

Pre-Operative Psychological Characteristics of Gastric Band and Gastric Bypass Patients

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Abstract Weight loss outcomes vary among different bariatric procedures, and may be partially due to differences in patient characteristics that are present preoperatively. In an observational study, laparoscopic adjustable gastric band (LAGB) and Roux-En-Y laparoscopic or open gastric bypass (RYGB) patients were compared on pre-op dimensions of depression, anxiety, and disordered eating. Results indicated that depression scores were in the mild range, and anxiety scores were in the mild range only for RYGB patients. In comparison to adults with eating disorders, scores on disordered eating scales were low. Cognitive-affective depression symptoms and several eating disorder subscale scores were higher in RYGB than in LAGB patients. This suggests that surgical candidates who choose RYGB surgery may differ psychologically from those who choose LAGB, although other factors impact choice of procedure also. Future research should delineate the decision-making process leading to the selection of a surgery type as well as the match of the patients to the demands of the post-op regimen.

Keywords Bariatric Surgery, Psychology, BDI, EDI

1. Introduction

As rates of obesity in the United States reach epidemic proportions [1], the popularity of surgical treatment options to reduce weight and weight-related medical comorbidities continues to grow. The number of bariatric surgical procedures performed over the last decade has increased significantly with estimates currently at 200,000-300,000 each year in the U.S. [2]. In the face of modest outcomes among conventional weight loss methods [3], bariatric surgery is a viable treatment alternative that offers successful weight loss as well as significant improvements in comorbidities associated with obesity [4].

In a review of weight loss outcomes across 89 studies, weight loss averaged 43.5 kg and 41.5 kg among Roux-En-Y gastric bypass (RYGB) patients and 30.2 and 34.8 kg among

laparoscopic adjustable gastric band (LAGB) patients at 12 and 36 months, respectively [5]. In a case-control study in which RYGB and LAGB patients were matched for age, sex, BMI, and co-morbid conditions, the RYGB patients had superior excess weight loss (74% vs. 51%) at 36 months as well as better resolution of preoperative comorbid conditions [6]. Review of medium-term weight loss outcomes (3 to 10 years) suggests that at longer follow-up times, differences in weight loss between RYGB and LAGB patients may be less pronounced [7], although the trajectory of weight loss between these groups differs. Weight loss among RYGB patients is rapid initially but levels off while weight loss among LAGB patients is gradual, resulting in greater differences in weight loss between groups in the short-compared to the long-term [8,9].

Clinically, it has appeared to us that bariatric surgery candidates select a specific procedure based partly on their estimation of their own strengths and weaknesses. Further, the characteristics of presenting patients may influence their ability to negotiate the demands of the particular procedure, and may ultimately play a role in weight loss trajectories and outcomes. For example, LAGB requires greater compliance with behavioral changes (e.g., reducing portion sizes, eliminating liquid calories) to achieve a satisfactory weight loss outcome. Additionally, patients must attend on-going follow-up appointments at which the band is adjusted for optimal weight loss. Utilization of the band without alterations in dietary habits and compliance with follow-up appointments will result in minimal, if any, weight loss [10]. Therefore, perhaps patients who have a history of successful weight loss with behavioral methods would be more attracted to LAGB. In contrast, in the RYGB procedures, the reconstruction of the digestive system largely prevents overeating and reduces absorption of nutrients from the food that is ingested. Therefore individuals who feel less in control of their own eating behavior may be more attracted to RYGB procedures. In light of the increased behavioral emphasis in LAGB, psychological factors (as they relate to compliance with these behavior changes) may be relevant to the patient's selection of a specific bariatric procedure, as well as predictive of weight loss success, regardless of type

of bariatric procedure.

Depression is the most common psychological disorder in obese individuals seeking bariatric surgery, and there is some evidence that it is associated with poorer weight loss outcomes [11]. It is also important to note that vegetative symptoms of depression (e.g., sleep, energy) may also occur secondary to obesity, so it may be useful to separate the somatic from the cognitive symptoms of depression in the study of this variable. As depression has also been shown to decrease adherence to medical instructions [12], it could also impact an individual's ability to comply with the post-op bariatric regimen.

In the present study, we compared a group of RYGB patients to LAGB patients on depression, anxiety, and disordered eating. It was our expectation that these two groups would differ on characteristics that would impact their choice of surgery. Furthermore, the elucidation of any differences in person characteristics between these groups preoperatively may lead to the development of interventions to enhance post-operative outcomes for both surgery types.

2. Methods

2.1. Participants

Participants were a non-randomized sample of patients who underwent bariatric surgery at the University of Illinois at Chicago Medical Center. Patients were serially recruited from Fall 2003 – Spring 2005. The present sample includes 71 patients who received laparoscopic adjustable gastric band (LAGB) and 58 patients who received laparoscopic or open gastric bypass (RYGB) surgery. Prior to surgery, all patients participated in a psychological interview with a health psychologist, and patients completed self-report questionnaires related to several domains of psychological functioning. The study protocol was approved by the Institutional Review Board of the University of Illinois at Chicago and consent was obtained from each participant.

2.2. Psychological Assessment

2.2.1. Psychological Interview and Medical Record Review

An unstructured psychological interview was performed to evaluate several target areas, including social functioning, medical history, weight history, psychiatric history and current psychiatric symptomatology, and preparedness for bariatric surgery. From this interview, variables were derived regarding demographics (age, gender, race, educational attainment, and marital status), weight/dieting history, and history of psychiatric treatment. Self-reported medical history of one's 'health status'; indexed by the number of comorbidities (i.e. hypertension, diabetes mellitus type 2, sleep apnea, osteoarthritis, chronic pain, gastroesophageal reflux disease [GERD], hypercholesterolemia/hyperlipidemia) and also body mass index (BMI) were corroborated by review of each patient's medical chart.

2.2.2. Depression

Depression was measured by the Beck Depression Inventory (BDI), a 21-item self-report questionnaire that assesses the presence and severity of depressive symptoms over the past week [13]. Items are scored on a 0-3 point scale and summed to create a total score with higher values indicating more depressive symptoms. Recently several groups of researchers have argued for a separation of BDI items into two subscales – one measuring the cognitive-affective symptoms of depression and the other measuring somatic symptoms [14-16]. In bariatric populations, as in other medical samples, somatic symptoms are common, and may incorrectly inflate total BDI scores, leading to a false positive diagnosis of depression. In the present study, we utilized the system of Munoz and colleagues [15] to develop these subscale scores. The somatic subscale consists of 9 items (e.g., sleep, appetite), and the cognitive/affective subscale contains 12 (e.g., sadness, guilt). The BDI is well established and shows adequate reliability and validity [17]. In our sample, internal consistency (e.g., coefficient alpha) was acceptable for the total BDI score ($\alpha=0.87$) as well as for the cognitive/affective ($\alpha=0.84$) and the somatic ($\alpha=0.71$) subscales.

2.2.3. Anxiety

Anxiety was measured by the Beck Anxiety Inventory (BAI), a 21-item self-report questionnaire that assesses the presence and severity of anxiety symptoms over the past week [18]. Items are scored on a 0-3 point scale and summed to create a total score with higher values indicating more anxiety symptoms. The BAI is well established and shows adequate reliability and validity [18]. In our sample, coefficient alpha = 0.85.

2.2.4. Disordered Eating

Disordered eating was measured by the Eating Disorder Inventory 2 (EDI-2), a 91-item self-report questionnaire that assesses thoughts, emotions, and behaviors related to DSM-IV diagnoses of anorexia nervosa and bulimia nervosa [19]. However, the Eating Disorder Inventory 3 (EDI-3) [20] subscales were scored from the original EDI-2 data. Each participant rates items on a 6-pt scale, but items are scored on a 4-pt scale. Scores were derived on twelve subscales. Higher scores indicate more symptoms of disordered eating. Previous reports have found internal consistency reliability and test-retest reliability to be adequate for all subscales; additionally, validity of the EDI has been demonstrated by its ability to discriminate between eating disordered and non-patient samples as well as its correspondence to clinician ratings and other self-report assessments of disordered eating [19,20]. In our sample, internal consistency varied widely across subscales, although most were acceptable. For individual subscales, alphas were: Bulimia = 0.76, Drive for thinness = 0.69, Body dissatisfaction=0.82, Low self-esteem=0.78, Personal alienation=0.77, Interpersonal insecurity=0.80, Interpersonal

alienation=0.71, Interoceptive deficits=0.80, Emotional dysregulation=0.51, Perfectionism=0.74, Asceticism=0.57, Maturity Fears=0.66.

3. Results

3.1. Sample Characteristics

Demographic and medical data are presented in Table 1 for the full sample and for LAGB and RYGB patients separately. Statistical comparisons (by *t* test for continuous variables and by χ^2 for dichotomous variables) showed no

significant differences between LAGB and RYGB patients on any of these dimensions. The average age was 41.9 years, and 82% of the participants were women. Forty-two percent were of ethnic minorities (26% African-American, 16% Hispanic). On average, participants reported attending some college and the majority were married. The average BMI was 48.9. All patients had commercial insurance coverage. Table 2 shows the intercorrelations among the main study variables for all participants combined. Note that there are many significant correlations among the BDI scales, the EDI scales, and the BAI. BMI was also significantly correlated with depression and with several of the EDI subscales.

Table 1. Sample characteristics

	RYGB (N*)	LAGB (N)	Total (N)	Statistic **
Age	42.2 (58)	41.7 (71)	41.9 (129)	$t(127)=0.24$
BMI	48.2 (57)	49.6 (55)	48.9 (112)	$t(110)=-0.99$
Comorbidities	3.7 (50)	3.5 (50)	3.6 (100)	$t(98)=0.51$
	RYGB (%)	LAGB (%)	Total (%)	Statistic
Gender				$\chi^2(1)=1.17$
Female	50 (86)	56 (79)	106 (82)	
Male	8 (14)	15 (21)	23 (18)	
Race				$\chi^2(2)=4.54$
Caucasian	37 (64)	38 (54)	75 (58)	
African-Amer	16 (28)	17 (24)	33 (26)	
Hispanic	5 (9)	16 (23)	21 (16)	
Marital status				$\chi^2(3)=5.28$
Married	30 (52)	47 (66)	77 (60)	
Divorced	10 (17)	5 (7)	15 (12)	
Single	17 (29)	19 (27)	36 (28)	
Separated	1 (2)	0 (0)	1 (1)	
Education				$\chi^2(4)=1.79$
< high school	1 (2)	4 (6)	5 (4)	
h.s. grad	12 (21)	12 (19)	24 (20)	
Some college	25 (44)	28 (44)	53 (44)	
College grad	13 (23)	12 (19)	25 (21)	
Post grad	6 (11)	7 (11)	13 (11)	

Notes: * N's vary due to missing data; ** No significant differences

Table 2. Intercorrelations among study variables

	BDI total	BDI Cog-Affect scale	BDI Somatic scale	BAI	EDI Bulimia	EDI Drive for thinness	EDI Body Dissat	EDI Low self-esteem	EDI Pers Alien	EDI Interpers Insecurity	EDI Interpers Alien	EDI Interocept Deficits	EDI Emot Dysreg	EDI Perfect	EDI Asceticism	EDI Maturity Fears
BDI Cog-Affect scale	0.93**															
BDI Somatic scale	0.91**	0.68**														
BAI	0.54**	0.51**	0.48**													
EDI Bulimia	0.46**	0.49**	0.35**	0.19												
EDI Drive for thinness	0.43**	0.45**	0.32**	0.35**	0.47**											
EDI Body Dissat	0.35**	0.33**	0.31**	0.23*	0.24**	0.28**										
EDI Low self-esteem	0.65**	0.68**	0.50**	0.33**	0.60**	0.42**	0.29**									
EDI Pers Alienation	0.62**	0.68**	0.44**	0.42**	0.65**	0.46**	0.31**	0.82**								
EDI Interpers Insecurity	0.38**	0.43**	0.26**	0.30**	0.42**	0.17	0.22*	0.67**	0.72**							
EDI Interpers Alien	0.54**	0.56**	0.43**	0.28**	0.53**	0.36**	0.23**	0.68**	0.81**	0.70**						
EDI Interocept Deficits	0.56**	0.58**	0.44**	0.35**	0.55**	0.40**	0.26**	0.67**	0.71**	0.56**	0.65**					
EDI Emot Dysreg	0.45**	0.47**	0.35**	0.36**	0.39**	0.29**	0.16	0.38**	0.49**	0.33**	0.37**	0.45**				
EDI Perfect	0.26**	0.19*	0.27**	0.05	0.17	0.30**	0.10	0.16	0.20*	0.14	0.32**	0.26**	0.05			
EDI Asceticism	0.49**	0.52**	0.36**	0.25*	0.44**	0.45**	0.23*	0.48**	0.46**	0.26**	0.43**	0.41**	0.39**	0.34**		
EDI Maturity Fears	0.43**	0.43**	0.34**	0.25*	0.33**	0.25**	0.09	0.51**	0.38**	0.28**	0.35**	0.31**	0.21*	0.21*	0.23*	
BMI	0.25**	0.19*	0.25**	0.07	0.20*	0.14	0.21*	0.24*	0.31**	0.22*	0.38**	0.27**	0.05	0.10	0.15	0.05

**p<.01

*p<.05

Table 3. Means (SD) on depression, anxiety, and disordered eating for RYGB and LAGB groups

	RYGB	LAGB	p
Depression (BDI)	12.4 (8.0)	10.4 (6.4)	NS
Cognitive Affective	5.4 (4.6)	3.8 (3.8)	.03
Somatic	7.0 (4.0)	6.6 (3.4)	NS
Anxiety (BAI)	9.4 (6.2)	7.8 (7.2)	NS
Disordered eating (EDI-3)			
Bulimia	5.8 (4.3)	4.5 (3.5)	NS
Drive for thinness	11.1 (5.1)	9.3 (3.4)	.05
Body dissatisfaction	28.7 (7.4)	27.5 (7.3)	NS
Low self-esteem	5.1 (4.7)	2.7 (2.9)	<.01
Personal alienation	5.8 (4.9)	3.3 (3.1)	<.01
Interpersonal insecurity	5.2 (5.1)	4.0 (3.7)	NS
Interpersonal alienation	4.7 (4.3)	4.2 (3.2)	NS
Interoceptive deficits	4.5 (5.5)	2.9 (2.8)	NS
Emotional dysregulation	2.4 (2.2)	1.9 (1.8)	NS
Perfectionism	6.8 (3.9)	6.9 (5.1)	NS
Asceticism	5.8 (3.2)	4.6 (2.9)	<.05
Maturity fears	6.0 (4.2)	5.5 (3.7)	NS

3.2. Comparison of LAGB and RYGB patients

3.2.1. Depression

The total BDI scores for both RYGB and LAGB groups indicated depression in the mild range clinically (RYGB = 12.38; LAGB = 10.35). A multivariate ANOVA, using total BDI scores and Cognitive/Affective and Somatic subscales, yielded a significant difference for only the Cognitive/Affective subscale ($F(1,123)=4.64, p<.04$). Means are in Table 3.

3.2.2. Anxiety

A t-test was performed to compare the two groups on their scores on the BAI (Table 3); mean scores for the two groups did not significantly differ ($t(99)=1.15, p=.25$). Clinically, however, the mean score for the LAGB group is in the minimal range, while the mean score for the RYGB group indicates mild anxiety [21].

3.2.3. Disordered Eating

Means for raw scores on the EDI-3 subscales are in Table 3. For all but two subscales, the mean scores are in the low range for clinical samples of adults. Two are at the borderline between “low” and “typical” for adults with eating disorders; these are Bulimia and Maturity Fears.

To assess differences in disordered eating, a MANOVA using the twelve subscales of the EDI-3 was performed. Results indicated that the groups differed significantly on

four of the EDI-3 subscales: Drive for thinness ($F(1,92)=3.95, p=.05$); Low self esteem ($F(1,92)=8.56, p=.004$); Personal Alienation ($F(1,92) = 8.79, p=.004$); Asceticism ($F(1,92)=4.05, p=.047$). In all cases the RYGB group had higher scores than the LAGB group.

4. Discussion

We compared symptoms of depression, anxiety, and disordered eating between RYGB and LAGB patients at their pre-surgical psychological evaluations. Examination of BDI total scores indicated that the average BDI score for both patient groups was in the mildly depressed range. Cognitive/affective and somatic items were also evaluated separately. Other researchers, using this method and scoring with bariatric patients, have reported higher BDI scores overall (mean=16.47), but reported a similar pattern of scores, i.e., that somatic scores were higher than cognitive/affective scores [15]. The higher somatic scores are due to the presence of medical symptoms that are associated with obesity and therefore artificially inflate BDI scores. In our sample, the two groups did not differ on the overall BDI score or on the Somatic subscale, but the RYGB patients scored higher on the Cognitive/affective subscale. The RYGB patients, then, reported more emotional and cognitive aspects of depression, such as sadness and guilt (but similar vegetative symptoms). It is also important to

note that this difference cannot be explained by higher BMI or comorbidities in the RYGB sample, or by demographic differences, as the groups did not differ on these variables. Anxiety levels did not significantly differ between the two surgery groups, and were in the “minimal” (LAGB) or “mild” (RYGB) range clinically, similar to other recent reports of anxiety in bariatric surgery candidates [22].

Overall, when comparing our mean scores on the EDI-3 subscales to those of eating disordered adults and normal controls, scores on all but one of the subscales were low relative to samples of adults with eating disorders, and quite similar to those of normal controls [23], indicating that our bariatric patients did not exhibit the level of pathology seen in eating disordered samples. The one exception was the Body dissatisfaction subscale. Here, our participants demonstrated a level of pathology consistent with that of adults with eating disorders [23], not surprising for a group of individuals who are seeking bariatric surgery.

While EDI subscale scores were not clinically elevated, there were some differences between the RYGB and LAGB groups. Specifically, the RYGB group reported more preoccupation with dieting and weight (Drive for thinness), more negative self-evaluation (low self-esteem), greater emptiness and poorer self-understanding (personal alienation), and greater tendencies toward self-discipline and self-sacrifice (asceticism) than the LAGB group.

Why would patients presenting for RYGB report more pathology, such as cognitive-affective depression, preoccupation with dieting and self-sacrifice, and negative self-esteem than their LAGB counterparts? The surgical procedure that a patient ultimately receives reflects a combination of influences, including his/her own perceptions of their options and their ability to achieve success with each option. In this study, patients were not randomized to surgical procedure, and the procedure chosen was limited only minimally by insurance, as all patients had commercial insurance. Patients typically expressed a procedure preference even prior to meeting with their surgeon. From our clinical discussions with patients, this preference was typically influenced by the patient’s assessment of the surgical risk and their ideas of how much control they could exert over their own behavior. Our results suggest that patients who are more preoccupied with and desperate for weight loss, have poorer self-esteem (i.e., less confidence in their own ability to make the required behavioral changes associated with restrictive procedures), and more cognitive/affective symptoms of depression may choose RYGB surgery. Ultimately, the procedure chosen is influenced by the surgeon’s recommendation as well as other variables, but the patient’s preference is also a major determinant. Importantly, the differences in psychological factors between the groups reported here could not be explained by weight or poor health as there were no significant differences between the groups on BMI or number of medical comorbidities.

There are several limitations of the present study, including a small sample size and a lack of post-operative

data to determine to what extent the pre-op psychological factors relate to outcomes. Additionally, the reasons why patients chose one surgery type over another were not explicitly addressed. Future research would do well to delineate factors involved in the decision-making process, as well as relating pre-op characteristics to post-op outcomes.

5. Conclusions

We report differences in pre-operative psychological characteristics between LAGB and RYGB bariatric surgery patients. While neither group demonstrated significant psychopathology, there were differences between the groups that reflect more distress and psychological characteristics associated with disordered eating in the RYGB group.

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