Current psychological assessment practices in obesity surgery programs: what to assess and why
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Introduction
Morbid obesity, as defined by a BMI of 40 or more, has become a major problem in many countries worldwide. The disorder is often refractory to dietary or drug treatment as well as to psychotherapy or other conventional interventions. It responds well, however, to weight-loss surgery (WLS), as documented by many studies over the past 10 years.

Most settings require a comprehensive psychosocial assessment before surgery, including psychiatric evaluation to determine candidates’ psychological suitability for surgery and for detecting factors influencing outcome. Assessments usually include a comprehensive psychiatric evaluation, often using a semi-structured interview, as well as the use of questionnaires for exploring the presence of depression (e.g. Beck Depression Inventory or BDI), anxiety (e.g. State–Trait–Anxiety Inventory or STAI), eating disorders with, in particular, binge eating disorder (e.g. Eating Disorder Inventory or EDI), self-esteem (e.g. Rosenberg Self-Esteem Scale) as well as personality disorders and/or abnormal personality traits (e.g. Minnesota Multidimensional Personality Inventory or MMPI, or NEO Personality Inventory Revised or NEO-PI-R).

The present article summarizes findings from previous review articles and reports on new research findings that have been published between August 2006 and August 2009 concerning current psychological assessment practices in obesity surgery programs, data regarding the prevalence of psychological problems in individuals with morbid obesity and change in psychopathology after surgery, and data relative to the predictive value of psychiatric and/or psychological assessment in patients with morbid obesity who are candidates for obesity surgery.

Keywords
anxiety, bariatric interventions, depression, eating disorders, morbid obesity, obesity surgery, personality disorders
2 Personality disorders and neurosis

Method
PubMed was searched for research studies published from August 2007 to August 2009, using the search words ‘morbid obesity’, ‘depression’, ‘anxiety’, ‘eating disorders’, ‘personality’ and ‘personality disorders’, ‘psychosocial factors’, ‘bariatric surgery’ and ‘obesity surgery’. In addition, a similar search was conducted for review articles published on this topic in the 3 years prior to August 2007.

Current psychological assessment practices in obesity surgery programs
Current psychological assessment practices in obesity surgery programs have been reviewed by several authors in recent years. Although most obesity surgery programs recognize the overall importance of psychological assessments prior to weight-loss surgery as well as during the follow-up, the scope, value and purpose of these assessments vary widely from one program to another and there are no uniform guidelines on what, and how, to evaluate in candidates with morbid obesity who apply for weight-loss surgery.

Prevalence of psychological assessment practices
Bauchowitz et al. [1] sent a questionnaire to 188 bariatric surgery programs to collect information on the level of involvement of mental health professionals with bariatric surgery programs and their approach to evaluating bariatric surgery candidates. Eighty-eight percent of the programs required patients to undergo a psychological evaluation and almost half required formal standardized psychological assessment. Current illicit drug use, active symptoms of schizophrenia, severe mental retardation, and lack of knowledge about the surgery were the most commonly cited contraindications preventing patients from gaining approval for surgery, but in fact the exclusion criteria for surgery varied greatly. The authors emphasized the importance of establishing uniform guidelines for the screening of bariatric surgery candidates.

Fabricatore et al. [2] sent a survey to bariatric surgeons, who were asked to distribute the document to the mental health professionals to whom they refer surgery candidates for preoperative evaluations. One hundred and ninety-four respondents provided information on the assessment methods they use, on the psychosocial domains that are the focus of their evaluations, and on what they consider to be contraindications to surgery. Responses to open-ended questions were coded for content. Most respondents reported using clinical interviews (98.5%), symptom inventories (68.6%), and objective personality/psychopathology tests (63.4%). A minority used tests of cognitive function (38.1%) and projective-personality tests (3.6%). Over 90% of respondents listed mental health issues among the most important areas to assess. Similarly, 92.3% listed psychiatric issues as ‘clear contraindications’ to surgery, but no specific disorder was listed by a majority of respondents. Issues related to informed consent and treatment adherence were the nonpsychiatric domains most frequently listed as important areas to assess and as contraindications to surgery. In the authors’ opinion, assessment practices of mental health professionals who evaluate bariatric surgery candidates vary widely and no consensus is likely to emerge until large long-term studies identify consistent psychosocial predictors of poor postoperative outcomes.

Walfish et al. [3] examined the frequency with which psychologists recommend delay or denial of surgery for psychological reasons, the procedures they use in making their clinical decisions, and the reasons for such conclusions. A sample of 103 psychologists with experience in conducting presurgical psychological evaluations responded to a brief survey. There was significant variability in the number of evaluations psychologists complete and the instruments they use to make their clinical decisions. For most candidates, the evaluation results in psychological clearance for surgery. However, approximately 15%, on average, are delayed or denied for psychological reasons. The most common reasons for delaying or denying surgery were significant psychopathology (including psychosis or bipolar disorder), untreated or undertreated depression, and lack of understanding about the risks and postoperative requirements of surgery.

Results similar to those obtained in the previous reviews were found again in a survey conducted by van Hout et al. [4] on bariatric surgery programs in the Netherlands between 2000 and 2005. According to these authors, most hospitals have a multidisciplinary selection process, and in 89% of the cases, a mental health specialist is involved. There is, however, no consensus regarding the content or scope of the psychiatric and/or psychological evaluation in these patients.

Purpose of psychological assessments
According to the information obtained in the surveys that have been discussed earlier, the main purposes of psychological assessments in obesity surgery programs are to evaluate the presence and severity of psychopathology in patients presenting for obesity surgery, to evaluate the change in psychopathology after surgery, and to identify factors that may be important for predicting outcome results and/or for detecting and providing additional postoperative support if needed.
During the past 20 years a considerable number of studies have been published concerning the prevalence of psychopathology in individuals with morbid obesity as well as on the change in psychopathology observed after surgery. The literature on these two issues has been reviewed extensively in recent years and will not be reviewed in detail again here. The literature on the predictive value of psychological assessment in individuals applying for obesity surgery is less extensive and will be reviewed in detail.

**Prevalence of psychopathology in individuals with morbid obesity**

Presurgery assessments have generally found increased rates of psychopathology in candidates with morbid obesity who apply for weight-loss surgery. In a review of the literature on the psychosocial status of extremely obese individuals who seek bariatric surgery, Wadden et al. [5] found increased rates of depression, eating disorders, and impaired quality of life.

Results from studies published during the last 2 years are in line with those of the review by Wadden et al. [5]. They confirm that individuals with morbid obesity have significantly increased odds, compared with individuals with normal weight, of any mood, anxiety, alcohol use, or personality disorder [6]; are at increased risk for a range of mood and anxiety disorders [7]; or have higher levels of stress, anxiety, depression, food craving, eating behavior disorder symptoms and lower levels of self-esteem and quality of life than normal-weight controls [8]. According to a study by Mauri et al. [9], about one-fifth of the sample presented with a current axis I disorder, and the same percentage had a personality disorder.

**Change in psychopathology following weight-loss surgery**

Comparisons between presurgery and follow-up psychological assessment data have generally found significant reductions in psychopathology. In a systematic literature search of recent articles, van Hout et al. [10] found that bariatric surgery leads not only to substantial weight reduction, but also to improvement or cure of physical as well as psychological comorbidities, although a significant minority of patients do not benefit psychologically from surgery.

Results from studies published during the last 2 years are in line with those of the review by Hout et al. [10]. Depression, anxiety, impulse to thinness and corporal dissatisfaction improved in patients with morbid obesity after bariatric surgery [11], gastric banding resulted in both long-term weight loss and improvement in depression and self-acceptance [12] and positive changes in BMI reduction increased employment and living in a partnership, and led to improvement in eating behavior, reduction in anxiety and depressive symptoms, as well as in improvement in health-related quality of life. According to Nickel et al. [13], those positive results remained stable over a total of 6 years.

**Psychological characteristics as predictors of outcome**

Although there is considerable consensus concerning the prevalence of psychopathology in patients with morbid obesity prior to surgery as well as concerning the (mostly) positive change in psychopathology following surgery, there is much less evidence with regard to the value of psychological and psychopathological characteristics as predictors of weight loss and mental health after surgery.

Several reviews have been published in recent years on psychological characteristics as predictors of weight loss and mental health in individuals with morbid obesity, which had been assessed by psychiatrists and/or psychologist prior to surgery and during follow-up. In addition, several new studies on this topic were published between August 2006 and August 2009.

**Reviews**

The predictive value of psychological and psychosocial factors on weight loss and mental health after bariatric surgery has been investigated in three recent reviews.

In a systematic review of all controlled and noncontrolled trials published in English and German between 1980 and 2002, Herpertz et al. [14] identified 29 articles focusing on psychosocial predictors of weight loss and mental health after obesity surgery. According to this review, personality traits have no predictive value for the postoperative course of weight or mental state. Apart from serious psychiatric disorders, including personality disorders, psychiatric comorbidity seems to be ‘of more predictive value for mental and physical well being as two essential aspects of quality of life than for weight-loss postsurgery’. However, depressive and anxiety symptoms as correlates of psychological stress with regard to obesity seem to be positive predictors of weight loss postsurgery. Finally, the severity of the symptoms or the disorder is more relevant for the outcome of obesity surgery than the specificity of the symptoms.

According to another systematic literature review, conducted by van Hout et al. [15], greater success following bariatric surgery appears to occur in patients who are young and female, have a high self-esteem, good mental health, a satisfactory marriage and high socioeconomic status, are self-critical and cope in a direct and active way, are not too obese and were obese before the age of 18 years, suffer from and are concerned about their...
obesity, have realistic expectations and undisturbed eating behaviors. In the authors’ opinion, the existing literature about potential predictors of success after bariatric surgery is, however, far from conclusive and it is still uncertain which factors can predict success.

Niego et al. [16] reviewed the status of the literature to April 2006 on significant binge eating in bariatric surgery patients and its influence on surgical outcome. As shown by the results of the survey, individuals with presurgical binge eating are more likely to retain their eating pathology and, if they do, to have poorer weight loss outcome. Many people with binge eating prior to surgery report continued feelings of loss of control when eating small amounts of food after surgery. The authors conclude that clinically significant binge eating is related to poorer surgical outcomes. Although surgery does alter the body’s physiology, claims that the psychological aspects of binge eating are ‘cured’ by obesity surgery must be viewed with caution. The authors also recommend that researchers and practitioners reach a consensus on how to better define binge eating after gastric surgery and conduct long-term prospective studies to further evaluate the effect of binge eating on surgical outcome and vice versa.

Ashton et al. [17] reviewed the literature to find evidence to support the argument for psychological screening as consisting of four premises (p1–p4) and a conclusion (C) as follows: (p1) a significant minority of obese patients will not be successful in losing weight following bariatric surgery—the ‘failure’ group; (p2) a significant minority of patients will exhibit abnormal psychological profiles during preoperative testing; (p3) the majority of individuals referred to in (p2) will be found in group (p1), that is, abnormal psychological profiles identified preoperatively predict less favorable weight-loss outcomes postoperatively; (p4) identifying patients with adverse psychological profiles preoperatively would allow either exclusion of those at high risk of failure or provide a more secure rationale for targeted pre and postoperative support; (C) psychological screening should be part of the routine preoperative assessment for patients undergoing obesity surgery.

The authors reviewed the literature to find evidence to support these premises. According to their findings, (p1) can be justified but (p2) is problematic and can be accepted only in a heavily qualified version. They did not find any evidence for (p3) and, as (p4) and (C) are predicated on (p3), they conclude that the argument clearly fails: ‘There is no evidence to suggest that preoperative psychological screening can predict postoperative outcomes and no justification for using such testing as a means of discriminating between candidates presenting themselves for bariatric surgery’.

Recent studies

Using a questionnaire that was sent to 220 women following laparoscopic Swedish adjustable gastric banding, Kinzl et al. [18] investigated the predictive value of various parameters with regard to weight loss after gastric-restrictive surgery after a minimum follow-up of 30 months. BMI loss was greatest in individuals with an atypical eating disorder (20.0 kg/m²) and least in those with no eating-disordered behavior before surgery (13.4 kg/m²). Individuals with two or more psychiatric disorders showed significantly less weight loss than those with only one or no psychiatric disorder. In particular, outcome was less successful in individuals with adjustment disorders, depression and/or personality disorders.

Pontiroli et al. [19] assessed 172 consecutive patients undergoing laparoscopic adjustable gastric banding. Before surgery, individuals were administered the NIMH Diagnostic Interview Schedule (version III-R, DIS III-R) and the Structured Clinical Interview for DSM-IV Axis II Personality Disorders (version 2.0, SCID-II). After surgery, patients were assessed again during a period of up to 4 years. At stepwise regression analysis, BMI and integrated compliance predicted weight-loss at 12, 24, and 36 months, whereas percent of attendance at scheduled visits predicted weight loss at 48 months. Narcissistic personality predicted weight loss only at 12 months. On the whole, adherence to scheduled visits and compliance to recommended rules, more than personality disorders, predicted success of laparoscopic adjustable gastric banding, at least during the first 4 years.

According to Sogg and Mori [20], the process of psychosocial evaluation for weight-loss surgery (WLS) is one that goes beyond serving the function of information gathering. This process offers myriad opportunities for delivering significant and powerful interventions that can enhance the patient’s success in the WLS process. A discussion of the unique opportunities for psychosocial intervention afforded by the presurgical evaluation process is presented, using The Boston Interview for Bariatric Surgery [21] as the organizing framework.

Lanyon and Maxwell [22] have correlated extensive presurgery interview and psychological test data obtained in 131 morbidly obese patients on a 273-item interview and five psychological assessment instruments with weight-loss measures (simple weight change and BMI change) obtained at a mean of 12.8 months following surgery. They constructed ‘optimal composite predictor variables’ for four general areas of presurgery assessments: physical/medical health, psychological health, interpersonal support, and eating disorder. Each composite variable significantly predicted weight loss, and together they showed multiple correlations of 0.50 with simple weight change and 0.54 with simple BMI change.
Sustained weight loss after gastric bypass surgery was related to a wide range of presurgery variables, each of which made a small contribution, but composite variables provided more effective prediction.

Odom et al. [23] sent a survey to 1117 patients after gastric bypass. Of these, 203 (24.8%) were completed and suitable for analysis. Predictors of significant postoperative weight regain after bariatric surgery included increased food urges, decreased postsurgery well being, and concerns over addictive behaviors prior to surgery. Postoperative self-monitoring behaviors were strongly associated with freedom from regain.

Belanger et al. [24] hypothesized that psychosocial and Minnesota Multiphasic Personality Inventory (MMPI) and Millon Clinical Multiaxial Inventory (MCMI) psychometric variables could be used to identify gastric bypass surgery candidates requiring additional preoperative and postoperative services. One hundred and forty-three candidates for surgical treatment of morbid obesity underwent psychological evaluation prior to approval for gastric bypass. Each was placed into one of the four diagnostic groups based upon results of personality measures and a preoperative semi-structured interview. Results support the K scale of the MMPI-2 as a significant predictor of postsurgical outcome as well as MCMI scores on the schizoid, schizotypal, and compulsive scales.

Rutledge et al. [25] addressed the issue concerning the value of presurgical psychological evaluations by examining patients’ total number of psychiatric indicators rather than individual psychological factors as predictors of weight loss/weight regain. Sixty adult veterans underwent gastric bypass surgery or laparoscopic gastric banding after completing a multidisciplinary evaluation for surgical clearance, including a psychological assessment. Patients were subsequently followed for 24 months to examine changes in weight, BMI, and risk of weight regain. Nearly three-fourths of the sample carried either single (40.0%) or multiple psychiatric diagnoses (33.4%). Nearly half (47.5%) of the sample ceased losing weight after 1 year, with 29.5% regaining weight after this point. Neither psychiatric nor biomedical factors effectively predicted 1-year weight-loss totals. There was, however, a significant linear relationship between the number of psychiatric factors and the weight changes after 1 year. After adjusting for demographic and biomedical factors, patients with two or more psychiatric diagnoses were found to be significantly more likely to experience weight loss cessation or weight regain after 1 year relative to those with zero or one psychiatric diagnosis.

Gorin and Raftopoulos [26] examined whether patients with a history of mood and eating disorders had less weight loss and poorer treatment compliance after laparoscopic gastric bypass than patients with a history of either mood or eating disorders, or no history of mood or eating disorders. One hundred and ninety-six consecutive patients underwent a preoperative psychological evaluation. Mood and eating disorders were observed in 10.2% of patients, 36.7% had eating disorders only, 24.0% had mood disorders only, and 29.1% of patients had no mood and no eating disorders. At 6 months postsurgery, BMI and excess weight loss, hospital readmissions, and adherence to behavioral recommendations were assessed. Patients with mood and eating disorders fared worse than all other groups in dietary violations, exercise habits, and readmission rates, but there were no group differences in either BMI change or percentage of excess weight loss.

Van Hout et al. [27] followed patients who underwent vertical banded gastroplasty (VBG) over a period of 2 years and investigated the predictive value of several preoperative parameters, especially health-related quality of life, personality, psychosocial functioning, body image, eating behavior and weight loss. Two years after VBG, patients had significant weight loss and reported improvements in physical health-related quality of life, personality and psychosocial functioning, body image, and eating behavior. The authors found no psychosocial predictors of excess weight loss or excess BMI loss. On the contrary, they did find psychosocial predictors of 2-year changes in health-related quality of life, personality and psychosocial functioning, body image, and eating behavior.

In a prospective study, Alger-Mayer et al. [28] assessed 157 adult patients before and 6 years after bariatric surgery. Patients completed a binge eating scale, the BDI, and the SF-36 at baseline prior to surgery. Thirty-seven patients were classified as severe binge eaters prior to surgery. There was no significant difference in their weight loss compared with the rest of the group at any time point up to 6 years after surgery. Patients with significant depressive symptoms (BDI > 13) had no significant difference in their weight loss outcomes compared with the rest of the group. Presurgery SF-36 scores did not predict differences in weight-loss outcome. The authors concluded that presurgical binge status, incidence of depressive symptoms and health-related quality of life were not predictive of poor weight-loss outcomes in patients up to 6 years after gastric bypass surgery, who were able to make lifestyle changes in preparation for surgery and who adhered to scheduled postsurgery clinic visits.

Scholtz et al. [29] had investigated the long-term outcome in patients after laparoscopic adjustable gastric banding in relation to a full range of DSM-IV defined psychiatric and eating disorders. Case notes of 37 individuals operated on between April 1997 and June 2000, who had been...
examined using a structured clinical interview during presurgical assessment to yield diagnoses of mental and eating disorders according to DSM-IV criteria, were analyzed according to a set of operationally defined criteria. Statistical analysis was carried out to compare those with a poor outcome and those considered to have a good outcome in terms of psychiatric profile. In this group of mainly female, white individuals, ranging in age from 27 to 60 years, one-third were diagnosed with a mental disorder according to DSM-IV criteria. The development of postoperative DSM-IV defined BED or depression strongly predicted poor surgical outcome, but presurgical psychiatric factors alone did not.

In a study by Leombruni et al. [30] 38 severely obese patients who underwent laparoscopic VBG were assessed prospectively before surgery and 6 months after surgery using a semi-structured interview and a battery of psychological tests including the State–Trait–Anger Expression Inventory (STAXI), the EDI-2, the Symptom Checklist 90 (SCL-90), the BDI, the BES, the Body Shape Questionnaire (BSQ), and the Temperament and Character Inventory (TCI). Only self-directedness (TCI) and body dissatisfaction (EDI-2) were predictors of short-term outcome regarding weight loss, whereas self-transcendence (TCI) was associated with emerging side effects.

Discussion
Psychiatric and psychological assessments prior to obesity surgery and during follow-up have become routine procedures in obesity surgery programs. These are time consuming and often costly procedures and as such it is important to ascertain whether there is sufficient evidence to justify their use.

The rationale for psychiatric and psychological assessment of candidates who apply for obesity surgery rests on four major assumptions:

(1) A significant percentage of individuals applying for obesity surgery present with psychiatric disorders or exhibit abnormal psychological profiles as observed in clinical interviews or elicited in psychological tests. According to the present review, there is substantial evidence to support this assumption.

(2) Depression, anxiety, eating disorders and other symptoms of psychopathology significantly decrease in most individuals after weight-loss surgery. According to the present review, there is substantial evidence to support the assumption that mental health does improve in most, although not in all, individuals.

(3) Candidates who present with psychiatric disorders and/or abnormal psychological profiles are at risk for poorer postsurgery outcome and higher rates of complications than candidates who do not. According to the present review, there is some evidence to support this assumption; for example, when several psychological measures are combined, but there is a clear need for additional specific information in particular with regard to reliable psychological predictors on this point.

(4) Candidates who present with psychiatric disorders and/or abnormal psychological profiles should be given particular attention and care before surgery and during follow-up after surgery. According to the present review, there seems to be a large consensus as to the necessity of detecting patients in need of psychiatric and/or psychological support and to be able to offer such support before or after surgery whenever needed.

Conclusion
Weight-loss surgery has become an important treatment option for individuals presenting with morbid obesity. It leads to significant weight loss and improvement in mental and physical health in most individuals, but results are not equally positive in all patients. A number of nonsurgical and, in particular, psychological factors may have a positive as well as a negative impact on postsurgery results. Although there is a clear need for additional specific information with regard to reliable psychological predictors of postsurgery weight loss and mental health, comprehensive assessment of psychosocial factors should continue to be part of the presurgery assessment of all those who apply for weight-loss surgery.

References and recommended reading
Papers of particular interest, published within the annual period of review, have been highlighted as:
• of special interest
• of outstanding interest

Additional references related to this topic can also be found in the Current World Literature section in this issue (pp. 000–000).


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