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Relationship of Psychiatric Disorders to 6-Month Outcomes after Gastric Bypass

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Abstract

Setting—University Medical Center, United States.

Background—Although most bariatric surgery patients undergo a preoperative psychological evaluation, the potential impact of psychiatric disorders on weight loss is not well understood.

Objective—We sought to document the relationship of preoperative psychiatric disorders to 6-month outcomes after gastric bypass.

Methods—The Structured Clinical Interview for the DSM-IV was used to assess current and lifetime Axis I clinical disorders as well as Axis II personality disorders prior to surgery. We utilized linear regression models to examine the relationship of psychiatric disorders to postoperative weight-related outcomes.

Results—The sample (n = 207) was 83.1% female and 92.7% White. Preoperative BMI was 51.4 (S.D. = 9.6) and age was 45.8 years (S.D. = 9.5). After adjusting for initial BMI, sex, race and age, lifetime Axis I disorder was associated with a smaller decrease in BMI (t = -3.7, df = 205, p < 0.001) at six months post-surgery. Results of separate models for each class of disorder indicated that lifetime mood disorder was associated with a smaller decrease in BMI (t = -3.7, df = 205, p < 0.001) as was lifetime anxiety disorder (t = -2.6, df = 205, p = 0.009), but substance and eating disorders were not. In this sample, Current Axis I clinical disorders and Axis II personality disorders were unrelated to outcomes at 6 months. Similar overall results were found when percent weight loss and excess weight loss were predicted.

Conclusions—Patients who have ever had an Axis I clinical disorder, especially mood or anxiety, exhibit poorer weight outcomes 6 months after gastric bypass than individuals who have

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never had an Axis I disorder. Further research with larger samples is needed to replicate these findings and examine more fully the impact of current clinical disorders and personality disorders. Nevertheless, results suggest that patients with current or past disorders may benefit from close monitoring or psychosocial intervention to improve short-term outcomes. However, a greater duration of follow-up is needed to identify predictors of longer-term weight control.

Keywords

Bariatric surgery; gastric bypass; weight loss; psychiatric disorders; psychological evaluation

Bariatric surgery is recommended for well-informed, motivated, severely obese individuals (BMI ≥ 40) with acceptable operative risks, and for moderately obese individuals (BMI 35 – 40) with high-risk, obesity-related medical comorbidities.¹ Recent meta-analyses indicate that patients experience significant, sustained weight loss after bariatric surgery, averaging 61% of excess weight,² or 20 to 30 kg.³ In addition, most individuals experience resolution or improvement in obesity-related comorbidities such as diabetes, hyperlipidemia, hypertension, and obstructive sleep apnea.^{2, 3} However, a significant minority of patients, approximately 20%, experience inadequate weight loss or weight regain.⁴

The vast majority of patients undergo a pre-surgical psychological evaluation.⁵⁻⁷ Published reports on the results of such clinical evaluations suggest that most patients are approved for surgery, with approximately 3% considered to have psychological contraindications to surgery.^{8, 9} However, empirical data to inform preoperative evaluation practices are limited. Research studies of the impact of psychopathology on post-surgical outcomes have yielded equivocal findings, and results can be difficult to compare across studies because of differences in design and methodology. These differences can include differences in patient samples, surgical procedures, mental health criteria, evaluation of weight loss, and duration of follow-up. Thus the relationship of preoperative psychiatric disorder to postoperative weight loss is not well understood.

Most studies examining the relationship of preoperative mental health to short-term weight loss have focused on symptoms of binge eating and depression, common among obese treatment seekers. Binge eating prior to bariatric surgery has been reported to be unrelated to short-term weight loss in some studies.^{10, 11} However, studies have reported inconsistent results, with some showing preoperative binge eating to be related to better weight loss¹² and others showing binge eating to be associated with poorer weight loss.^{13, 14} Similarly, depressive symptoms have been related to greater weight loss in some studies,¹⁵ but not others.¹⁶ Thus, binge eating and depressive symptoms prior to operation have not been consistently related to short-term weight outcomes.

Few investigations in bariatric surgery have included preoperative assessment of a full range of Axis I and Axis II psychopathology. Axis I disorders include, but are not limited to, major mental disorders such as mood, anxiety, eating and substance use disorders. Axis II personality disorders refer to enduring, inflexible and pervasive patterns of impairment in social interactions. There is increasing recognition that not only Axis I disorders, such as depression,¹⁷ but also Axis II personality disorders,^{18, 19} may be associated with adverse health outcomes. Some studies in bariatric surgery have shown Axis I and II disorders to be unrelated to short-term²⁰ and longer-term²¹ outcomes. In contrast, Kinzl and colleagues²² found that patients with two or more preoperative psychiatric disorders, in most cases a comorbid Axis I clinical disorder and Axis II personality disorder, had a smaller reduction in BMI at follow-up at least 30 months after adjustable gastric banding. Given the inconsistencies in the literature, more research is needed to identify preoperative factors

associated with postoperative weight control, as results may directly inform efforts to enhance surgery preparation and aftercare.

As part of a large, prospective study, psychiatric assessments were administered prior to bariatric surgery. In our initial report, we provided compelling evidence that Axis I clinical disorders and Axis II personality disorders are a major concern for this patient population, not only because they are relatively common, but also because they are associated with severity of obesity and decreased functional health status.²³ In the present report, we aimed to determine if current or lifetime preoperative psychiatric disorders were associated with early weight loss following Roux-en-Y gastric bypass.

Materials and Methods

Participants

Two hundred seven patients who were at least 18 years of age and underwent a first Roux-en-Y gastric bypass at a large, urban medical center were included in the analysis. Of 213 patients who participated in a baseline assessment, 189 (88.7%) were weighed at a follow-up visit 6 months (range 4 to 8) after surgery, 18 (8.5%) self-reported their weight, and 6 (2.8%) were lost to follow-up. Participants who were weighed did not differ significantly from those who self-reported their weight at follow-up in terms of preoperative BMI, sex, race, or age. Thus, the total sample for the present investigation ($n = 207$) was 83.1% female and 16.9% male, 92.7% White and 7.3% Black or multiracial. A majority had at least some college education (72.0%) and was married (58.9%). On average, participants weighed 141.8 kg ($SD = 30.2$), BMI was 51.4 ($SD = 9.6$), and age was 45.8 ($SD = 9.5$) years at preoperative evaluation.

Procedure and Measures

At the initial preoperative visit, height was measured with a mounted stadiometer, and weight was assessed using a digital scale. Participants were informed about ongoing studies at this clinical visit and assured their medical care would not be affected by the decision to participate or not to participate in research. All participants who enrolled in the research study provided written informed consent and were compensated for participation.

Interviewers were masters and doctoral level clinicians who received standardized training and ongoing supervision from a doctoral level, licensed clinical psychologist. Axis I clinical disorders were assessed with the Structured Clinical Interview for DSM-IV (SCID I/NP with Psychotic Screen).²⁴ Interviewers first administered the overview before inquiring about the absence of particular DSM-IV criterion items. All patients were administered the psychotic screening module, with none reporting clinically significant psychotic symptoms. The following disorders were assessed: mood (including major depressive disorder, dysthymia, and bipolar I and II disorders), anxiety (including panic disorder with and without agoraphobia; agoraphobia without panic, social phobia, specific phobia, obsessive compulsive disorder, post traumatic stress disorder, and generalized anxiety disorder), substance use (including alcohol and other drug abuse and dependence), and eating (including anorexia nervosa, bulimia nervosa and binge eating).

The SCID clinical interview determines whether an Axis I diagnosis has ever been present (lifetime prevalence) and whether or not there is a current episode (defined as meeting diagnostic criteria within the past month). It is important to note that lifetime prevalence subsumes current disorder. Exceptions include dysthymic disorder and generalized anxiety disorder which are rated only if current due to the difficulty in making a reliable retrospective assessment. The semi-structured questions are designed to approximate the

differential diagnostic process of an experienced clinician, and it is possible to diagnose more than one disorder.

The SCID II²⁵ was used to assess DSM-IV Axis II personality disorders, which are chronic, pervasive, inflexible patterns of impairment in interpersonal functioning. Interviewers first administered the personality questionnaire before inquiring about the absence of particular DSM-IV criterion items. All patients were then assessed for the following personality disorders: Avoidant, Obsessive Compulsive, Dependent, Paranoid, Schizotypal, Schizoid, Histrionic, Narcissistic, Borderline and Antisocial. For the purposes of the SCID II, chronicity is operationalized by a characteristic having been frequently present over a period of at least the last 5 years. Individuals meeting full diagnostic criteria for at least one personality disorder are categorized as having an Axis II personality disorder. Again, more than one DSM-IV disorder may be rated. Research participants reported sex, age, race, education, and marital status on a questionnaire, and height and weight were obtained from the medical record.

Analytic Plan

We used descriptive statistics to characterize sample demographics and Axis I (lifetime and current) and Axis II diagnoses at the time of preoperative evaluation. We then examined the relationship between Axis I and II disorders. Individuals with a lifetime Axis I diagnosis were more likely than those without to have an Axis II diagnosis (Chi-Square = 8.48, df = 1, $p = 0.004$). As these diagnoses tended to co-occur, we utilized separate models to examine the relationship of Axis I clinical disorders and Axis II personality disorders to weight-related outcomes at 6 months, as detailed below.

For all analyses, we used the follow-up weights measured at the routine postoperative clinical visits ($n = 189$, 91.3%) and a self-reported weight for those patients who had not been weighed during the specified time interval of 4 to 8 months ($n = 18$, 8.7%). Since the weights of patients with both measured weight and self-reported weight was not significantly different ($t = 0.435$, $df = 205$, $p = 0.664$), and the percent of missing actual weights was acceptably low, the use of self-reported weights was not expected to increase the bias of the estimators.

Three weight-related outcomes were utilized. These included reduction in BMI, percent weight loss, and percent excess weight loss. BMI was calculated as weight in kilograms divided by the square of height in meters. Percent weight loss was defined as weight loss divided by preoperative weight times 100. Excess weight was calculated as the difference between preoperative and ideal weight for a patient's sex and height based on the 1983 Metropolitan Height and Weight Table for a person of medium frame; percent excess weight loss was calculated as weight loss divided by initial excess weight times 100.

We employed linear regression to examine the relationship of preoperative psychiatric diagnoses to weight-related outcomes at 6 months after surgery. Having previously documented that pre-surgery BMI is significantly related to psychiatric disorder,²³ all models included the pre-surgery BMI as an explanatory variable and also controlled for age, race and sex, as these have been related to postoperative weight control in some studies.²⁶

First, relationship of lifetime Axis I clinical disorder (including individuals with current or past disorder) to BMI change at 6 months was evaluated. We then ran separate models for each class of disorder (mood, anxiety, eating and substance). Next, we examined the relationship of current Axis I clinical disorder to BMI change at 6 months. Finally, we modeled the relationship of Axis II personality disorder to BMI change at 6 months.

We also fit a similar series of models as described above for the two other weight outcomes--percent weight loss and percent excess weight loss. All models for percent weight loss adjusted for preoperative weight, as well as age, race, and sex. All models for percent excess weight loss adjusted for preoperative excess weight, as well as age, race, and sex.

Results

As shown in Table 1, 141 (68.1%) of the participants had a lifetime history of at least one Axis I mood, eating, anxiety or substance disorder, and 79 (38.2%) currently met diagnostic criteria for any Axis I disorder at the time of preoperative evaluation. With respect to Axis II, 59 (28.5%) of the patients met diagnostic criteria for at least one personality disorder. Participant characteristics and unadjusted weight-related outcomes as a function of psychiatric disorder are also shown in Table 1.

First, relationship of lifetime Axis I clinical disorder (including individuals with current or past disorder) to BMI change at 6 months was evaluated. Having at least one lifetime Axis I disorder was related to a significantly smaller decrease in BMI 6 months after surgery. We then ran separate models for each class of disorder. Results indicate that lifetime mood and anxiety disorders were each associated with a significantly smaller decrease in BMI. However, lifetime substance and eating disorders were not related to BMI change at 6 months. Results from all models are shown in Table 2.

Next, we examined the relationship of current Axis I clinical disorder to BMI change at 6 months, and results were not significant ($B = -0.666$, $SE(B) = 0.508$, $t = -1.312$, $df = 205$, $p = 0.191$). Finally, we modeled the relationship of Axis II personality disorder to BMI change at 6 months, which also yielded a nonsignificant result ($B = -0.371$, $SE(B) = 0.544$, $t = -0.683$, $df = 205$, $p = 0.496$). As described in the analytic plan, we fit a similar series of models for percent weight loss and percent excess weight loss. The same overall pattern of results was achieved across all weight outcomes. Thus, we report results of modeling with respect to reduction in BMI only.

Discussion

The present study examined the relationship of psychiatric disorders to weight outcomes at six months after Roux-en-Y gastric bypass. All analyses adjusted for initial weight parameters, age, sex, and race. Results indicate that patients with at least one lifetime Axis I clinical disorder prior to surgery exhibited poorer weight outcomes afterward. Specifically, mood and anxiety, but not substance or eating disorders, accounted for a modest, but significant amount of the variability in short-term outcomes. Although lifetime Axis I disorder had prognostic significance, whether or not there was a current episode within the last month was not independently predictive of short-term weight outcomes in this study.

The strengths of the current study include assessment of a broad range of Axis I and II psychiatric disorders with standardized assessment interviews confidentially administered by trained interviewers prior to surgery. Because analyses were restricted to short-term outcomes among patients who underwent gastric bypass, study results do not address the broader clinical question of identifying patients whose psychiatric status would contraindicate surgery. Nonetheless, this investigation does have some direct clinical implications. Results clearly support monitoring individuals who have ever had an Axis I disorder prior to surgery for sub-optimal weight loss afterward. Close surveillance of patients with current or past disorders may help in identifying patients who could benefit from early adjunctive interventions that target potential mediators of poor outcome. Patients

with mood and anxiety disorders may be vulnerable to developing inappropriate eating, restricted activity, or other behaviors that affect compliance to the post-surgical regimen. Interventions targeting eating, activity or compliance may help patients achieve optimal postoperative outcomes.

This study also has some limitations. First, a majority of the sample met lifetime diagnostic criteria for an Axis I clinical disorder. However, only a minority of the sample met diagnostic criteria for a current Axis I clinical disorder or Axis II personality disorder at the time of preoperative evaluation. Therefore, it remains possible that a failure to detect a relationship between current Axis I disorder and Axis II disorder to short-term outcomes is due to limited statistical power. Accordingly, larger samples may be required to examine the relationship of mental health to outcomes more completely. Next, although analyses adjusted for weight-related parameters as well as patient age, sex and race, other factors we have not evaluated may account for some of the variability in short-term outcome, including surgical parameters such as length of Roux limb or anastomotic type. Finally, the study sample was comprised of predominantly middle-aged white females who underwent Roux-en-Y gastric bypass surgery. Therefore, results are most relevant to individuals fitting this demographic profile, and generalizability to other sub-groups of weight loss surgery patients may be limited.

As weight loss generally continues for 18 to 24 months after gastric bypass,²⁷ a greater duration of follow-up is needed to evaluate predictors of longer-term weight control. Furthermore, predictors of longer-term weight control may differ from predictors of short-term weight outcomes. Indeed, a recent review of the literature suggests that those with clinically significant binge eating prior to surgery may be more likely to have binge eating problems after surgery, and if they do, have poorer longer-term weight outcomes.²⁸ Thus, we continue to follow all patients prospectively to examine the impact of psychopathology on longer-term postoperative outcomes, and to evaluate the impact of surgery on mental health.

Future hypothesis-driven studies with larger samples, or inclusion of high-risk subgroups, may allow investigators to explore the impact of a broader range of surgical, biological, behavioral and psychosocial factors on postoperative weight control. Factors of interest may include a focus on aberrant eating patterns such as binge eating and night eating. Although Night Eating Syndrome (NES) is not a DSM-IV Axis I disorder, it has been associated with excess weight among psychiatric outpatients²⁹ and has been associated with less weight loss in outpatient behavioral treatments.³⁰ Moreover, the impact of factors of interest may vary over time as patients advance from initial weight loss toward longer-term weight stabilization. In summary, findings of the present study are important in documenting that patients who have ever had an Axis I mood or anxiety disorder exhibit poorer weight outcomes 6 months after gastric bypass than do those who have not had these disorders. Further examination of the relationships between mental health and bariatric surgery outcomes may inform the multidisciplinary treatment of individuals with severe obesity.

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Table 1

Preoperative characteristics and 6-month weight outcomes as a function of current and lifetime psychiatric disorder (N = 207).

	Total Sample	Any Current Axis I	No Current Axis I	Lifetime Mood	Lifetime Anxiety	Lifetime Substance	Lifetime Eating	Any Lifetime Axis I	No Lifetime Axis I	Any Current Axis II	No Current Axis II
N	207	79	128	91	72	69	64	141	66	59	148
Preoperative characteristics											
Sex (Female) (%)	83.1	83.5	82.8	85.7	88.9	76.8	84.3	81.6	86.4	86.4	81.8
Race (White) (%)	92.7	88.6	94.5	91.2	87.5	91.3	92.2	91.5	93.9	93.2	91.9
Age (years) (M ± SD)	45.8±9.5	46.2±9.2	45.6±9.7	45.8±9.1	45.5±9.1	45.7±9.2	46.3±9.2	45.8±9.2	46.0±10.1	43.6±8.8	46.7±9.6
BMI (kg/m ²) (M ± SD)	51.4± 9.6	53.8±9.8	49.9±8.6	52.9±11.0	53.3±11.1	53.6±10.6	53.6±11.2	52.3±10.1	49.4±8.3	53.3±11.5	50.7±8.7
Weight (kg) (M ± SD)	141.8±30.2	148.7±31.8	137.6±28.5	146.5±32.6	147.5±31.2	151.5±33.8	148.2±31.7	145.5±30.6	134.0±28.0	146.5±32.7	140.0±29.0
Excess weight (Kg) (Mean ± SD)	79.2±28.1	85.7±30.1	75.0±26.0	83.2±31.4	84.9±30.4	88.4±31.9	86.2±31.2	82.6±29.1	71.9±24.4	83.2±31.9	77.7±26.5
6-month outcomes											
Reduction in BMI (Mean ± SD)	14±4.2	14.1±4.09	13.9±4.3	13.4±4.5	13.6±4.2	14.1±4.3	14.4±4.5	13.7±4.1	14.8±4.3	14.2±4.3	13.9±4.2
% Weight loss (M ± SD)	27±6.5	26.1±6.3	27.6±6.6	25.1±6.7	25.3±6.3	26.0±5.6	26.5±6.4	25.9±6.3	29.5±6.3	26.4±6.1	27.3±6.7
% Excess weight loss (M ± SD)	50.5±14.5	47.7±14.5	52.6±14.3	46.5±15.2	46.4±14.2	47.0±11.6	48.5±14.3	47.7±14.0	56.9±13.8	48.1±12.8	51.6±15.1

Notes:

Excess weight = preoperative weight - ideal weight for a patient's sex and height based on the 1983 Metropolitan Height and Weight Table for a person of medium frame

Reduction in BMI = preoperative BMI - postoperative BMI

Percent weight loss = [(preoperative weight - postoperative weight) / preoperative weight] X 100

Percent excess weight loss = [(preoperative weight - postoperative weight) / preoperative excess weight] X 100

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Table 2

BMI Change as a function of lifetime Axis I psychopathology

Factor	B	SE (β)	t- statistic (df = 205)	p-value
Lifetime Mood Disorder	-1.8	0.5	-3.7	<0.001
Lifetime Anxiety Disorder	-1.3	0.5	-2.6	0.009
Lifetime Substance Disorder	-0.7	0.5	-1.4	0.178
Lifetime Eating Disorder	-0.3	0.5	-0.6	0.580
Any lifetime Disorder (Mood, Anxiety, Substance or Eating)	-1.9	0.5	-3.7	<0.001

Note: All ordinary least squares regression models included initial BMI as an explanatory variable (in each model the corresponding p was < 0.001) and sex, race and age as control variables. All models were highly significant ($F_s(5, 201) = 21 - 27$, $p_s < 0.001$, with adjusted R squared range of 0.3 to 0.4).