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Patient-reported quality of life after bariatric surgery: a single institution analysis

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Abstract

Background: Bariatric surgery is an effective weight loss and comorbidity treatment among severely obese patients. However, there are limited data describing its impact on patient-reported quality of life (QoL). We examined patient-reported QoL after bariatric surgery and analyzed variables associated with higher postoperative QoL.

Methods: Patient demographics, comorbidities, and weight loss data were obtained from our institutional database for patients who underwent bariatric surgery from January 2010 to December 2012. QoL scores were obtained during preoperative and postoperative visits (2, 6, 12, 24, 52, and 104 wk) from the Moorehead-Ardelt Quality of Life Questionnaire II. Multivariable logistic regression was performed to generate odds ratios for variables hypothesized *a priori* to be associated with higher postoperative QoL.

Results: A total of 209 patients were included in the study. Patients lost an average of 59.1% (± 19.0) of excess body weight 1 y after surgery. One-year postoperative QoL scores were available for 42% of patients. Mean QoL scores improved from 0.82 preoperatively to 1.66 1 y postoperatively ($P = 0.004$). Patients scored higher in all individual areas of Moorehead-Ardelt Quality of Life Questionnaire II: self-esteem (0.22 *versus* 0.36), physical activity (0.11 *versus* 0.31), social life (0.28 *versus* 0.36), work ability (0.07 *versus* 0.22), sexual functioning (0.04 *versus* 0.16), and approach to food (0.11 *versus* 0.26; all P values < 0.05). On multivariable analysis, higher QoL was associated with private insurance/self-pay *versus* Medicare (odds ratio 4.20 [95% confidence interval 1.39–12.68]).

Conclusions: Bariatric surgery patients experienced significant improvement in QoL 1 y after surgery. Identifying modifiable predictors of high QoL after bariatric surgery requires additional investigation.

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Disclosure

The authors report no conflicts of interest.

Keywords

Quality of life; Bariatric surgery; Moorehead-Ardelt Quality of Life Questionnaire

Introduction

Bariatric surgery is a highly effective treatment option for patients with severe obesity. When compared with medical treatment, bariatric surgery results in significant excess weight loss (EWL) and obesity-related comorbidity resolution, including type 2 diabetes mellitus (Type II DM).^{1–4} Bariatric surgery is also cost-effective, with most studies finding cost savings within several years.^{5–7} Numerous studies have reported improvements in quality of life (QoL) after bariatric surgery, using generic QoL instruments such as the Short-Form 36 or Gastrointestinal Quality of Life questionnaire.^{8–14} Several studies have also reported significant improvements in QoL after bariatric surgery using the Moorehead-Ardelt Quality of Life Questionnaire II (MAQoLII).^{15–19} MAQoLII is a validated six-question survey that focuses on QoL for patients with obesity.²⁰

Despite these positive outcomes, questions remain regarding QoL after bariatric surgery. Several studies have reported that patients recovering from bariatric surgery are at increased risk for exhibiting self-harm behaviors and depressive symptoms.^{21–23} Bhatti *et al.* recently reported an increase of self-harm incidents after undergoing bariatric surgery, from 2.33 to 3.63 per 1000 patient-years.²² These findings seem to be inconsistent with the positive QoL impact that bariatric surgery typically has on patients. Furthermore, predictors of a higher QoL after bariatric surgery are unknown.

In this study, we sought to characterize postoperative QoL among patients undergoing bariatric surgery at a single institution at different time points within the first two postoperative years. In addition, we aimed to identify predictors of a higher patient-reported QoL postoperatively.

Materials and methods

Study population

QoL scores were reviewed for 209 consecutive patients who underwent bariatric surgery at University of Wisconsin Hospital and Clinics from January 27, 2010, to December 31, 2012. Patients underwent either a laparoscopic Roux-en-Y gastric bypass (LRYGB) or laparoscopic sleeve gastrectomy (LSG). Patients undergoing revisional surgery or gastric bands were excluded.

Study variables

Patient demographics (age, gender, race, insurance type, body mass index [BMI], type of surgery [LRYGB or LSG], smoking history, and the presence of eight comorbidities [Type II DM, obstructive sleep apnea, hypertension, gastroesophageal reflux disease [GERD], hyperlipidemia, coronary artery disease, depression, and anxiety]) were extracted from the electronic health record (Epic, Verona, WI). The presence of a comorbidity was determined

by reviewing the preoperative anesthesiology note, the referring physician note, and the bariatric surgery team notes. These processes for comorbidity identification have been applied in our previous bariatric surgery database studies.^{24,25}

Surgical outcomes

Inpatient and outpatient notes were reviewed to determine if patients developed a complication, were readmitted, or had an emergency department visit within 90 d of surgery. “Any complication” was defined as presence of at least one of the following: anastomotic or staple line leak, bleed, intra-abdominal abscess, deep vein thrombosis, pulmonary embolism, myocardial infarction, cerebrovascular accident, acute renal failure, wound infection, pneumonia, or urinary tract infection. Percent excess weight loss (%EWL) and change in BMI 1 y after surgery were obtained from bariatric surgery clinic notes. Patients’ ideal weights were calculated using the Metropolitan life scale.²⁶ These ideal weights were subtracted from their preoperative weights to determine their excess amount of weight. %EWL was then calculated from the amount of weight lost from the predetermined amount of excess weight. Resolution of a comorbidity was recorded if a follow-up note stated the resolution, if the comorbidity was removed from the active problem list, or if medications to treat the comorbidity were discontinued.²⁴ Type II DM was also considered resolved if the patient’s hemoglobin A1c was <6.5%.²⁴

Quality of life

QoL scores were determined by the MAQoLII, which patients were asked to complete at each preoperative and postoperative visit. The MAQoLII questionnaire asks patients about six aspects of QoL: self-esteem, social life, physical activity, work ability, sexual functioning, and approach to food. Approach to food refers to patients’ thoughts on how they view food and meals, judged as “live to eat” or “eat to live.” The cumulative score of MAQoLII ranges from +3.0 (“very good”) to −3.0 (“very poor”), with each individual question ranging from +0.5 to −0.5 as a Likert score. QoL scores were assessed at each preoperative visit and at the 2, 6, 12, 26 (±8), 52 (±16), and 104 (±24) wk postoperative visits.

Statistical analysis

A repeated measures analysis of variance test was conducted to analyze the significance of the trend in QoL scores during visits within 1 y of surgery. A paired t-test was used to compare preoperative and 1-y MAQoLII scores. Bivariate and multivariable logistic regression analyses were performed for variables hypothesized *a priori* to have a significant impact on QoL postoperatively. “High” QoL was defined as a 1-y QoL score within the top tercile of the patient cohort. %EWL was dichotomized at the median in these regression analyses.

Nonresponder analysis

A nonresponder analysis was conducted to assess the differences between patients who responded *versus* those who did not respond at the 1-y visit. Two-sample *t*-tests were

performed for continuous variables, whereas chi-square tests were used for categorical variables.

P values <0.05 were considered statistically significant. All statistical analyses were performed in SAS 9.4 (SAS Institute Inc, Cary, NC). The study protocol was approved by the Health Sciences Institutional Review Board at the University of Wisconsin–Madison. A waiver of informed consent was obtained for this study.

Results

Patient characteristics

Of the 209 bariatric surgery patients, 79% were female and 87% were Caucasian. The mean age was 47 y (± 12.16 ; Table 1). Private insurance/self-pay and Medicare coverage were the most common forms of insurance coverage (42.1% and 41.6%, respectively). The mean preoperative BMI was 48.0 (± 8.1) kg/m², with 50.7% of patients in the BMI class of 40.0–49.9 kg/m². Hypertension was the most common preoperative comorbidity (68.4%). Nearly half (48.3%) of the patients presented with Type II DM at the time of surgery. LRYGB patients comprised 91.4% of the cohort. The remaining 9.6% underwent LSG.

Surgical outcomes

Within 90 d of surgery, 13.4% of patients experienced a complication, and 5.3% experienced a wound complication (Table 2). Nearly one-third were evaluated in the emergency department, and 14.6% were readmitted at least once within 90 d postoperatively. The follow-up rate 1 y after surgery was 77%. Mean %EWL was 59.1% (± 19.0), and BMI decreased by 13.3 kg/m² (± 12.4). Type II DM was the condition with the highest rate of resolution (70.4%).

QoL outcomes

At their 1-y postoperative visit, 42% of patients (*n* = 87) completed the MAQoLII survey. The trend in QoL scores from the preoperative visit up to 1 y after surgery improved significantly from 0.82 to 1.66 (*P* = 0.004; Figure). Of the subset of patients who completed both a preoperative and 1-y postoperative visit questionnaire (*n* = 39), the mean composite QoL score improved from 0.76 to 1.54 (*P* < 0.001; Table 3). Compared with their preoperative visits, patients scored higher in each facet of the survey at their 1-y postoperative visits.

Predictors of high QoL

On bivariate analysis, private/self-pay insurance status was associated with a higher QoL compared with Medicare patients (odds ratio [OR] 3.79, 95% confidence interval [CI]: 1.44–9.81; Table 4). This association persisted on multivariable analysis (OR 4.20 [95% CI 1.39–12.68]). Age, gender, race, pre-operative BMI, number of comorbidities, %EWL, and 90-d complications were not associated with a higher postoperative QoL. A sub-analysis revealed that private/self-pay patients were, on average, 5 y younger than Medicare patients, although the groups had a similar number of comorbidities (3.4 *versus* 3.8, respectively; *P* = 0.33). BMI category was not significantly associated with a high QoL although there was a trend

toward a lower QoL as the BMI class increased: 58.3%, 42.9%, and 32.0% of patients in BMI class 30.0–39.9, 40.0–49.9, and >50.0, respectively, had a high QoL (Cochran-Armitage Trend Test; one-sided P value = 0.06).

Nonresponder analysis

Compared with nonresponders, survey responders at their 1-y postoperative visit were slightly older (49.4 *versus* 45.3; P = 0.017) and more likely to identify as Caucasian (93.2% *versus* 83.5 %; P = 0.036; Table 5). Responders and nonresponders were similar regarding insurance type, smoking history, number of comorbidities, preoperative QoL, 90-d emergency department visits, 90-d readmissions, and surgery type.

Discussion

Our retrospective single institution review found that QoL 1 y after bariatric surgery improved significantly. This increase did not appear to be because of one specific factor but rather improvements in numerous aspects of patients' lives. Patient characteristics, preoperative comorbidities, short-term complications, and weight loss were not independently associated with QoL outcomes. However, private/self-pay insurance status was associated with improved QoL at 1 y compared with Medicare patients.

This improvement in QoL is consistent with other studies that have investigated QoL changes for bariatric surgery patients. Charalampakis *et al.* reported that MAQoLII scores increased from –0.40 to +1.75 at 6 mo, +2.18 at 12 mo, and +1.95 at 24 mo in a Greek population.¹⁶ Zhang *et al.* found in a prospective Chinese study of 64 LRYGB and LSG patients that MAQoLII scores increased from 0.42 to 1.59 for LRYGB patients and 0.38 to 1.62 for LSG patients 1 y after surgery.¹⁸ In addition, Mohos *et al.* reported that 47 LRYGB and 47 LSG patients in Austria had postoperative MAQoLII scores of 2.09 and 1.70, respectively.¹⁹ Finally, in a Brazilian cross-sectional study, Costa *et al.* noted that all 26 bariatric surgery patients in the 1-y postoperative group reported their QoL as good, very good, or excellent.²⁷

Patients' scores improved in all six of the surveyed areas after surgery in our study. This result is consistent with several studies that have found that QoL improves in numerous areas. In a Spanish study of 79 patients, Mar *et al.* reported increases of 0.2 for each MAQoLII question at the 2-y postoperative visit.¹⁷ Sarwer *et al.* found that 112 patients had significant score increases in all eight areas tested by the Impact of Weight on Quality of Life Questionnaire survey at a 2-y follow-up visit.²⁸ In addition, sexual satisfaction increased fourfold among our patients. While sexual functioning after bariatric surgery has not been widely studied, the results from our study support previous findings from Goitein *et al.*, who reported in a study of 43 females and 14 males who underwent bariatric surgery that sexual satisfaction increased after their operation.²⁹

Identifying preoperative characteristics that are associated with excellent QoL after bariatric surgery is an important clinical area. We found that patients with private insurance or self-payers had a higher QoL compared with Medicare patients. On post-hoc analysis, the reason for this difference was unclear. The private/self-pay cohort was younger but the groups had a

similar burden of obesity-related diseases, suggesting their operative risk was similar. This suggests that other elements outside of the patient's preoperative comorbid status, such as limitations in patient mobility and activity that worsen with age, may have significantly influenced postoperative QoL.

Charalampakis *et al.* found that patients who experienced a higher %EWL and a reduction in comorbidities, specifically Type II DM and obstructive sleep apnea, were more likely to have higher QoL after bariatric surgery.¹⁶ In addition, Muller concluded that female gender, marriage status, and physical activity were associated with higher QoL according to MAQoLII in a matched study of 47 LRYGB and 47 gastric band patients in Switzerland.³⁰ The lack of agreement between our study, which did not find EWL, comorbidity resolution, or gender to be associated with improved QoL suggests there may be heterogeneity between our surgical populations (e.g., different nationalities of patients, providers, and their respective health care systems) that may not be captured in variables that were analyzed. Further qualitative and quantitative research is needed to identify factors other than insurance status that are associated with higher QoL after surgery.

There are several limitations in this analysis. It is a single institution review with a high population of Caucasian patients. Thus, the results may not be generalizable to a non-Caucasian patient population. Second, the longitudinal QoL assessment included different patients' scores at different times. Some patients declined to fill out the survey at each clinic visit, and some did not present for every follow-up visit. Despite this, the QoL improvement seen in this study is similar to what others have reported using the MAQoLII survey.^{16–18} Finally, our response rate 1 y postoperatively was 42%, and only 18.7% of our patients had both preoperative and 1-y QoL scores. To address this relatively low response rate, we performed a nonresponder analysis that suggested the groups were similar. Some biostatisticians have reported that nonresponder analyses are as important as the response rate because if the responders are similar to the nonresponders, the results should be generalizable to the study population.³¹ Finally, although our QoL outcomes are considered short-term,³² we would not expect further improvements in QoL after our study period given that weight loss typically peaks at 12–18 mo.³³ QoL could worsen for patients if they regained weight, yet studies suggest that QoL remains steady out to 5 y.^{15,18}

In summary, our study suggests that bariatric surgery candidates can be counseled that QoL should improve significantly after surgery across many facets of life. These improvements seem to last beyond the initial postoperative period. Identification of modifiable factors that are associated with improved QoL remains a research priority and will require additional quantitative and qualitative research.

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Figure -.
Patient-reported QoL scores (MAQoLII) after bariatric surgery.

Table 1 –

Patient characteristics.

Characteristic	n = 209
Female (%)	79.0
Age (mean years $\pm$ SD)	47.0 $\pm$ 12.2
Race (%)	
Caucasian	87.6
Non-Caucasian	12.4
Insurance(%)	
Private/self-pay	42.1
Medicare	41.6
Medicaid	15.3
Preoperative BMI (mean kg/m ² $\pm$ SD)	48.0 $\pm$ 8.1
Preoperative BMI class (%)	
30.0–39.9 kg/m ²	14.4
40.0–49.9 kg/m ²	50.7
50.0 kg/m ²	34.9
Smoker (%)	
Former	52.6
Never	47.4
Preoperative comorbidities (%)	
Hypertension	68.4
Obstructive sleep apnea	58.9
Depression	52.2
Type II DM	48.3
Hyperlipidemia	48.3
GERD	47.9
Anxiety	25.8
Coronary artery disease	7.2
Number of comorbidities	
0	2.4
1–2	23.4
3	74.2
Surgery type (%)	
LRYGB	91.4
LSG	8.6

SD = standard deviation.

Table 2 –

Patient outcomes after bariatric surgery.

90-d follow-up	
Any complication (%)	13.4
Wound complication (%)	5.3
Readmission (%)	14.6
Emergency department visit (%)	31.1
1-y follow-up	
Follow-up (%)	77.0
Excess weight loss (mean % $\pm$ SD)	59.1 $\pm$ 19.0
Change in BMI (mean, kg/m ²)	−13.3 $\pm$ 12.4
Resolution of comorbidities	
Type II DM	70.4
Obstructive sleep apnea	57.8
Hypertension	58.7
GERD	50.9
Hyperlipidemia	46.0
Revisional surgery (%)	0.5
Mortality	0

SD = standard deviation.

Table 3 –

QoL scores (MAQoLII) at preoperative and 1-y visits.

MAQoLII component	Preoperative score (mean)	1-y score (mean)	<i>P</i> value
Self-esteem	0.22	0.36	0.008
Physical functioning	0.11	0.31	0.003
Social interaction	0.28	0.36	0.048
Work ability	0.07	0.22	<0.001
Sexual functioning	0.04	0.16	0.019
Approach to food	0.11	0.26	0.004
Total score	0.76	1.54	<0.001

Table 4 –

Bivariate and multivariable analysis of predictors of high QoL at 1 y.

MAQoLII component	Bivariate		Multivariable	
	OR (95% CI)	P value	OR (95% CI)	P value
Age	0.99 (0.96–1.03)	0.74	1.01 (0.97–1.06)	0.63
Gender				
Female	Reference		Reference	
Male	1.40 (0.50–3.89)	0.52	1.13 (0.34–3.70)	0.84
Race				
Caucasian	Reference		Reference	
Non-Caucasian	1.49 (0.28–7.81)	0.64	1.87 (0.29–12.15)	0.51
Insurance				
Medicare	Reference		Reference	
Private/self-pay	3.79 (1.44–9.81)	0.01	4.20 (1.39–12.68)	0.01
Medicaid	2.35 (0.60–9.26)	0.22	3.03 (0.62–14.97)	0.17
Preoperative BMI				
30.0–39.9 kg/m ²	3.15 (0.76–13.00)	0.11	4.06 (0.82–20.19)	0.09
40.0–49.9 kg/m ²	1.63 (0.60–4.45)	0.34	1.54 (0.49–4.85)	0.46
50.0 kg/m ²	Reference		Reference	
Preoperative number of comorbidities				
0–2	Reference		Reference	
3	1.20 (0.42–3.41)	0.73	0.99 (0.29–3.31)	0.98
%EWL				
Higher EWL	Reference		Reference	
Lower EWL	1.08 (0.46–2.55)	0.85	1.20 (0.45–3.25)	0.71
Any complication				
Present	Reference		Reference	
Absent	1.24 (0.34–4.61)	0.74	1.06 (0.25–4.50)	0.94

Table 5 –

Nonresponder analysis for patients who did or did not complete the MAQoLII at the 1-y postoperative visit.

Characteristic	Responder	Nonresponder	P value
Age (mean)	49.4	45.3	0.02
Race (%)			0.04
Caucasian	93.2	83.5	
Non-Caucasian	6.8	16.5	
Insurance(%)			0.28
Private/self-pay	39.8	45.4	
Medicare	47.7	37.2	
Medicaid	12.5	17.4	
Smoker (%)			0.64
Former	54.5	51.2	
Never	45.5	48.8	
Comorbidities (%)			0.84
0	29.6	27.5	
1–2	52.1	57.5	
2+	18.3	15.0	
Preoperative QoL (mean)	0.76	0.86	0.61
90-d outcomes (%)			
Readmission	46.7	53.3	0.64
ED visit	37.5	62.5	0.31
Surgery type (%)			0.77
LRYGB	92.0	90.9	
LSG	8.0	9.1	

ED = emergency department.