic and bariatric surgery. Surg obes relat dis. 2022 Dec;18(12):1345-56. doi: 10.1016/j.soard.2022.08.013.
19. Vitolins MZ, Crandall S, Miller D, Ip E, Marion G, Spangler JG. Obesity educational interventions in US medical schools: a systematic review and identified gaps. Teach Learn Med. 2012;24(3):267-72.
20. Özgüç H, Narmanlı M, Işık Ö. Impact of bariatric and metabolic surgery education program on the knowledge and attitude of medical students. Turk J Surg. 2023;39(1):63.
21. Fan M, Hong J, Cheung PN, Tang S, Zhang J, Hu S, et al. Knowledge and attitudes towards obesity and bariatric surgery in Chinese nurses. Obes surg. 2020;30(2):618-29.
22. Stanford FC, Johnson ED, Claridy MD, Earle RL, Kaplan LM. The role of obesity training in medical school and residency on bariatric surgery knowledge in primary care physicians. Int J Family Med. 2015;2015: 841249.
23. Matłok M, Pędziwiatr M, Major P, Nowakowski M, Rubinkiewicz M, Wyleżoł M, et al. The knowledge of Polish medical students about surgical treatment of obesity. Eur Surg. 2015; 47:266-70.
24. Jay M, Schlair S, Caldwell R, Kalet A, Sherman S, Gillespie C. From the patient's perspective: the impact of training on resident physician's obesity counseling. J Gen Intern Med. 2010; 25:415-22.

APPENDIX

Appendix 1. Questionnaire				
1-Which of the following for surgical treatment is obesity used?	Balneology	Body Sculpting	Lipomatic	Bariatric
2-Wht is the meaning of bariatric surgery treatment?	Through surgery on the stomach and intestine, the amount of food intake or digestion and absorption is reduced.	Removal of excess intra-abdominal fat, especially greater omentum	Removing subcutaneous fat from the abdomen and lower limbs	Placing a balloon containing methylene blue solution or air in the stomach to restrict food intake
3- What are the indications for bariatric surgery?	Body mass index more than 35 along with the occurrence of disease	Body mass index more than 30 along with the occurrence of disease	Body mass index more than 40	A &C
4- In which patient, bariatric surgery be considered as treatment option: A man with a height of 200 cm and a weight of 141 kg and suffering from type 2 diabetes OR a woman who is 150 and weighing 60 kg and high blood pressure	Man	Woman	Both	None
5 -Is there a relationship between cavity surgery and the risk of cancer?	It increases the risk of cancer	Reduces the risk of cancer	It has no effect on the risk of developing cancer.	Obesity has been documented to alter the development of cancer. But until now, there is not enough scientific evidence to show that the latter causes a reduction or Increased risk of cancer
6- What health care costs does bariatric surgery lead to for obese patients?	Increase	Decrease	It does not affect health care costs	The above issues have not yet been investigated
7- Which scientific evidence is one of the safest techniques according to the way for bariatric surge	Endoscopic	Laparoscopic	Laparotomy	None
8- patients who undergo bariatric surgery are expected, how long will it take to reach normal or close to normal weight?	3-6 months	12-18 months	2-3 years	none
9- Anastomosis leakage is one of the serious and early complications?	It is true and it happens in most cases	True, but it rarely happens	Incorrect	none
10- If the patient meets the standard criteria for bariatric surgery, his evaluation by a surgeon	I quite agree	No idea	I disagree	I completely disagree
11. I think bariatric surgery is a useful method for the treatment of obesity.	I quite agree	No idea	I disagree	I completely disagree
12-I think bariatric surgery Is safe and less complicated way to treat obesity?	I completely agree	I agree	No idea	I disagree
13-How do you rate your knowledge about bariatric surgery?	Completely satisfactory	Satisfying	No idea	Not enough
14-Given that bariatric surgery is gaining recognition in society, do you think it is important for medical graduates to know the basics about it?	Very important	Important	No idea	Not important
15-Is it beneficial to include bariatric surgery in the curriculum for surgery in the medical profession?	It is very useful	Useful	No idea	Not useful