

Original Research Article

General public awareness of indications and complications of sleeve gastrectomy in Al'qassim region, Saudi Arabia

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ABSTRACT

Background: Obesity is risingly becoming a health care problem. After ineffective tries to lose weight with lifestyle-based conservative methods, the most effective obesity treatment will become bariatric surgery. Objective of this study aimed to assess the awareness of the general public about indications and complications of sleeve gastrectomy in Al'Qassim region, Saudi Arabia.

Methods: This was a cross-sectional study conducted among the general population living in Al'Qassim region, Saudi Arabia. A validated Arabic/English questionnaires were distributed among the targeted individual using an online platform. Questionnaires included demographic data, general knowledge about gastric sleeve and the knowledge toward the indication and complication of sleeve gastrectomy. All statistical analyses were performed using SPSS version 26.

Results: Nearly all participants were aware of sleeve gastrectomy (99.1%). The prevalence of participants who knew the indications and complications of sleeve gastrectomy were 60.9% and 72.2%, respectively. Furthermore, approximately three quarters (70.3%) were confident that the most common indication of the gastric sleeve was an adult with BMI >40 kg/m². Statistical tests revealed that the knowledge toward the indication and complication of sleeve gastrectomy were more common among those who have heard about BMI and those who knew the BMI range of obese person (p<0.05).

Conclusions: Although, general population awareness toward the indication and complication of sleeve gastrectomy was moderate, however, their knowledge about the BMI seems to be lacking. Having better knowledge about BMI likely influenced their awareness of the indications and complications of gastric sleeve.

Keywords: Sleeve gastrectomy, Indication, Complication, Awareness, General public

INTRODUCTION

Obesity is rising to become a health care problem.¹ It is now known as the most widespread metabolic disease reaching epidemic proportions in developed and developing countries.^{2,3} In 2017 according to WHO, more than four million people dying each year as a result of this issue and more than 1.9 billion adults aged 18 years and

older were overweight 650 million adults of these were obese. The prevalence of obesity in Saudi Arabia considered one of the highest in the world with more than 35% of the population being obese, It has raised in both genders by an average of 0.64% per year from 2012-2016.^{4,5} Worldwide, the obesity prevalence has shown a marked rise over the past 40 years.⁶ So one of the common health problems is obesity and as a result of it, most family physicians might face patients who ask for bariatric

surgery without scientific indications only because of mass media advertisements.⁷ There are lines for managing obesity.³ First, should be advised lifestyle modification and behavioral therapies for all obese patients.³ Then as a second-line, pharmacological agents may be used in adjuncts to lifestyle modification.³ After ineffective tries to lose weight with lifestyle-based conservative methods, the most effective obesity treatment will become bariatric surgery.^{8,9} There are specific guidelines for bariatric surgery that should be followed, which vary with the type of procedure performed.^{10,14} Sleeve gastrectomy and Roux-en-Y gastric bypass are the most common techniques, most significant was the rise in prevalence of sleeve gastrectomy from 0 to 37% of the world total from 2003 to 2013.¹⁰ In Saudi Arabia, the indication of sleeve gastrectomy consists of adults with a body mass index (BMI) of 30 kg/m² or higher with poorly controlled type 2 diabetes and increased cardiovascular risk or adults with a BMI of 35 kg/m² or higher with severe co-morbidities or adults with a BMI of 40 kg/m² or higher.^{11,13} Although, sleeve gastrectomy as any surgery has specific complications that can lead to a possibly life-threatening condition and need specialized and multidisciplinary management.¹⁵ Studies have shown that postoperative complications prevalence between 4.4 and 12.8%.^{16,18} Postoperative complications included anastomotic leaks, strictures, hemorrhage, vein thromboses, abscesses, nutritional deficiencies, surgical site infections and other uncommon conditions. However, the only major complications between them were leaks and hemorrhage. Anastomotic leak was a vital complication that was not easy to handle and was most commonly diagnosed after discharge.¹⁹ Bariatric procedures which were registered in Arabian Gulf countries had the highest percentage although Arabian Gulf countries had the lowest number of research publications about this type of surgery in comparison to Western countries.²⁰ In total, numerous studies have been done about obesity and sleeve gastrectomy in Saudi Arabia and other countries. However, there was no study has been done in Al'Qassim. Also, it was important for these studies to be done in this region to measure the awareness among society about the indication and complications of this type of surgery in our community. Also, to encourage the health awareness department in the ministry of health to undertake necessary actions for raising the awareness. We aimed to assess the general public awareness level of indications and complications of sleeve gastrectomy in Al'Qassim region, Saudi Arabia.

METHODS

Study design, settings and participants

This was a descriptive cross-sectional study conducted between 13 July to 13 August 2021 among the general population living in Al'Qassim region, Saudi Arabia. A group of males and females who were above 18 years old of the general population questioned their awareness about indication and complications of sleeve gastrectomy. The

study was done in Al'Qassim region, Saudi Arabia. The minimum required sample size was 385 which represented a confidence level of 95%.

Data collection methods

The data have been collected through validated Arabic/English questionnaires. At first, we distributed our questionnaire randomly via online platforms, which were developed by reviewing the literature. The questionnaire's face and content validity had been checked and critiqued by a bariatric surgeon. The questionnaire contained five sections, first one regarding participant consent form, in the second section was about demographics which included age, gender and educational level, in the third section questions assessed the knowledge of sleeve gastrectomy such as knowledge about BMI, BMI ranges and sleeve gastrectomy, then fourth section assessed the knowledge of sleeve gastrectomy indications and the last section questions assessing the knowledge of sleeve gastrectomy complications. After completion, all questionnaires were automatically reviewed to make sure that there were no blank boxes. Participation was voluntary and confidential as the study investigators imposed no influence, bias or stressors.

Statistical analysis

The data analysis were carried out using statistical packages for software sciences (SPSS) version 26 Armonk, New York, IBM Corporation. Qualitative variables were presented using numbers and percentages while quantitative variables were presented using mean and standard deviation. The knowledge toward the indication and complication of sleeve gastrectomy were compared with the demographic characteristics by using the Chi-square test. Significant results generated in univariate analysis were then placed in a multivariate regression model to determine the independent significant predictor of the knowledge about the indication and complication of sleeve gastrectomy with odds ratio and 95% confidence interval were also being presented. A p value of 0.05 was considered statistically significant.

RESULTS

This study recruited 553 participants living in Al'Qassim region, Saudi Arabia. Table 1 presented the demographic characteristics of the sample population. Participant's mean age was 30.1 (SD 11.3) years with 18-25 years was the most common age group (54.4%). Females were slightly more (50.3%) than males (49.7%). With respect to their education, the majority was bachelor's degree (72.9%) followed by high school (20.6%) (Table 1).

The general knowledge of participants regarding sleeve gastrectomy was given in Table 2. Accordingly, nearly all respondents have heard about sleeve gastrectomy (99.1%) while the prevalence of respondents who have heard about BMI was 49.5%. Furthermore, more than a quarter of the

respondents (26.4%) knew that a person with a BMI of 30 or more (kg/m²) was considered obese. The prevalence of respondents who were aware of the indications and complications of sleeve gastrectomy were 60.9% and 72.2%, respectively (Table 2).

Table 1: Demographic characteristics of the sample population living in Al'Qassim region, Saudi Arabia (n=553).

Study variables	N (%)
Age in years (mean±SD)	30.1±11.3
18-25	301 (54.4)
26-35	87 (15.7)
36-45	92 (16.6)
46-55	57 (10.3)
>55	16 (02.9)
Gender	
Male	275 (49.7)
Female	278 (50.3)
Educational level	
Elementary school	06 (01.1)
Intermediate school	06 (01.1)
High school	114 (20.6)
Bachelor	403 (72.9)
Master's degree	17 (03.1)
PhD	07 (01.3)

Table 2: General knowledge of participants about sleeve gastrectomy (n=553).

Variables	N (%)
Did you hear about sleeve gastrectomy?	
Yes	548 (99.1)
No	05 (0.90)
Have you heard about the BMI?	
Yes	274 (49.5)
No	279 (50.5)
What is the BMI range that we can say this person is obese? (in kg/m²)	
≥30	146 (26.4)
25-29.9	69 (12.5)
18.5-24.9	25 (04.5)
<18.5	0
I don't know	313 (56.6)
Do you know about the indication of sleeve gastrectomy?	
Yes	337 (60.9)
No	216 (39.1)
Do you know about the complications of sleeve gastrectomy?	
Yes	399 (72.2)
No	154 (27.8)

Table 3: Knowledge of participants regarding indications for sleeve gastrectomy (n=337).

Indications (BMI kg/m ²)	N (%)
Adult with BMI >40	237 (70.3)
Adult with BMI >35 and severe co-morbidities	171 (50.7)
Adult with BMI >30, poorly controlled type 2 diabetes, increased cardiovascular risk	155 (46.0)
For cosmetics	65 (19.3)
Adult with BMI from 18.5-24.9	29 (08.6)
Adult with BMI of 18.5	06 (01.8)
Adult with BMI less than 18.5	04 (01.2)

Table 4: Knowledge of participants regarding complication of sleeve gastrectomy (n=399).

Characteristics	Acute complications N (%)	Chronic complications N (%)
Hemorrhage	249 (62.4)	105 (26.3)
Leak of gastric content	224 (56.1)	93 (23.3)
Abscess	193 (48.4)	75 (18.8)
Iron deficiency	166 (41.6)	210 (52.6)
Anemia	159 (39.8)	218 (54.6)
Other nutritional and mineral deficiency	143 (35.8)	169 (42.4)
Twist of stomach	131 (32.8)	65 (16.3)
Pulmonary emboli	88 (22.1)	63 (15.8)
Neuropathies	84 (21.1)	114 (28.6)
Weight regain	34 (08.5)	80 (20.1)

It has shown the knowledge of participants regarding the indication for sleeve gastrectomy. Based on participants knowledge, the most common indication of sleeve gastrectomy was an adult with a BMI of more than 40 kg/m² (70.3%), followed by an adult with a BMI of more than 35 kg/m² with severe co-morbidities (50.7%) and an adult with BMI more than 30 kg/m² with poorly controlled type 2 diabetes and increased cardiovascular risk (46%) while the least answered question was an adult with BMI less than 18.5 kg/m² was an indication of sleeve gastrectomy (Table 3).

Regarding the knowledge of participants toward the complications of sleeve gastrectomy, it can be observed that the participants believe that the most common acute complication of sleeve gastrectomy was hemorrhage (62.4%), followed by the leak of gastric content (56.1%) and abscess (48.4%) whereas the most common chronic complication was anemia (54.6%), followed by iron deficiency (52.6%) and other nutritional and mineral deficiencies (42.4%) (Table 4).

We used the Chi-square test in table 5 to measure the relationship between the indications and complications of

sleeve gastrectomy in regards to the demographic characteristics of participants. Based on the results, it was found that participants who have heard about BMI were more common among those who knew the indications ($X^2=19.030$; $p<0.001$) and complications ($X^2=16.340$; $p<0.001$) of sleeve gastrectomy. We also have observed that participants who indicated that the obese person had a BMI range of 30 kg/m² or more were more common among those who have the knowledge regarding the indications ($X^2=21.751$; $p<0.001$) and complications ($X^2=23.206$; $p<0.001$) of sleeve gastrectomy. In addition, the prevalence of participants who have knowledge regarding the complications of sleeve gastrectomy was common among participants who have bachelor or higher degrees ($X^2=8.528$; $p=0.008$) (Table 5).

A multivariate regression model was subsequently performed to determine the independent significant factor associated with the knowledge toward the indications and complications of sleeve gastrectomy (Table 6). Following the results, it was shown that in model 1, variables such as heard about BMI and the BMI range of obese persons did not show a significant effect in the knowledge toward indication to sleeve gastrectomy after adjustment to the regression model ($p>0.05$). In model 2, variables such as educational levels, knowledge about BMI, and knowledge regarding the BMI range of obese persons did not reach statistical significance after adjustment to the regression model ($p>0.05$) (Table 6).

Table 5: Relationship between the knowledge toward indications and complications in regards to the demographics of the participants (n=553).

Factors	Knowledge toward indications		Knowledge toward complications	
	Yes (n=337) N (%)	No (n=216) N (%)	Yes (n=399) N (%)	No (n=154) N (%)
Age group (in years)				
18-25	181 (53.7)	120 (55.6)	223 (55.9)	78 (50.6)
26-35	54 (16.0)	33 (15.3)	57 (14.3)	30 (19.5)
36-45	59 (17.5)	33 (15.3)	63 (15.8)	29 (18.8)
46-55	32 (9.5)	25 (11.6)	44 (11.0)	13 (8.4)
>55	11 (3.3)	05 (2.3)	12 (3.0)	04 (2.6)
X ²	1.484		3.870	
P value	0.829		0.424	
Gender				
Male	160 (47.5)	115 (53.2)	189 (47.4)	86 (55.8)
Female	177 (52.5)	101 (46.8)	210 (52.6)	68 (44.2)
X ²	1.749		3.193	
P value	0.186		0.074	
Educational level				
High school or below	69 (20.5)	57 (26.4)	78 (19.5)	48 (31.2)
Bachelor or higher	268 (79.5)	159 (73.6)	321 (80.5)	106 (68.8)
X ²	2.617		8.528	
P value	0.106		0.003**	
Heard about BMI				
Yes	192 (57.0)	82 (38.0)	219 (54.9)	55 (35.7)
No	145 (43.0)	134 (62.0)	180 (45.1)	99 (64.3)
X ²	19.030		16.340	
P value	<0.001**		<0.001**	
BMI range of obese person (in kg/m²)				
≥30	101 (30.0)	45 (20.8)	122 (30.6)	24 (15.6)
25-29.9	51 (15.1)	18 (8.3)	57 (14.3)	12 (7.8)
18.5-24.9	20 (5.9)	05 (2.3)	19 (4.8)	06 (3.9)
I don't know	165 (49.0)	148 (68.5)	201 (50.4)	112 (72.7)
X ²	21.751		23.206	
P value	<0.001**		<0.001**	

P value has been calculated using the Chi-square test; **significant at $p<0.05$ level.

Table 6: Determine the influence of the knowledge toward indication and complication of sleeve gastrectomy (n=553).

Indications and complications	AOR	95% CI	P value
Model 1: Knowledge toward indication			
Heard about BMI			
Yes	1.320	0.641-2.718	0.451
No	Ref		
BMI range of obese person (in kg/m²)			
≥30	2.800	0.848-9.245	0.091
25-29.9	1.782	0.629-5.047	0.277
18.5-24.9	1.412	0.462-4.317	0.545
I don't know	Ref		
Model 2: Knowledge toward complication			
Educational level			
High school or below	Ref		
Bachelor or higher	1.289	0.852-1.950	0.229
Heard about BMI			
Yes	1.309	0.635-2.698	0.466
No	Ref		
BMI range of obese person (in kg/m²)			
≥30	2.781	0.841-9.195	0.094
25-29.9	1.817	0.641-5.155	0.261
18.5-24.9	1.390	0.454-4.257	0.564
I don't know	Ref		

AOR-adjusted odds ratio; CI-confidence interval.

DISCUSSION

This study was carried out to evaluate the knowledge of the general public regarding the indications and complications of sleeve gastrectomy. The findings of this study revealed that the knowledge of the general population was adequate. Based on our accounts, 60.9% and 72.2% were sure about the indications and complications of gastric sleeve. However, their knowledge about BMI seemed to be lacking since more than a half of the subjects (50.5%) were unaware of the term BMI and only more than one quarter (26.4%) were able to identify the BMI range of obese individuals which was 30 kg/m² or more. These findings were consistent with the paper of AlWatban et al their study found a lack of awareness regarding sleeve gastrectomy, around 41% and 64.8% of their respondents had heard about the indications and complications of sleeve gastrectomy but most of them reported no knowledge about the term BMI with mostly exhibited poor knowledge about the correct BMI range of obese person.⁷ Another published paper done in Jeddah, Saudi Arabia, indicated that among 298 medical students, 73% and 78.9% of them knew the correct indications and complications of bariatric surgery which were slightly higher than our report.²¹ However, one may argue that the perceived knowledge of medical students was higher than the general population which could be the turning point. Furthermore, we noted that more than 70% of the subjects were sure about the correct indication of sleeve gastrectomy which was an adult with BMI more than 40 kg/m². Relatively, the knowledge of the study population

in our report toward the precise indication of the gastric sleeve was higher than the study of AlWatban et al as well as Bshait et al.^{7,22} Conversely, regarding the knowledge of participants toward the complication of sleeve gastrectomy which we measured among 399 subjects. The answers of 399 respondents in the multiple response questions showed that the most common acute complication of sleeve gastrectomy was hemorrhage (62.4%) followed by the leak of gastric content (56.1%) and abscess (48.4%). Accordingly, regarding chronic complications, anemia (54.6%), iron deficiency (52.6%) and other nutritional and mineral deficiency were the top three most common chronic complications of gastric sleeve. These findings are likely comparable with the study of AlWatban et al.⁷ They also reported hemorrhage (51%) as the main acute complication of sleeve gastrectomy followed by iron deficiency (40.8%). However, in the chronic complication, hemorrhage was also identified as the main chronic complication (51%) of the gastric sleeve which differed from our results. In another study conducted in Al Ahsa, Saudi Arabia, they indicated that the most common complication of bariatric surgery was gastroesophageal reflux disease, iron, vitamin B12 and protein deficiencies which were also in line with our results.²²

Moreover, we noticed that although most of the subjects have heard about sleeve gastrectomy (99.1%) however, their knowledge about BMI and the correct BMI range of obese people was poor. According to our results, more than half of the respondents were not aware of the BMI while only 26.4% knew that an obese person had a BMI range of

30 kg/m² or more, the large majority (56.6%) were not aware of it. In Turkey, research indicated that the awareness about BMI was insufficient and only 39.4% knew that 30 kg/m² was the cutoff point to detect obesity which was consistent with our reports.²³

Accordingly, we noted that the increase in the knowledge toward the indications and complications of sleeve gastrectomy can be predicted with increasing knowledge about BMI and the precise knowledge regarding the BMI range of obese persons. In addition, we have known that educational level was a factor of the knowledge toward complication of sleeve gastrectomy where educated subjects were more knowledgeable than those less educated subjects. On the other hand, the knowledge regarding the indications and complications were similar across the age group and gender. However, after conducting multivariate estimates, all these factors did not show a significant effect with the knowledge regarding indications and complications of sleeve gastrectomy ($p > 0.05$). In a study by AlWatban et al they reported that educational level was not an influential factor with having heard of indications and complications of sleeve gastrectomy.⁷ Similarly, in a study conducted by Alamri et al they pointed out that the awareness of females regarding bariatric surgery complications was higher than males but their awareness was similar across educational levels which were not consistent with our results.²⁴

Limitations

This study was limited for populations of Al'Qassim region, Saudi Arabia. As result of that, it might not reflect the real result of whole population in the Saudi Arabia.

CONCLUSION

Although, general public awareness toward the indications and complications of sleeve gastrectomy was moderate, however, their knowledge about the BMI seems to be lacking. Having better knowledge about BMI positively influenced their awareness of the indications and complications of gastric sleeve. There is still room for improvement in view of the knowledge toward the indications and complications of sleeve gastrectomy, specifically in terms of BMI and how to correctly identify the obese person. Community awareness is necessary, to increase the knowledge of the public regarding the subject. Healthcare workers had the vital role to deliver proper education in the community about the importance of having adequate knowledge toward the indications and complications of sleeve gastrectomy.

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