

Psychological Characteristics of Morbidly Obese Candidates for Bariatric Surgery

V. Abilés · S. Rodríguez-Ruiz · J. Abilés · C. Mellado ·
A. García · A. Pérez de la Cruz ·
M. C. Fernández-Santaella

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Abstract

Background Morbid obesity has multiple negative consequences for psychological health. These patients are described as depressed, anxious, and impulsive, with low self-esteem and impaired quality of life. The severity of these psychological disorders has been related to the degree of obesity. The aim of this study was to analyze the psychopathological characteristics of obese candidates for bariatric surgery, determining differences and similarities in general and specific psychopathologic symptoms among patients with different degrees of obesity and normal-weight individuals. **Methods** The study included 50 patients (26 type III obesity, 24 type IV obesity) and 25 normal-weight volunteers. They were all assessed for: stress (*CED44-B*), anxiety–depression (*General Health Questionnaire*), self-esteem (*Rosenberg Self-Esteem Scale*), family function (*Apgar Family Function Questionnaire*), quality of life (Spanish version of the *Quality of Life Index*), personality (*Eysenck Personality Questionnaire-Revised*), food craving (*Food Craving Questionnaire-Trait*), and eating behavior disorder

(*EBD*) symptomatology (*Eating Disorders Examination–Questionnaire Version-4*).

Results The obese patients had higher levels of stress, anxiety, depression, food craving, and *EBD* symptoms and lower levels of self-esteem and quality of life compared with normal-weight controls. No personality or family function disorders were observed in any of the obese or normal-weight subjects. Patients with type III and type IV obesity differed only in anxiety and personality findings. **Conclusions** Although the presence of psychological disorders cannot be taken as an absolute criterion for exclusion of candidates for obesity surgery, a better understanding of the relationship of these variables with weight loss and other outcomes of bariatric surgery may improve patient selection and facilitate more appropriate interventions.

Keywords Morbid obesity · Anxiety · Depression · Self-stem · Eating behavior disorders · Bariatric surgery

Introduction

Morbid obesity (MO) is a major risk factor for premature mortality and other diseases [1]. It is associated with greater morbidity and a lower health-related quality of life, including smoking, drinking problems, and poverty [2]. MO has multiple negative consequences for psychological health. These patients are described as depressed, anxious, and impulsive, with low self-esteem and an impaired quality of life [3–7].

Surgical treatment of obesity should be considered in situations where: (a) nonsurgical methods of weight reduction fail (e.g., diets, behavior modification, increased physical activity, and pharmacotherapy) and (b) health and psychosocial problems related to obesity are pronounced

V. Abilés (✉) · J. Abilés · C. Mellado · A. Pérez de la Cruz
Department of Clinical Nutrition and Dietetics,
Virgen de las Nieves University Hospital,
Avda. Fuerzas Armadas No. 2,
18014 Granada, Spain
e-mail: veronica.andrea.exts@juntadeandalucia.es

S. Rodríguez-Ruiz · M. C. Fernández-Santaella
Department of Personality, Treatment, and Evaluation,
School of Psychology, University of Granada,
Granada, Spain

A. García
Department of Surgery, Virgen de las Nieves University Hospital,
Granada, Spain

[8]. Hence, bariatric surgery (BS) is an effective treatment for morbidly obese patients who have failed numerous attempts to reduce their weight [3].

Patients typically show a 50–60% loss of excessive body weight at 2 years after BS [9]. Postoperative weight loss is associated with significant improvements in obesity-related comorbidities [10]. Unfortunately, around 20% of patients fail to lose a significant amount of weight [11]. This failure of BS is frequently attributed to psychological factors (e.g., eating disorders) rather than to technical factors (e.g., postsurgical gastric dilatation) [12]. Despite the benefits of BS in managing obesity, psychosocial and behavioral factors likely play an influential role in postoperative outcomes [13]. According to some authors, psychopathology that is sufficiently severe to require treatment may be a negative predictor of surgical outcome [14]. However, evidence remains ambiguous regarding the influence of psychological variables on BS outcomes [3, 14].

The severity of psychological disorders has been related to the degree of the obesity, finding a positive association between the presence of psychopathology and the body mass index (BMI) [15]. Thus, patients with grades III and IV obesity report greater depression and a lower self-esteem and quality of life in comparison to those with grade II obesity.

The aim of this investigation was to analyze the psychopathological characteristics of obese candidates for BS, determining differences and similarities in general and specific psychopathologic symptoms among patients with different degrees of obesity and normal-weight individuals. The study population comprised candidates for BS who had failed to reduce weight by nonsurgical methods and those with extreme obesity ($\text{BMI} \geq 50 \text{ m}^2/\text{kg}$).

Methods

Study design A prospective observational and analytical study was performed.

Participants This study included all 50 patients (39 females, 11 males) in the Bariatric Surgery Program of our Clinical Nutrition and Dietetics Unit between June and December 2007, who were divided between 26 patients (20 females, six males) with type III obesity (BMI of 40–49.9 kg/m^2), designated the OIII group, and 24 patients (19 females, five males) with type IV obesity ($\text{BMI} > 50 \text{ kg}/\text{m}^2$), designated the OIV group. A control group was formed by 25 normal-weight volunteers (16 females, nine males) with $\text{BMI} < 26.9 \text{ kg}/\text{m}^2$ and similar characteristics (age, educational, cultural, and socioeconomic level) to those of the patients. Participants signed their informed consent to inclusion in the study, which was approved by the Clinical Research Ethics Committee of the hospital.

Variables and Measurement Instruments

Four types of variables were compared among groups: (a) general psychopathologic symptomatology, (b) individual and family function, (c) personality, and (d) eating behavior (Table 1).

General psychopathology symptomatology Stress, anxiety, depression, self-esteem, and personality were assessed by using validated instruments.

Stress was evaluated by using the *Daily Stress Questionnaire (CED44-B)* by Santed et al. [16]. Anxiety and

Table 1 Variables and instruments

Variables	Instruments
Patient nutritional assessment	
Obesity	Impedance measurement: scales
General psychopathology symptomatology	
Stress	Daily stress questionnaire (CED44-B) by Sanz-Carrillo et al. [16]
Anxiety	Abbreviated scale of anxiety–depression by Montón et al. [17]
Depression	(General Health Questionnaire, GHQ) by Montón et al. [17]
Self-esteem	Rosenberg Self-Esteem Scale (RSE) by Vázquez et al. [18]
Specific psychopathology	
Food craving	Food Craving Questionnaire-Trait (FCQ-T) by Cepeda-Benito et al. [22]
Eating behavior symptomatology version 4	Eating Disorders Examination–Questionnaire (EDE-Q Version-4) by Katrine et al. [23]
Individual and family function	
Quality of life	Quality of Life Index (QLI-Sp) by Mezzich et al. [19]
Family function	Apgar Family Function Questionnaire (APGAR-Familiar) by Bellón et al. [20]
Personality	
Personality	Eysenck Personality Questionnaire-Revised (EPQ-R) by Eysenck [21]

depression were measured with the *Abbreviated Scale of Anxiety–Depression (General Health Questionnaire)* included in the General Health Questionnaire by Goldberg [17]. Self-esteem was assessed with the *Rosenberg Self-Esteem Scale (RSE)* translated by Echeburúa [18], which includes ten items on feelings of self-respect and self-acceptance.

- *Individual and family function*: Quality of life was assessed by the Spanish version of the *Quality of Life Index (QLI-Sp)* questionnaire by Hernández et al. and Mezzich et al. [19], which contains ten quality-of-life dimensions: psychological well-being, physical well-being, self-care and independent functioning, occupational functioning, interpersonal functioning, emotional and social support, community and service support, personal self-fulfillment, spiritual satisfaction, and a global quality-of-life assessment. Each item is assessed according to the subject’s personal perspective at the time. Family function was also assessed by means of the *Apgar Family Function Questionnaire (Family-APGAR)* developed by Smilkstein [20]. This instrument comprises five items that gather perceptions on five family function dimensions: (1) being satisfied with the help received from their family, (2) being satisfied with the way in which the family discusses and shares, (3) believing that the family accepts and supports their wishes, (4) feeling that the family loves them, and (5) being satisfied with the time that the subject and family spend together. A family is considered to be perceived as severely dysfunctional when the sum of the scores for the five variables is 0–3, mildly dysfunctional when the sum is 4–6, and functional when it is 7–10.
- *Personality*: Personality was assessed using the *Eysenck Personality Questionnaire-Revised (EPQ-R)* [21]. The Spanish adaptation of the complete version of the Revised-EPQ includes 83 items on three dimensions of personality (extraversion (scale E), emotionality or neuroticism (scale N), and tough-mindedness or psychoticism (scale P), and a lie scale (scale L) to measure dissimulation–conformity.
- *Specific psychopathology*: Eating desire intensity was assessed by means of the *Food Craving Questionnaire-Trait (FCQ-T)*, which has demonstrated predictive, convergent, and divergent validity in Spanish and English samples [22]. Likewise, participants completed the *Eating Disorders Examination–Questionnaire Version-4 (EDE-Q Version-4)*, designed for the symptomatic assessment of eating behavior disorder (EBD) [23]. It includes four subscales: restraint, food concern, shape concern, and weight concern. Scores for each subscale and a global score of disease severity can be obtained. The novelty of this instrument lies in its attempt to examine constructs such as “objective

binging” (episodes where individuals have eaten what other people would consider a large amount of food under these circumstances) and “subjective bingeing” (episodes where there is a feeling of loss of control and where they eat too much, but they have not really eaten what other people would consider a large amount of food under the circumstances).

Procedure Participants were patients referred to the Bariatric Surgery Program of the Clinical Nutrition and Dietetics Unit by primary care physicians, endocrinologists, and/or other specialists and who met the criteria established by the hospital for entry into the bariatric surgery program.

Data were gathered during two psychological assessment sessions. In the first, the multidisciplinary team (nurse, nutritionist, and psychologist) collected sociodemographic data and weight and height and carried out a clinical interview to counsel the patient on the advantages and disadvantages of the surgery. In the second session, the psychologist administered the selected instruments. After completing the sessions, data were analyzed and the diagnosis was established.

Each patient was matched with a normal-weight individual of the same age and sex, selected from among individuals accompanying the obese patients or other volunteers. After the assessment stage, the study groups were formed according to their BMI.

Statistical Analysis

The statistical package SPSS for Windows, version 15.0, was used for analyses. Continuous variables were expressed as mean±SD. Intragroup comparisons were performed by means of univariate analysis of variance (ANOVA), using the Bonferroni test for a posteriori analyses. $p < 0.05$ was considered significant.

Results

Demographic and Descriptive Data of the Sample

Consistent with their inclusion criteria, the three groups (OIII, OIV, and control groups) did not significantly differ in sex ($F=0.836$, $p=0.43$) or age ($F=0.302$, $p=0.74$) but differed in BMI ($F=464.555$, $p=0.001$; Table 2).

General Psychopathologic Symptoms

Table 3 shows the results obtained for each group. The degree of *stress* differed among the groups ($F=3.210$, $p < 0.05$). The OIV group had the highest stress level, although significance was only reached between the obese groups

Table 2 Age and BMI of participants

Group	Number	Age		BMI	
		Mean	SD	Media	SD
OIV	24	38.54	8.27	55.85	5.45
OIII	26	39.31	8.70	44.95	3.01
CN	25	40.72	12.42	23.62	2.18
Total	75	39.53	9.88	41.33	13.88

OIV patients with type IV obesity, OIII patients with Type III Obesity, CN: control group)

and controls ($p<0.05$), with no significant differences between the OIII and OIV groups ($p=0.66$).

The *anxiety* score significantly differed among groups ($F=4.411$, $p<0.05$), and a posteriori analyses indicated that this significant difference only existed between the OIII group and the remaining groups ($p<0.05$).

The *depression* score significantly differed among groups ($F=7.165$, $p<0.01$), with the OIII group showing the highest value. A posteriori analyses verified that the differences were only with respect to the controls ($p=0.001$), with no significant differences between clinical groups ($p=0.07$).

Self-esteem scores were lower in the clinical groups than in the control group ($F=3.012$, $p<0.05$), with no difference between obese groups.

Individual and Family Function

Quality of life With regard to individual dysfunction in daily life activities, a significant difference in *QLI-Sp* was found between obese patients and normal-weight volunteers ($F=5.355$, $p<0.01$; Fig. 1). Obese patients (types III and IV) showed lower psychological and physical well-being, less independence, more work problems, a worse relationship with the environment, and lower personal and spiritual well-being compared with the controls ($p<0.05$).

None of the groups perceived any family dysfunction, with Family-APGAR scores ranging from 7.96 to 8.44 points. All participants were satisfied with the help received by the family and the way in which the family discusses and shares; they believed that their family supported and

accepted their wishes; they felt loved by the family and were satisfied by the time they spent together ($F=0.356$, $p=0.70$).

The groups did not significantly differ in the *personality* score ($F=2.658$, $p=0.07$). In a posteriori analyses, significant differences in *EPQ-R* scales on emotionality and lying were found between the obese patients and controls ($F=7.591$, $p<0.001$ and $F=5.483$, $p<0.05$, respectively; Fig. 2). In the psychoticism scale, differences were found between type III and type IV obesity ($p<0.05$) but neither showed significant differences with the control group ($p=0.79$ and $p=0.11$ for OIII and OIV, respectively). No difference in extraversion was found among any of the study groups ($p=0.87$).

Specific Psychopathology

Eating Behavior Disorders

ANOVA results indicated a significant effect of the group in all study variables. Groups differed significantly in eight of the nine scales of the *FCQ-T*: plans, negative reinforcement, loss of control, food concern, hunger, emotions, context, and guilt ($F=3.173$, $p=0.000$), with no differences in positive reinforcement ($F=1.929$, $p=0.15$; Fig. 3).

Significant differences were also observed among groups in the four levels of the *EDE-Q Version-4*, i.e., restraint, food, and weight and shape concerns ($F=5.651$, $p=0.001$; Fig. 4). The a posteriori analyses showed no difference between the OIII and OIV groups in food craving ($p=0.79$), with both groups having significantly higher scores than the control group. Among the dimensions of the *FCQ-T*, the obese groups made more plans at the time of eating, taking account of the setting, and they generally always ate when alone and felt guilty after overeating. They were more concerned about food, eating to satisfy hunger. Eating followed episodes of negative emotions, and patients felt that they lost control over what they were consuming ($p<0.05$).

No differences in EBD variables were found between the OIII and OIV groups ($p=0.52$), whereas the control group reported a lower level of restraint and less concern about

Table 3 General psychopathology symptomatology

Scales		OIII ($n=26$)		OIV ($n=24$)		CN ($n=25$)	
		Mean	SD	Mean	SD	Mean	SD
GHQ	Depression	6.50	2.37	4.79	3.28	4.36	2.46
	Anxiety	4.61	2.28	3.37	2.41	2.08	2.48
RSE	Self-esteem	24.46	2.56	24.91	2.79	26.80	2.95
CED44-B	Stress	96.77	25.17	99.92	26.03	82.48	26.25

OIV patients with type IV obesity, OIII patients with type III obesity, CN control group

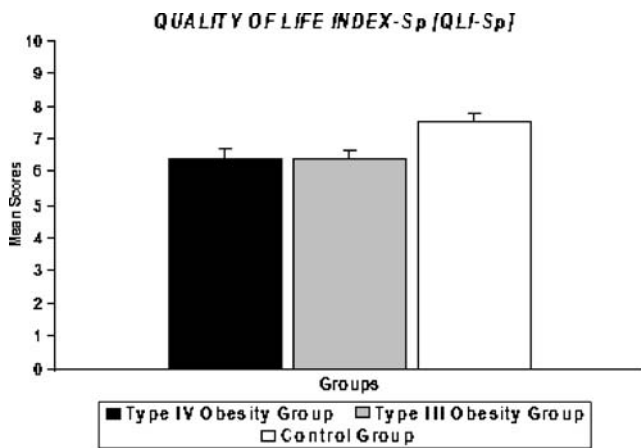


Fig. 1 Quality of life: graph depicting the mean RSE test scores for each group, showing lower scores (worse quality of life) for obesity grades III and IV patients than for controls

food, weight, and shape compared with the obese groups ($p < 0.05$).

The obese groups significantly differed from controls in the presence and frequency of objective and subjective bingeing and in purgative and nonpurgative behaviors ($F = 1.837, p < 0.05$), while a higher percentage of the OIV than the OIII group showed these characteristics, although the differences between them did not reach significance (Table 4).

Discussion

The present multidisciplinary study adopted a comprehensive approach to the obese patient, considering the psychopathological aspect from a diagnostic perspective.

As reported by other authors, morbid obesity is not only associated with medical and physical comorbidity but also

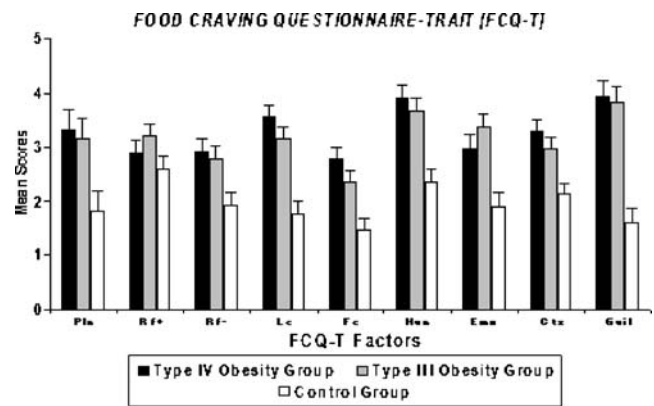


Fig. 3 Food craving: graph depicting the mean Questionnaire-Trait (FCQ-T) scores for each group; obese and control groups significantly differed in eight of the nine scales: plans (*Pln*), negative reinforcement (*Rf-*), loss of control (*Lc*), food concern (*Fc*), hunger (*Hun*), emotions (*Emo*), context (*Ctx*), and guilt (*Gul*), with no differences in positive reinforcement (*Rf+*)

with psychological and social problems and a poor quality of life [3–7]. Psychological disorders of the present obese patients included depression, anxiety, low self-esteem, and EBD, among others. They reported social isolation, dissatisfying relationships, and occupational problems. However, all participants felt satisfied with the help received by their family and with the way in which the family discussed and shared; they believed that their family supported and accepted their wishes; they felt loved by them, and they were satisfied with the time they spent with them.

Results were analyzed according to the degree of obesity of participants since a more severe obesity may influence the psychological comorbidity of patients [15]. In fact, we found considerable similarity in general psychopathology symptomatology between patients with type III and type IV obesity. Thus, OIII and OIV groups had similar scores for stress, depression, and self-esteem and only significantly

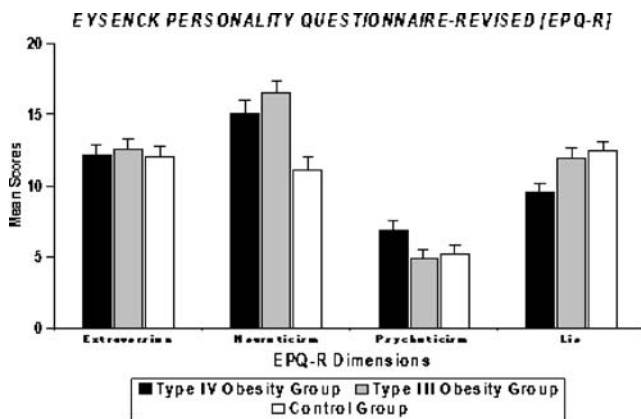


Fig. 2 Personality: graph depicting the mean EPQ-R scale scores, showing differences between the obese patients and controls in all dimensions studied (neuroticism, psychoticism, and lie scale) with the exception of extraversion

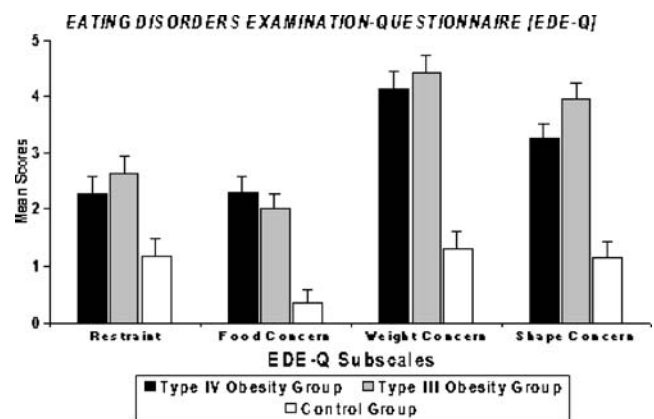


Fig. 4 Eating behavior disorders: graph depicting the mean EDE-Q questionnaire scores for each group, showing significant differences between obese and control groups in all four dimensions: restraint, food, weight, and shape concerns

Table 4 Percentages of scores of degree of severity of the pathology (EDE-Q) for each group

Group	Ex_OB %	Fr_OB %	Pc_OB %	Ex_SB %	Fr_SB %	Vomits %	Laxatives %	Diuretics %	Exercise %
OIV	66.7	66.7	45.8	45.8	50	12.5	4.2	12.5	41.7
OIII	46.2	46.2	34.6	38.5	38.5	3.8	3.8	7.7	15.4
CN	16	16	12	8	8	4	0	0	24

EX_OB existence of objective bingeing, *Fr_OB* frequency of objective bingeing, *Pc_OB* percentage of objective bingeing, *EX_SB* existence of subjective bingeing, *Fr_SB* frequency of subjective bingeing

differed in anxiety score. The lower anxiety reported by the patients with type IV obesity may have various explanations, including a greater acceptance of their condition and a longer history of the disease and its treatment [24].

There was no difference in personality scores between the obese patients and normal-weight individuals. Although BS is contraindicated for patients with severe personality disorders, evaluation of the personality of patients may improve our understanding of the behavior of the obese, including social conformism, emotionality, and impulsivity, and other aspects. Some authors observed impulsive behaviors reminiscent of substance abuse in obese individuals who were not substance abusers [7].

In our study, different personality characteristics were observed according to the type of obesity. Those with a lower degree of obesity were more emotional, expressed their feelings more, and dissimulated their attitudes for the sake of improved socialization. In contrast, patients with higher degrees of obesity were more introverted and more timid in social relationships, with a lower level of dissimulation.

With regard to specific psychopathologic symptoms, it is known that binge eating is relatively frequent among obese populations, and 23–36% of those seeking weight loss treatments are reported to suffer from EBD [25].

EBD is characterized by the consumption of an objectively large amount of food in a brief period of time (≤ 2 h) with the patient's report of a subjective loss of control during the overeating episode [23]

In our own investigation, 46–68% of the clinic groups reported at least one binge episode per week during the month before seeking treatment. Obese patients showed elevated eating concern, which incorporates fear of losing control over eating, concern about being seen eating, and guilt about eating.

The high levels of concern about weight and body image shown by the obese patients are characteristics with nosological value in the two main EBDs, bulimia and anorexia nervosa.

Despite unsuccessful attempts to lose weight followed by eating objectively and subjectively more food, obesity has not been associated with the purgative or nonpurgative behaviors characteristic of bulimia and anorexia nervosa

[26]. Moreover, while several theories regarding the maintenance of binge eating and obesity highlight the role of external-cue restraint in precipitating binge episodes, the role of emotional regulation was also recently examined. Eldredge et al. [27] reported that negative emotions precede binge eating, and patients often describe themselves as eating in response to emotion.

We also evaluated the intensity of concern about food and the external and internal causal factors that might cause it, observing that all of these characteristics were similar between the obese groups. All patients were more vulnerable to a desire for eating generated by negative emotions, physiological needs, or contextual clues rather than by a pursuit of pleasure or well-being. Hence, these obese individuals do not appear to be motivated by gluttony, which might be the popular conception. Some research has demonstrated that negative emotional states serve as triggers for the return of unhealthy eating in dieters and that eating in response to emotion increases food intake [28].

Although a relationship was found between obesity and psychological dysfunction, the possible contribution of different factors was beyond the scope of the present investigation. Despite the limitations of the present study, including the small sample size, it confirmed some well-known characteristics of overweight patients (in relation to stress, quality of life, self-esteem, anxiety, and personality) and detected specific symptoms of other disorders that have been less well studied in this population, including the intensity of concern about food. The main study finding was the similarity in study variables between patients with grade III and grade IV obesity, confirming the absence of differences in psychological health between these groups.

The presence of psychological disorders cannot be taken as an absolute criterion for exclusion of candidates for obesity surgery. However, it appears intuitively unlikely that a patient with uncontrolled depression or significant eating disease would be able to adhere to the postoperative diet that is essential for long-term success.

Various studies showed that patients undergoing BS regain a significant amount of weight over years following the procedure [29]. It has also been hypothesized that eating-disorder behavior before surgery contributes to

weight regain after surgery. However, there have been contradictory reports on the postoperative effect of presurgical binge eating status. [3].

These data support our proposition that a better understanding of the relationship of psychological variables with weight loss and other BS outcomes will improve the selection of candidates and the development of interventions to improve outcomes. It is important to conduct postsurgical as well as presurgical evaluations of BS patients, as demonstrated by various studies [30], using previously published protocols and maintaining a follow-up program for patients with this chronic disease.

Future investigations must verify the effectiveness of bariatric surgery in obese patients who have received presurgical assessment and treatment at emotional, cognitive, and behavioral levels. Undoubtedly, the most important step would be to prevent these psychological disorders in obese patients before they become candidates for bariatric surgery.

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