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Identification Of Bariatric Surgery Complications

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Abstract

Background:

Obesity is a growing global health issue, often leading to serious comorbidities such as diabetes, hypertension, and sleep apnea. Bariatric surgery has become an increasingly popular treatment for morbid obesity, showing significant short-term benefits. However, complications and long-term outcomes require further investigation. Aim : This study aims to assess the frequency and common complications associated with bariatric surgery among individuals in Salah al-din governorate, Iraq, focusing on surgical outcomes and patient experiences post-surgery. Methods: A cross-sectional study was conducted among 70 individuals who underwent bariatric surgery in salah al-din governorate . The data was collected through self-administered questionnaires. The questionnaire covered demographic information, type of surgery, history of chronic diseases, post-surgical complications, and overall post-surgery experiences. Data was analyzed using SPSS version 25, with descriptive statistics and chi-square tests used to examine associations between variables. Results: Of the 70 participants, 54.3% were female, mean age of 28.7 years (±10.5 years). The most common type of surgery was the gastric sleeve (65.7%). The majority (75.7%) had no pre-existing chronic conditions, while 12.9% had diabetes mellitus and 10.0% had hypertension. Common complications included vitamin and mineral deficiencies (70.0%), nausea or vomiting (61.4%), and pain or difficulty swallowing (51.4%). Post-surgery, 71.4% of participants reported feeling good, while 18.6% required further medical interventions. Conclusion: Bariatric surgery, particularly the gastric sleeve, is an effective intervention for significant weight loss and improvement in obesity-related conditions. However, the high frequency of post-surgical complications, particularly nutritional deficiencies, highlights the need for long-term follow-up and patient education.

Keywords:

Bariatric surgery, obesity, gastric sleeve, complications, Salah al-din governorate, nutritional deficiencies.

INTRODUCTION

An imbalance in dietary habits and excessive nutrient intake can lead to conditions such as obesity. Beyond aesthetic concerns, obesity is characterized by an accumulation of adipose tissue that poses health risks. Specifically, when body weight exceeds 20% of the ideal weight based on age, gender, and height, it is considered a significant health concern[1].Bariatric surgery, a collection of surgical techniques aimed at treating morbid obesity, has seen growing acceptance and is widely regarded as both safe and effective. Some recent studies indicate its short-term efficacy, although long-term complications are either infrequently reported or remain largely unrecognized[1]. This surgical intervention typically results in substantial weight reduction and improvement or resolution of many obesity-related comorbidities, including diabetes, hypertension, sleep apnea, bronchial asthma, arthritis, dyslipidemia, gastroesophageal reflux disease, fatty liver disease, urinary stress incontinence, and pseudotumor cerebri. Furthermore, in cases of severe obesity, bariatric surgery has been shown to reduce overall mortality, giving rise to the increasingly common term "metabolic surgery"[2].The incidence of obesity continues to rise worldwide due to various contributing factors. According to the World Health Organization, obesity has tripled in many European countries since 1980, with half of the population in several nations now classified as overweight or obese. Global projections suggest that by 2030, approximately 60% of the population, or 3.3 billion people, could be affected by excess weight, with 2.2 billion individuals classified as overweight and 1.1 billion as obese[3].

Bariatric surgery is typically recommended for individuals who have been unsuccessful in losing weight through diet and exercise and have a body mass index (BMI) of 35 or higher with accompanying conditions such as metabolic syndrome, diabetes, or hypertension, or for those with a BMI exceeding 40, regardless of associated conditions. The primary objective of bariatric surgery is to reduce food intake and absorption[3].Bariatric surgery were first outlined in 1991. However, the consensus panel later deemed procedures like Roux-en-Y gastric bypass (RYGB) and vertical banded gastroplasty (VGB) as both safe and effective for patients with a BMI $\geq$ 40 kg/m2 or a BMI $\geq$ 35 kg/m2 with associated medical complications of obesity[4]. This decision established bariatric surgery as a legitimate and standardized surgical discipline, and since then, substantial clinical evidence has supported its effectiveness.The health positive effects of bariatric surgery include improvements in hyperglycemia, normalization of blood glucose levels, reductions in blood pressure and cholesterol, and alleviation of conditions such as obstructive sleep apnea and diabetes-related complications. Surgical techniques vary but often involve bypassing the duodenum, which results in reduced levels of the hormone ghrelin and increased levels of GLP-1 and PYY, leading to improved insulin sensitivity and other favorable metabolic outcomes. Meta-analyses tracking patients for up to five years have shown control of blood glucose in type 2 diabetes following this surgery[5-8].When COVID-19 pandemic occur, elective surgeries, including bariatric procedures, were largely delayed due to public health measures[9]. Nonetheless, researches had confirmed that bariatric surgery results in greater weight loss and better management of type 2 diabetes compared to non-surgical treatments, with these benefits extending beyond five years post-surgery. However, continued research is necessary to evaluate long-term complications, survival outcomes, and the impact on mental health and healthcare costs[10].Despite its benefits, bariatric surgery carries inherent risks, including the possibility of life-threatening long-term nutritional deficiencies. Patients often experience conditions such as anemia and deficiencies in calcium and vitamins, necessitating lifelong supplementation. Other potential complications include micronutrient and macronutrient deficiencies, stenosis, ulceration at the anastomosis site, reflux esophagitis, cholelithiasis, steatohepatitis, and altered pharmacokinetics and pharmacodynamics[11-13].Other risks, are recurrent kidney stones type calcium oxalate and osteoporosis, particularly following RYGB, which bypasses the duodenum where calcium absorption occurs. Increased oxalate excretion, a complication of RYGB, is difficult to manage, and calcium malabsorption results in low urinary calcium levels. Notably, RYGB-related osteoporosis does not appear to be linked to weight changes or vitamin D metabolism[14].

STUDY AIM

The aim of this study is to identify the frequency and common complication of bariatric surgery in Salah al-din governorate .

Objectives :

1- To identify the frequency of bariatric surgery types .
2- To determine the most common age group that undergoing bariatric surgery.
3- To identify the common complications of bariatric surgery .
4- To describe the relation between bariatric surgery complications and gender.

METHODOLOGY

2.1 Type of Study

This study is a cross-sectional study to assess the demographic characteristics, types of surgery, chronic disease history, complications, and post-surgery experiences of individuals who underwent bariatric surgery. Data collection was conducted using Self-administered questionnaire by direct interview in Salah al-din governorate, Iraq.

This study conducted during the period: From August 14th to September 2nd, 2024

2.2 Study Population

The study included a sample of 70 participants who had undergone bariatric surgery in Salah al-din governorate.

- **Inclusion criteria**:
  - Adults (18 years and older) who had undergone any type of obesity surgery (e.g., gastric sleeve, gastric bypass).
  - Willingness to participate in the study and provide informed consent.
- **Exclusion criteria**:
  - Incomplete or unclear information's .
  - Individuals with pre-existing cognitive impairment that could interfere with accurate questionnaire completion.

2.3 Data Collection

Data were collected through a self-administered questionnaire by direct interview in Salah al-din governorate. The questionnaire was designed to gather detailed information regarding the demographic characteristics, type of obesity surgery, chronic diseases, complications post-surgery, and overall post-surgical experience.

The questions are done by using Arabic language because they were presented to different ages and levels (They was close type questions)

The questionnaire included the following sections:

1. **Demographic Characteristics**: Gender, age, and pre-surgery weight.
2. **Type of Surgery**: Information regarding the type of obesity surgery the participant underwent (e.g., gastric sleeve, gastric bypass, or other).
3. **Chronic Diseases**: Presence or absence of chronic diseases such as diabetes mellitus, hypertension, or sleep apnea prior to surgery.
4. **Post-Surgery Complications**: Questions regarding the occurrence of complications after surgery, such as nausea, vomiting, pain or difficulty swallowing, gastroesophageal reflux, vitamin or mineral deficiencies, gallstones, and bowel obstruction.
5. **Post-Surgery Experience and Pain Assessment**: Questions on participants' overall condition after surgery, how they felt regarding pain at the incision site, and whether they needed further medical interventions.

2.4 Statistical Analysis

The data collected were entered and analyzed using SPSS version 25. Descriptive statistics were used to summarize the data, including frequencies, percentages, means, and standard deviations for continuous variables such as age and weight.

Key statistical analyses included:

- **Descriptive Statistics**:
  - Gender and age distribution were presented as frequencies and percentages.
  - The pre-surgery and post-surgery weight of participants was reported as mean ± standard deviation.
- **Chi-Square Test**: To examine associations between categorical variables, such as gender and post-surgery complications.
- **Significance Level**: A p-value of less than 0.05 was considered statistically significant in all analyses.

RESULTS

3.1 Demographic Characteristics

Table 1 presents the demographic distribution of the study participants. Of the 70 individuals who underwent obesity surgery, 54.3% were female (n = 38) and 45.7% were male (n = 32). The mean age of the participants was 28.7 years (±10.5 years). The mean weight before surgery was 106.6 kg (±20.8 kg), while the mean weight after surgery decreased to 72.0 kg (±17.8 kg).

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Table 1: Demographic Distribution

Gender	Frequency	Percent
Female	38	54.3%
Male	32	45.7%
Total	**70**	**100.0%**
Age Mean ± Sd (Years)	**28.7 ±10.5**	
Weight before surgery Mean ± Sd (Kg)	**106.6 ± 20.8**	
Weight after surgery Mean ± Sd (Kg)	**72.0 ± 17.8**	

3.2 Type of Obesity Surgery

Figure 1 shows the distribution of the types of obesity surgery performed among the participants. The most common surgery was the Gastric Sleeve, reported by 65.7% of participants (n = 46). A smaller percentage of participants (5.7%, n = 4) underwent Gastric Bypass, while 17.1% (n = 12) had other types of obesity surgery. Notably, 11.4% of participants (n = 8) were uncertain about the type of surgery they had undergone.

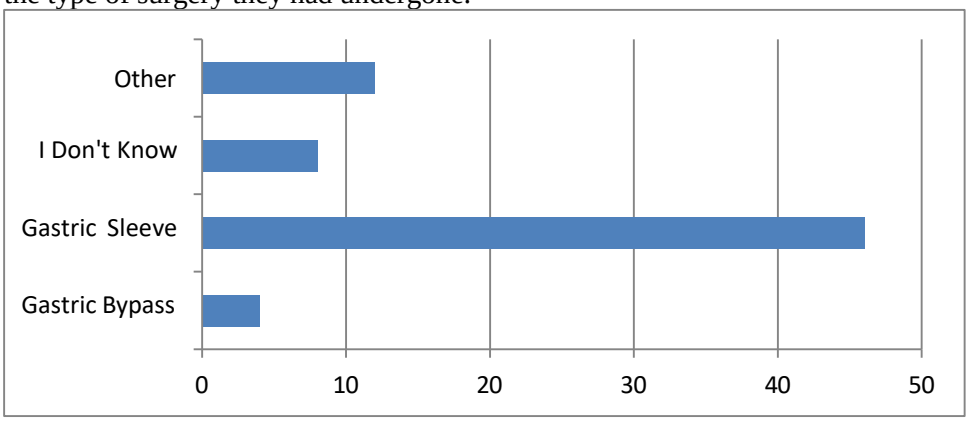

Figure 1: Type of Obesity Surgery

3.3 Chronic Disease Diagnosis

Figure 2 also provides the distribution of chronic diseases among the participants. The majority (75.7%, n = 53) reported having no chronic disease, while 12.9% (n = 9) were diagnosed with diabetes mellitus (DM), and 10.0% (n = 7) had hypertension (HTN). A small proportion (1.4%, n = 1) reported being diagnosed with sleep apnea.

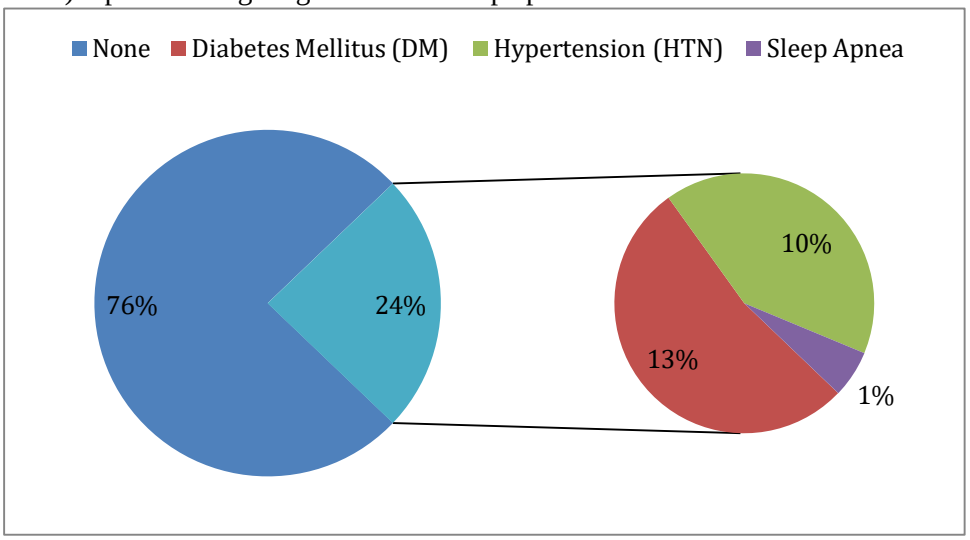

Figure 2: Past Medical History Distribution

3.4 Complications Experienced Post-Surgery

Table 2 summarizes the complications experienced by participants following their obesity surgery. The most frequently reported complication was nausea or vomiting, affecting 61.4% (n = 43) of participants. Pain or difficulty swallowing food was reported by 51.4% (n = 36), and symptoms

of gastroesophageal reflux were experienced by 42.9% (n = 30). Notably, 70.0% (n = 49) of participants were diagnosed with vitamin and mineral deficiencies post-surgery. Less common complications included weight gain post-surgery (32.9%, n = 23), surgical wound infections (31.4%, n = 22), and gallstones (28.6%, n = 20). A smaller proportion of participants experienced complications such as bowel obstruction (14.3%, n = 10) and post-surgery hernia (15.7%, n = 11).

Table 2: Complications Experienced Post-Surgery

Complication	Yes (Frequency, %)	No (Frequency, %)
Infection at surgical site (redness, pus, fever)	22 (31.4%)	48 (68.6%)
Nausea or vomiting	43 (61.4%)	27 (38.6%)
Pain or difficulty swallowing food	36 (51.4%)	34 (48.6%)
Surgical interventions during the operation	8 (11.4%)	62 (88.6%)
Blood transfusion or other surgeries post-operation	10 (14.3%)	60 (85.7%)
Diagnosed with vitamin and mineral deficiency	49 (70.0%)	21 (30.0%)
Gastroesophageal reflux symptoms	30 (42.9%)	40 (57.1%)
Diagnosed with gallstones	20 (28.6%)	50 (71.4%)
Bowel obstruction	10 (14.3%)	60 (85.7%)
Post-surgery hernia	11 (15.7%)	59 (84.3%)
Weight gain post-surgery	23 (32.9%)	47 (67.1%)
Mood swings, depression, or other psychological issues	46 (65.7%)	24 (34.3%)

3.5 Post-Surgery Experience and Pain Assessment

As shown in Table 3, when asked about their overall condition after controlling for complications, 71.4% of participants (n = 50) reported feeling good, 22.9% (n = 16) felt neutral, and 5.7% (n = 4) felt bad. Regarding pain at the surgical incision site, 45.7% of participants (n = 32) rated it as moderate , while 44.3% (n = 31) rated it as mild , and 10.0% (n = 7) described the pain as severe.

Table 3: Post-Surgery Experience and Pain Assessment

Question	Frequency	Percent
How do you feel after controlling the complications?		
Good	50	71.4%
Bad	4	5.7%
Neutral (No feeling)	16	22.9%
Did you need any surgeries or medical interventions post-operation?		
No	57	81.4%
Yes	13	18.6%
How do you rate the pain of the surgical incision?		
Mild pain	31	44.3%
Severe pain	7	10.0%
Moderate pain	32	45.7%

3.6 Association between Gender and Complications

Table 4 outlines the association between gender and post-surgery complications. There was no statistically significant difference between males and females regarding most complications, including surgical wound infections ($p = 0.521$), nausea or vomiting ($p = 0.847$), surgical interventions during the operation ($p = 0.307$), and vitamin/mineral deficiencies ($p = 0.232$). However, a significant difference was found in the incidence of pain or difficulty swallowing food post-surgery, with males being more likely to experience this complication compared to females

(65.6% vs. 39.5%, p = 0.045). Other complications, such as symptoms of gastroesophageal reflux (p = 0.883), gallstones (p = 0.348), and bowel obstruction (p = 0.774), showed no significant gender differences.

Table 4: Association between Gender and Complications

Complication	Female	Male	p-value
Surgical wound infection symptoms (redness, pus, fever)	13 (34.2%)	9 (28.1%)	**0.521**
Nausea or vomiting	23 (60.5%)	20 (62.5%)	**0.847**
Pain or difficulty swallowing	15 (39.5%)	21 (65.6%)	**0.045**
Surgical interventions during operation	3 (7.9%)	5 (15.6%)	**0.307**
Needed blood transfusion or additional surgery post-operation	5 (13.2%)	5 (15.6%)	**0.774**
Diagnosed with vitamin/mineral deficiency (iron, B12, calcium)	29 (76.3%)	20 (62.5%)	**0.232**
Symptoms of gastroesophageal reflux	16 (42.1%)	14 (43.8%)	**0.883**
Diagnosed with gallstones	9 (23.7%)	11 (34.4%)	**0.348**
Bowel obstruction	5 (13.2%)	5 (15.6%)	**0.774**

DISCUSSION

The mean age of the study participants was 28.7 years, with females constituting 54.3% of the sample. This gender distribution is consistent with previous studies on obesity surgery, where a majority of patients undergoing such procedures are women. For example, a study conducted by **Wilson et al. (2023)** reported that the majority of patients undergoing bariatric surgery were female (77.6%), which aligns closely with our findings [15].

The majority of participants in our study underwent gastric sleeve surgery (65.7%), which is consistent with the increasing popularity of this procedure globally. According to **Howard et al. (2021),** gastric sleeve surgeries have become the most common bariatric procedure due to their lower complication rates compared to other types, such as gastric bypass [16]. In our study, only 5.7% of participants had gastric bypass surgery, which is showing a decline in its popularity due to higher associated risks and the emergence of less invasive alternatives like the gastric sleeve.

The most common post-surgery complication was nausea or vomiting, experienced by 61.4% of participants. This result aligns with **Pandolfino et al. (2004)** who found that gastrointestinal symptoms such as nausea are prevalent in the months following bariatric surgery [17].

The current study found that 70.0% of participants reported vitamin and mineral deficiencies post-surgery, highlighting significant nutritional challenges following bariatric procedures. In comparison, the Tehran Obesity Treatment Study (TOTS) identified specific deficiencies: 30% in vitamin B12, 19% in ferritin, and 16.2% in vitamin D, with over 80% of patients showing inadequate protein intake [18]. Both studies emphasize the critical need for continuous dietary monitoring and individualized supplementation to address nutrient inadequacies and optimize health outcomes in bariatric surgery patients.

In our study, no significant gender differences were found in most post-surgical complications such as wound infections, nausea, or vitamin deficiencies, though males were more likely to report pain or difficulty swallowing (p = 0.045). In contrast, the MBSAQIP® database analysis identified male gender as an independent risk factor for major complications and mortality following bariatric surgery, including laparoscopic sleeve gastrectomy and Roux-en-Y gastric bypass. Males had significantly higher rates of major complications (1.72% vs. 1.05%) and 30-day mortality (0.18% vs. 0.07%), highlighting a higher overall risk profile for males post-surgery [19].

CONCLUSIONS

1. **Demographic Insights**: The study highlighted a higher prevalence of obesity surgery among females (54.3%) compared to males (45.7%), with a significant mean weight

reduction post-surgery (from 106.6 kg to 72.0 kg). This indicates a substantial impact of surgical interventions on weight management in this population.

2. **Post-Surgical Complications**: The findings indicated that a majority of participants experienced nausea or vomiting (61.4%) and vitamin/mineral deficiencies (70.0%) after surgery, suggesting that while obesity surgery can lead to weight loss, it is also associated with considerable post-operative complications that require careful management.
3. **Gender Differences in Complications**: The analysis revealed a significant difference in the incidence of pain or difficulty swallowing food between genders, with males experiencing these complications at a higher rate (65.6% vs. 39.5% in females). This finding emphasizes the need for gender-specific approaches in post-operative care and monitoring.

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