Awareness of the Indications and Complications of Sleeve Gastrectomy in Riyadh, Saudi Arabia

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Received: December 2022 Accepted: January 2023; Published: February 1, 2023.
Citation: Khalid Bin Abdulrahman et al. Awareness of the Indications and Complications of Sleeve Gastrectomy in Riyadh, Saudi Arabia. World Family Medicine. February 2023; 21(1): 13-23
DOI: 10.5742/MEWFM.2023.95256014

Abstract

Background: Obesity significantly affects daily activities and contributes to countless diseases and comorbidities that can drastically alter an individual's life. This study aims to measure the awareness of the indications and complications of sleeve gastrectomy in Riyadh, Saudi Arabia.

Methods: This study was cross-sectional, and participants completed an online self-administered questionnaire on sleeve gastrectomy in Riyadh through Google Forms. Data were entered into Microsoft Excel 2013 and statistically analyzed using SPSS software.

Results: The total number of respondents assigned is 1,700. Among these individuals, women outnumbered males with a percentage of (67.4%) versus (23.6%). The majority of respondents held a bachelor's degree (64.0%). The majority of participants are familiar with the complications associated with sleeve gastrectomy (43.9%). However, 33.1% of the participants are unaware of the complications related to sleeve gastrectomy surgery. As a result, the study has a favorable attitude among the target populations, as the majority are well aware of the surgery.

Conclusion: According to our findings, the study population is moderately aware of the indications and complications. However, to ensure that our community has a significant level of knowledge about complications, we must raise social awareness about the indications and complications of sleeve gastrectomy.

Keywords: Sleeve surgery, obesity, gastrectomy, complications, Saudi Arabia.

Introduction

Obesity is one of the leading causes of many major health problems worldwide (1–5). Its prevalence has increased in the Kingdom of Saudi Arabia (6–8). Obesity significantly affects daily activities and contributes to countless diseases and comorbidities that can drastically alter an individual's life (9,10). The World Health Organization (WHO) defines it as abnormal or excessive fat accumulation with a body mass index (BMI) greater than 30 kg/m, which increases the risk of mortality and morbidity in an individual (2,11). As a result, weight loss is the ideal treatment to reduce the common risk factors associated with obesity (12,13). Sleeve gastrectomy is the only known treatment for morbid obesity (14–17).

Furthermore, its effectiveness is the most commonly performed gastrointestinal surgical procedure (18–21). Sleeve gastrectomy, also known as vertical sleeve gastrectomy, is a restrictive procedure that removes the outer margin to restrict food intake. As a result of this reduction in stomach size, the patient will be able to feel full after eating less, consuming fewer calories, and removing the stomach part that secretes a hormone responsible for the sensation of hunger (22–24). Despite the effectiveness of sleeve gastroenterology surgery, the prevalence of postoperative complications, such as surgical site infections, nutritional deficiencies, vein thrombosis, hemorrhages, and anastomotic leaks, is unfortunately considered high (25–27). As a result, educating patients about the complications and indications of sleeve gastrectomy surgery is critical before referring them to surgery (28–30).

Furthermore, as a first step, educating and raising awareness throughout society is critical (31). The study aims to assess public awareness of sleeve gastrectomy surgery and its indications and complications in Riyadh, Saudi Arabia. Awareness in this study covers a wide range of topics, including the procedure itself and postoperative complications.

Materials and Methods

Study design

A self-administered cross-sectional survey study was conducted in Riyadh City, Saudi Arabia, from October 1 to November 30, 2020.

Study subjects

The study population consists of Riyadh residents aged 18 to 65 years. Participants under 18 years of age and older than 65 who are not residents of Riyadh were excluded. Purposive sampling was performed according to the subject's eligibility criteria. The questionnaire had 14 questions, and participants needed an average of 2 –3 minutes to answer them. Participation was voluntary, and no incentives were used.

Sample size

The sample size was calculated using Raosoft (Raosoft Inc., Seattle, Washington, USA) based on a confidence interval of 95% and a 5% margin of error to meet the standard approximation assumption, resulting in a sample size of 724 volunteer adults.

Study questionnaire and its validation process

The authors designed the self-administered online questionnaire. The questionnaire underwent the validation process, starting with face validity, followed by the pilot testing by 25 volunteers. The data set cleaning, principal component analysis, Cronbach's Alpha, and final revision were carried out to make sure it was ready for distribution. Two thousand two hundred fifty (2250) targeted participants were emailed and reminded to participate. The pretest was conducted to assess the reliability of the questionnaire for the sample; some questions were modified accordingly. Participants were informed about the purpose of the study and given instructions on completing the questionnaires. Information confidentiality was also ensured. After voluntarily signing the informed consent form, participants were asked to complete the study questionnaire. The questionnaire included 14 multiple choice questions, 5 of which were dichotomous (yes/no), one (male/female), and one residential place.

Furthermore, there were eight multiple-choice questions about postoperative complications, patient age and complications, and background knowledge about the surgical procedure. The significance of sleeve gastrectomy was used to evaluate all the questions. In addition, tests are preferred to be performed after a sleeve gastrectomy.

Data Analysis

Continuously measured variables were described using mean and standard deviation, while categorically measured factors were described using frequencies and percentages.

Kolmogorov-Smirnov statistical normality and histograms were used to assess the normality assumption for metric variables. The multiple-response dichotomies analysis described the variables measured with more than one option. The chi-squared association test was used to determine the relationship between the years and their future medical specialty. The chi-square test was also used to determine differences in perceptions of future career prospects between male and female medical students. A continuity-adjusted chi-square association test was used for the two × two contingency tables that showed statistical count violations within the contingency table cells (i.e., when one or more cells had counts of 5 or less than the expected count). The relationship between predictors and their odds of being highly aware of sleeve gastrectomy complications was expressed as an odds ratio (OR) with a 95% confidence interval. The SPSS IBM V21 program was used for statistical data analysis. The alpha significance level was considered statistically significant at the 0.050 level.

Results

Of the 2,250 emailed participants, 1,700 (75.5%) responded. The respondent's results were divided into four categories. The first shows sociodemographic characteristics: women outnumbered men by 67.4%. The prevalent age group was 18 to 29 years (52.6%). The second category shows the health status by displaying their BMI and health conditions. While 84.9% of the participants did not suffer from chronic diseases, 15.1% did. The third category discusses the background knowledge of sleeve gastrectomy. For example, 71.1% of participants were aware a history of sleeve gastrectomy surgery, either personally or through friends or family. Finally, the last category shows the participant's awareness of sleeve gastrectomy complications since approximately half (43.9%) participants were familiar with sleeve gastrectomy. However, 33.1% of the participants do not know about the complications of sleeve gastrectomy surgery.

Table 1 presents the sociodemographic characteristics of the respondents. The vast majority of the respondents (83.6%) live in Riyadh. Approximately two-thirds (64.0%) have a bachelor's degree, 26.0% have a high school diploma or less, and 9.0% have a Master's or Ph.D. Regarding occupation, nearly 80.6% worked in fields other than healthcare.

Table 1: Descriptive analysis of sociodemographic and health-related characteristics

	Frequency	Percentage
Sex		
Male	402	23.6
Female	1298	76.4
Age group		
18-29 years	894	52.6
30-40 years	315	18.5
41-50 years	284	16.7
51-65 years	207	12.2
Educational Level		
High school Level or less	459	27
University Degree	1089	64.1
Higher studies	152	8.9
Residence city		
Outside Riyadh	278	16.4
Inside Riyadh	1422	83.6
Body Mass Index		
I don't know/ unsure	454	26.7
Less than 18 (Underweight)	57	3.4
18-25 (Normal)	383	22.5
25-30 (Overweight)	274	16.1
30-40 (Obese)	298	17.5
>40 (Pathological obesity)	234	13.8
Working field / occupation		
Other professional work	1370	80.6
Healthcare worker	330	19.4
Comorbid		
No	1443	84.9
Yes	257	15.1
Comorbidity type, n=257 patients.		
Diabetes mellitus	128	49.8
Hypertension	110	42.8
Heart disease	19	7.4

Table.2: Descriptive analysis of perceptions and indicators of awareness of gastric sleeve surgery

	Frequency	Percentage
Have you or family members or friends had sleeve gastrectomy surgery?		
No	491	28.9
Yes	1209	71.1
How familiar are you with the medical complications associated with sleeve gastrectomy surgery?		
I don't know much	562	33.1
I have a great familiarity with the complications	747	43.9
I think there might be slight complications, and it cannot be more than a surgical site infection	344	20.2
There are no complications with gastric sleeve surgery at all, to my best of knowledge	47	2.8
What are the post-surgical complications of sleeve gastrectomy?		
Vitamin and minerals deficiencies	1215	86.7
Infection	679	48.5
Adverse reactions to anesthesia,	517	36.9
Bleeding from the surgical site	607	43.3
What follow-up tests must be followed postoperatively for a sleeve gastrectomy operation?		
Kidney Function test	644	53.9
Liver Function test	647	54.2
Serum Iron content	669	56
Serum Vitamin D Level	643	53.9
Serum Ferritin Level	642	53.8
Complete Blood Count (CBC)	994	83.2
Serum Zinc Level	541	45.3
Vitamin B12. Level	732	61.3
Do you have a reliable background on the surgical procedure in sleeve gastrectomy operation, such as (the duration, type of anesthetics, etc.)		
No	845	49.7
To some point/degree	525	30.9
Yes	330	19.4
Do you think the patient's age is related to the surgical complications of sleeve gastrectomy?		
No	250	14.7
To some point/degree	542	31.9
Yes	908	53.4
Do you think that sleeve gastrectomy postoperative complications are curable or can be reduced?		
No	154	9.1
To some point/degree	729	42.9
Yes	817	48.1
General gastric sleeve surgery complication awareness score (0-14 points), mean (SD)	6.78 (4.1)	
General awareness of sleeve gastronomy complications level		
Awareness score <=6 points	894	52.6
Awareness score >6 points	806	47.4

Table 2 summarizes the general knowledge of complications from bariatric surgery. Among those surveyed, 454 (26.7%) did not know their body mass index (BMI), while 383 (22.5%) had a BMI in the normal range of 18.5 to 25. On the other hand, 298 (17.5%) were obese. The remaining 274 (16.1%) participants were overweight. Additionally, 57 (3.4%) people were underweight. 234 (13.8%) were classified as extremely obese. Regarding health conditions, 1,443 (84.9%) participants did not have any chronic disease, 128 (7.5%) had diabetes, 110 (6.5%) had hypertension, and the remaining 19 (1.1%) had chronic heart diseases.

More than 200 participants (71.1%) had knowledge of sleeve gastrectomy surgery as participants, or through their friends, or family members. About a fifth of participants said they have had surgery. Table 3 shows the background knowledge of sleeve gastronomy surgery.

More than half, 53.4%, believed that the patient's age was related to the incidence of complications. Approximately 48.0% believe that the postoperative complications of sleeve gastrectomy could be curable or reduced.

Table 4 shows the participant's awareness of sleeve gastrectomy complications. About a third (33.1%) were unaware of the complications of the surgery. Furthermore, (19.4%) of the participants did not know of any postoperative complications of surgery. Furthermore, 31.6% were unaware of any postoperative blood tests.

Multivariate logistic binary regression analysis was used to verify the findings from the bivariate analysis. The analysis model, Table 4, showed that people over 40 years of age were found to be significant, $p<0.001$, less predicted (41.7% times less or ((1-0.583) X 100)) to have a high awareness of sleeve gastronomy surgery compared to those aged <=40 years on average, considering the other predictors in the analysis as accounted for; however, note Figure 1. Furthermore, the analysis model showed that it was significantly more predicted that women would be highly wary of sleeve gastronomy surgery (2.096 times more) than men on average, $p<0.001$. Furthermore, the multivariate analysis model showed that people living within the capital city were significantly more predicted (1.325 times more) to be highly aware of sleeve gastronomy surgery than those outside the capital city, $p = 0.049$, which accounts for everything else in the model. Not only that, but the analysis model indicated that people who were unaware of their body mass status were significantly less (37% less) predicted to be highly aware of sleeve gastronomy surgery compared to people who perceived themselves as having high body mass indexes, $p=0.001$, but people with normal and high body mass index perceptions may not necessarily differ significantly in their awareness of sleeve gastronomy surgery, $p = 0.091$, see Figure 2. The level did not converge particularly with their odds of having a high awareness of sleeve gastronomy, $p=0.544$.Also , people's work converged significantly with their odds of having a heightened awareness of sleeve gastronomy. Healthcare workers were significantly more predicted, 2.088, to have a high awareness of sleeve gastronomy surgery compared to those who are not healthcare workers, $p<0.001$. Unsurprisingly, the analysis model showed that people previously exposed to sleeve gastronomy surgery were significantly more predicted to have a high awareness of sleeve gastronomy surgery (1.456 times more) compared to people not previously exposed /experienced with sleeve gastronomy surgery, on average, $p=0.002$. But also, the analysis model indicated that people without reliable sources of information on sleeve gastronomy surgery were significantly less predicted (53.7% times less) to be highly aware of sleeve gastronomy surgery and required medical follow-up compared to those who had some or a great extent of information sources on sleeve gastronomy surgery, $p<0.001$. People's comorbidities (diabetes and hypertension) did not converge significantly on their odds of being highly aware of the aspects of sleeve gastronomy surgery. Still, people who believed that sleeve gastronomy had no complications at all were significantly less predicted (78.8% times less) to be highly aware of the complications of sleeve gastronomy surgery and desired post-surgical follow-up compared to those who believed sleeve gastronomy had some complications or those fully aware of the complications of the sleeve gastronomy surgery or even those who advised that they lacked information at all, on average, $p<0.001$ according to the multivariate analysis model.

Table 3: Descriptive bivariate analysis of people's awareness of gastric sleeve surgery complications and postoperative precautionary measures

	Awareness of Gastric Sleeve Surgery Complications			
	Low (n=894)	High (n=806)	test statistic	p-value
Sex				
Male	262 (29.3)	140 (17.4)	χ^2 (1)=33.50	<0.001
Female	632 (70.7)	666 (82.6)		
Age group				
18-29 years	410 (45.9)	484 (60)	χ^2 (3)=51.28	<0.001
30-40 years	161 (18)	154 (19.1)		
41-50 years	183 (20.5)	101 (12.5)		
51-65 years	140 (15.7)	67 (8.3)		
Educational Level				
High school Level or less	244 (27.3)	215 (26.7)	χ^2 (2)=2.73	0.255
University Degree	561 (62.8)	528 (65.5)		
Higher studies	89 (10)	63 (7.8)		
Residence city				
Outside Riyadh	162 (18.1)	116 (14.4)	χ^2 (1)=4.31	0.038
Inside Riyadh	732 (81.2)	690 (85.6)		
Body Mass Index				
I don't know/unsure	299 (33.4)	155 (19.2)	χ^2 (2)=46.32	<0.001
Normal/Underweight	327 (36.6)	387 (48)		
Overweight/Obese	268 (30)	264 (32.8)		
Working field/ occupation				
Other professional work	782 (87.5)	588 (73)	χ^2 (1)=57.12	<0.001
Healthcare worker	112 (12.5)	218 (27)		
Comorbid				
No	735 (82.2)	708 (87.8)	χ^2 (1)=10.50	0.001
Yes	159 (17.8)	98 (12.2)		
Comorbidity type				
Diabetes mellitus	78 (8.7)	50 (6.2)	χ^2 (1)=3.90	0.049
Hypertension	69 (7.7)	41 (5.1)	χ^2 (1)=4.85	0.028
Heart disease	12 (1.3)	7 (0.9)	χ^2 (1)=0.86	0.353
Have you or family members or friends had sleeve gastrectomy surgery?				
No	297 (33.2)	194 (24.1)	χ^2 (1)=17.30	<0.001
Yes	597 (66.8)	612 (75.9)		

Table 3: Descriptive bivariate analysis of people's awareness of gastric sleeve surgery complications and postoperative precautionary measures (continued)

How familiar are you with the medical complications associated with sleeve gastrectomy surgery?				
			χ^2	
I don't know much	440 (49.2)	122 (15.1)	(3)=297.3	<0.001
I have a great familiarity with the complications	234 (26.2)	513 (63.6)		
I think there might be slight complications, and it cannot be more than a surgical site infection	183 (20.5)	161 (20)		
There are no complications with gastric sleeve surgery at all, to the best of my knowledge	37 (4.1)	10 (1.2)		
Do you have a reliable background on the surgical procedure in sleeve gastrectomy operation, such as (the duration, type of anesthetic, etc.)				
			χ^2	
No	533 (59.6)	312 (38.7)	(1)=92.34	<0.001
To some extent	252 (28.2)	372 (33.9)		
To a great extent	109 (12.2)	221 (27.4)		

Table 4: Multivariate logistic binary regression analysis of people's odds of being well aware of gastric sleeve surgery complications. N=1700

	Multivariate adjusted Odds Ratio (OR)	95% C.I. for OR Lower	Upper	p value
Age >40 years	**.583**	**.452**	**.752**	**<0.001**
Sex= Female	**2.096**	**1.633**	**2.692**	**<0.001**
Residence=City-Riyadh	**1.325**	**1.001**	**1.752**	**.049**
Did not have an UpToDate BMI reading/don't know	**.630**	**.475**	**.836**	**.049**
Underweight/Normal weighted	**1.250**	**.965**	**1.619**	**.091**
Educational Level	**.946**	**.790**	**1.133**	**.544**
Work field - Health worker	**2.088**	**1.584**	**2.752**	**<0.001**
Had previous sleeve gastronomy surgery/ A relative had sleeve gastronomy.	**1.456**	**1.143**	**1.855**	**.002**
Lack of a reliable source of information on gastric sleeve surgery	**.463**	**.374**	**.574**	**<0.001**
Comorbidity - Diabetes	**.826**	**.548**	**1.246**	**.363**
Comorbidity - Hypertension	**.764**	**.489**	**1.193**	**.236**
Comorbidity - Heart Disease	**.541**	**.198**	**1.476**	**.230**
Believes that sleeve gastronomy surgery has no complications	**.212**	**.101**	**.449**	**<0.001**
Constant	**.556**			**.036**

Dependent outcome variable = Has a sleeve gastronomy awareness score greater than average (median = 6 points): No/ Yes. Overall statistical significance $\chi 2$ (13) =250.6.

Figure 1: People's awareness of the complications of sleeve gastrectomy surgery

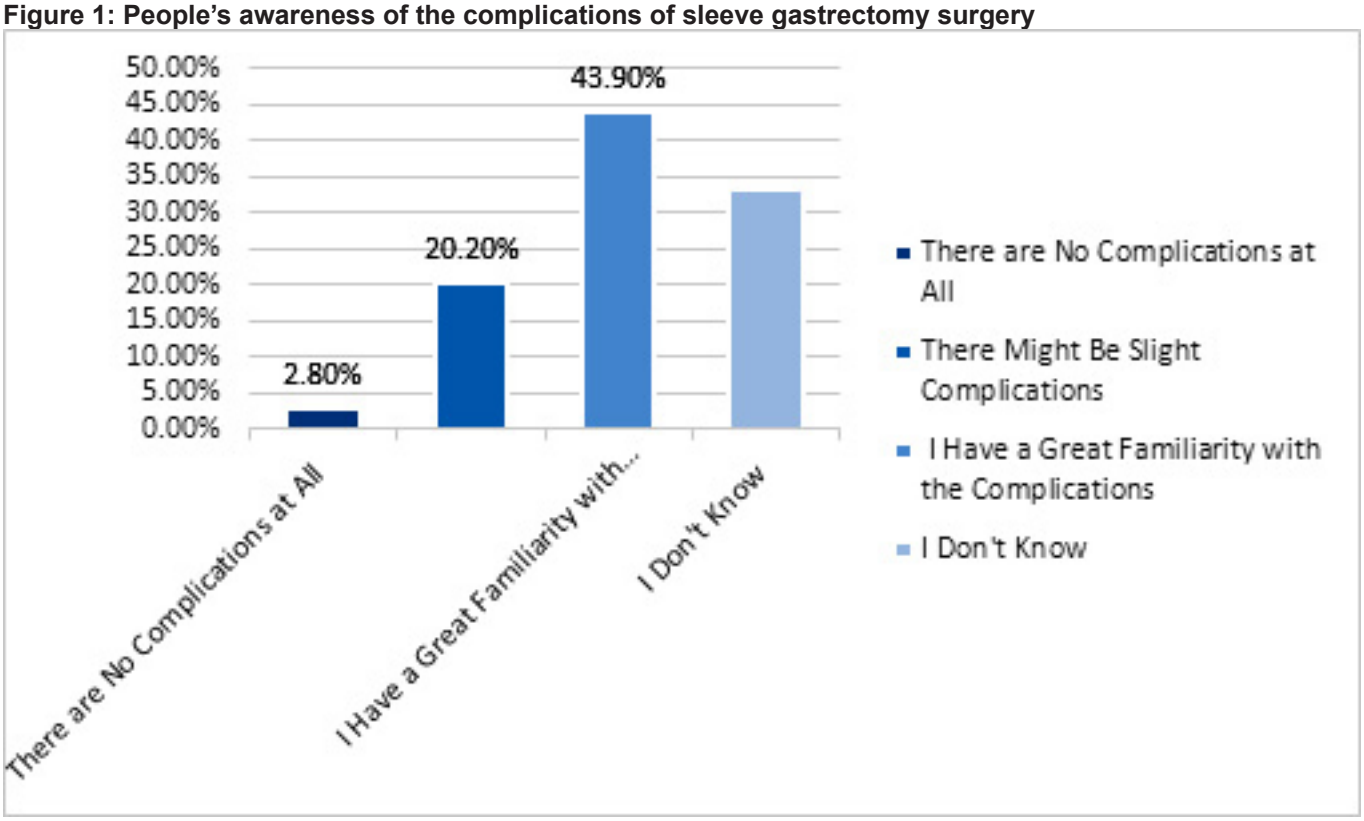
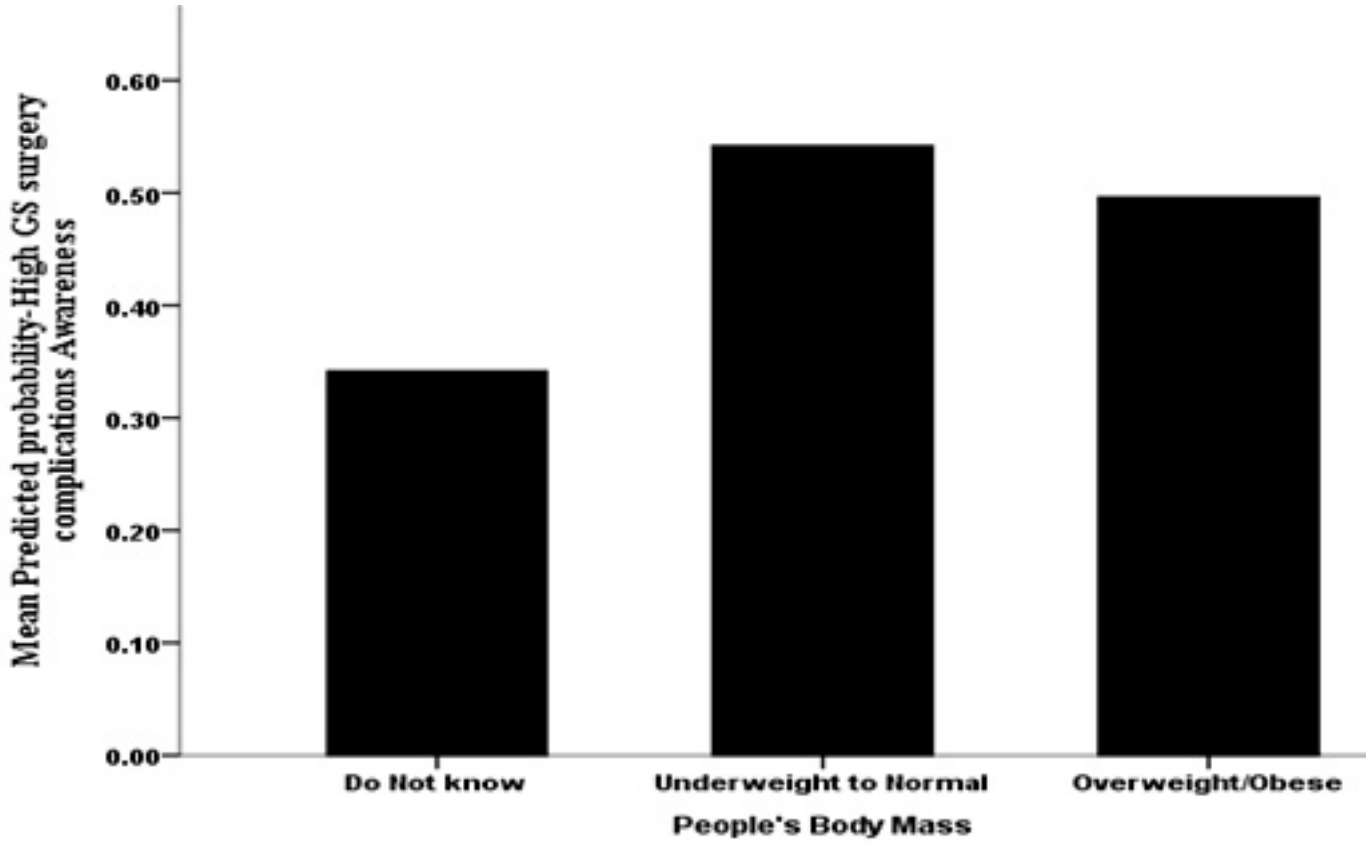


Figure 2: The association between people's perceived body mass with their multivariate adjusted probability of being highly aware of sleeve gastrectomy surgery complications



Discussion

A good public awareness of sleeve gastrectomy complications is essential to ensure that those affected seek medical advice for weight loss. Many factors can influence people's awareness, including education level, personal experience, lifestyle modification after surgery, and individual experience.

The findings of the current study revealed a moderate level of knowledge, particularly among those aged 18 to 29 years. Most of the participants have some knowledge about sleeve gastrectomy complications because most of the participants indicated that bleeding, infections, and vitamin deficiency could occur as complications after surgery. Female participants demonstrated a higher level of knowledge than males. Most of the participants did not know their BMI.

To spread more knowledge about complications, it is imperative to improve society's educational activities in our community and ensure that all health data are based on scientific evidence. The result showed that 58% were aware of the correct postoperative sleeve gastrectomy blood test.

Sleeve gastrectomy induces weight loss by restricting food intake, making it difficult for the individual to consume daily food intake, resulting in spontaneous weight loss (32,33). In addition to its effective contribution to controlling heavy weight with the least effort possible, some people experience postoperative complications that can lead to undesirable health conditions (34). In addition, the patient's symptoms can worsen over time (35). To avoid harmful complications, patients willing to undergo surgery must have a clear understanding and awareness of the surgical procedure and preoperative and postoperative complications (36,37). A good background in bariatric surgery is undoubtedly one of the primary responsibilities (38–40). Unfortunately, few studies have been conducted on this topic in Saudi Arabia, and most reveal a lack of awareness (28,29,41–44). A study was conducted at King Khalid Hospital to assess awareness of sleeve gastrectomy complications and indications of sleeve gastrectomy. The study found that 59.0% of the participants were unaware of the indications for sleeve gastrectomy (41). However, another study has examined whether these patients have a better quality of life and self-reported functional status than obese adults who do not have bariatric surgery. According to the findings, significant weight loss after bariatric surgery, the search for depression treatment, and the absence of medical comorbidities appear to predict better quality of life and self-reported functional status (45). Despite its effectiveness, bariatric surgery has been associated with several serious complications. A study on patients' awareness of the potential risks of weight loss surgery found that acute complications occurred in 0.3 to 8% of operations. According to the survey, two-thirds of the general population knew the possible acute complications associated with bariatric surgery (42). Another study investigated the public perception of morbid obesity and bariatric surgery in Saudi Arabia. According to the survey, the public perception of obesity and bariatric surgery in Saudi Arabia is limited; approximately 50% were unaware of the correct indications for bariatric surgery (46). Patients should be aware of bariatric surgery's safety, effectiveness, and consequences to avoid or deal with complications. A study in Jeddah city revealed that 74% have inadequate opinions about bariatric surgery, and 50.8% have good knowledge about the prevention behavior of obesity (47).

In addition, a survey of Saudi adults was conducted to assess their knowledge and attitudes toward bariatric surgery. According to the study, understanding obesity is generally good in Saudi Arabia. Most Saudis prefer to avoid surgery by following a healthy diet, with most falling into the normal range (BMI 18.5–25) (43).

Conclusion

According to our findings, the study population is moderately aware of the indications and complications. However, to ensure that our community has a significant level of knowledge about complications, we must raise social awareness about the indications and complications of sleeve gastrectomy.

Limitations

This study may have limitations. The sensitive nature of sharing personal information, such as a respondent's weight and BMI, may contribute to low compliance or incorrect responses. The method used in this study is cross-sectional; the timing of the collected data cannot be guaranteed to be representative.

Authors' Contributions:

All authors participated in the concept, design, analysis, interpretation of data, the writing, and manuscript review. They have seen and approved the final version of the manuscript.

Conflict of interest

The authors declare that there is no conflict of interest concerning the publication of this article.

Funding

None.

Ethical Consideration

The study was approved by the IMSIU Research Ethics Committee (project number 119-2020; approval date, 08 December 2020). All writing is done in accordance with the ethical principles of the Declaration of Helsinki. The survey link included a brief description of the study and a more detailed explanation on the survey's front page. Participants were told that completion of the study constituted consent. All participant consent and data were collected in complete confidence throughout the study.

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