Impact of Bariatric Surgery on Patients' Satisfaction and Quality of Life: A Narrative Review

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ABSTRACT

Context: Obesity is a significant health issue that has been considered an epidemic in the world during the last 20 years and has persistently increased over time. The World Health Organization recently reported that the worldwide prevalence of overweight among adults was more than 1.9 billion, and approximately 650 million adults were obese. Bariatric surgery remains the most successful and effective long-term option for treating morbid obesity and obesity-related co-morbidities due to the significant outcomes in long-term weight loss, resolution of obesity-related co-morbidities, reduction of cardiovascular complications, and the causes of obesity-related mortality.

Aim: This review sought to provide a comprehensive and critical summary of existing literature on the impact of bariatric surgery on patients' satisfaction and quality of life.

Methods: A systematic search was undertaken between 2018 and 2022 with specific inclusion criteria. Search terms were determined to select the best relevant studies using a wide search in different databases, including PubMed, Medline, EBSCO, EBMR, and ERIC. The review used the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines to identify the literature used in this review. The review identified fifty studies that met the eligibility criteria and were involved in this review.

Results: The result indicates that quality of life was improved in most of the studies after the different types of bariatric surgeries. Also, the satisfaction level was high in most of the retrieved studies. Besides, all co-morbidities associated with obesity were reduced significantly.

***Conclusion*:** The findings demonstrate that each surgical procedure has negative and positive outcomes. The finding also recognized the impact of bariatric surgery in improving the patients' satisfaction, enhancing their quality of life, and remission of obesity-related co-morbidity diseases. Bariatric surgery is strongly suggested in the treatment of morbidly obese patients.

Keywords: Quality of life, patient satisfaction, bariatric surgery

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1. Introduction

Obesity is associated with an increased risk of chronic and non-communicable diseases such as (type 2 diabetes, cardiovascular disease, certain cancers, musculoskeletal diseases), and decreased quality of life *(World Health Organization (WHO), 2021).* According to the WHO, more than 650 million (13%) of adults over the age of 18 are obese worldwide (BMI ≥ 30) *(WHO, 2021).*

Obesity causes several problems in physical and mental health and therefore, directly and significantly affects satisfaction and quality of life. Patients with higher degrees of obesity reported worse quality of life and were dissatisfied with their body image than those with lower degrees.

Treatment options for morbid obesity vary widely. Weight-loss medications are limited and have shown minimal success in treating obesity. Lifestyle planning is common, but successful long-term weight loss is uncertain, especially in people with morbid obesity *(Jakobsen et al., 2018).*

On the other hand, bariatric surgery is considered the most effective treatment for severe or morbid obesity (body mass index—BMI >40 kg/m^2 and BMI>35 kg/m^2, respectively) in terms of sustained weight loss for long-term remission of diabetes mellitus, and prevention of obesity-related diseases *(Jakobsen et al., 2018).*

Studies documented that the quality of life and satisfaction of patients undergoing bariatric surgery has improved significantly, with the greatest effect occurring in the first two years after the operation *(Hegland et al., 2020).*

2. Significance of the study

Obesity is considered a major public health issue, and many challenges are being faced to control its prevalence and incidence. In this context, according to the latest survey findings in Saudi Arabia, around 30% of adults were obese (BMI ≥35 Kg/m^2). At the same time, the vast majority of the

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included population was overweight. Saudi Arabia is now the twelfth most obese country in the world, with 35.4% of its population having a body mass index greater than 30 kg/m^2 *(Althumiri et al., 2021; Dillinger, 2021).*

Bariatric surgery is considered the most successful treatment for severe or morbid obesity due to the huge positive outcomes such as long-term weight loss, remission of co-morbidity diseases, improved quality-of-life level (QoL) and satisfaction *(Jakobsen et al., 2018).* So, this review is important to focus on qualitative analysis and interpretation of information from various sources. This narrative review is particularly valuable for providing context, insights, and a broad overview of the impact of bariatric surgery on the patient's quality of life and satisfaction. It can set the stage for further research, clarify complex phenomena, and offer a foundation for understanding the state of knowledge in this arena.

Also, it will help to understand and utilize the impact of these surgeries to enhance patients' ability to make informed health-related decisions and manage their condition, thus positively affecting co-morbidity diseases and improving health outcomes.

3. Aim of the study

This review sought to provide a comprehensive and critical summary of existing literature on the impact of bariatric surgery on patients' satisfaction and quality of life.

3.1. Research Questions

The PICOT format formulated the clinical question. The acronym stands for (P) patient or population, (I) intervention or interest area, (C) comparison intervention or current practice, (O) outcome(s) desired, (T) time to achieve outcome (optional). The PICOT question that was formed in answering the clinical issue is "Inpatient post-bariatric surgery (P), how does the bariatric surgery (I) influence their quality of life and satisfaction level (O)?"

- **P** (Population): The population of interest was all adult patients (male and female and ≥18 years) who had undergone any type of bariatric surgery.
- **I** (Interventions): The intervention was the bariatric surgery.
- **C** (Comparison): Not applicable
- **O** (The outcome measures): The outcome measures were the level of satisfaction and quality of life.

4. Methodology

4.1 Search Strategy

The electronic searches were performed using the following electronic databases: PubMed, Medical Literature Online (Medline), EBSCO (Elton Bryson Stephens Company), Evidence-Based Medicine Reviews (EBMR), and Education Resources Information Center (ERIC) were chosen as they provided access to virtually all English-language nursing and allied health journals.

The search terms were drawn from the research question and the conceptual framework. The keywords were used in various combinations to search and to narrow down the results, which include: (Sleeve Gastrectomy OR bariatric surgery OR Gastric bypass OR Gastric banding OR Gastric balloon OR weight loss surgery OR gastric sleeve surgery) AND (quality of life OR health-related quality of life OR QoL) AND (satisfaction OR treatment satisfaction OR overall treatment satisfaction).

The years searched were specified to identify the most up-to-date literature depending on the inclusion and exclusion criteria. The titles, abstracts, and texts were reviewed to assess the article's fit with the stated inclusion criteria.

4.2. Inclusion and Exclusion Criteria

Inclusion criteria

- All peer-reviewed articles are available in English.
- Articles published between 2018 and 2022.
- Articles focused on assessing the quality of life and satisfaction level after any type of bariatric surgery.
- Studies with adult obese patients aged at least 18 years.
- Full-text paper.

Exclusion criteria

All non-English written articles, conducted on children, beyond the scope of the time limit, including the intervention with weight loss medication, and only abstracts, commentaries and editorials were excluded.

4.3. Study selection process

The review used the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines to identify the literature used in this review. The guidelines helped to ensure appropriateness regarding the content in the reviewed research.

In the initial search, 3180 articles were identified from different databases (Pub Med, Medline, EBSCO, EBMR, and ERIC), and 1789 were removed for duplication. Then, titles/abstracts of 1391 articles were screened by the investigator. After that, 844 records were excluded because they were irrelevant to the research objective. Five hundred forty-seven full-text articles were screened, and 382 studies were removed because they were unrelated to the research study.

Following this, 165 full-text articles were assessed for eligibility. In the preliminary review, 115 articles were excluded for the following reasons: Studying the adolescent as their population (n=83) and the articles not in the English language (n=32). Finally, the remaining 50 full-text articles were retrieved and included in this review. Figure 1 outlines the PRISMA Flow Diagram summarizing the steps followed in screening and selecting the studies for the review.

5. Finding / Result

Fifty articles were included in this review to assess the patient's satisfaction and quality of life following post-bariatric surgery. The result indicates that quality of life improved in most articles after the different types of bariatric surgeries. Also, the satisfaction level was high in most of the retrieved articles. Besides, all co-morbidities associated with obesity were reduced significantly.

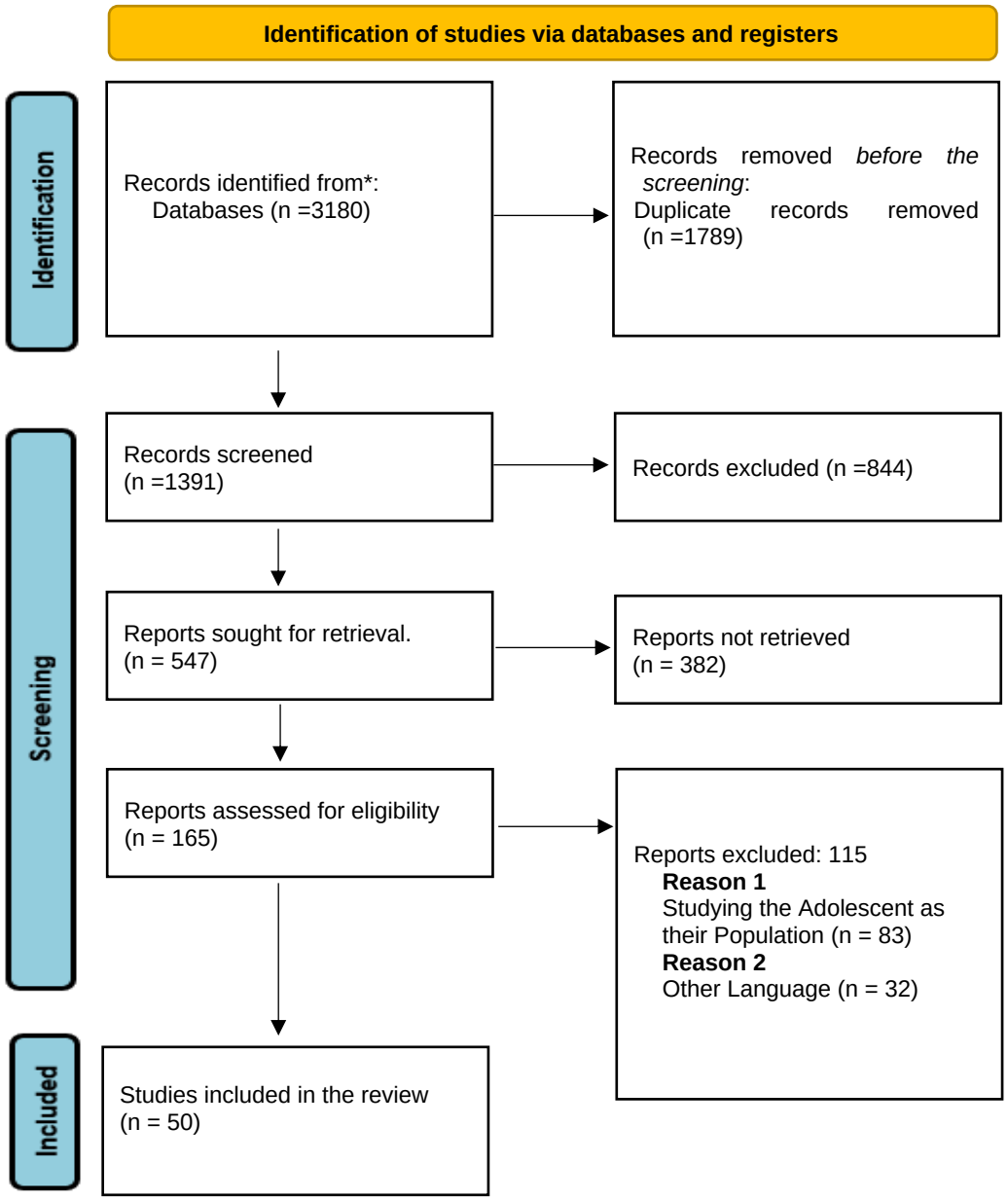

Figure (1): PRISMA Flow Diagram Preferred Reporting Items for Systematic Reviews and Meta-Analyses: the PRISMA statement guidelines *(Page et al., 2021).*

These articles were conducted in various countries, six in Kingdom of Saudi Arabia *(Babqi et al., 2021; Dalboh et al., 2021; Althumiri et al., 2021; Alamri et al., 2020; Alsisi et al., 2020; Alharbi et al., 2018; Aldawqi et al., 2018; Al-Ghamdi et al., 2018),* four in Norway *(Lundin Kvalem et al., 2022; Nielsen et al., 2022; Hegland et al., 2020; Jakobsen et al., 2018),* three in Brazil *(Kikuchi et al., 2022; Fernandes et al., 2021; Castanha et al., 2018),* three in United State of America *(Martens et al., 2021; Van Wieren et al., 2019; Kilpatric et al., 2019),* two in each of the following countries India *(Baige et al., 2019; Moly 2019),* France *(Le Foll et al., 2020; Faucher et al., 2019),* Lebanon *(El Haddad et al., 2019; Alkassis et al., 2019),* Netherland *(Poelemeijer et al., 2020; Monpellier et al., 2019),* and one in each of the following countries Germany and Poland *(Paczkowska et al., 2022),* Sweden *(Hult et al., 2019),* Turkey *(Akkayaoğlu & Çelik, 2020),* Iraq *(Ahmed & Ezzat, 2019),* Italy *(Galli et al., 2018),* Germany *(Moulla et al., 2018),* Sweden *(Tolvanen et al., 2022),* England *(Coulman et al., 2020),* Malaysia *(Loo et al., 2019)* while the remaining articles weren't mentioned the countries clearly.

The studies deployed different methods and designs to collect insights into patients' satisfaction and quality of life following post-bariatric surgery. The review includes thirty-four quantitative studies. Among the quantitative research, we found six retrospective studies *(Dalboh et al., 2021; Alsisi et al. 2020; El Haddad et al., 2019; Baige et al., 2019; Loo et al., 2019; Moulla et al., 2018),* three longitudinal cohort studies *(Le Foll et al., 2020; Ahmed & Ezzat, 2019; Jakobsen et al., 2018),* two follow-up studies *(Kilpatric et al.,2019; Galli et al., 2018),* ten prospective cohort studies *(Lundin Kvalem et al., 2022; Paczkowska et al., 2022; Akkayaoğlu & Çelik, 2020; Poelemeijer et al., 2020; Hegland et al., 2020; Monpellier et al., 2019; Faucher et al., 2019; Alkassis et al., 2019; Johari et al., 2019; Hult et al., 2019),* two observational study *(Nielsen et al., 2022; Fernandes et al., 2021),* one state wide study *Van Wieren et al., 2019),* and ten cross-sectional studies *(Babqi et al., 2021; Althumiri et al., 2021; Martens et al., 2021; Alamri et al., 2020; Alsisi et al., 2020; Moly 2019; Alharbi et al., 2018; Aldawqi et al., 2018; Al-Ghamdi et al., 2018; Castanha et al., 2018),* while the remaining studies were not mentioned.

The age of the participants included in most of the articles ≥18 years and up to 65 years. At the same time, the BMI ≥35 kg/m^2 and the follow-up times for measuring the satisfaction and quality of life level during the post-operative period varied from 4 months and up to 10 years *(Lundin Kvalem et al., 2022; Nielsen et al., 2022; Kikuchi et al., 2022; Babqi et al., 2021; Dalboh et al., 2021; Martens et al., 2021; Fernandes et al., 2021; Akkayaoğlu & Çelik, 2020; Alamri et al., 2020; Poelemeijer et al., 2020; Le Foll et al., 2020; Alkassis et al., 2019; Hult et al., 2019; Ahmed & Ezzat, 2019; Hegland et al., 2020; Monpellier et al., 2019; El Haddad et al., 2019; Moly, 2019; Van Wieren et al., 2019; Kilpatric et al., 2019 Galli et al., 2018; Alharbi et al., 2018; Castanha et al., 2018)* respectively.

Different instruments were used to assess the quality of life and satisfaction level. Ten articles assessed the quality of life by using the Short Form-36 (SF-36) questionnaire for Health Survey *(Kikuchi et al., 2022; Nielsen et al., 2022; Babqi et al., 2021; Akkayaoğlu & Çelik, 2020; Poelemeijer et al., 2020; Hegland et al., 2020; Hult et al., 2019; Johari et al., 2019; Galli et al., 2018; Alharbi et al., 2018).* This questionnaire assesses eight health concepts and is divided into physical and mental components *(Ware & Sherbourne, 1992).* Three articles were used in the Moorehead-Ardelt Quality of Life Questionnaire II (M-A QoLQII) *(Le Foll et al., 2020; Alkassis et al., 2019; Castanha et al., 2018).* This questionnaire was incorporated into the bariatric analysis and reporting outcomes (BAROS) *(Oria & Moorehead, 1998).* One article was used the gastro-esophageal reflux disease-Health-Related Quality of Life (GERD-HRQL) *(Dalboh et al., 2021).* The remaining articles used a self-develop questionnaire to assess the quality-of-life outcome *(Ahmed & Ezzat, 2019).*

On the other hand, satisfaction level was assessed by using a self-develop questionnaire *(Lundin Kvalem et al., 2022; Martnes et al., 2021; Alamri et al., 2020; El Haddad et al., 2019; Hult et al., 2019; Monpellier et al., 2019; Kilpatric et al., 2019; Van Wieren et al., 2019; Galli et al., 2018),* overall treatment satisfaction *(Hegland et al., 2020),* Stunkard Image Rating Scale (*Fernandes et al., 2021)* and the satisfaction level was assessed before surgery by using Body Area Satisfaction Scale *(Lundin Kvalem et al., 2022).*

6. Literature review

6.1. Obesity overview

Obesity is a worldwide common health issue that persistently increases over time. In 2025, predicted that 18% and 21% of males and females, respectively, will fall into the obese category, while 6% of males and 9% of females will be classified as severely obese *(Gagnon & Schafer, 2018).* In this context, Saudi Arabia is now the twelfth most obese country in the world, with 35.4% of the Saudi population having a body mass index greater than 30 kg/m^2 *(Althumiri et al., 2021).* In Saudi Arabia, it was found a frequency of 28% of males and 44% of females were obese, while 66% of men and 71% of women were overweight *(Al-Ghamdi et al., 2018).*

Obesity is an excess fat accumulation in different body regions, measured as BMI ≥30 kg/m^2. BMI is the measurement used to classify patients' obesity through a calculation of the patient's height and weight *(WHO, 2021).* Furthermore, based on BMI level, patients' weights can be categorized into four groups: Underweight (less than 18.5 kg/m^2), normal weight (18.5 – 24.9 kg/m^2), overweight (25 – 29.9 kg/m^2), and obesity (greater than or equal to 30 kg/m^2) *(Centers for Disease Control and Prevention [CDC], 2021).* Moreover, Obesity is subdivided into three categories according to the patient's BMI: Class I or moderately obese (BMI: 30 – 34.9 kg/m^2), Class II or severe obese (BMI: 35 – 39.9 kg/m^2), and Class III or very severe obese (BMI ≥40 kg/m^2) *(CDC, 2021).*

Obesity has numerous clinical implications, underlying metabolic disorders, and disease processes, which include cardiovascular pathologies, type 2 diabetes mellitus and its microvascular and macrovascular complications, hypertension, metabolic syndrome, obstructive sleep apnoea, non-alcoholic liver disease, structural cerebral alterations, cognitive deficits, neurodegenerative conditions, and malignancy *(Sinclair et al., 2021).* Thus, the financial cost of obesity is huge, constituting health-related costs on the health care organizations, and it can cause socio-economic and cultural burdens to the patient *(Sinclair et al., 2021).*

Numerous therapeutic strategies have been suggested for individuals suffering from morbid obesity. However, these pharmacological agents and lifestyle changes often fail to lead to lasting weight reduction in this population cohort *(Sinclair et al., 2021).* Conversely, the data from surgical interventions have indicated that they facilitate long-term weight reduction, diminish associated co-morbidities, and reduce the causes of obesity-related mortality and cardiovascular complications *(Sinclair et al., 2021).*

6.2. Bariatric surgery overview

Bariatric procedures for managing obesity were first introduced in the early 1950s and are now widely estimated because of the merely effective, long-term obesity treatment. Worldwide, about 580,000 people undergo bariatric surgery yearly *(Althumiri et al., 2021).* In the United States, in 2019,

more than 256,000 people experienced bariatric surgery *(American Society for Metabolic and Bariatric Surgery [ASMBS], 2022).* In Saudi Arabia alone, it is estimated that over 20,000 bariatric surgeries are completed annually *(Althumiri et al., 2021).*

Despite the high incidence of bariatric surgery globally and locally, some eligibility criteria exist for this type of surgery. The 1991 National Institutes of Health (NIH) and ASMBS guidelines approved some eligibility criteria for bariatric surgery, such as patients aged between 18-64 years; patients must have a body mass index (BMI) of more than 40 kg/m^2 or patients who have BMI between 35 and 40 kg/m^2 with at least one or more obesity-related co-morbidity such as cardiovascular risk or hypertension or diabetes mellitus and patients who unable to achieve a healthy weight loss sustained for a period of time with prior weight-loss effort *(Chung et al., 2018; Arterburn et al., 2020).*

Moreover, there are some contraindications for bariatric surgery, such as massive cardiopathy, end-stage lung disease, unstable coronary artery disorders, liver cirrhosis with portal hypertension, uncontrolled drug or alcohol addiction dependency, terminal cancer, Crohn's disease, rigorously decreased intellectual capacity *(Arterburn et al., 2020).*

6.3. Common types and procedures of bariatric surgery

Bariatric operations can be categorized, according to the mechanism of enhancing weight reduction, into either restrictive or malabsorptive, or a combination of the two. The former reduces gastric dimensions, thus modifying dietary intake; examples are adjustable gastric banding (AGB) and sleeve gastrectomy (SG). The Roux-en-Y gastric bypass (RYGB), biliopancreatic diversion with duodenal switch (BPD-DS), one-anastomosis gastric bypass (OAGB), or mini-gastric bypass (MGB) fall into the combined category. Such interventions restrict dietary nutrient absorption not only by limiting the size of the stomach but also by bypassing section of the small bowel.

Either open or laparoscopic surgical techniques can perform these procedures. The choice of intervention is guided by a clinical appraisal of each patient's requirements *(Gagnon & Schafer, 2018).* The main bariatric surgery types include Sleeve Gastrectomy, Gastroplasty, Bilio Pancreatic Diversion (BPD), Adjustable Gastric Banding, Vertical Banded Gastroplasty (VBG), Jejunoileal Bypass (JIB), Gastric bypass or Roux-en-Y Gastric Bypass *(Arterburn et al., 2020).*

Many studies documented the growing popularity of bariatric surgery in numerous settings. *Chung et al. (2019)* found widespread use of bariatric surgical procedures in this context. They found 256,830 patients who underwent various bariatric procedures: Laparoscopic Sleeve Gastrectomy (LSG), Laparoscopic Gastric Bypass (LGB), and Laparoscopic Adjustable Gastric Band (LAGB). LSG was the most popular procedure in the USA, followed by LGB and LAGB in 2015.

Current literature further shows that the most common bariatric surgery types that are performed worldwide are 38.2%, 46%, 7.6%, and 5% of Laparoscopic Roux-en-Y Gastric Bypass, Laparoscopic Sleeve Gastrectomy, Anastomosis Gastric Bypass, and Laparoscopic Adjustable Gastric Banding, respectively, performed since 2014. *(Welbourn et al., 2019).* However, Saudi Arabia had the highest rate of sleeve gastrectomy operations performance in the last two years *(Welbourn et al., 2019).*

6.3.1. Sleeve gastrectomy (SG)

The most frequently performed bariatric operation is SG, a restrictive procedure. The initial laparoscopic SG was carried out in 1999. It is a permanent and non-modifiable intervention during which the lateral area of the stomach is removed following longitudinal resection from the fundus to the antrum; the remaining stomach has a narrow and tubular conformation and comprises approximately 20% of the original volume *(Gagnchon & Schafer, 2018; Wang et al., 2019).*

Sleeve gastrectomy has many advantages, as it is technically safe, simple, and rapid surgery time. The risk of complications is low. Five-year follow-up data have indicated successful weight reduction, absence of internal herniation, and consequent intestinal obstruction; there was a low risk of nutrient or drug malabsorption and absence implantation of foreign material *(Loo et al., 2019).*

Early complications following SG include staple-line bleeding or stenosis, leakage, dehydration, deep venous thrombosis (DVT), and pulmonary embolism. While strictures, weight regain, malnutrition, gastro-esophageal reflux diseases (GERD), erosive esophagitis, and Barrett's esophagus are potential late complications *(Chung et al., 2018; Loo et al., 2019).* The incidence of post-operative complications following SG ranges between zero and six percent *(Chung et al., 2018).* A gastric leak may occur in approximately 1% of cases *(Loo et al., 2019).*

6.3.2. Roux-en-Y gastric bypass (RYGB)

The second most frequently conducted bariatric procedure is RYGB. A combination technique involving restrictive and malabsorptive methods was first performed in 1966 by two surgeons, Mason and Ito, and is considered a reference standard procedure *(Seeras et al., 2023).* Initially, RYGB was carried out as an open surgical technique. At the same time, a laparoscopic version was designed in 1994 by Wittgrove and Clark to circumvent the large incidence of post-surgical complications observed following the open approach *(Seeras et al., 2023).*

During the RYGB operation, a small gastric pouch is constructed with a volume of approximately 30 ml. There is then a transection of the small bowel approximately 30 to 50 cm distal to the Treitz ligament; the alimentary portion is joined via an anastomosis to the gastric pouch. A channel of approximately 400 cm in length to facilitate food and nutrient absorption is then generated by linking the biliopancreatic limb at a distance of 75-150 cm distal to the gastric pouch *(Gagnon & Schafer, 2018).*

The most perceived benefits of the RYBG include the diminished loop tension, which avoids the reflux of bile into the upper gastric pouch. Besides, the ongoing efficacy of

weight reduction, the favourable safety profile, and the resolution or reduction of obesity-associated co-morbidities. RYBG is still a benchmark operation within the bariatric field *(Moulla et al., 2018).*

Possible adverse events following RYBG may encompass an anastomotic leak, infection, hemorrhage, deep venous thrombosis (DVT), marginal ulcers, internal hernia, dumping syndrome, malnutrition, development of a gastro-gastric fistula, intestinal obstruction and gallstones *(Seeras et al., 2023).*

6.3.3. Adjustable gastric band/Gastric band (AGB)

Gastric banding, or adjustable gastric banding, was initially implemented in 1992. It became a more common choice of procedure during 2008-2010 owing to its excellent safety profile, effectiveness, and the fact that it can be modified or reversed. AGB is an intervention that only has a restrictive effect; an adjustable silicone band is sited inferior to the gastro-oesophageal junction, which reduces the gastric pouch to a volume of 15-20 ml *(Wang et al., 2019).*

Laparoscopic Adjustable Gastric Band (LAGB) is a safe procedure, and medium-term effectiveness has been demonstrated. The benefits encompass the lack of a gastric incision, no stapling, shorter hospitalization period, fewer hospital readmissions, and a modest incidence of complications. Furthermore, the patient's food intake limitation can be controlled by the quantity of liquid injected into the gastric band *(Gundogdu & Moran, 2021).*

The commonly observed disadvantages to this procedure include the decreased speed of weight reduction compared to alternative bariatric operations; additionally, band modification is necessary to achieve the best outcome. Complications of this procedure include gastrointestinal perforation, hepatosplenic damage, pouch dilatation, gastric prolapse, herniation, band erosion, leakage, a rise in weight gain, and absence of weight loss *(Gundogdu & Moran, 2021).*

6.3.4. One anastomosis (OAGB) / mini gastric bypass (MGB)

Additional combination procedures are one anastomosis gastric bypass or mini gastric bypass, developed in 1997 by Rutledge. A loop anastomosis is generated between the long and vertical lesser curvature-based gastric pouch and jejunum, approximately 150-200 cm distal to the ligament of Treitz *(Solouki et al., 2018).*

The OAGB or MGB benefits include simplicity, accessibility, and safe procedure. Additionally, the surgery is rapid with rapid resolution or remission of obesity-related co-morbidities and significant weight reduction. There is an option for modification or the procedure to be reversed *(Solouki et al., 2018).* While the complication rates were low, which included leakage, bile reflex, risk of malignancy, hemorrhage, internal hernia, diarrhea, insufficient weight loss, and malabsorption, they were minimal *(Solouki et al., 2018).*

6.4. Bariatric surgeries outcome

The main bariatric surgeries generate short and long-term outcomes, so *Coulman et al. (2020)* conducted a qualitative study of adults in two hospitals in the South of England to assess the varied patient experiences with RYGB, SG, and AGB after four months to 9 years. The semi-structured interviews revealed that adaptations to life after bariatric surgeries varied because some patients experience normality, ambivalence, isolation, and abandonment. Others registered continued social and psychological difficulties post-surgeries.

On the other hand, *Alsisi et al. (2020)* established a retrospective study on bariatric surgery regarding health needs and complications in Medina, Saudi Arabia, to evaluate RYGB and AGB surgeries from 2010-2017. The result revealed that no mortalities or intraoperative compilations were reported during the study. On the other hand, 3.8% of patients reported post-operative complications like infection, gastric bleeding, leakage from staples, embolism, pain at the wound site, and portal thrombosis. Also, the study noted that bariatric surgery had a good impact on weight loss, co-morbidity conditions, and other diseases associated with obesity, like gynecological diseases.

The findings of *Faucher et al. (2019)* aligned with the findings of *Jakobsen et al. (2018)* on obesity-related co-morbidities after bariatric surgeries. They found that RYGB, SG, and gastric bypass reduced diabetic conditions besides overcoming BMI and fat mass and enhanced the management of obesity-related co-morbidities, including T2DM, dyslipidemia, obstructive apnea, GERD, and hypertension. Moreover, *Castanha et al. (2018)* found that co-morbidities with the highest resolution rate were sleep apnea (90.2%), diabetes mellitus (80.7%), and hypertension (70.8%). They also found that the most common problems were hair loss (79.6%), nutritional deficit (37.9%) and anemia (35%).

The most important challenge to the successful outcome of bariatric surgery is to preserve weight loss in the long term and diminish weight regains (WR). A multi-center retrospective study of 9617 patients was conducted by *Baige et al. (2019).* The study aimed to compare weight gain in the medium and future after different bariatric surgeries (SG, RYGB, and OAGB) in the Indian population. The study suggests that OAGB had the lowest percentage of WR by 3% compared to SG and RYGB over five years and also the highest rate of total weight loss (TWL) over 3-5 years by 33.33% and 32.62% respectively ($p < 0.001$) while SG was one amongst the surgeries that had the best proportion of WR by 35.1% and the lowest rate of total weight loss by 28.71% and 24.05% over 3 to five years respectively ($p < 0.001$).

As well, *Tolvanen et al. (2022),* in their qualitative study of patients' experiences of weight regain after bariatric surgery, found different expectations and experiences with bariatric procedures, particularly when seeking to handle the weight gain. The interviews were conducted on 16 adults aged between 20 to 64 years at a Swedish obesity clinic in 2018-2019. The thematic analysis found that participants who underwent a gastric bypass regained weight by 36%. The participants struggled with loneliness, difficulty eating in social places, increased appetite, family problems, and psychological instability. The distraction from weight management reversed the advantages of gastric bypass. The analysis presented behavioral, social support, and self-care

changes because they are the ultimate tools for reducing weight after bariatric surgery.

Furthermore, studies analyzed the possible or associated factors contributing to weight gain after bariatric surgery. In this context, *Athanasiadis et al. (2021)* identified anatomical, temporal, psychiatric, dietary, and genetic issues after a scientific review of 32 studies on procedures like Roux-en-Y gastric bypass and sleeve gastrectomy. The specific factors leading to weight gain were portion size, gastric volume after sleeve, sweet consumption, food urges, emotional eating, time after surgery, and binge eating. The patients were liable for losing control of overeating, gastro-jejunal stoma diameter, anxiety, changes in physical activities, social support, self-esteem, and overall quality of life. The review emphasized the worth of preoperative and post-operative input to reduce weight gain risks.

Another important outcome of bariatric surgeries is that patients with morbid obesity have many psychological problems. In this context, *Paczkowska et al. (2022)* conducted a study on the impact of bariatric surgery on psychiatric disorders among morbidly obese patients. The study aimed to compare psychiatric symptoms among patients who underwent bariatric surgery and those who received conservative treatment for morbid obesity in two countries for one year. The patients improved their psychiatric status and reduction in their weight after surgery regardless of the kind of bariatric surgery, BMI, and age.

Another outcome of bariatric surgery is eradicating potential risks, with more bariatric techniques implemented in current years and safety enhancements. In this context, *Aldawqi et al. (2018)* found that the mortality rate from bariatric surgery is between 0.1% and 0.33% lower than that of gallbladder surgery (0.7%) and hip surgery (0.93%), respectively. Overall, the likelihood of complications is 4.6%; these statistics depend on the nature of the intervention, the severity of the patient's medical condition, age, and surgical and anaesthetic proficiency *(Moulla et al., 2018).*

6.5. Quality of life after bariatric surgery

Quality of life (QoL) is important when assessing chronic illness patients. The term "quality of life" emerged in the USA first after World War II. There are many attempts to define QoL but to no avail, as the clarifications of the QoL have only led to more confusion about its nature because it comprises a complex and multidimensional concept. For instance, QoL has been proposed as a global construct while being seen as focused on nature. Different definitions of QoL have emerged from what has been mentioned above. For example, Gotay and colleagues defined QoL in 1992 as "A state of well-being which is a composite of two components: first, the ability to perform everyday activities which reflects physical, psychological, and social well-being. The second component is patient satisfaction with levels of functioning and the control of disease and treatment-related symptoms" *(Sinha, 2019).*

Also, based on *Sinha (2019),* the concept of QoL was explained in 1999 by Hass as "A multidimensional evaluation of an individual's current life circumstances in the context of the culture in which they live and the values they hold. Moreover, *Sinha (2019)* emphasized that the World Health Organization defined QoL in 1995 as "The individuals' perception of their position in life in the context of the culture and value systems in which they live, and concerning their goals, expectations, standards and concerns" as delineated by the WHO definition for health as a "state of complete physical, mental, and social well-being, and not merely the absence of disease and infirmity" in 1948.

Furthermore, the term health-related quality of life (HRQoL) is a fundamental concept that has become popular in practice and research in medicine and health in recent years. It is often described as "A term referring to the health aspects of quality of life, generally considered to reflect the impact of disease and treatment on disability and daily functioning. It has also been considered to reflect the impact of perceived health on an individual's ability to live a fulfilling life. HRQoL evaluates an individual's self-perceived health in three main health dimensions: Physical, mental, and social well-being *(Haraldstad et al., 2019).* The concept of HRQoL was also introduced and defined as "how well an individual functions in his or her life and perceived well-being in physical, mental, and social domains of health *(Cai et al., 2021).*

The quality of life now encompasses additional factors about a patient's health. Researchers gave more weight to people's subjective assessments of the most significant aspects of their lives, considering the quality of life to be more of a subjective perception than just an objective and quantifiable concept. This updated definition of quality of life considers a patient's perception of their internal health and interpersonal relationships *(Speight et al., 2020).*

Patients with severe obesity who undergo bariatric surgery experience significant weight loss and improved quality of life. However, bariatric surgery's long-term results have only and infrequently been documented, and it is unknown what influences patients' quality of life. Preoperative variables like gender, starting weight, physical activity levels, and eating habits have all been recognized as significant factors that could account for variations in patients' quality of life following bariatric surgery *(Marshall et al., 2020).* Additionally, it has been shown that several post-operative behavioral factors affect the patient's quality of life. Among these factors are following dietary recommendations for caloric intake, how much the patient exercise or do not exercise, and the personality *(Pyykkö et al., 2022).*

It is essential to assess the quality of life because it reflects how the patient views the effects of their illness to ensure optimal management. Quality of life assessment is very subjective since it represents patients' personal experiences *(Barbe et al., 2018).* Several scales have been made to measure the quality of life, ranging between generic and disease-specific questionnaires. Bariatric surgery patients' quality of life is usually assessed by the SF-36 score, SF-12 score, Health Related Quality of Life (HRQOL) score, the Weight on Quality-of-Life Questionnaire (IWQQOL) score, the World Health Organization Quality of Life (WHOQOL) score, Bariatric Analysis and Reporting

Outcome System (BAROS) and the Moorehead-Ardelt Quality of Life Questionnaire II (MA-II) *(Haraldstad et al., 2019).*

Before bariatric surgery, morbidly obese patients were likely to have a poor quality of life, in addition to maladaptive eating behaviors, mental health issues, and chronic health disorders. However, after bariatric surgery, the quality of life improved. Many studies were conducted to assess the same context of that hypothesis. According to this hypothesis, a quantitative study conducted in Saudi Arabia by *Alharbi et al. (2018)* found that most participants reported a higher overall quality of life with the feeling of being active, full of energy, and self-confidence.

Furthermore, *Alkassis et al. (2019)* conducted a study to assess the quality of life of obese subjects before and after bariatric surgery. Their result shows that the quality-of-life parameters improved significantly after the procedure ($p \leq 0.001$). In the same context, *Akkayaoğlu and Çelik (2020)* found that the overall quality of life increased significantly compared to the preoperative results.

In contrast, *Babqi et al. (2021)* found no statistically significant difference in overall QoL between before and after bariatric surgery among gastric bypass patients, while only a difference was observed in the general health aspect during the study conducted in Jeddah, Saudi Arabia. In addition, other evidence revealed that men reported no further improvement in QoL after three months post-bariatric surgery; also, women showed decreased levels of QoL from 15 to 24 months *(Le Foll et al., 2020).* Moreover, the investigators named the period between 15-18 months after bariatric surgery as the "critical" period, characterized by the possibility of gaining weight or decreasing the perceived quality of life among both men and women *(Le Foll et al., 2020).*

The presence of an association between excess weight loss and QoL after laparoscopic sleeve gastrectomy was investigated by *Moly (2019)* in India. The researcher included 100 participants. After data analysis, the findings showed a significant positive association between excess weight loss and QoL after bariatric surgery.

In addition, the correlation between anxiety symptoms and perception of QoL was analyzed by *Kikuchi et al. (2022)* in Brazil among 50 women who underwent bariatric surgery. The result shows that 64% of women had severe and 36% had moderate symptoms. So, the anxiety symptom seems common in women after bariatric surgery. Also, the perception of overall QoL domains had a good level, while pain and vitality domains had the worst level of perceptions.

Quality of life was evaluated after using surgical and non-surgical methods to treat the obese patient. *Ahmed and Ezzat (2019)* conducted a longitudinal study in the same context. They found that the quality of life improved significantly in most aspects after an intra-gastric balloon (IGB) and an Atkin's diet ($p=0.005$). Also, patients who underwent intra-gastric balloon insertion had a weight loss (up to 35 kg) compared to patients on the Atkins diet (up to 20 kg).

Johari et al. (2019) compared the impact of LAGB and LSG on weight loss, QoL, hospital resource use, and patient-reported outcome measures. The study found that LSG led to a better level of QoL than LAGB due to reduced complications, such as regurgitation symptoms and dysphagia, besides readmissions and early post-operative complications. In addition, *Nielsen et al. (2022)* aligned with the findings of *Poelemeijer et al. (2020)* when compared between LSG and RYGB outcomes. They found that both procedures are safe for severely obese patients, significantly improving overall QoL scales, long-term weight loss, and resolution of co-morbidities diseases. However, RYGB was higher in long-term weight loss and remission rates of obesity-related co-morbidities than LSG.

Moreover, the impact of laparoscopic sleeve gastrectomy on GERD risk factors among obese patients was evaluated at Asser Central Hospital by *Dalboh et al. (2021).* They found that 32.2% of the patients had newly developed GERD post-operatively, and 19.69% of those who had preoperative GERD had resolution symptoms. Older patients, smokers, and excess weight loss (EWL) sustained GERD symptoms more in the post-operative phase, which reduced QoL levels.

6.6. Satisfaction of patient after bariatric surgery

Patient satisfaction does not have an obviously defined concept, but it may be defined as a measure of the extent to which a patient is content with the health care, they received from their health care provider *(Manzoor et al., 2019).* The degree of consistency between the life imagined, and the life actually lived is measured by patient satisfaction, which is a broad indicator of overall wellness. Specifically, satisfaction emphasizes the "feeling" element or subjective well-being, reflecting more on the psychological factor. Satisfaction has been linked in prior studies to healthy behaviors, improved physical and mental health outcomes, and lifespan. Patient satisfaction can be a general sign of health risks and positive life events *(Ghimire et al., 2018).*

Massive weight loss following bariatric surgery has left many patients unhappy with the appearance of excess, loose skin, which can lead to physical, psychological, and social health concerns. The loose skin folds have a negative impact on their moods and self-confidence and make them feel depressed and extremely self-conscious about their appearance. So, numerous instruments can be used in clinical research and practice to assess patient satisfaction after bariatric surgery. The most frequently used tools, which are specifically designed to address this issue are the Post-Bariatric Satisfaction Questionnaire, the Post Bariatric Outcome Tool, BODY-Q, BODY-QoL, Post-Bariatric Surgery Appearance Questionnaire, the Obesity Psychosocial State Questionnaire and patient-reported outcome (PRO) *(Barone et al., 2018).*

Patients' satisfaction with their treatment is an important outcome indicator of the services delivered by health care systems, as a patient's satisfaction may impact their daily lives. However, despite the good results that have been achieved in weight loss after surgery, patients are not always satisfied due to unrealistic expectations or consequences of bariatric surgery, such as the unexpected body image or extra skin due to massive weight loss may have significant negative effects on patients' life *(Hegland et al., 2020).*

In Saudi Arabia, a recent descriptive cross-sectional study was conducted in Najran City by *Alamri et al. (2020)* to evaluate satisfaction levels among clients undergoing different bariatric surgeries. The result showed that 63.6% of the participants were satisfied with their general body image. Regarding post-bariatric surgery satisfaction and body-contouring consideration after massive weight loss, *Alamri et al. (2020)* found that 28.8% of the participants had massive weight loss after surgery. The most affected area that had skin folding due to massive weight loss was in the abdominal region (41.5%), followed by the upper limbs (16.9%) and buttocks and thigh (14.4%). Moreover, 64.4% of patients showed their desire to undergo body-contouring surgery to improve their general appearance.

Also, women's satisfaction and reasons to seek bariatric surgery were evaluated through a prospective cohort study with a one-year follow-up among 40 women who underwent laparoscopic Roux-en-Y gastric bypass. The finding revealed that weight loss is the main reason for seeking bariatric surgery. However, the significant weight loss and improvement in self-esteem (55.6%) is the greatest satisfaction after surgery. Also, 80% of the patients reported being satisfied. Besides, the level of satisfaction after 1 year of bariatric surgery increased with the increase in the mean percent of EWL *(Hult et al., 2019).*

The regret and dissatisfaction with the surgery depend on the desire for body contouring surgery. In this context, *Monpellier et al. (2019)* conducted their study on 590 patients, and 26.6% did not desire the body contouring surgery, while those who underwent expressed their regrets with overhanging skin affecting their body parts. Post-bariatric surgery shows different patient outcome possibilities regardless of the nature of the procedure. The consultation of plastic surgery and related specialists remains important to meeting expectations and enhancing satisfaction with the body improvement procedure in the post-operative phase.

Patient satisfaction depends on the effect of specific bariatric surgery on different symptoms. *Van Wieren et al. (2019)* studied 6608 patients who underwent laparoscopic sleeve gastrectomy to correct gastro-esophageal reflux symptoms in 2013-2017. The analysis of score changes of the gastro-esophageal reflux and patient satisfaction showed a significant improvement in patient outcomes and satisfaction.

Furthermore, satisfaction with body image associated with physical activity was tested in Brazil by *Fernandes et al. (2021)* on post-bariatric surgery patients between Oct 2018 and Jul 2019. The finding of this study showed a strong association between satisfaction with body image and physical activity in obese patients after bariatric surgery and the development of a healthy body image, which was an important factor related to physical, social, and emotional well-being.

Another study was conducted by *Martens et al. (2021)* to investigate some of the psychological and physical factors that may affect patient satisfaction after bariatric surgery. They found a link between mental health, weight loss, and patient satisfaction for 1991 patients who underwent RYGB and SG in 2015-2018. The satisfaction scores improved before and after surgeries but remained low in patients with inconsistent weight loss and post-operative depression. Depressions in pre- and post-operative periods may influence post-operative outcomes, especially patient satisfaction, and weight loss.

The predictor of satisfaction after bariatric surgery was surveyed with 210 patients who underwent different weight loss surgeries. They examined pre- and post-operative predictors for satisfaction with outcome and follow-up care from 1 to 5 years on body image, weight loss, and mental health (depression and anxiety) and follow-up visits. The study's results revealed that most patients (90%) were satisfied with the result of surgery's outcome and hospital treatment in the 1st year after surgery. However, 69% of the patients had met their expectations from the surgery, and 62% were satisfied with the follow-up care five years after the surgery *(Lundin Kvalem et al., 2022).*

Regarding the importance of the long-term co-morbidities and psychological outcomes of bariatric surgery to enhance patient satisfaction, *Kilpatrick et al. (2019)* showed that patients have high satisfaction and confidence. The overall satisfaction ratings depend on the potential of the bariatric surgery to meet the expectations of the patients hoping to solve their long-term co-morbidities, emotional state, and body image.

Long-term outcomes and patient satisfaction were investigated in the different types of bariatric surgery. *Galli et al. (2018)* conducted a ten-year follow-up study among 63 women and 27 men who underwent a biliointestinal bypass (BIB) surgery and were involved in the study. The finding showed that 65% of the participants reported high satisfaction with the surgery. Furthermore, *El Haddad et al. (2019)* evaluated 65 patients (14 males and 51 females) who had their Intra Gastric Balloon inserted/removed between the years 2009 and 2016. They found that 39% of patients were satisfied with the procedure, and 49.2% of the patients were satisfied with the weight loss effect achieved. Moreover, *Hegland et al. (2020)* used an overall treatment satisfaction to assess the satisfaction level five years after surgery, namely duodenal switch (DS) and LSG. The results showed that 82.4% of the patients were very satisfied or satisfied with weight loss.

7. Discussion

Overweight and obesity, as well as their related non-communicable diseases, are largely preventable. Supportive environments and communities are fundamental in shaping people's choices, by making the choice of healthier foods and regular physical activity the easiest choice (the choice that is the most accessible, available, and affordable), and therefore preventing overweight and obesity *(WHO, 2021).* The current review aims to provide a comprehensive and critical summary of existing literature on the impact of bariatric surgery on patients' satisfaction and quality of life.

The currentt review reveals a high incidence of bariatric surgery globally. This finding was explained by *Arterburn and Courcoulas (2014),* who stated that the global pandemic of obesity has continued unabated over the past two decades,

and little progress has been made in its behavioral and drug treatment, especially in patients with severe obesity. By contrast, the evidence base for bariatric surgical procedures has expanded rapidly over this time, and it has yielded important short-term and long-term data on the efficacy and safety of surgical treatment for obesity and related metabolic disorders.

Current literature further shows that the most frequently performed bariatric surgeries that are performed worldwide are Laparoscopic Roux-en-Y Gastric Bypass, Laparoscopic Sleeve Gastrectomy, One Anastomosis Gastric Bypass, And Laparoscopic Adjustable Gastric Banding in descending order.

Franco et al. (2011) reported similar findings in a review comparing three laparoscopic procedures in bariatric surgery: Sleeve Gastrectomy, Roux-en-Y Gastric Bypass, and Adjustable Gastric Banding, that the most commonly performed procedures are laparoscopic Roux-en-Y Gastric Bypass (LRYGB), Laparoscopic Adjustable Gastric Banding (LAGB), and the novel laparoscopic sleeve gastrectomy (LSG). The *American Society for Metabolic and Bariatric Surgery (2023)* reported the common procedures. They were Sleeve Gastrectomy, Roux-en-Y Gastric Bypass, Adjustable Gastric Band, Biliopancreatic Diversion with Duodenal Switch, Single Anastomosis Duodeno-Ileal Bypass with Sleeve Gastrectomy.

The current review's findings cover a wide range of outcomes related to bariatric surgery, including safety, weight loss, co-morbidity resolution, psychiatric weight regain, and patient experiences. The current reviewed studies demonstrate varied outcomes, including safety and no or low mortality, with lower complication rate compared to other surgical interventions *(Alsisi et al., 2020),* effectiveness in losing weight, reducing diabetic conditions, and managing obesity-related co-morbidities *(Faucher et al., 2019; Jakobsen et al., 2018; Castanha et al., 2018).* Patients experience feelings of normality, ambivalence, isolation, and abandonment *(Coulman et al., 2020),* with improved psychiatric symptoms *(Paczkowska et al., 2022).* The reviewed studies reveal challenges with weight regain and its contributing factors of anatomical, temporal, psychiatric, dietary, and genetic factors *(Tolvanen et al., 2022; Athanasiadis et al., 2021).*

These findings match *Wiggins et al. (2020),* who conducted a systematic review and meta-analysis on studies that included 1,539,904 patients, with 269,818 receiving bariatric surgery and 1,270,086 control patients. Bariatric surgery was associated with reduced all-cause mortality and cardiovascular mortality rates. Bariatric surgery was strongly associated with reduced incidence of T2DM, hypertension, dyslipidemia, and ischemic heart disease. Another systematic review by *O'Brien et al. (2013)* reviewed 33 datasets reporting data beyond ten years after bariatric surgery. There were no surgical fatalities. *Gulinac et al. (2023)* and *Wolfe et al. (2016)* emphasized the same findings. They reported that bariatric surgery has significant health benefits, such as lowering hyperglycemia or normalizing blood glucose levels, lowering blood pressure and cholesterol, and improving obstructive sleep apnea and diabetes-related micro- and macrovascular complications.

Besides, these findings are matched with *Karlsson (2007),* who reported sustained improvements in mental health (i.e., depression) up to 10 years after Metabolic and Bariatric Surgery (MBS). At the same time, others reported a return to baseline levels or even deterioration *(Herpertz et al., 2015; Kalarchian et al., 2019).* Several qualitative studies conducted during short- or midterm follow-ups in patients after MBS report rapid changes in everyday life during the first year after MBS, including a renegotiation of self-identity *(Coulman et al., 2020; Knutsen et al., 2012; Nilsson-Condori et al., 2020).*

A thematic synthesis of 33 qualitative studies of MBS patients identified three global themes: Control (primarily control overeating and weight), normality (ability to engage in everyday activities and look more "normal"), and ambivalence (many changes perceived as improvements, but some as new difficulties) *(Coulman et al., 2017).* A qualitative synthesis of 20 papers focusing on patients' experiences with follow-up after MBS concluded that many continue to need support in several domains (medical, nutritional, and psychological) after the first year *(Parretti et al., 2019).*

Although the prevalence rates for weight regain (WR) vary depending on the weight parameters defined as "regain" *(Lauti et al., 2017),* it is now well established that a large proportion of patients experience significant WR during long-term follow-up *(Wittgrove & Clark, 2000; Sjöström et al., 1999; King et al., 2018).* In a study of 300 RYGB patients, 37% had significant weight regain at 7-year follow-up using the definition of ≥25% increase from nadir weight (lowest post-operative weight) *(Cooper et al., 2015).* A systematic review revealed that up to 76% of SG patients had significant weight regain at 6-year follow-up *(Lauti et al., 2016).* In the largest prospective cohort study of 1406 RYGB patients, the average weight regains, as a percentage of nadir weight, was 5.7% at one year after reaching the nadir weight, increasing to 10.1% after two years, 12.9% after three years, 14.2% after four years, and 15% after five years, thus revealing that the largest change in weight regain occurs two years after reaching nadir weight. However, it continues to increase to 5 years post-op *(King et al., 2018).* In the same study, the incidence of ≥10% weight regain was 23%, 51%, 64%, 69%, and 72% after 1 to 5 years respectively.

Various studies in the current review documented that bariatric surgery often results in improvements in patients' QoL. Comparisons between different bariatric procedures, such as LSG and LAGB, are explored, with findings indicating variations in outcomes, including post-operative complications, QoL, and long-term weight loss. Some studies report significant improvements, while others highlight variations and potential differences between surgical techniques such as sleeve gastrectomy (LSG) and Roux-en-Y gastric bypass (RYGB).

Other studies investigate the effectiveness of different weight loss methods, including intra-gastric balloons and diets, in improving QoL. *Sierżantowicz et al. (2022)* emphasize these findings when systematically reviewing the quality of life after bariatric surgery. *Sierżantowicz et al. (2022)* reviewed 18 identified publications that demonstrated that bariatric treatment provides a persistent benefit in

HRQoL, especially its physical component score, whether in terms of HRQoL or bodyweight reduction. Additionally, published reviews suggest that HRQoL, whether generic or obesity-specific, improves within 1–2 years after bariatric treatment and then again deteriorates but is still better than before treatment *(Rausa et al., 2019; Andersen et al., 2015; Hachem & Brennan, 2016).*

Moreover, the current review indicates the presence of anxiety symptoms that correlate with QoL in post-bariatric surgery patients, emphasizing the importance of psychological aspects in assessing QoL. *Sierżantowicz et al. (2022)* emphasize that some patients are less likely to benefit from bariatric treatment due to psychological predispositions. The findings of *Soroceanu et al. (2023)* revealed that whilst bariatric surgery significantly improved physical health, it resulted in a decrease in mental health scores.

Despite bariatric surgery being the most effective obesity treatment, some individuals do not respond adequately, especially in the long term. The current review also examines the factors influencing the quality of life after bariatric surgery. Preoperative variables such as gender, starting weight, physical activity levels, and eating habits significantly determine post-surgery QoL. The studies also demonstrate that post-operative factors like dietary adherence, exercise, personality, surgical procedures, patient characteristics, and post-operative behaviors can impact QoL. The review also underscores the importance of considering psychological aspects and patients' subjective experiences when evaluating QoL.

Cornejo-Pareja et al. (2021) reported some factors influencing the outcomes and quality of life after bariatric surgery. One of the factors is a surgical procedure that reveals that despite Roux-en-Y gastric bypass is more effective in the long term, sleeve gastrectomy shows a more beneficial effectiveness–complications balance. Another factor is the pre-surgical psychological and behavioral evaluation along with post-surgical treatment to improve long-term surgical outcomes; physical activity programs after bariatric surgery, in addition to continuous and comprehensive care interventions regarding diet habits, improve weight loss maintenance, but it is necessary to improve adherence; the impact of bariatric surgery on the gut–brain axis seems to influence weight maintenance. *Susmallian et al. (2017)* reported that preoperative eating habits do not impact the short-term success of an LSG. The long-term success of bariatric operations should be based on multidisciplinary support to encourage patients to maintain healthy eating habits.

Overall, patient satisfaction is considered a vital indicator of healthcare services, reflecting patients' subjective experiences and outcomes related to their health and well-being. Patient satisfaction in healthcare is highlighted in this review, specifically focusing on the impact of massive weight loss on patient well-being. After bariatric surgery, despite significant weight loss, some patients may not be satisfied, possibly due to unrealistic expectations, concerns about body image, or the physical consequences of massive weight loss. Research findings from various studies in different countries provide insights into factors affecting patient satisfaction after bariatric surgery. Mental health, weight loss consistency, follow-up care, and long-term co-morbidities affect patient satisfaction.

Findings from both cross-sectional and longitudinal studies suggest general improvements in body image occur following bariatric surgery. Some studies, however, suggest that certain aspects of body image do not improve post-operatively or do not reach norms *(Ivezaj & Grilo, 2018). Also, Gilmartin (2013),* in a study about body image concerns amongst massive weight loss patients, reported that body image matters are hugely significant and appear to have a lasting effect on emotional well-being and function, contributing to psychological distress and social isolation.

8. Conclusion

In conclusion, bariatric surgery underscores this medical intervention's complexity and multifaceted nature. Bariatric surgery offers significant benefits in weight loss, improved quality of life, and the resolution of co-morbidities in many patients. However, the long-term outcomes and patient satisfaction vary, and these depend on factors such as the choice of surgical procedure, individual patient experiences, quality of life, and expectations. Patient satisfaction is a vital outcome measure, reflecting the extent to which individuals are content with the healthcare they receive. Factors contributing to patient satisfaction include preoperative expectations, the ability to maintain weight loss, body image concerns, psychological well-being, and post-operative care.

9. Limitation and implication

The limitations of this review were that the article's quality assessment was not conducted. Besides, the data extraction table review matrix was also not conducted.

10. Recommendation

The current review emphasizes the need for ongoing research in bariatric surgery to better understand long-term outcomes and how to enhance patient satisfaction. This research should encompass various surgical options, post-operative support, and strategies to improve patients' physical and psychological well-being. Bariatric surgery remains a valuable tool in treating severe obesity, and its continued refinement is essential for achieving the best possible results and patient satisfaction.

Develop a comprehensive questionnaire to assess the satisfaction level. Also, the consultation of plastic surgery and related specialists remains important to meeting expectations and enhancing satisfaction with the body improvement procedure in the post-operative phase. Early identification of dissatisfied patients and those with reduced quality of life and providing them with holistic care, including psychological intervention, would likely further improve the outcomes of bariatric treatment.

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