

Article

The Influence of Emotional Dysregulation on Bariatric Surgery Outcome: A 2-Year Observational Study

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Abstract

Background: Bariatric surgery is the most effective long-term treatment for severe obesity; however, a subset of patients fails to achieve optimal weight loss. This study investigated the role of psychiatric disorders and transdiagnostic psychopathological traits in predicting weight loss outcomes two years after surgery. **Methods:** This prospective naturalistic study included 125 consecutive bariatric surgery candidates undergoing routine preoperative psychiatric assessment. Psychiatric comorbidities, emotional dysregulation and ADHD-related dimensions were assessed using structured clinical interviews and self-report questionnaires. Weight outcomes were evaluated at 24 months after bariatric surgery, with post-surgical inadequate weight loss defined as percentage of excess weight loss (%EWL) < 50%. **Results:** Of the 125 patients initially assessed, 89 underwent bariatric surgery and 48 completed the follow-up. At 24 months, 10 patients (20.8%) showed inadequate weight loss. Poorer weight outcomes were associated with older age, sleeve gastrectomy, and lifetime mood disorders, whereas no significant associations emerged with anxiety disorders or binge eating disorder. Patients with inadequate weight loss showed higher levels of emotional dysregulation, while no differences emerged for other ADHD-related dimensions. Emotional dysregulation remained significantly associated with poorer weight outcomes in multivariate analysis. **Conclusions:** Emotional dysregulation may represent a transdiagnostic factor influencing bariatric surgery outcomes, supporting the importance of integrating emotional and cognitive dimensions into preoperative assessment and postoperative care.

Keywords: emotional dysregulation; bariatric surgery; obesity; mood disorders; ADHD



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1. Introduction

The World Health Organization (WHO) has identified obesity as one of the most significant chronic health problems in adults and a major risk factor for non-communicable diseases (NCDs), including hypertension, diabetes, and dyslipidemia [1,2]. Over the last 30 years, cultural and environmental changes have contributed to the rapid rise in obesity prevalence, particularly through increased consumption of energy-dense diets and increasingly sedentary lifestyles. Genetic predisposition further amplifies the risk of developing obesity in an obesogenic environment [3].

A growing body of research has investigated the relationship between obesity and mental health disorders. Although definitive conclusions remain elusive, substantial evidence supports a strong association between obesity and several psychiatric conditions [4–6]. Assessing the prevalence and clinical significance of psychiatric disorders in individuals with obesity remains challenging. However, current evidence suggests that this association strengthens with higher body mass index (BMI) [7,8]. Furthermore, individuals actively seeking bariatric surgery exhibit higher rates of psychopathology compared to those opting for non-surgical approaches, such as lifestyle interventions or pharmacotherapy [9]. Studies in pre-bariatric populations have consistently identified binge eating disorder (BED), mood disorders, and anxiety disorders as the most common psychiatric comorbidities [10–12]. In addition, increasing evidence supports an association between obesity and attention-deficit/hyperactivity disorder (ADHD) [13–15]. Finally, impairments in executive functioning, impulsivity, and emotional dysregulation have been widely reported [16–20].

The primary goals of obesity treatment are to achieve and maintain clinically meaningful weight loss, improve obesity-related comorbidities, and promote long-term adherence to healthy lifestyle changes [3]. Obesity management should be individualized based on disease severity, comorbidities, and functional impairment. Current treatment options include lifestyle interventions, psychological therapies, pharmacotherapy, and bariatric surgery [4]. Among these, bariatric and metabolic surgery is recognized as the most effective long-term treatment for severe obesity [3,4,21,22].

However, approximately 15–20% of patients experience inadequate weight loss following bariatric surgery [23]. This variability reflects a complex interplay between provider-related factors (e.g., surgical technique) and patient-related characteristics (e.g., sex, age, metabolic comorbidities) [24–26]. Among patient-related factors, behavioral and psychopathological characteristics have increasingly been investigated as potential predictors of postoperative outcomes [27,28]. Several studies have reported associations between suboptimal weight loss and preoperative psychiatric disorders, particularly mood disorders [29–32], anxiety disorders [24] and eating disorders [33,34]. However, considerable heterogeneity across studies exists, and no clear consensus has been reached regarding which psychiatric conditions reliably predict poorer weight loss outcomes after surgery [35]. It has been hypothesized that, beyond specific diagnoses, transdiagnostic psychopathological dimensions may be more relevant in explaining variability in bariatric outcomes [28,35]. Supporting this perspective, recent evidence has identified distinct prebariatric patient subtypes characterized by elevated levels of impulsivity, including reduced inhibitory control, emotional dysregulation, and disinhibited eating behaviors [35,36]. Emotion dysregulation has been linked to maladaptive coping strategies, such as emotional overeating and other disordered eating patterns, and may therefore represent a key mechanism through which psychopathology influences postoperative weight trajectories [37–39]. Similarly, impulsivity has been associated with food addiction and food cravings, potentially contributing to maladaptive eating behaviors and difficulties in maintaining long-term lifestyle changes after surgery [40,41]. Although increasing attention has been paid to these transdiagnostic dimensions and their influence on eating behaviors [35,36,38], relatively few studies have examined their impact on the long-term outcomes of bariatric surgery [42]. Consequently, the identification of clinically meaningful psychopathological predictors of postoperative weight loss remains an open challenge.

The primary aim of this study is to evaluate whether specific psychiatric disorders or psychopathological traits in bariatric surgery candidates could influence weight outcomes two years after surgery in a naturalistic setting. We hypothesize that patients characterized by higher levels of emotional dysregulation and impulsivity—core dimensions often

underlying mood and eating disorders—will show less favorable weight loss outcomes following bariatric surgery.

2. Materials and Methods

2.1. Patient Sample and Study Design

Adopting a naturalistic and prospective approach, this study consecutively recruited 125 obese patients being assessed for bariatric surgery at the U.O. Endocrinology 1 Obesity Centre of Pisa University Hospital (March 2019–July 2022). Enrollment took place during the routine psychiatric pre-surgical evaluation preceding the bariatric procedure.

All patients over 18 years of age who were candidates for bariatric surgery ($\text{BMI} \geq 40 \text{ kg/m}^2$ or $\text{BMI} \geq 35 \text{ kg/m}^2$ plus an obesity-related medical comorbidity) were included. Patients unable to complete the self-questionnaires or with unstable and/or severe medical conditions were excluded from the recruitment. All subjects provided written informed consent for the study participation.

Between pre-surgical multidisciplinary evaluation and bariatric surgery, 1–3 months typically elapse, during which the patient should implement lifestyle and diet changes aimed at weight loss. Because normal clinical practice was profoundly altered by the COVID-19 pandemic in 2020–2021, bariatric interventions were suspended for a few months, and the waiting time for surgery lengthened to an average of 6 months per patient.

Patients who underwent bariatric surgery were followed postoperatively according to the following schedule: the first follow-up visit at 1 month (± 1 week), the second at 7 months (± 2 weeks), the third at 12 months (± 2 weeks), the fourth at 18 months (± 2 weeks), and the final visit at 24 months (± 2 weeks).

2.2. Data Collection and Clinical Assessment

At baseline, before the bariatric intervention, participating psychiatrists collected sociodemographic data and clinical variables. Current and lifetime psychiatric comorbidities, according to Diagnostic and Statistical Manual of Mental Disorders, 5th ed. (DSM-5) criteria, were assessed using the Mini-International Neuropsychiatric Interview (MINI, version 7.0.2.), a brief structured diagnostic interview designed to provide a short but accurate psychiatric evaluation [43].

In addition, patients were administered the Wender-Reimherr adult attention deficit disorder scale (WRAADDs) and the Reactivity, Intensity, Polarity and Stability questionnaire (RIPoS-40). The WRAADDs is a clinician-rated scale based on the Utah criteria for adult ADHD and assesses symptom severity across seven domains: attention difficulties, hyperactivity/restlessness, temper, affective lability, emotional over-reactivity, disorganization, and impulsivity [44]. Each domain is rated on a 5-point scale ranging from 0 (none) to 4 (very much). Factor analysis of the WRAADDs scale supports the validity of two types of ADHD in adults: the inattentive presentation (WRAADDs-I, which includes the attention difficulties and disorganization domains) and the emotional dysregulation presentation (WRAADDs-ED, which includes the temper, affective lability, and emotional over-reactivity domains), with hyperactivity and impulsivity common to both types [45]. The RIPoS-40 is a 40-item self-questionnaire assessing different components of emotional dysregulation, including affective instability, emotional impulsivity, and negative and positive emotionality [46]. The scale has proven good test–retest reliability and high internal consistency in both clinical and non-clinical samples.

For patients who underwent surgery, data on body weight at the time of surgery and the type of procedure were obtained from medical records. During follow-up visits, body weight was measured, and patients were interviewed regarding surgery-related side effects (e.g., regurgitation/vomiting, dumping syndrome, and gastrointestinal disturbances) and

adherence to dietary recommendations. Changes in pharmacological treatments, including psychotropic medications, were also recorded at each follow-up visit. Due to the COVID-19 pandemic, some follow-up assessments were conducted via telemedicine.

Weight loss outcomes were assessed using the percentage of excess weight loss (%EWL), a commonly adopted metric for comparing bariatric procedures. Ideal body weight was defined based on a BMI of 25 kg/m². %EWL was calculated as follows: $(\% \text{initial weight} - \text{follow-up weight}) / (\text{initial weight} - \text{ideal weight}) \times 100$.

2.3. Statistical Analysis

Descriptive statistics were used to summarize sample characteristics and are presented as means and standard deviations (sd) for continuous variables, and frequencies and percentages for categorical variables. Pairwise comparisons between baseline and 2-year follow-up were conducted by means of a paired *t*-test for continuous variables and a McNemar Test for categorical ones. Patients with %EWL < 50% at 2 years were compared with those achieving adequate weight loss (%EWL ≥ 50%). The normality of continuous variables was assessed using the Shapiro–Wilk test. Between-group comparisons were conducted using Student's *t*-tests for normally distributed continuous variables, the Mann–Whitney U test for non-normally distributed continuous variables, and chi-square tests for categorical variables. In addition, BMI values at each follow-up time point were compared between patients with and without lifetime mood disorders using Student's *t*-tests. Statistical significance was set at $p < 0.05$ (2-tailed). A stepwise backward logistic regression model was performed to identify clinical predictors of inadequate weight loss (%EWL < 50%) at 2 years. Variables with a p -value < 0.05 in univariate analyses were included in the model. The goodness-of-fit of the final logistic regression model was assessed using the Hosmer–Lemeshow test. All analyses were conducted using IBM SPSS Statistics for Mac, Version 25.0 (IBM Corp., Armonk, NY, USA).

3. Results

3.1. Baseline Assessment

The baseline sample included 125 patients referred for bariatric surgery. Women accounted for almost three-quarters of the sample (72%), and the mean age was approximately 46 years (range 21–68), with a normal distribution and no significant sex differences (Table 1). Among women, 65 (72.2%) had children and 34 (37.8%) were postmenopausal at the time of assessment.

The mean BMI was 44.7 kg/m², and approximately three-quarters of the sample had a BMI ≥ 40 kg/m². Baseline BMI did not significantly differ between patients with and without lifetime mood disorders; however, patients with BED showed significantly higher BMI compared with those without BED (46.70 ± 6.94 vs. 43.00 ± 5.54 , $p = 0.001$).

Lifetime psychiatric comorbidity was highly prevalent, affecting 73% of the sample. Mood disorders were the most frequent (56%), particularly bipolar disorder (38%), followed by BED (46%) and anxiety disorders (45%). A history of childhood/adolescent neurodevelopmental disorder in 12% of patients, including intellectual disability ($n = 5$), ADHD ($n = 4$), and specific learning disorders ($n = 6$). Less frequent comorbidities included substance use disorder (8%), obsessive–compulsive disorder (2%), and psychotic disorders (2%). Six patients (4.8%) reported previous suicide attempts. At the time of evaluation, 14 patients (11%) were experiencing a current major depressive episode, 10 (8%) a hypomanic episode, and 45 (36%) a current BED.

Sex differences emerged, with women showing significantly higher rates of bipolar disorder (44.4% vs. 22.9%, $p = 0.026$), bulimia nervosa (15.6% vs. 2.9%, $p = 0.05$), social

phobia (17.8% vs. 2.9%, $p = 0.029$), and overall psychiatric comorbidity (77.8% vs. 60.0%, $p = 0.045$) compared with men.

Table 1. Clinical characteristics of the obese bariatric sample ($n = 125$) at baseline.

Female sex (n , %)	90 (72.0%)
Age, years (mean, sd)	46.38 (10.76)
BMI, kg/m ² (mean, sd)	44.72 (6.47)
BMI, kg/m ² (range)	33.09–65.81
Maximum lifetime BMI, kg/m ² (mean, sd)	46.95 (7.01)
Age at obesity onset, years (mean, sd)	18.44 (10.16)
Childhood obesity (n , %)	35 (28.0%)
Family history of obesity (n , %)	93 (74.4%)
Previous weight-loss pharmacological therapy (n , %)	52 (41.6%)
Previous bariatric surgery (n , %)	16 (12.8%)
Lifetime psychiatric comorbidities (n , %)	
Bipolar Disorders	48 (38.4%)
Major Depressive Disorder	22 (17.6%)
Any mood disorder	70 (56.0%)
Panic Disorder	46 (36.8%)
Agoraphobia	31 (24.8%)
Social phobia	17 (13.6%)
Any anxiety disorder	56 (44.8%)
Binge Eating Disorder	58 (46.4%)
Bulimia Nervosa	15 (12.0%)
Any psychiatric disorder	91 (72.8%)
Current pharmacological treatment (n , %)	
Mood stabilizing agents	24 (19.2%)
Antidepressant agents	32 (25.6%)
Antipsychotics	5 (4.0%)
Benzodiazepines	14 (11.2%)
Stimulants	2 (1.6%)
Oral hypoglycemic agents	38 (30.4%)
Lipid-lowering agents	16 (12.8%)
Antihypertensive agents	53 (42.4%)

Abbreviations: BMI, Body Mass Index.

More than half of the entire sample (64%) had a family history of psychiatric disorders and/or suicide. Specifically, family history was positive for bipolar disorder in 34% of cases, substance use disorders in 18%, BED in 18%, major depressive disorder in 16%, panic disorder in 16%, and suicide in 10%.

At baseline, 42% of the sample was prescribed antihypertensive therapy, 30% hypoglycemic agents and 13% lipid-lowering agents. Regarding the psychopharmacological treatment, 26% of the sample was prescribed antidepressant therapy, 19% mood stabilizing agents and 11% benzodiazepines. Only 5 patients took antipsychotics (4%) and 2 stimulants for the treatment of ADHD (1.6%).

3.2. Follow-Up Analysis

Of the initial 125 patients, 36 did not undergo bariatric surgery. In some cases, surgery was postponed, whereas in others it was not recommended for various reasons, including psychiatric contraindications (Figure 1). Among the 10 patients excluded because of psychiatric contraindications, 6 presented with a current major depressive episode with suicidal ideation, 2 had an active substance use disorder, and 2 had a current psychotic disorder.

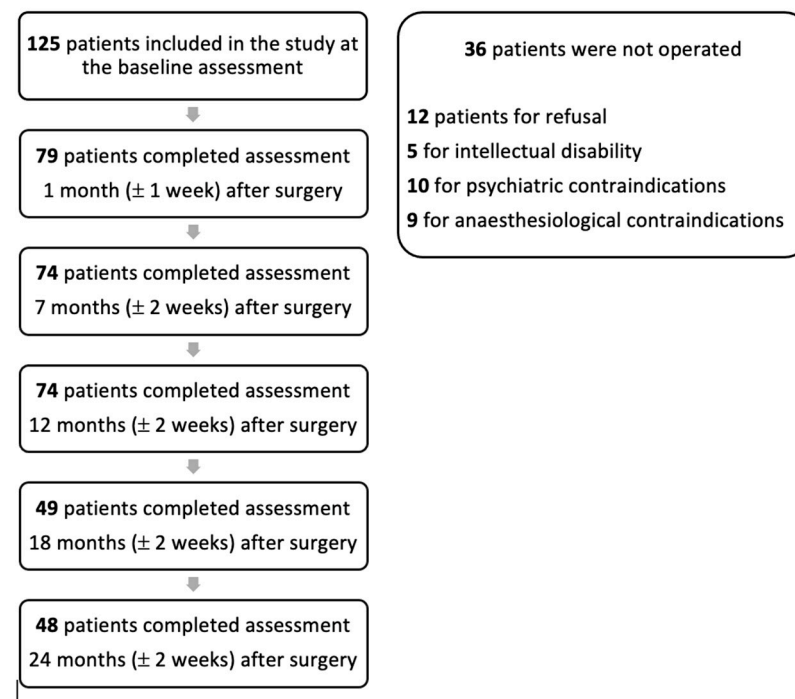


Figure 1. Flowchart of patient inclusion and follow-up.

Among the 89 operated patients, 53 (60%) underwent laparoscopic sleeve gastrectomy (LSG) and 36 (40%) Roux-en-Y gastric bypass (RYGB). All procedures were performed laparoscopically, with no conversions to open surgery. No major surgical complications or re-operations were recorded. The most common side effects were vomiting/regurgitation (approximately 50% of patients) and gastroesophageal reflux (approximately 33%).

Overall, 48 of the 89 operated patients (53.9%) completed the 2-year follow-up assessment. Among them, 39 (81.3%) were female. Patients lost to follow-up had a lower prevalence of psychiatric disorders compared with those who completed the study (66.2% vs. 85.4%, $p = 0.018$), while no significant differences were observed in age, sex, or BMI at the time of surgery.

Among patients who completed follow-up, bariatric surgery resulted in a substantial reduction in BMI (Table 2). At 2 years, the mean BMI decrease was 14.86 kg/m², corresponding to 32.8% of initial BMI and 73.2% of initial excess BMI (%EWL). Regarding pharmacological treatment of obesity-related comorbidities, only the use of oral hypoglycemic agents was significantly reduced at follow-up compared with baseline.

Table 2. Bariatric surgery effectiveness: comparisons between baseline and follow-up assessment.

	Baseline (<i>n</i> = 89)	1 Year After Surgery (<i>n</i> = 74)	2 Years After Surgery (<i>n</i> = 48)	<i>t</i>	<i>p</i>
BMI, kg/m ²	45.31 (5.99)	31.01 (5.46)	30.45 (5.89)	16.439	<0.001
Excess BMI, kg/m ²	20.31 (5.99)	6.01 (5.46)	5.45 (5.89)		
Pharmacological therapy (<i>n</i> , %)					
Oral hypoglycemic agents	29 (32.6%)	1 (1.4%)	2 (4.2%)	-	<0.001
Lipid-lowering agents	11 (12.4%)	6 (8.1%)	2 (4.2%)	-	0.125
Antihypertensive agents	35 (39.3%)	20 (27.0%)	9 (18.8%)	-	0.125

Abbreviations: BMI, Body Mass Index.

At 2 years, 10 of 48 patients (20.8%) showed inadequate weight loss (%EWL < 50%). When comparing patients with adequate versus inadequate weight loss (Table 3), no

differences emerged in sex, baseline excess weight, or previous pharmacological or surgical weight-loss treatments. In contrast, patients with inadequate weight loss were significantly older and more frequently treated with LSG rather than RYGB. Regarding psychiatric disorders, inadequate weight loss was associated with lifetime mood disorders, whereas no significant differences were observed for anxiety disorders or BED. Similarly, no between-group differences emerged in psychopharmacological treatment during follow-up.

Table 3. Comparisons of clinical variables between patients who lost < 50% and patients who lost $\geq$ 50% of excess weight at 2 years after bariatric surgery ($n = 48$).

	%EWL < 50% ($n = 10$, 20.8%)	%EWL $\geq$ 50% ($n = 38$, 79.2%)	χ^2/T	OR (95% C.I.)	p
Age (mean, sd)	53.60 (10.43)	43.58 (10.83)	2.622	-	0.012
Female gender (n , %)	8 (80.0%)	31 (81.6%)	0.013	1.11 (0.19–6.39)	0.909
Excess weight (at time of surgery) (mean, sd)	61.58 (21.28)	51.67 (15.86)	1.634	-	0.109
Current sleeve gastrectomy (n , %)	9 (90.0%)	20 (52.6%)	4.623	8.10 (0.93–70.37)	0.032
Previous weight-loss pharmacological therapy (n , %)	5 (50.0%)	17 (44.7%)	0.088	1.23 (0.31–4.98)	0.766
Previous bariatric surgery (n , %)	0 (0.0%)	5 (13.2%)	1.469	-	0.226
Lifetime psychiatric comorbidities (n , %)					
Any mood disorder	10 (100%)	24 (63.2%)	5.201	-	0.023
Any anxiety disorders	5 (50.0%)	19 (50.0%)	0.654	1.00 (0.25–4.02)	1.000
Binge eating Disorder	7 (70.0%)	18 (47.4%)	1.625	0.39 (0.09–1.72)	0.202
Any psychiatric disorder	10 (100%)	31 (81.6%)	2.157	1.32 (1.11–1.57)	0.142

Abbreviations: BMI, Body Mass Index; %EWL, percentage of excess weight loss.

Patients with inadequate weight loss (%EWL < 50%) exhibited significantly higher levels of emotional dysregulation and negative emotionality compared with those achieving adequate outcomes (Table 4). These differences were observed across both clinician-rated and self-reported measures, with higher scores on the emotional dysregulation domain of the WRAADDs interview and on the negative emotionality scale of the RiPoST-40 questionnaire.

Table 4. Comparisons of emotional dysregulation and ADHD symptoms between patients who lost < 50% and patients who lost $\geq$ 50% of excess weight at 2 years after bariatric surgery.

	%EWL < 50% ($n = 10$, 20.8%)	%EWL $\geq$ 50% ($n = 38$, 79.2%)	Z	p
ADHD symptoms (Wender-Reimherr adult attention deficit disorder scale, WRAADDs) (mean, sd)				
Inattention	3.50 (2.50)	3.82 (2.36)	−0.463	0.644
Hyperactivity	1.10 (1.29)	1.17 (1.54)	−0.287	0.774
Impulsivity	3.10 (0.99)	2.28 (1.37)	−1.727	0.084
Emotional dysregulation	9.90 (2.88)	7.26 (3.45)	−2.132	0.021
WRAADDs total score	17.60 (5.23)	14.55 (6.45)	−1.462	0.144
Emotional dysregulation (Reactivity, Intensity, Polarity and Stability questionnaire, RiPoSt-40) (mean, sd)				
Affective instability	29.70 (9.26)	26.70 (8.82)	−1.171	0.241
Positive emotionality	41.33 (6.40)	38.32 (7.52)	−1.197	0.231
Negative emotionality	30.35 (4.59)	25.94 (6.27)	−2.152	0.031
Emotional impulsivity	20.84 (3.56)	17.77 (4.78)	−1.605	0.109
RiPoSt-40 total score	122.23 (16.72)	108.72 (20.20)	−1.336	0.181

Abbreviations: ADHD, Attention-Deficit/Hyperactivity Disorder; %EWL, percentage of excess weight loss.

In multivariate logistic regression analysis, older age and higher WRAADDs emotional dysregulation scores remained independently associated with inadequate weight loss at 2 years (Table 5). The final logistic regression model showed an adequate goodness-of-fit according to the Hosmer–Lemeshow test ($\chi^2 = 12.75$, $df = 8$, $p = 0.121$).

Table 5. Multiple logistic regression of clinical features on the presence of %EWL < 50% at 2 years after bariatric surgery.

Variables in Equation	Wald	<i>p</i> -Value	OR (95% CI)
Age	5.095	0.024	1.14 (1.02–1.28)
WRAADDs emotional dysregulation	4.715	0.030	0.34 (1.03–0.76)

Wald = 8.724, $df = 1$, $p = 0.003$. Variables not included in the equation: any mood disorder, RPoSt negative emotionality, and sleeve gastrectomy. Abbreviations: RPoSt, Reactivity, Intensity, Polarity and Stability; WRAADDs, Wender-Reimherr adult attention deficit disorder scale; %EWL, percentage of excess weight loss.

Finally, when stratifying patients according to the presence of lifetime mood disorders, BMI trajectories diverged over time, with between-group differences becoming statistically significant after 12 months and remaining significant at 18 and 24 months (Figure 2).

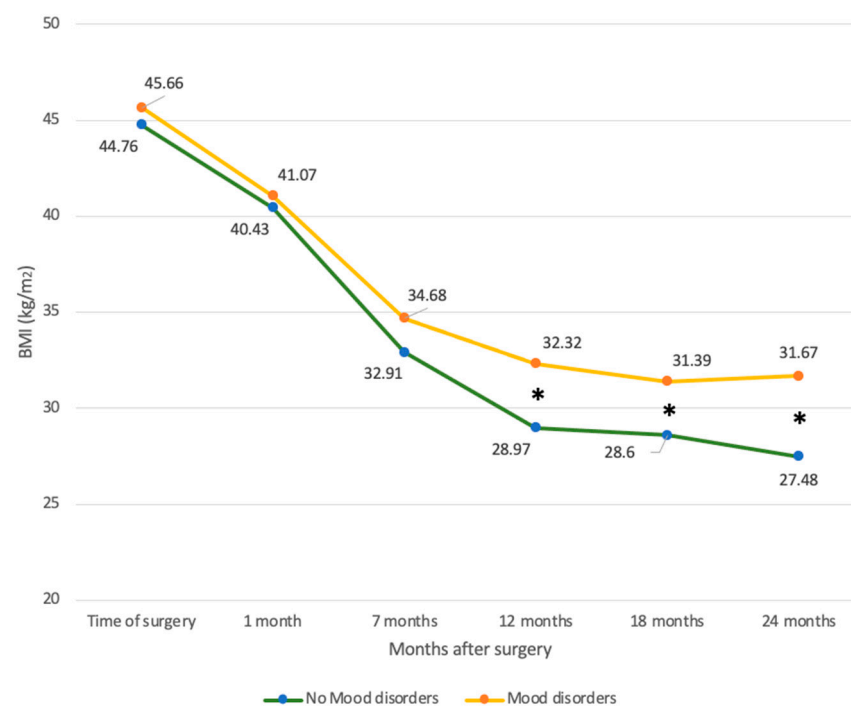


Figure 2. BMI trajectories over the 2-year follow-up according to the presence of lifetime mood disorders. Data are presented as mean BMI values at each assessment point. * $p < 0.05$ for between-group comparisons (Student's *t*-test) between patients with and without lifetime mood disorders at the corresponding follow-up time points.

4. Discussion

Two years after bariatric surgery, 20.8% of patients in our sample exhibited inadequate weight loss, a finding consistent with previous reports indicating that 15–20% of patients fail to achieve optimal weight outcomes [23]. While traditional predictors such as baseline BMI, sex, and prior weight loss attempts were not associated with postoperative outcomes in our cohort, age and type of surgical procedure emerged as significant factors. Specifically, patients with inadequate weight loss were older and more likely to have undergone LSG, in line with prior evidence identifying older age and surgical technique as relevant predictors of suboptimal weight trajectories [47–55].

A key finding of this study is the high prevalence of psychiatric comorbidity, observed in 72.8% of patients, with mood disorders representing the most frequent diagnostic category (56%). Notably, the presence of mood disorders was significantly associated with inadequate weight loss at two years, whereas anxiety disorders and binge eating disorder did not show such an association. These findings are consistent with previous literature linking depressive and bipolar spectrum conditions to poorer postoperative outcomes [29,31,32,56].

Several mechanisms may explain this relationship. Depressive symptoms have been consistently associated with reduced weight loss and poorer psychosocial functioning, including increased eating disorder psychopathology and lower quality of life [56]. Furthermore, the bidirectional relationship between obesity and mood disorders may exacerbate postoperative vulnerability, contributing to weight regain after initial weight loss [29,57]. The worsening or persistence of psychiatric symptoms following surgery may further impair adherence to behavioral recommendations, ultimately affecting long-term outcomes [12].

The prevalence of bipolar disorder observed in our sample (38.4%) was higher than that reported in several previous studies of bariatric surgery candidates, although considerable heterogeneity exists across the literature. While some investigations have described a relatively low prevalence of bipolar disorders (1–6%) [58,59], others have reported substantially higher rates approaching those observed in our cohort (23–37%) [10,11,60]. In our study, the use of a structured diagnostic interview and the focus on lifetime psychiatric comorbidity may have facilitated the identification of bipolar spectrum conditions. The relatively low rate of mood stabilizer prescription at baseline, despite the high prevalence of bipolar diagnoses, raises the possibility that some bipolar conditions had remained previously undetected. The under-recognition of bipolar disorders, particularly the difficulty in distinguishing bipolar II disorder from recurrent unipolar depression, has been widely reported and may have contributed to this phenomenon [61–63]. This issue is clinically relevant, as unrecognized bipolarity may influence both the psychopathological profile and treatment response, with potential implications for postoperative outcomes [64].

Beyond categorical diagnoses, our findings support the relevance of transdiagnostic dimensions, particularly emotional dysregulation, as key contributors to bariatric outcomes. Patients with inadequate weight loss showed significantly higher levels of emotional dysregulation, characterized by increased irritability, affective instability, and emotional reactivity. Similarly, higher negative emotionality, as measured by the RPoST scale, was observed in this subgroup. In contrast, impulsivity did not emerge as a significant predictor of inadequate weight loss in our analyses. These results align with growing evidence indicating that emotional dysregulation plays a central role in maladaptive eating behaviors, including emotional overeating and loss-of-control eating [38,65–67]. Our group previously reported an association between negative emotional dysregulation and inadequate weight loss one year after bariatric surgery [67]. The present study extends those findings by evaluating weight loss outcomes over a two-year follow-up period and by adopting a broader transdiagnostic approach that integrates categorical psychiatric diagnoses with dimensional measures of emotional dysregulation and ADHD-related features.

From a neurobehavioral perspective, chronic negative affect may enhance reward sensitivity to food through dysregulation of mesolimbic pathways, reinforcing maladaptive eating patterns and negatively influencing weight loss [68]. Although BED was not associated with inadequate weight loss in our sample, other eating-related behaviors that may influence postoperative outcomes, such as emotional eating, grazing, night eating, and loss-of-control eating, were not systematically assessed. These behaviors, which are not captured by DSM diagnoses, may partly explain the relationship between emotional dys-

regulation and long-term weight outcomes [69] and should be explored in future studies. Furthermore, deficits in executive functions and impulse control may interfere with adherence to postoperative recommendations and lifestyle modifications, thereby negatively impacting weight loss trajectories [14,70,71].

Finally, sex differences observed in our sample are consistent with existing literature indicating a higher burden of psychiatric comorbidity among women with obesity, particularly for mood and anxiety disorders [8,72,73]. Biological, psychological, and social factors—including greater vulnerability to atypical depression and emotion regulation difficulties—may contribute to this pattern and its association with maladaptive eating behaviors [74–78].

Overall, our findings highlight the importance of integrating a dimensional, transdiagnostic perspective into the psychiatric assessment of bariatric surgery candidates. Emotional dysregulation, mood disorders, and executive dysfunction appear to represent key, interrelated factors influencing postoperative outcomes. In line with current American Society for Metabolic and Bariatric Surgery (ASMBS) and European recommendations [79,80], comprehensive psychiatric care extending from the preoperative evaluation through long-term postoperative follow-up may facilitate the early identification and management of factors associated with suboptimal weight outcomes. In particular, the identification of patients presenting with significant emotional dysregulation or lifetime mood disorders may help stratify the risk of inadequate weight loss and guide the implementation of tailored and closer follow-up strategies. Moreover, targeted psychological interventions aimed at improving emotion regulation skills, treatment adherence, and adaptive coping strategies may represent a valuable adjunct to standard bariatric care [81].

Despite these findings, the identification of reliable psychopathological predictors of bariatric outcomes remains challenging, as current evidence is still characterized by heterogeneity and inconsistent results [54]. Future research should aim to develop more precise predictive models integrating clinical, psychological, and neurocognitive variables to improve patient stratification and optimize long-term outcomes.

This study has several limitations. First, the relatively small sample size at the two-year follow-up ($n = 48$) may have reduced the statistical power of the study and may limit the generalizability of the findings. The possibility of type II error cannot be excluded, particularly for non-significant findings. Furthermore, patients lost to follow-up had a significantly lower prevalence of psychiatric disorders than those who completed the study, raising the possibility of selection bias, which may have influenced the observed associations between psychopathology and weight loss outcomes. In addition, only 10 patients experienced inadequate weight loss at the two-year follow-up. Therefore, the multivariable logistic regression analysis may have been susceptible to model instability and overfitting. Overall, the present findings should be interpreted cautiously and considered preliminary until replicated in larger cohorts with more complete follow-up data. Second, psychiatric evaluations were conducted as part of the pre-surgical assessment, which may have led patients to underreport symptoms or psychiatric history to avoid affecting their eligibility for surgery. Future studies should consider separating psychiatric assessment from the surgical approval process to improve the accuracy of psychopathological evaluation. Third, the reliance on self-report questionnaires may have affected data reliability. In addition, some clinical variables, including past hypomanic episodes and neurodevelopmental disorders, were assessed retrospectively, increasing the risk of recall bias. Finally, only lifetime psychiatric comorbidities were included in the analyses, and the longitudinal course and severity of psychiatric disorders were not systematically reassessed during postoperative follow-up. Therefore, we were unable to evaluate whether changes in psychiatric symptomatology influenced long-term weight outcomes. Furthermore, although changes in

psychopharmacological treatments were recorded during follow-up visits, the duration and dosage adjustments of these treatments were not systematically analyzed, limiting the possibility of evaluating their potential influence on postoperative outcomes.

5. Conclusions

In conclusion, this study highlights the high prevalence of psychiatric comorbidities among bariatric surgery candidates and their relevance to postoperative outcomes. In particular, emotional dysregulation emerged as a key factor associated with inadequate weight loss two years after surgery. These findings support the importance of moving beyond categorical diagnoses and adopting a transdiagnostic perspective that considers underlying emotional and cognitive dimensions. From a clinical standpoint, comprehensive preoperative psychiatric assessment and continued postoperative monitoring are essential, particularly for patients presenting with mood disorders and elevated emotional dysregulation. Targeted interventions addressing emotional regulation and executive functioning may improve long-term weight outcomes. Further research is needed to better define the role of psychopathological and neurocognitive factors in predicting bariatric surgery outcomes and to develop individualized treatment strategies.

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Abbreviations

The following abbreviations are used in this manuscript:

ADHD	Attention Deficit/Hyperactivity Disorder
BED	Binge Eating Disorder
BMI	Body Mass Index
DSM	Diagnostic and Statistical Manual of Mental Disorders
EWL	Excess weight loss
LSG	Laparoscopic Sleeve Gastrectomy
MINI	Mini-International Neuropsychiatric Interview
NCDS	Non-Communicable Diseases
RIPoSt-40	Reactivity, Intensity, Polarity and Stability
UO	Operative Unit
WHO	World Health Organization
WRAADDs	Wender-Reimherr Adult Attention Deficit Disorder Scale

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