

ORIGINAL ARTICLE



Bariatric Surgery between Health Need And Complications , Medina 2010-2017

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Abstract

Background: Obesity is established worldwide health problem. One of the methods to manage it is bariatric surgery. Our study aim is to determine the complications of bariatric surgery at Medina, KFH from surgical overview and compare the results with other studies.

Objectives: To identify the most common health needs indicating bariatric surgery and the health impact of these procedures on them. And to determine the types of intra and postoperative complications can occur due to bariatric surgery.

Methodology: This is an analytical retrospective study of the patients who underwent bariatric surgery in KFH, Medina, K.S.A, from 2010-2017. Data was gained from the hospital medical records between 8th – 16th April 2018. It had been typed into an excel 2010 program, and statistical analysis done by statistical package for the social sciences (SPSS v.21) for windows.

Results: 154 patients underwent bariatric surgery in KFH, 78.6% of them are female and 21.4% are male. The mean BMI is 49.69 ± 9.386 . 29.9% of them are previously diagnosed with chronic illnesses HTN 38.7%, DM 30.1%, IHD 2.2%, and others 29.0%. Regarding the type of operation gastric sleeve done approximately 96.1%, adjustable gastric banding approximately 3.3%, Roux en Y gastric bypass approximately 0.7%. With 0.0% intraoperative complication and 3.8% postoperative complications.

Conclusion: In KFH Medina, bariatric surgery had a good effect on gynecological conditions. No mortalities or intraoperative complications. We recommend more studies to study the effect of bariatric surgery on DM and HTN in Medina in a longer period.

Keywords: Bariatric, surgery, obesity, weight loss, gastric, sleeve, bypass

1 | INTRODUCTION

Obesity is a medical term defined as excessive accumulation and storage of body fat that may present a risk on health (1). Generally, people considered obese when the body mass index (BMI), calculated as a person's weight divided by the square of the person's height, is over 30 kg/m², and as overweight within a range of 25–30 kg/m². Morbid or severe obesity defined as a BMI ≥ 40 or ≥ 35 kg/m². Some East Asian countries use lower values (2), values classification in the following table.

Weight categories	BMI (kg/m ²)
Underweight	<18.5
Healthy weight	18.5 – 24.9
Overweight	25 – 29.9
Obese	30 – 34.9
Severely obese	35 – 39.9
Morbidly obese	>40

The epidemic globally estimated as about more than 1 billion adults overweight - at least 300 million of them clinically obese and it has a main role in the global burden of chronic disease and disability (3). WHO data in Saudi Arabia about the prevalence of obesity is striking; a total percentage of 72.5% of Saudis are either overweight or obese (4).

The high prevalence of obesity could be associated with various illnesses and health-related abnormalities like type 2 diabetes, hyperlipidemia, hypertension, obstructive sleep apnea, osteoarthritis and depression, etc (5, 6).

Dietary and lifestyle changes showed no significance in long-term weight loss for morbid obese persons (7). Thus, bariatric surgery is the best procedure for the treatment of morbid obesity and its comorbidities (8, 9).

Bariatric surgery is one of the methods to lose weight which is a surgical alteration of the stomach or intestine or both (10). These procedures work by restricting the amount of food, the stomach can accommodate and accordingly cause malnutrition and malabsorption. There are many types of bariatric procedures performed using minimally invasive techniques such as sleeve gastrectomy, adjustable gastric band, gastric bypass, and biliopancreatic diversion with duodenal switch (11).

In the last two decades, bariatric procedures have gained popularity and extended due to the laparoscopic development and the metabolic activity of the surgical treatment (12). The American Society for Metabolic and Bariatric Surgery ASMBS estimated the number of bariatric surgery in 2015 as 196,000 (13). In Saudi Arabia; it has estimated that 15,000 bariatric surgeries are performed annually (14).

The bariatric operations are comparatively safe, especially given the large size of the patients as well as the frequency and seriousness of the comorbidities. Previous studies showed that bariatric surgery not only leads to massive and sustained weight loss but also improves or cures obesity-related comorbidities (15).

Despite the huge benefits of bariatric surgery, it has complications as any other surgical intervention. The complications divided into two groups: short-term and long-term (16).

The short-term complications depend on the age, type of procedure, patient risk, and condition, mirror those after other abdominal operations, i.e. infection, hemorrhage, anastomotic leaks, obstruction, arrhythmias, and pulmonary emboli. It's occurring in 5–10% of the patients (16).

Long-term complications may be striking to those unfamiliar with bariatric surgery: anastomotic stenosis, internal hernias, neuropathies due to nutritional

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deficiencies, and emotional disorders (16).

Previous studies in KSA focused on exploring complications of bariatric surgery. However, there is still limited information related to the bariatric procedures (17).

Study aim:

Our study aim is to determine the complications of bariatric surgery at Medina, KFH from surgical overview and compare the results with other studies.

2 | METHODOLOGY:

This study was approved by the Research Ethics Committee of Taibah

University and King Fahad Hospital in Medina, K.S.A.

It is an analytical retrospective study, using hospital database about the patients who underwent bariatric surgery at King Fahad Hospital in Medina, K.S.A, from 2010 to 2017.

The period of data collection is between 8th – 16th April 2018 and our sample size is 154 files after reviewing 224 files and applying our exclusion criteria.

All obese patients who underwent bariatric procedures from both genders between the ages of 20 and 60 years. The exclusion criteria were all patients who are older than 60 years old or younger than 20 and the patients with missed files data, mismatched diagnosis. The information collected and transmitted to a data record protocol, created by the authors, with the following variables: age, gender, preoperative BMI, patient's comorbidities, complications which have been classified into intraoperative and post-operative complications. The data had been typed into an Excel 2010 program, and statistical analysis done by a statistical package for the social sciences (SPSS v.21) for windows. The Chi-squared test used to find the difference between the patients who had postoperative complications and those who didn't have postoperative complications, with a confidence level of 95% ($p < 0.05$).

3 | RESULTS:

This section includes the statistical analysis and results which was

obtained to study health need that indicates bariatric surgery and its complications.

The study tool:

The questionnaire was the study tool, it was prepared by the researchers with the help of specialists and experts in this field, and the questionnaire includes a part of questions on socio-demographic data as age, gender, BMI and smoking.

While the second section consisted of many questions to study the complications of bariatric surgery occurred.

Statistical methods:

The statistical analysis program (SPSS v.21) has been used in the study in data entry and analysis, with the use of necessary statistical methods to achieve the objectives of the study.

Results:

Table 1 shows that the mean age of participants' is 34.13 with a standard deviation 9.715, the mean weight is 131.15 with a standard deviation 24.063, and the mean height is 160.65 with a standard deviation 11.278 .

For blood pressure, we note that the mean of systolic pressure of participants' is 130.6 with a standard deviation 17.725, and the mean of diastolic pressure of participants' is 74.21 with a standard deviation 12.571. The mean BMI of participants' is 49.69 with a standard deviation of 9.386.

Their distribution according to gender, 78.6% of them were female, while 21.4% of them were male.

Their distribution according to smoking, 6.5% of them smokers, 21.4% are non-smokers and 1.3% are Ex-smoker.

Table 2 shows the participants' distribution according to "Associated comorbidity", where we note that 70.1% of them are not diagnosed with chronic diseases, while 29.9% are previously diagnosed.

For those who had associated comorbidity, 30.1% diagnosed with diabetes mellitus DM, 38.7% diag-

TABLE 1:

Table 1: the mean, standard deviation of age, weight, height, blood pressure, and body mass index.			
Age		34.13 ± 9.715	
Weight (kg)		131.15 ± 24.063	
Height (cm)		160.65 ± 11.278	
Systolic Pressure	Mean ± SD	130.60 ± 17.725	
Diastolic Pressure		74.21 ± 12.571	
Body mass index		49.69 ± 9.386	
		Frequency (n= 154)	Percentage %
Gender	Female	121	78.6
	Male	33	21.4
Smoking	Smoker	10	6.5
	Not smoker	33	21.4
	Ex-smoker	2	1.3
	Not recorded	109	70.8

nosed with hypertension HTN, 2.2% diagnosed with Ischemic heart disease IHD, while 29% diagnosed with other diseases .

Table 3 shows the participants' distribution according to their types of operations, where we note that 96% of the procedures is "gastric sleeve", 3.3% of them is "Laparoscopic Adjustable Gastric Band (Lab Band)" and 0.7% of them is "Gastric Bypass" (open, laparoscopic and the fobi pouch operation).

Table 4 shows the participants' distribution according to complications occurred during operation, noting that 100% of them hadn't complications during the operation.

Table 5 shows the participants' distribution according to complications occurred after the operation, noting that 96.2% (148 patients) hadn't complications after the operation, while 3.8% (6 patients) had complications occurred after the operation.

Table 6 shows the Chi square test of the differences in the participants' distribution according to complications after the operation with P value (0.000).

Regarding the results of Table 5, the most important complications after the operation:

1. Gastric bleeding. Treated conservatively and went well (1 patient)
2. Wound infection (abdominal pain and fever). Treated by systemic antibiotic and analgesia (1

patient)

3. Leakage from staples. Treated by gastric stent (1 patient)
4. Pulmonary embolism. Referred to internal medicine (1 patient)
5. Pain at wound site treated conservatively and went well (1 patient)
6. Portal vein thrombosis. Referred to internal medicine (1 patient)

4 | DISCUSSION:

Bariatric surgery is one of the methods used for weight loss. It is not for anybody need to lose some weight. This procedure has its own indication. In our study, the mean age of participants is 34.13 with 9.715 standard deviations. Mayo Clinic, Batsis J and Dolkart K (18, 19) studies conclude that there's no specific age limit for gastric bypass surgery and this result agrees with our result done in King Fahad Hospital.

The mean BMI of participants' is 49.69 with a standard deviation of 9.386 so, all participants are under indication of bariatric surgery as body-mass index (BMI) >40 kg/m² or with BMI >35 kg/m² and

TABLE 2:

Table 2: the participants' distribution according to "Associated comorbidity".			
	Frequency	Percent	
No	108	70.1	
Yes	46	29.9	If yes/ choose one of the following
			DM
			30.1
			HTN
			38.7
			IHD
			2.2
			Other
			29.0
Total	154	100.0	100.0

TABLE 3:

Table 3: the participants' distribution according to the type of operation.		
	Frequency	Percent
Laparoscopic Adjustable Gastric Band (Lab Band)	5	3.3
Gastric Bypass (open, laparoscopic and the fobi pouch operation)	1	0.7
Gastric Sleeve	148	96.0
Total	154	100.0

TABLE 4:

Table 4: the participants' distribution according to complications occurred during operation.		
	Frequency	Percent
No	154	100.0
Yes	0	0.0
Total	154	100.0

TABLE 5:

Table 5: the participants' distribution according to complications occurred after operation.		
	Frequency	Percent
No	148	96.2
Yes	6	3.8
Total	154	100.0

TABLE 6:

Table 6: the differences in the participants' distribution according to complications after the operation.				
	Frequency	Percent	Chi-Square	P-value
No	148	96.2	130.935	.000
Yes	6	3.8		
Total	154	100.0		

one or more significant comorbid conditions (20). National Institutes of Health mentioned other possible indications for patients with BMI's between 35 and 40 include obesity-induced physical problems interfering with lifestyle e.g., a joint disease treatable but for the obesity, or body size problems disturbing or severely interfering with ambulation, family function, and employment (21).

Our study shows 78.6% of those who included are women it is going with WHO studies it states that in all WHO regions women were more likely to be obese than men (3). 6.5% of participants are known to be smokers, 1.3% are ex-smokers while 70.8% are not recorded. It is not fair to comment on the relationship; we have not enough data. Shadrach D et al, Beliefs that smoking protects against obesity may be over-simplistic; especially among younger and heavier smokers (22) while Gruber Jet all investigate the issue between smoking and obesity and find no evidence that reduced smoking leads to weight gain (23).

There is an association between cardiovascular disease and obesity, particularly the biological mechanisms linking hypertension and obesity (24, 25).

Comorbidities:

Morbid obesity (BMI > 35kg/m²) is associated with a lot of health risks.

One of our research questions is "what are the comorbidities associated with obesity and what is the most common one and are they affected by bariatric surgery?". To answer the first half of the question, our results revealed that 29.9% of the patients of King Fahad hospital who underwent bariatric surgery are diagnosed previously with HTN, DM either one or both and ischemic heart diseases. Hy-

pertension has the upper hand 38.7% compared to diabetes mellitus 30.1% and ischemic heart disease 2.2%.

Improvement of obesity-related comorbidities is the second outcome of bariatric surgery (26). Regarding hypertension, follow up of HTN is a complex measurement, it needs frequent monitoring and long term follow up to judge the improvement of the disease. Remission and relapsing of HTN after bariatric surgery appears to be related to the aging process, using of drugs and weight discrepancies either by decrease or increase in time (27).

We should clarify that recognition of improved patients' health done by optimization of metabolic state criteria in box 1. The achievable goal of bariatric surgery regarding diabetes is not cured but remission of diabetes state (28). A study went to compare between bariatric surgery plus medical therapy and intensive medical therapy alone in treating diabetes mellitus and the results revealed that bariatric surgery significantly achieved better glycemic control than medical therapy alone (29). Our results find one patient who achieved good glycemic control after bariatric surgery without using antidiabetic.

Obesity is a risk factor for ischemic heart diseases, bariatric surgery was associated with reduced number of cardiovascular deaths and lower incidence of cardiovascular events in obese adults (30), but we do not have statistical results in our study due to the lack of information regarding this part.

There are many medical conditions that are proved to have a link with obesity such as PCO (polycystic ovary) and infertility (31). A study found that bariatric surgery has a good impact on the diagnostic features of many gynecological cases (32). We

recorded 6 cases of different gynecological diseases, one of them improved after bariatric surgery, the others stopped their follow up and no results detected from them.

In general, many studies went to study the effect of bariatric surgery on obesity-associated comorbidities, a meta-analysis done to follow up this effect in 5 years long follow up revealed that the reduction of blood pressure reached the plateau in 20 months after surgery and longer time with diabetes mellitus and hyperlipidemia. Moreover, they found that the type of procedure has a role in the reduction of these diseases (33).

Types of procedures:

The most common types of bariatric procedures are Roux en Y gastric bypass (RYGB), Adjustable gastric banding (AGB) and Gastric sleeve (GS) Figure 1.

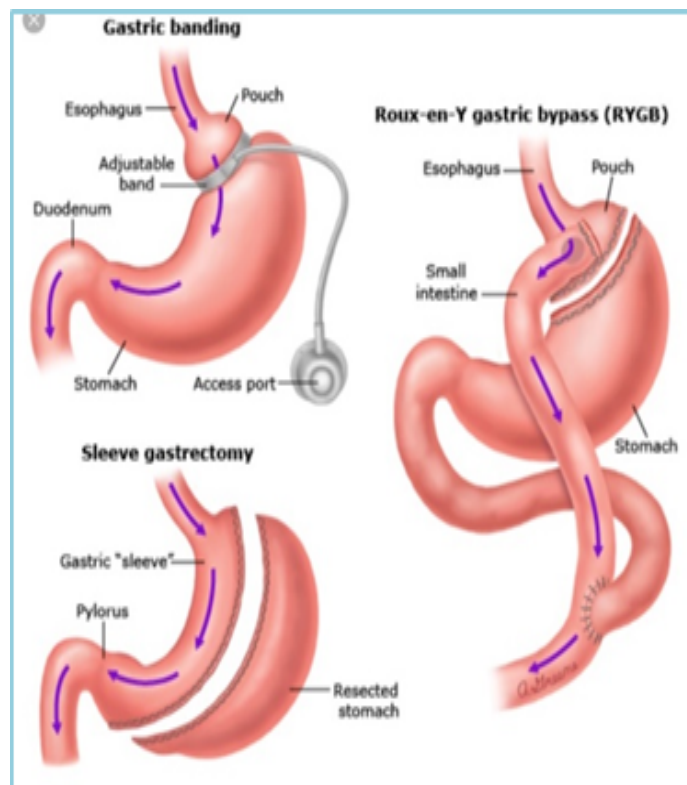


FIGURE 1:

Optimizing the metabolic state maybe defined as;

- HBA1c <42mmol (6%)
- No hypoglycemia
- Total cholesterol < 4mmol/L; LDL cholesterol <2mmol/L
- Triglycerides ,2.2mmol/L
- Blood pressure < 135/85 mmHg
- >15% weight loss
- With reduced medication from the pre-operated state or without other medications (where medications are continued, reduced doses from pre-surgery with minimal side effects would be expected)

In our study, we found that at King Fahd Hospital, The gastric sleeve was used in a high proportion compared to Roux en Y gastric bypass and adjustable gastric banding. The choice of bariatric procedure was based on our intuition and the patient's preference. Also, the individualized goals of therapy and the presence of associated nutritional risks. We can base our judgment on European Association for Endoscopic Surgery(EAES) and Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) guidelines but there is no definite indication for any type of surgery, especially in the area of rapidly appearing new procedures such as mini-gastric bypass, the endoscopic bypass systems (34, 35) . Sleeve gastrectomy and gastric banding are the two most frequently performed bariatric procedures in Europe. While the Roux en Y gastric bypass is the most commonly used in the United States. They are well-developed and standardized procedures. The main differences are the reversibility, the need for adjustments, the type of complications and the magnitude of their outcomes.

The main advantage of AGB surgery is that it is reversible, and the band can be removed at any time. It can also be adjusted by injecting more fluid into the port to tighten it, thus providing more restriction if needed.

The SG procedure provides good restriction, and by eliminating the greater curvature and therefore most

ghrelin-producing cells, it has an influence on the hunger-satiety axis, though that is irreversible.

In the Roux-en-Y gastric bypass, the surgeon creates a small pouch at the top of the stomach. This is greater overall weight loss due to the tighter dietary restrictions, less caloric absorption, and faster initial weight loss. Many papers have compared surgical outcomes between different bariatric procedures; however, the conclusions were not categorical and sometimes conflicted. In a cohort study that compared RYGB with AGB in matched patients and followed them for 3 years showed superior weight loss and comorbidity reduction in the RYGB group (36). In a multicenter study that compared RYGB with SG, RYGB was associated with greater morbidity; however, weight loss was comparable at 6, 12 and 18 months, and remission of type 2 diabetes was more frequent (37). Given the increasing popularity of SG over AGB as a restrictive procedure (38).

In a systematic review of randomized controlled trials, the authors concluded that AGB was not the most effective bariatric procedure to reduce weight, compared with the other procedures; nevertheless, it was associated with fewer early complications, as well as a shorter operative time and shorter length of hospital stay. In a meta-analysis, perioperative complication rates and mortality were higher in the RYGB group compared to the AGB group. At the same time, there was better weight loss at 6 months and 12 months and significantly better comorbidity resolution in the RYGB group (39).

In general, we can say that our results are consistent with the results of other studies, that sleeve gastrectomy is more beneficial than adjustable gastric banding and Roux en Y gastric bypass.

Intraoperative complications:

In our study sample, the incidence of intraoperative complications was 0.00%. Most of the studies in bariatric surgery complications were focusing on postoperative complications and only a few studies focused on the intraoperative complications. In a very small number of available studies in the subject, the most common reported intraoperative complications were bleeds and leaks. We found three studies reported bleeding with the incidence of 3.93 % and another four studies reported leakage with incidence

of 4.07% (40). The rate of complications varies according to many factors such as patient factors, surgeon experience, and devices malfunction. Surgeries which performed by experienced surgeons were associated with low rates of complications (41).

In addition, it is related to the type of surgical approach. For example, the laparoscopic approach was associated with fewer complications than open approach (42).

Postoperative complications:

Bariatric operations are being performed at a rapidly increasing rate and the outcomes are dramatically improved in the past decade (43) complications and mortality have decreased to the extent that the risk-benefit ratio clearly favors a broader application in the medically complicated obese population (44)

In our study, the estimated complications rate was 3.8% that is constant with the previous study which showed 3.8% of patients underwent bariatric surgery had some complications. These numbers corroborate those obtained by the American College of Surgeons, in a publication containing an analysis of a period of 30 days regarding patients submitted to video-laparoscopic gastric bypass with complication rate higher than 3.3% (45)

On the other hand, in randomized controlled trials, the overall complications rate was 21% that may differ from the other studies (46). This was based on the following variables; type of surgery, extremes of BMI 35 to <45 and >60 kg/m² and the associated comorbidities (47).

Our data showed that there is no mortality rate associated with any type of bariatric surgeries. Chang et al. found 3% mortality rate after gastric bypass procedures of 0.38% similarly, death rate found was 0.6% (48).

The main postoperative complications we noted are gastric bleeding, leakage, wound infection, pulmonary embolism, portal vein thrombosis and wound site pain, with an equal rate for each of them estimated by 0.63%.

Leakage:

An anastomotic leak is a serious life-threatening problem and can be difficult to diagnose due to the patient's size. The incidence of leaks following

RYGB is 1–5.6% (49). Analgesia, antibiotics, aggressive fluid resuscitation and urgent transfer back to the bariatric unit is usually optimum management. In a stable patient who is suitable for transfer, it is sometimes possible to stent leaks endoscopically with good results. If symptoms are severe and the patient is deteriorating clinically, a laparoscopic washout and drain placement may be a temporizing measure until definitive bariatric team management occurs (50) (51)

In our study, leakage occurred in one patient 0.63% treated conservatively by a gastric stent.

Pulmonary embolism:

A Postoperative pulmonary embolism is the major cause of death in this group. The incidence of pulmonary embolism is 1–2% in this population, with up to 50% of these being fatal at least 1 co-morbidity known to increase the risk of postoperative venous thromboembolism. 4 comorbidities were common to patients: venous stasis disease, BMI \geq 60, truncal obesity, and obesity hypoventilation syndrome/sleep apnea syndrome (52, 53)

Pulmonary embolism in our study happened in one patient 0.63% treated by internal medicine department and this result is less than other studies.

Wound problems:

Patients who suffer a wound infection are at high risk of developing an incisional hernia, and early, aggressive treatment with antibiotic therapy can help prevent fascial dehiscence (incidence of 1%). They also may present with wound cellulitis and sepsis (54, 55). Pain at wound site after surgery is a frequent complaint and often simply the result of dietary issues (44)

We have one patient with postoperative wound pain 0.63% treated conservatively by medical treatment and this agrees with results of other studies.

Gastric bleeding:

Immediate postoperative bleeding is usually from staple lines or from poor hemostasis at the time of surgery (56). Despite the increased risk of bleeding from staple lines or suture holes. Ren et al. reported a clinically significant hemorrhage from anastomoses

in 10% of postoperative patients receiving formal anticoagulation (57).

We have one patient 0.63% complaining postoperatively from gastric bleeding treated conservatively and this result is less than other studies mostly due to surgeon experience.

There are many other complications associated with bariatric surgery. A common late postoperative complication noted to occur with rapid weight loss from bariatric surgery is gallstone formation (44). The incidence of developing gallstones after bariatric surgery up to 30% (55).

Nutritional deficiencies are less common after SG compared with operations that cause more drastic diet alterations or involve intestinal bypass; despite the lack of a malabsorptive component, deficiencies in iron (43%), vitamin D (39%), folic acid (15%), vitamin B1 (11%), and vitamin B12 (9%) have been observed after Vertical SG. Interestingly, some patients were noted to have an excess of vitamin A and vitamin B6 (58). These types of complications are not recorded in our study.

5 | CONCLUSION:

Bariatric surgery is a method to lose weight; it becomes popular due to the increasing rate of obesity and its comorbidities. These procedures are indicated in morbid obese patients BMI $>$ 40kg/m² or $>$ 35kg/m² with significant comorbidity. HTN is the most common comorbidity associated with the obesity in the patients who underwent bariatric surgery in KFH, but the effect of the operation needs to be studied more in a longer time, in addition, we found that bariatric surgery has a good effect on other conditions associated with obesity such as gynecological diseases.

Fortunately; no mortalities or intraoperative complications reported during our research period. Some postoperative complications reported at 3.8% such as gastric bleeding, infection, leakage from staples, pulmonary embolism, pain at the wound site, portal vein thrombosis.

Recommendation: Given the accumulating evidence that bariatric surgery is efficacious in produc-

ing significant and durable weight loss with minimal surgical risks and complications but clearly, there is a need to do more studies about the effect of bariatric surgery on DM and HTN in Medina.

Limitations: One of the limitations is that the study is single centered, so the results could not be generalized which affect the external validity of the study. The other one is some patients aren't following up for their comorbidities at KFH so we couldn't access their data and that affected one of our study objectives.

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