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# REVIEW STUDY: THE RELATION BETWEEN BARIATRIC SURGERY WITH DEPRESSION AND ANXIETY

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**Abstract:**

*Obesity has been linked to a variety of psychological problems and has been demonstrated to have a detrimental effect on one's overall well-being in several research investigations. Research has found that the link between obesity and mental health varies by culture. Predictors of reduced family income are associated with poorer self-assessed beauty; gender; health policy; life satisfaction; and socioeconomic situations. More weight reduction and better comorbidity remission have been seen in trials comparing bariatric surgery with non-surgical therapy for obesity. Some studies have shown that bariatric surgery improves mental health and quality of life, as well as the financial condition of patients. A few experts, like Borgeraas et al., have studied the impact of bariatric surgery on health, including psychological elements. Variability in weight loss results after bariatric surgery might be rather high. The kind of bariatric surgery done, weight reduction, medical comorbidity, and social support are all important predictors of improved mental health in bariatric surgery patients. Mental health benefits from bariatric surgery may be influenced by variables other than weight reduction alone, such as pre-existing health conditions and the aftermath of surgery. Sleeve-gastrectomy and gastric bypass surgery resulted in higher improvements in mental health than laparoscopic adjustable gastric banding and vertical banding gastroplasty, research by Picot et al. found (2 years). Possibly due to the fact that these operations result in increased weight loss throughout this timeframe.*

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## INTRODUCTION:

It is estimated that obesity affects 300 million individuals throughout the globe [1]. An excess of adipose tissue, which causes several chronic illnesses and early death, is considered a global pandemic disease. Obesity has garnered national and worldwide attention because of its negative effect on health, the immense financial burden it places on society, and the fact that it is on the rise. Overeating and obesity are becoming more common among children and adolescents as they consume more food and become less active [2].

Obesity has been linked to a variety of psychological problems and has been demonstrated to have a detrimental effect on one's overall well-being in several research investigations[3]. Research has found that the link between obesity and mental health varies by culture. Predictors of reduced family income are associated with poorer self-assessed beauty; gender; health policy; life satisfaction; and socioeconomic situations[4]. More weight reduction and better comorbidity remission have been seen in trials comparing bariatric surgery with non-surgical therapy for obesity[5]. Some studies have shown that bariatric surgery improves mental health and quality of life, as well as the financial condition of patients[6]. A few experts, like Borgeraas et al., have studied the impact of bariatric surgery on health, including psychological elements[7]. Variability in weight loss results after bariatric surgery might be rather high[8]. The kind of bariatric surgery done, weight reduction, medical comorbidity, and social support are all important predictors of improved mental health in bariatric surgery patients. Mental health benefits from bariatric surgery may be influenced by variables other than weight reduction alone, such as pre-existing health conditions and the aftermath of surgery[9]. Sleeve-gastrectomy and gastric bypass surgery resulted in higher improvements in mental health than laparoscopic adjustable gastric banding and vertical banding gastroplasty, a research by Picot et al. found (2 years). Possibly due to the fact that these operations result in increased weight loss throughout this timeframe[10]. 10

Furthermore, Diet and exercise guidance is combined with exercise and movement therapy, as well as psychoeducation and cognitive behavioral therapy at obesity treatment clinics that provide complete conservative treatment[11]. It is necessary to look at the impact on patients' psychological well-being of the treatment strategies used to treat obesity thus this study aims at studying the effect ofbariatric surgery on depression and anxiety.

## METHOD:

The online data was investigated using key words including bariatric surgery, depression and anxiety then the articles were evaluated then all the eligible English studies from 2009-2022 included in the present study. Older studies were used if there is no new available data.

## RESULTS:

The study included56 articles were included in this review that were published between 2009-2020 including RCTs, reviews, case-controlled studies and clinical trials.

## DISCUSSION:

***Psychological Health of Obese subjects:***

Obese people have a high frequency of psychological comorbidities, including mood disorders, anxiety, and poor self-esteem, which are all common in the population. The likelihood of experiencing a severe depressive episode in the preceding year is about 5 times higher in very obese persons than in those of medium weight [12]. The relationship between these two illnesses is complex and involves many factors. Dissatisfaction with one's body image, which is frequent in obese patients, is highly connected with symptoms of depression, and this is especially true in women, which is likely due to cultural focus on the feminine form. People who are overweight or obese face prejudice and discrimination, which has been shown to induce or worsen depression [13]. When compared to their non - obese contemporaries with equivalent intellectual potential, these people have lower family earnings, struggle to get further education, and are less likely to be married, according to a number of studies. [14, 15].

Another research found that obese persons who seek medical treatment for obesity (pharmacotherapy or surgery) are more likely to experience psychological discomfort than their counterparts with same BMI who seek behavioral therapy and food restriction, according to the findings. The development of obesity-related complications including cardiovascular disease and type 2 diabetes mellitus, as well as the degradation of psychological health among the obese population, has also been linked [16, 17].

***Effect of bariatric surgery on weight loss:***

Short- and long-term weight reduction after bariatric surgery has been investigated and documented, since weight loss is the main goal of bariatric surgery. Generally, people report losing on average significant of weight. Even with seemingly identical surgical

treatments like RYGB or LAGB, there is a substantial degree of diversity in the amount of weight lost[18]. Bariatric procedures reduce oral intake and/or cause malabsorption in order to achieve weight loss. LAGB (laparoscopically adjustable gastric banding) is the main restrictive bariatric operation; RYGB (roux-en-Y gastric bypass) combines restrictive and malabsorptive techniques. Laparoscopic sleeve gastrectomy (LSG) and biliopancreatic diversion are two more options. There are several factors to consider while deciding on a bariatric operation, including medical, psychological, and social considerations[19]. A meta-analysis of bariatric surgery found that patients who had gastric banding lost an average of 47.5% of their extra weight, whereas those who had gastric bypass lost an average of 61.6 percent of their excess weight. Generally, weight reduction plateaus two years after surgery, with some regaining of lost weight possible in the third year. Numerous studies have shown that surgical procedures may significantly reverse various obesity-related comorbidities, such as type 2 diabetes, metabolic syndrome, and adjusted long-term mortality. Additionally, bariatric surgery has been shown to be a cost-effective treatment option for very obese individuals [10, 20-22].

Weight loss following RYGB was categorized into five distinct weight loss trajectories, ranging from 12 percent TBW loss to 45 percent at 3 years, by the LABS consortium after 6 months of follow-up surgery[23]. A year after surgery for LAGB, most but not all patients have trajectories that can be followed. The wide range of weight reduction results has been studied and reported on, but the underlying causes remain a mystery. Weight loss may be predicted by a variety of variables, including both the patient and the provider. Comorbid illnesses such as diabetes, as well as gender, age, and behavioral variables including physical activity and eating habits are among these determinants[24].

The first 3 yearsof RYGB were associated with weight reduction of 30 to 35 percent of body weight (TBW). Weight reduction after LAGB in Australia was said to be comparable to that found with RYGB, according to early reports. In Europe and the United States, however, there has been no evidence of a similar weight reduction after LAGB, closer to 15.9 percent TBW after 3 years[25]. There has been a significant decrease in the use of LAGB as therapy for extreme obesity because of this lower weight loss. While RYGB weight loss is equivalent or slightly less than that of biliopancreatic diversion/duodenal switch, weight loss after RYGB has been shown to be somewhat more than that of RYGB in numerous publications. [26-28]. Researchers have found no long-term weight reduction in non-surgical comparison groups, such as the Swedish Obese Subjects study and Utah's prospective clinical trial using a population-based comparison. Patients selected for surgery must first undergo and fail medical treatment before being selected for surgical intervention. This is not a surprise. In addition to Pories and the Swedish and Utah investigations, longer-term follow-up has been described. Following RYGB, all patients have significant weight reduction for the first 12 months, followed by a gradual weight increase over the next 3 to 5 years. Weight reduction tends to stabilize around the 30 percent TBW range in the third and fourth years of treatment. Maintaining weight reduction with RYGB for 10 to 20 years has been proven[29, 30].

Losing weight using minimally invasive or endoscopic techniques like LAGB, vagal blocking, and balloon implantation is more difficult; however, the perioperative and long-term risks are much reduced. Research is required to better predict the amount of weight reduction needed to obtain a given response, such as improved control or remission of a certain comorbid disease, after any of these approaches, including lifestyle modification and medication. So, if it is feasible to correctly estimate the weight reduction needed to attain a certain clinical result and the relative risk associated, candidates for specific treatments may be more reliably identified by considering the projected weight loss and risk profiles[19, 31].

- ***Psychological outcomes of bariatric surgery:***

The influence of weight reduction surgery on psychological change is well documented, despite substantial measurement variation. A meta-analysis of 40 trials from 1982–2002 found continuous improvement of axis I mental illnesses (especially sadness and anxiety) postoperatively [32]. These benefits are similar to those shown in people who lose weight by behavioral or pharmaceutical means. Postoperative weight gain has also been linked to greater depression. Overall, evidence implies that severely obese people's psychopathology is caused by their weight, not their character. The quantity of mental health gain may be linked to postoperative weight reduction [33-35]

Weight reduction and improved self-concept are believed to be contributors to postoperative improvements in psychological health. Patients who do not lose weight or who do not lose weight significantly after a few weeks of surgery have

reported mental health benefits. This might be due to patients actively improving their lifestyles despite being overweight. As a result of being relieved of the stressful incident that caused surgery, patients may report an exaggerated shift in mood immediately after surgery [36-39].

Despite overall surgical improvements, a large minority of patients report long-term mental health advantages dissipating or no psychological benefit. Even if considerable weight reduction is accomplished, preoperative patient expectations that life would significantly alter following bariatric surgery may have a detrimental influence on psychological health. Also, some patients discover that presurgical issues linger postoperatively, which displeases them since they cannot link their weight to underlying mental issues. Patients may also struggle to cope with unfavorable life situations that they previously attributed to their weight[1, 3].

Postoperative depression levels have been shown to diminish up to two and even four years, whereas others show an initial recovery followed by a deterioration. This corresponds to early weight loss, followed by weight gain or stability [40, 41]. The patient's psychological condition may improve initially after surgery owing to many post-operative clinic visits [42, 43]. However, long-term follow-up is required to monitor and support the patient's psychological well-being.

Several studies have found higher rates of suicide in their patient group following surgery, however cohort features and follow-up time vary widely. Thus, comparing postbariatric patient suicide rates to the general population is challenging [44, 45].

In both groups of test subjects, bariatric surgery had a stronger effect on mental health than non-surgical obesity management. The research compared the physical and psychological effects of individuals who had or had not undergone bariatric surgery. The surgical group outperformed the standard therapy group in terms of depression, health perception, social engagement, and psychosocial functioning[3, 46].

The quality of mental health in individuals with morbid obesity is influenced by gender and the percentage of total weight lost. The scientific literature backs up our findings. Weight reduction and subsequent increases in body image, self-esteem, and self-concept have been linked to improved mental health in most studies[47]. Also, obese women experience sadness and anxiety symptoms more than fat males. Obese patients who have bariatric surgery and those who get conservative therapy are both in the same predicament[3].

Many clinical studies have linked obesity to depression however the link between depression and fat is likely muddled by confounding variables. Gender may have a role in the link between obesity and depression[22].

The kind of bariatric surgery done had no effect on the felt levels of depression, anxiety, and stress in obese patients from Poland and Germany. Some studies compared outcomes such as weight loss, quality of life, anxiety and depressive symptoms, post-operative complications, and mortality after laparoscopic sleeve gastrectomy vs laparoscopic Roux-en-Y gastric bypass in individuals with obesity and type 2 diabetes[48-50].

In Saudi Arabia , it was found that the majority of patients experienced melancholy following bariatric surgery, around 30.4 percent[51], which is similar to the findings of a research done in Jeddah in Saudi Arabia, which found that 31.3 percent of patients had post-operative depression [52]. It was discovered in a research done in the United States of America that the proportion of those suffering from depression following bariatric surgery was 32% [53]. Another research, found that the incidence of depression following surgery, with 16.5 percent experiencing sadness at one year and 14.3 percent experiencing depression at two years after surgery[54].

Despite major assessment heterogeneity in evaluating depression, previous findings on the prevalence of depression after bariatric surgery are estimated to be higher than the most of depression in the general population, whether in the United States or elsewhere in the world. According to the Saudi national mental health survey, major depressive disorder and GAD- 7 accounted for 6 percent and 1.9 percent, respectively, of the population [55].In a recent Saudi study, the prevalence of anxiety after bariatric surgery was 33 percent[51], and 16.8 percent in a study done by de Zwaan et al. [54]. When comparing postoperative anxiety ratings to preoperative values, several studies found either a reduction or no change in anxiety. Perhaps the use of different anxiety questionnaires is to blame for these discrepancies. Despite this, the prevalence of anxiety after bariatric surgery is still greater than the general population [56].

## CONCLUSION:

In this literature review, patients' mental health improves dramatically with bariatric therapy for obesity, both in terms of lowering depression, stress, and anxiety symptoms as well as reducing body mass, compared to the more conservative treatment choice. The percentage of total weight lost, the gender of the patient, and the kind of bariatric surgery were all unrelated to improvements in mental health as a result of therapy. However, obese patients contemplating surgery have a greater frequency of psychological distress than other obese people in the community, and the negative responses to adverse outcomes may be amplified in these patients. Thus, the preoperative examination is crucial in identifying and monitoring people at risk of post-surgical psychopathology. Also, postoperative behavioral and lifestyle changes and their impact on weight reduction should also be discussed in other studies. Weight reduction and physical and psychological comorbidities may be greatly improved with long-term rigorous surgical follow-up.

## REFERENCES:


1. Susmallian S, Nikiforova I, Azoulai S, Barnea R. Outcomes of bariatric surgery in patients with depression disorders. PloS one. 2019;14(8):e0221576-e. doi:10.1371/journal.pone.0221576.
2. Bell LK, Schammer C, Devenish G, Ha D, Thomson MW, Spencer JA, et al. Dietary Patterns and Risk of Obesity and Early Childhood Caries in Australian Toddlers: Findings from an Australian Cohort Study. Nutrients. 2019;11(11). doi:10.3390/nu11112828.
3. Paczkowska A, Hoffmann K, Raakow J, Pross M, Berghaus R, Michalak M, et al. Impact of bariatric surgery on depression, anxiety and stress symptoms among patients with morbid obesity: international multicentre study in Poland and Germany. BJPsych Open. 2022;8(1):e32-e. doi:10.1192/bjo.2021.1084.
4. Lavallee KL, Zhang XC, Schneider S, Margraf J. Obesity and Mental Health: A Longitudinal, Cross-Cultural Examination in Germany and China. Frontiers in psychology. 2021;12:712567. doi:10.3389/fpsyg.2021.712567.
5. Khawali C, Ferraz MB, Zanella MT, Ferreira SR. Evaluation of quality of life in severely obese patients after bariatric surgery carried out in the public healthcare system. Arquivos brasileiros de endocrinologia e metabologia. 2012;56(1):33-8. doi:10.1590/s0004-27302012000100006.
6. Sarwer DB, Wadden TA, Moore RH, Eisenberg MH, Raper SE, Williams NN. Changes in quality of life and body image after gastric bypass surgery. Surgery for obesity and related diseases : official journal of the American Society for Bariatric Surgery. 2010;6(6):608-14. doi:10.1016/j.soard.2010.07.015.
7. Borgeraas H, Hofsø D, Hertel JK, Hjelmesaeth J. Comparison of the effect of Roux-en-Y gastric bypass and sleeve gastrectomy on remission of type 2 diabetes: A systematic review and meta-analysis of randomized controlled trials. Obesity reviews : an official journal of the International Association for the Study of Obesity. 2020;21(6):e13011. doi:10.1111/obr.13011.
8. Hachem A, Brennan L. Quality of Life Outcomes of Bariatric Surgery: A Systematic Review. Obesity surgery. 2016;26(2):395-409. doi:10.1007/s11695-015-1940-z.
9. Wimmelmann CL, Dela F, Mortensen EL. Psychological predictors of mental health and health-related quality of life after bariatric surgery: a review of the recent research. Obesity research & clinical practice. 2014;8(4):e314-24. doi:10.1016/j.orcp.2013.11.002.
10. Picot J, Jones J, Colquitt JL, Gospodarevskaya E, Loveman E, Baxter L, et al. The clinical effectiveness and cost-effectiveness of bariatric (weight loss) surgery for obesity: a systematic review and economic evaluation. Health technology assessment (Winchester, England). 2009;13(41):1-190, 215-357, iii-iv. doi:10.3310/hta13410.
11. Dawes AJ, Maggard-Gibbons M, Maher AR, Booth MJ, Miake-Lye I, Beroes JM, et al. Mental Health Conditions Among Patients Seeking and Undergoing Bariatric Surgery: A Meta-analysis. Jama. 2016;315(2):150-63. doi:10.1001/jama.2015.18118.
12. Wu YK, Berry DC. Impact of weight stigma on physiological and psychological health outcomes for overweight and obese adults: A systematic review. Journal of advanced nursing. 2018;74(5):1030-42. doi:10.1111/jan.13511.
13. Mallorquí-Bagué N, Lozano-Madrid M, Vintró-Alcaraz C, Forcano L, Díaz-López A, Galera A, et al. Effects of a psychosocial intervention at one-year follow-up in a PREDIMED-plus sample with obesity and metabolic syndrome. Scientific reports. 2021;11(1):9144. doi:10.1038/s41598-021-88298-1.
14. Slavich GM, Irwin MR. From stress to inflammation and major depressive disorder: a social signal transduction theory of depression. Psychological bulletin. 2014;140(3):774-815. doi:10.1037/a0035302.
15. Luppino FS, de Wit LM, Bouvy PF, Stijnen T, Cuijpers P, Penninx BW, et al. Overweight,

obesity, and depression: a systematic review and meta-analysis of longitudinal studies. Archives of general psychiatry. 2010;67(3):220-9. doi:10.1001/archgenpsychiatry.2010.2.
16. Zarza-Rebollo JA, Molina E, Rivera M. The role of the FTO gene in the relationship between depression and obesity. A systematic review. Neuroscience and biobehavioral reviews. 2021;127:630-7. doi:10.1016/j.neubiorev.2021.05.013.
17. Rossi AA, Manzoni GM, Pietrabissa G, Di Pauli D, Mannarini S, Castelnuovo G. Weight stigma in patients with overweight and obesity: validation of the Italian Weight Self-Stigma Questionnaire (WSSQ). Eating and weight disorders : EWD. 2022. doi:10.1007/s40519-022-01385-8.
18. O'Brien PE, Hindle A, Brennan L, Skinner S, Burton P, Smith A, et al. Long-Term Outcomes After Bariatric Surgery: a Systematic Review and Meta-analysis of Weight Loss at 10 or More Years for All Bariatric Procedures and a Single-Centre Review of 20-Year Outcomes After Adjustable Gastric Banding. Obesity surgery. 2019;29(1):3-14. doi:10.1007/s11695-018-3525-0.
19. Arterburn DE, Telem DA, Kushner RF, Courcoulas AP. Benefits and Risks of Bariatric Surgery in Adults: A Review. Jama. 2020;324(9):879-87. doi:10.1001/jama.2020.12567.
20. Paczkowska A, Hoffmann K, Raakow J, Pross M, Berghaus R, Michalak M, et al. Impact of bariatric surgery on depression, anxiety and stress symptoms among patients with morbid obesity: international multicentre study in Poland and Germany. BJPsych Open. 2022;8(1):e32. doi:10.1192/bjo.2021.1084.
21. Colquitt JL, Pickett K, Loveman E, Frampton GK. Surgery for weight loss in adults. The Cochrane database of systematic reviews. 2014(8):Cd003641. doi:10.1002/14651858.CD003641.pub4.
22. Bøgelund M, Jørgensen NB, Madsbad S, Spanggaard M, Panton UH, Pedersen MH, et al. The Effect of Bariatric Surgery on Healthcare Costs and Labor Market Attachment. Obesity surgery. 2022;32(4):998-1004. doi:10.1007/s11695-022-05913-4.
23. Courcoulas AP, Christian NJ, Belle SH, Berk PD, Flum DR, Garcia L, et al. Weight change and health outcomes at 3 years after bariatric surgery among individuals with severe obesity. Jama. 2013;310(22):2416-25. doi:10.1001/jama.2013.280928.
24. Mitchell JE, Selzer F, Kalarchian MA, Devlin MJ, Strain GW, Elder KA, et al. Psychopathology before surgery in the longitudinal assessment of bariatric surgery-3 (LABS-3) psychosocial study. Surgery for obesity and related diseases : official journal of the American Society for Bariatric Surgery. 2012;8(5):533-41. doi:10.1016/j.soard.2012.07.001.
25. Flum DR, Belle SH, King WC, Wahed AS, Berk P, Chapman W, et al. Perioperative safety in the longitudinal assessment of bariatric surgery. The New England journal of medicine. 2009;361(5):445-54. doi:10.1056/NEJMoa0901836.
26. Mahawar KK, Graham Y, Carr WR, Jennings N, Schroeder N, Balupuri S, et al. Revisional Roux-en-Y Gastric Bypass and Sleeve Gastrectomy: a Systematic Review of Comparative Outcomes with Respective Primary Procedures. Obesity surgery. 2015;25(7):1271-80. doi:10.1007/s11695-015-1670-2.
27. Wang MC, Guo XH, Zhang YW, Zhang YL, Zhang HH, Zhang YC. Laparoscopic Roux-en-Y gastric bypass versus sleeve gastrectomy for obese patients with Type 2 diabetes: a meta-analysis of randomized controlled trials. The American surgeon. 2015;81(2):166-71.
28. Wolfe BM, Kvach E, Eckel RH. Treatment of Obesity: Weight Loss and Bariatric Surgery. Circulation research. 2016;118(11):1844-55. doi:10.1161/CIRCRESAHA.116.307591.
29. Carlsson LM, Peltonen M, Ahlin S, Anveden Å, Bouchard C, Carlsson B, et al. Bariatric surgery and prevention of type 2 diabetes in Swedish obese subjects. The New England journal of medicine. 2012;367(8):695-704. doi:10.1056/NEJMoa1112082.
30. Carlsson LMS, Sjöholm K, Karlsson C, Jacobson P, Andersson-Assarsson JC, Svensson PA, et al. Long-term incidence of microvascular disease after bariatric surgery or usual care in patients with obesity, stratified by baseline glycaemic status: a post-hoc analysis of participants from the Swedish Obese Subjects study. The lancet Diabetes & endocrinology. 2017;5(4):271-9. doi:10.1016/s2213-8587(17)30061-x.
31. Maggard-Gibbons M, Maglione M, Livhits M, Ewing B, Maher AR, Hu J, et al. Bariatric surgery for weight loss and glycemic control in nonmorbidly obese adults with diabetes: a systematic review. Jama. 2013;309(21):2250-61. doi:10.1001/jama.2013.4851.
32. Herpertz S, Kielmann R, Wolf AM, Langkafel M, Senf W, Hebebrand J. Does obesity surgery improve psychosocial functioning? A systematic

review. International journal of obesity and related metabolic disorders : journal of the International Association for the Study of Obesity. 2003;27(11):1300-14. doi:10.1038/sj.ijo.0802410.
33. Karagülle OO, Yavuz E, Gülçiçek OB, Solmaz A, Şentürk S, Erdoğan A, et al. Psychological well-being and marital satisfaction in response to weight loss after bariatric surgery. Surgery today. 2019;49(5):435-42. doi:10.1007/s00595-018-1750-8.
34. Klassen AF, Cano SJ, Kaur M, Breitkopf T, Pusic AL. Further psychometric validation of the BODY-Q: ability to detect change following bariatric surgery weight gain and loss. Health Qual Life Outcomes. 2017;15(1):227. doi:10.1186/s12955-017-0802-x.
35. Perdue TO, Schreier A, Swanson M, Neil J, Carels R. Evolving self view and body image concerns in female postoperative bariatric surgery patients. Journal of clinical nursing. 2018;27(21-22):4018-27. doi:10.1111/jocn.14527.
36. Brunault P, Frammery J, Couet C, Delbachian I, Bourbao-Tournois C, Objois M, et al. Predictors of changes in physical, psychosocial, sexual quality of life, and comfort with food after obesity surgery: a 12-month follow-up study. Quality of life research : an international journal of quality of life aspects of treatment, care and rehabilitation. 2015;24(2):493-501. doi:10.1007/s11136-014-0775-8.
37. Karlsen TI, Lund RS, Røislien J, Tonstad S, Natvig GK, Sandbu R, et al. Health related quality of life after gastric bypass or intensive lifestyle intervention: a controlled clinical study. Health Qual Life Outcomes. 2013;11:17. doi:10.1186/1477-7525-11-17.
38. Myers VH, Adams CE, Barbera BL, Brantley PJ. Medical and psychosocial outcomes of laparoscopic Roux-en-Y gastric bypass: cross-sectional findings at 4-year follow-up. Obesity surgery. 2012;22(2):230-9. doi:10.1007/s11695-010-0324-7.
39. Sellberg F, Possmark S, Willmer M, Tynelius P, Berglind D. One-year follow-up of a dissonance-based intervention on quality of life, wellbeing, and physical activity after Roux-en-Y gastric bypass surgery: a randomized controlled trial. Surgery for obesity and related diseases : official journal of the American Society for Bariatric Surgery. 2019;15(10):1731-7. doi:10.1016/j.soard.2019.07.001.
40. Aarts EO, Dogan K, Koehestanie P, Aufenacker TJ, Janssen IM, Berends FJ. Long-term results after laparoscopic adjustable gastric banding: a mean fourteen year follow-up study. Surgery for obesity and related diseases : official journal of the American Society for Bariatric Surgery. 2014;10(4):633-40. doi:10.1016/j.soard.2014.03.019.
41. Lin VW, Wright A, Flum DR, Garrison LP, Jr., Alfonso-Cristancho R, Sullivan SD. Patients' experience and outcomes after laparoscopic adjustable gastric banding in Washington state. Surgery for obesity and related diseases : official journal of the American Society for Bariatric Surgery. 2013;9(5):701-5. doi:10.1016/j.soard.2012.03.011.
42. Burton PR, Ooi GJ, Laurie C, Anderson M, Parker K, Paul E, et al. Changes in Outcomes, Satiety and Adverse Upper Gastrointestinal Symptoms Following Laparoscopic Adjustable Gastric Banding. Obesity surgery. 2017;27(5):1240-9. doi:10.1007/s11695-016-2434-3.
43. Lanthaler M, Mattesich M, Nehoda H, Puelzl P, Matiasek J, Nitto A, et al. Long-term quality-of-life improvement in gastric banding patients from body-contouring surgery. The American surgeon. 2015;81(1):34-40.
44. Toma T, Harling L, Athanasiou T, Darzi A, Ashrafian H. Does Body Contouring After Bariatric Weight Loss Enhance Quality of Life? A Systematic Review of QOL Studies. Obesity surgery. 2018;28(10):3333-41. doi:10.1007/s11695-018-3323-8.
45. Castaneda D, Popov VB, Wander P, Thompson CC. Risk of Suicide and Self-harm Is Increased After Bariatric Surgery-a Systematic Review and Meta-analysis. Obesity surgery. 2019;29(1):322-33. doi:10.1007/s11695-018-3493-4.
46. Kolotkin RL, Crosby RD, Gress RE, Hunt SC, Adams TD. Two-year changes in health-related quality of life in gastric bypass patients compared with severely obese controls. Surgery for obesity and related diseases : official journal of the American Society for Bariatric Surgery. 2009;5(2):250-6. doi:10.1016/j.soard.2009.01.009.
47. O'Brien PE. Bariatric surgery: mechanisms, indications and outcomes. Journal of gastroenterology and hepatology. 2010;25(8):1358-65. doi:10.1111/j.1440-1746.2010.06391.x.
48. Murphy R, Clarke MG, Evennett NJ, John Robinson S, Lee Humphreys M, Hammodat H, et al. Laparoscopic Sleeve Gastrectomy Versus Banded Roux-en-Y Gastric Bypass for Diabetes and Obesity: a Prospective Randomised Double-Blind Trial. Obesity surgery. 2018;28(2):293-302. doi:10.1007/s11695-017-2872-6.

49. Schauer PR, Kashyap SR, Wolski K, Brethauer SA, Kirwan JP, Pothier CE, et al. Bariatric surgery versus intensive medical therapy in obese patients with diabetes. The New England journal of medicine. 2012;366(17):1567-76. doi:10.1056/NEJMoa1200225.
50. Keidar A, Hershkop KJ, Marko L, Schweiger C, Hecht L, Bartov N, et al. Roux-en-Y gastric bypass vs sleeve gastrectomy for obese patients with type 2 diabetes: a randomised trial. Diabetologia. 2013;56(9):1914-8. doi:10.1007/s00125-013-2965-2.
51. Alsubaie S, Asiri G, Asiri E, Alqahtani F, Bredy G, Alshehri D. Depression and anxiety on post-bariatric surgery among Saudi Adults residing in Abha, Asir Province, Saudi Arabia. International Journal of Medicine in Developing Countries. 2020;5(1):165–71.
52. Sait S TN, Zagzoog M, Mortada H, AltowairebA, Hemdi A. Prevalence of depression and anxietydisorders among bariatric surgery patients J SurgMed. 2019;3(8):574-8.
53. Alley JB, Fenton SJ, Harnisch MC, Tapper DN, Pfluke JM, Peterson RM. Quality of life after sleeve gastrectomy and adjustable gastric banding. Surgery for obesity and related diseases : official journal of the American Society for Bariatric Surgery. 2012;8(1):31-40.
54. de Zwaan M, Enderle J, Wagner S, Mühlhans B, Ditzen B, Gefeller O, et al. Anxiety and depression in bariatric surgery patients: a prospective, follow-up study using structured clinical interviews. J Affect Disord. 2011;133(1-2):61-8.
55. Al-Subaie AS, Al-Habeeb A, Altwaijri YAJIJoMiPR. Overview of the Saudi National Mental Health Survey. International Journal of Methods in Psychiatric Research. 2020;29(3):e1835.
56. Remes O, Brayne C, van der Linde R, Lafortune L. A systematic review of reviews on the prevalence of anxiety disorders in adult populations. Brain Behav. 2016;6(7): e0049.