Introduction

Obesity is a major health problem that affects daily life activities and contributes to numerous diseases.[1‑6] It is now recognized as the most prevalent metabolic disease affecting both adults and children, reaching epidemic proportions in developed and developing countries.[3,5] Obesity is a common health problem in family medicine practice and most of family physicians might face patients who request bariatric surgery without scientific evidence-based indications, and just by peer influence or mass media advertisements. So it is important to know how our patients are aware about the indications and possible complications of sleeve gastrectomy before referring them to obesity surgical clinics. In Saudi Arabia, prevalence of obesity is one of the highest in the world, with over 35% of the population being obese.[4,7] The prevalence of obesity in the country has increased in both genders by an average of 0.64% per year from 2012–2016.[4] Worldwide, the prevalence of obesity has shown a marked increase over the past 40 years.[1] Obesity should be managed in a stepwise approach. Initially, all obese patients should be counselled for lifestyle modification and behavioral therapies.[5] Pharmacological agents may also be used as second-line adjuncts to lifestyle modification. The third line of management is bariatric surgery, which is considered the most effective long-term treatment for individuals.
with severe obesity or moderate obesity complicated by comorbid conditions unresponsive to nonsurgical approaches. The highest percentage of bariatric procedures performed were registered in Arabian Gulf countries although Arabian Gulf countries has the lowest number of research publications about bariatric surgery in comparison to Western countries.

Although bariatric surgeries are the most common surgeries performed to manage obesity, there are specific guidelines that should be followed, which vary with the type of procedure performed. The surgical indications to perform sleeve gastrectomy in Saudi Arabia include adults with a body mass index (BMI) of 40 kg/m2 or greater, adults with a BMI of 35 kg/m2 or greater with severe comorbidities, and adults with a BMI of 30 kg/m2 or greater with poorly controlled type 2 diabetes and increased cardiovascular risk. Although studies have indicated that there are many complications of sleeve gastrectomy (SG), the prevalence of postoperative complications range between 4.4 and 12.8%. Postoperative complications described in the literature include anastomotic leaks, hemorrhage, strictures, abscesses, nutritional deficiencies, vein thromboses, surgical site infections, and other rare conditions. However, the only major complications among them are leaks and hemorrhage. An anastomotic leak is a serious complication which is difficult to manage and is most commonly diagnosed after discharge. Leakage can occur from any location in the staple line, and can cause fever, abscesses, sepsis, metabolic disturbance, and/or multiple organ failure. The incidence of leaks after sleeve gastrectomy ranges from 1.3 to 2.8%.

Bleeding is another major complication. However, it is uncommon, and the incidence can be reduced by using buttressing materials on the staple line. Bleeding has been reported in 1.8–5% of procedures. Strictures, which are less common, have an incidence rate of 0.591.4%. The objective of this study is to assess patients' awareness of indications and complications of sleeve gastrectomy in King Khalid University Hospital, Riyadh, Saudi Arabia.

### Methods

This is a cross-sectional study which included admitted patients and outpatients at King Khalid University Hospital (KKUH), a tertiary care center in Riyadh, Saudi Arabia. This study was conducted from December 2017 to May 2018. The study included all patients aged 18 years and older. Using the simple proportion equation, the calculated sample size consisted of 480 participants. The sample was collected using a simple random technique, by identifying participants from the patient list in the hospital wards and appointment schedules at outpatient clinics. Data collection was conducted through self-administered questionnaires, which were developed by reviewing the literature. The questionnaire's face and content validity have been checked and critiqued by a bariatric surgeon. The questionnaire was piloted on 48 subjects before it was used in this study. The questionnaire contains five sections: 1-participant consent form, 2- demographics which includes age, gender, and educational level, 3-questions assessing the knowledge of sleeve gastrectomy such as knowledge about BMI, BMI ranges, and sleeve gastrectomy, 4-questions assessing the knowledge of sleeve gastrectomy indications, and 5- questions assessing the knowledge of sleeve gastrectomy complications. PubMed was used to find and identify related articles. The ethical approval was obtained from the ethical committee of the university teaching hospital 26 November 2017. This study was conducted according to the principles of the Declaration of Helsinki (Ethical Principles for Medical Research Involving Human Subjects). Data were analyzed using SPSS (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp.).

For categorical variables, data were presented as percentages. For continuous variables, data were presented as mean and standard deviation. Chi-square test was performed to determine the significant differences between variables; the correlation between educational level and other variables was established using the Spearman correlation. A P value of <0.05 was considered statistically significant.

### Results

A total of 480 participants were selected based on the inclusion and exclusion criteria and were given the questionnaire. The mean age of the participants was 33.40 ± 10.75 with age ranging from 18 to 66 years. 142 (29.6%) of the participants fall under the age of 18–25, 153 (31.9%) participants fall under the age of 26–35, 116 (24.2%) participants fall under the age of 36–45, 49 (10.2%) participants fall under the age of 46–55, 19 (4%) participants fall under the age of 56–65, and 1 (0.2%) participant falls under the age of 66–70. Of the 480 participants, 247 (51.5%) were male and 233 (48.5%) were female. Of the 480 participants, 13 (2.7%) have completed elementary school, 26 (5.4%) intermediate school, 124 (25.8%) secondary school, 253 (52.7%) undergraduate, 47 (9.8%) postgraduate, and 17 (3.5%) PhD. All demographics are presented in Table 1.

Of the total, 463 (96.5%) participants have heard about sleeve gastrectomy while 326 (67.9%) have not heard about body mass index (BMI).

### Table 1: Demographic data of the participants

| Variable          | Frequency (n) | Percentages (%) |
|-------------------|---------------|-----------------|
| Age               |               |                 |
| 18-25             | 142           | 29.6%           |
| 26-35             | 153           | 31.9%           |
| 36-45             | 116           | 24.2%           |
| 46-55             | 49            | 10.2%           |
| 56-65             | 19            | 4.0%            |
| 66-75             | 1             | 0.2%            |
| Gender            |               |                 |
| Male              | 247           | 51.5%           |
| Female            | 233           | 48.5%           |
| Educational level |               |                 |
| Elementary school | 13            | 2.7%            |
| Intermediate school | 26          | 5.4%            |
| Secondary school  | 124           | 25.8%           |
| Bachelor's degree | 253           | 52.7%           |
| Master's degree   | 47            | 9.8%            |
| Doctor of Philosophy degree | 17 | 3.5% |
mass index (BMI). Of 480 participants, 326 (67.9%) did not know about obese BMI, 2 (0.4%) responded as less than 18.5, 24 (5%) responded as 18.5–24.9, 48 (10%) responded as 25–29.9 and 80 (16.7%) responded as >30. Although 283 (59%) of the participants have not heard about sleeve gastrectomy indications, 311 (64.8%) participants have heard about the complications of sleeve gastrectomy. All participant responses about the general knowledge of sleeve gastrectomy are presented in Table 2.

The responses of 480 participants to multiple response questions about the indications of sleeve gastrectomy are adult with BMI less than 18.5 in 63 (13.2%) of the participants, adult with BMI more than 40 kg/m² in 278 (58.0%) of the participants, adult with BMI of 18.5 in 28 (5.8%) of the participants, adult with BMI from 18.5-24.9 in 114 (23.8%) of the participants, adults with BMI >30 kg/m², poorly controlled type 2 diabetes, increased cardiovascular risk in 209 (43.6%) of the participants, adults with more than 35 kg/m² and severe comorbidities in 206 (43.0%) of the participants and for cosmetics in 192 (40.1%) of the participants. All participants’ responses about indications of sleeve gastrectomy are presented in Table 3.

The responses of 480 participants in multiple response question about the acute complications of sleeve gastrectomy are hemorrhage in 290 (60.4%) of the participants, other nutritional and mineral deficiencies in 232 (48.3%) of the participants, anemia in 207 (43.1%) of the participants, iron deficiency in 222 (46.3%) of the participants, abscess in 171 (35.6%) of the participants, leak of gastric content in 162 (33.8%) of the participants, weight regain in 68 (14.2%) of the participants, neuropathies in 98 (20.4%) of the participants, twist of stomach in 95 (19.8%) of the participants, and pulmonary embolism in 68 (14.2%) of the participants [Table 4]. On the other hand, the responses of 480 participants in multiple response question about chronic complication of sleeve gastrectomy are hemorrhage in 245 (51.0%) of the participants, other nutritional and mineral deficiencies in 185 (38.5%) of the participants, anemia in 185 (38.5%) of the participants, iron deficiency in 196 (40.8%) of the participants, abscess in 98 (20.4%) of the participants, leak of gastric content in 165 (34.4%) of the participants, weight regain in 115 (24.0%) of the participants, neuropathies in 122 (25.4%) of the participants, twist of stomach in 135 (28.1%) of the participants, and pulmonary embolism in 100 (20.8%) of the participants [Table 4]. All participant responses about acute and chronic complications of sleeve gastrectomy are presented in Table 4.

There was positive significance correlation between the educational level and both perception about BMI (r = 0.136, P = 0.003) and knowledge about obese BMI (r = 0.135, P = 0.003). There was no significant correlation between the educational level and perception of both sleeve gastrectomy procedure and sleeve gastrectomy complication. In addition, there was no significance correlation between the educational level and perception of sleeve gastrectomy indications [Table 5].

### Table 2: General knowledge of participants about sleeve gastrectomy

| Characteristics | Response | Frequency (n) | Percentages (%) |
|-----------------|----------|---------------|-----------------|
| Heard about Sleeve gastrectomy | Yes | 463 | 96.5% |
| | No | 17 | 3.5% |
| Heard about body mass index | Yes | 154 | 32.1% |
| | No | 326 | 67.9% |
| Knowledge of obese body mass index | I don’t know | 326 | 67.9% |
| | less than 18.5 | 2 | 0.4% |
| | 18.5-24.9 | 24 | 5.0% |
| | 25-29.9 | 48 | 10.0% |
| | >30 | 80 | 16.7% |
| Heard about sleeve gastrectomy indication | yes | 197 | 41.0% |
| | no | 283 | 59.0% |
| Heard about sleeve gastrectomy complications | yes | 311 | 64.8% |
| | no | 169 | 35.2% |

### Table 3: Participants responses about sleeve gastrectomy indications

| Characteristics | Frequency (n)* | Percentages (%) |
|-----------------|---------------|-----------------|
| Adult with BMI less 18.5 | 63 | 13.2% |
| Adult with BMI more than 40 kg/m² | 278 | 58.0% |
| Adult with BMI of 18.5 | 28 | 5.8% |
| Adult with BMI from 18.5-24.9 | 114 | 23.8% |
| Adults with BMI >30 kg/m², poorly controlled type 2 diabetes, increased cardiovascular risk. | 209 | 43.6% |
| Adults with more than 35 kg/m² and severe comorbidities | 206 | 43.0% |
| For cosmetics | 192 | 40.1% |

*responses exceed 480. †percentages exceed 100%. Patient can choose more than one item.

### Discussion

A proper awareness among public about the specific surgical managements such as sleeve gastrectomy is a fundamental step to ensure that the affected individuals will seek medical advice for weight reduction. Many factors such as educational level, patient–physician relationship, Internet, lifestyle modification after surgery, and individual experience may affect individuals’ decision. Searching about healthcare information by Internet is the commonest method. However, the average quality of websites that provide information about bariatric surgery was of ‘poor’ to ‘fair’ quality.

In this study, we aimed to assess the awareness of King Khalid University Hospital patients about the indications and complications of sleeve gastrectomy. The results showed obvious lack of knowledge, especially about BMI, obese BMI, and sleeve
There is a lack of knowledge in majority of the participants about sleeve gastrectomy complications. While some acknowledged hemorrhage, iron deficiency, and nutritional and mineral deficiencies as a complication, 46.3% of the study population considered cosmetic reasons as an indication of sleeve gastrectomy. However, 40.1% of the study population considered cosmetic reasons as an indication of sleeve gastrectomy. A study was conducted in Saudi Arabia to assess the public perception of bariatric surgery. The result showed that approximately 50% were unaware of the correct indications for bariatric surgery and that 41.2% were not willing to seek a bariatric surgeon’s help if diagnosed with morbid obesity.[28] Moreover, a study was conducted in Turkey to assess obesity and bariatric surgery awareness. The result showed that most of the participants (55.2%) have not heard about BMI but 84.9% have heard about bariatric surgery; yet, they did not know any details about its methods, risks, and techniques.[29]

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deficiencies are acute complications, others acknowledged them as chronic complications of sleeve gastrectomy. A study was conducted in Canada to assess the nutritional status among the patients 5 years after sleeve gastrectomy; the results showed that 37.8% of the patients have low ferritin level and 16.4% have low Vitamin B12 levels. Obese should be managed through a multidisciplinary team, including primary care providers, to achieve desirable weight loss. However, the role of primary care providers in managing obesity usually is underestimated. Moreover, the primary care providers are not only involved in losing weight but also in reducing comorbidity. Although there are potential barriers that lead patients with obesity to avoid routine medical care such as embarrassment and disrespectful attitude by the physician, we need to increase the awareness level of people about sleeve gastrectomy indications and complications by improving patient-physician relationship, improving the communication and coordination between bariatric surgeons, family physicians, health educators, and other healthcare providers, and to conduct further community-based researches to assess people awareness about bariatric surgeries.

Conclusion

Our study shows that there is a lack of awareness of sleeve gastrectomy indications and complications in the study population. We need to increase public awareness about sleeve gastrectomy indications and complication through proper community scientific health education.

Limitations

The study was only conducted in one center. Therefore, the results do not represent the Riyadh region nor the entire Saudi population.

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Conflicts of interest

There are no conflicts of interest.

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