Agüera Z, García-Ruiz-de-Gordejuela A, Vilarrasa N, Sanchez I, Baño M, Camacho L, Granero R, Jiménez-Murcia S, Virgili N, Lopez-Urdiales R, Montserrat-Gil de Bernabe M, Garrido P, Monasterio C, Steward R, Pujol-Gebelli J, Fernández-Aranda F, Menchón JM. (2015). Psychological and Personality Predictors of Weight Loss and Comorbid Metabolic Changes After Bariatric Surgery. ***European Eating Disorders Review, 23,*** **509-516. doi: 10.1002/erv.2404.**

Abstract

Bariatric surgery (BS) has proven to be the most effective treatment for weight loss and for improving comorbidities in severe obesity. A comprehensive psychological assessment prior to surgery is proposed to prepare patients for a successful post-surgical outcome. There- fore, the main aim of the present study was to assess psychological and personality predictors of BS outcome. The sample comprised 139 severely obese patients who underwent BS. Assessment measures included the Eating Disorders Inventory-2, the Symptom Checklist- Revised and the Temperament and Character Inventory-Revised. Our results show that favourable BS outcome, after 2 years follow up, was associated with younger age, less depression, moderate anxiety symptoms and high cooperativeness levels. Likewise, metabolic improvements were found to be linked to younger age and certain psychopathological factors. In conclusion, our findings suggest that age, baseline body mass index, psychopathological indexes and personality traits predict successful BS outcome.

Keywords: bariatric surgery; obesity; outcome; personality; psychological predictors

Introduction

Obesity is one of the most common health problems in the world today. According to the World Health Organization, obesity has reached epidemic proportions worldwide. Prevalence data pub- lished in 2014 indicated that 39% of the adult world population were overweight and 13% were obese (WHO, 2014). In Spain, specifically, obesity has shown a considerable increase in recent years, reaching rates of almost 17%, with higher prevalence among males (18%) than females (16%) (NAOS Strategy, 2013). In the last few years, obesity rates in Spain have undergone a 200% increase (from 1.8 to 6.1/1000 people) (Basterra-Gortari et al., 2011), approaching the rates of Northern European coun- tries (Gallus et al., 2015).

Severe obesity [class III, body mass index (BMI)≥ 40 kg/m2] is associated with an increased risk of mortality and morbidity, such as certain forms of cancer, type 2 diabetes mellitus (T2DM), arte- rial hypertension (AHT), obstructive sleep apnoea syndrome (OSA) and cardiovascular diseases (Kwok et al., 2014; Pories, 2008; Rubio, Salas-Salvadó, & Barbany, 2007). The Practical Guide for the treatment of obesity published by the National In- stitutes of Health (NIH, 2000) suggests that, although diet, pharmacotherapy and behavioural interventions may be effective in the short term in patients with obesity class I and class II (BMI= 30–34.9 and 35–39.9 kg/m2, respectively), these strategies have shown poor long-term results. This is also true in cases where obesity is quite severe (Elder & Wolfe, 2007). Hence, the current literature indicates that bariatric surgery (BS) is the most effective long-term treatment for weight loss in the severely obese, improving health-related quality of life, as well as at decreasing the risk of mortality and related comorbidities such as T2DM, metabolic syndrome and cardiovascular-associated diseases, com- pared with other available treatments (Buchwald et al., 2004, 2009; Gloy et al., 2013; Kwok et al., 2014).

There are different and well-described surgical techniques for morbid obesity treatment, which are frequently divided in three categories: (1) restrictive techniques [sleeve gastrectomy (SG), ad- justable gastric banding, laparoscopic gastric plication and vertical banded gastroplasty] that reduce food intake by gastric intake re- striction or volume reduction; (2) malabsorptive techniques (biliopancreatic diversion/duodenal switch) that reduce the ab- sorption of nutrients in the digestive tract; and (3) mixed tech- niques (i.e. Rouxen-Y gastric bypass) that combine both restriction and nutrients malabsorption (Korenkov, Sauerland, & Adams, 2007; Pories, 2008). Nowadays, the most commonly performed BS procedure worldwide is Rouxen-Y gastric bypass, followed by SG, adjustable gastric banding and biliopancreatic diversion/duodenal switch (Angrisani et al., 2015; Buchwald & Oien, 2013). These surgical interventions are generally considered successful techniques for weight reduction when at least 50% of excess weight loss (%EWL) is achieved (Buchwald et al., 2004), but the efficacy (Garb, Welch, Zagarins,

Kuhn, & Romanelli, 2009) and the period of time necessary for weight loss differs ac- cording to the technique used (Colquitt, Pickett, Loveman, & Frampton, 2014).

The NIH Consensus Conference (NIH, 1992) recommended that BS procedures be considered for selected and motivated se- verely obese patients. Therefore, a comprehensive psychosocial and psychiatric assessment prior to BS would be helpful to iden- tify factors associated with treatment outcome (Marcus, Kalarchian, & Courcoulas, 2009). Even though the benefits of sur- gical techniques in weight loss are well studied, the studies assessing preoperative predictors of BS outcome show contradic- tory findings. Whereas a positive association between greater weight loss and lower baseline BMI (Ma et al., 2006; Thalheimer et al., 2009), as well as other psychosocial predictors such as age, gender or socioeconomic status, has been reported by some au- thors (Chau et al., 2005; Larsen et al., 2004; Livingston & Langert, 2006; Ma et al., 2006), a recent study has highlighted the opposite, showing that very few predictive factors were associated with BS outcome, and the effect and magnitude were small (Courcoulas et al., 2015).

With regard to psychopathology before BS, the literature shows prevalence rates of comorbid axis I psychiatric disorders ranging from 27% to 60% (Herpertz, Kielmann, Wolf, Hebebrand, & Senf, 2004), with affective disorders, anxiety disorders, substance use and eating disorders (ED) being the most frequent comorbid disorders in severe obesity (Wimmelmann, Dela, & Mortensen, 2014). However, concerning the influence of psychological factors on BS outcomes, no consistent predictors have been found. Most studies have considered possible predictors of poor outcome, such as lack of motivation, anxiety, depression and psychiatric disor- ders (de Zwaan et al., 2011; Kinzl et al., 2006). However, published findings have been inconclusive and sometimes contra- dictory (van Hout, Verschure, & van Heck, 2005). Surprisingly, a positive correlation between depression and good BS outcome has also been reported (Averbukh et al., 2003). On the other hand, a high prevalence of a comorbid ED [mainly binge ED] has fre- quently been reported in pre-surgical obese patients, with rates ranging from 10% to 50% (Niego, Kofman, Weiss, & Geliebter, 2007). Nevertheless, some controversial findings have also been described. Some studies reported that binge ED patients have more difficulties adapting to restrictive eating behaviour after sur- gery and therefore are at greater risk of poor surgical outcome (Meany, Conceição, & Mitchell, 2014; Niego et al., 2007), while others found no association (Kinzl et al., 2006; Wadden et al., 2011). There are also studies suggesting that BS has a positive effect on abnormal eating behaviour, including uncontrolled and binge eating, at least in the short term (Wimmelmann et al., 2014).

Studies analysing personality in severely bariatric candidates have shown that these patients are very heterogeneous (Claes, Vandereycken, Vandeputte, & Braet, 2013; Müller, Claes, Wilderjans, & de Zwaan, 2014). However, most obese patients commonly score high on measures of neuroticism, harm avoid- ance and impulsivity and report low self-esteem (Wimmelmann et al., 2014). The role of personality factors as predictors of BS outcome is still not clear (Claes et al., 2013). Some studies have shown that high neuroticism and low conscientiousness were negatively associated with weight loss (Canetti, Berry, & Elizur, 2009; Gade, Rosenvinge, Hjelmesæth, & Friborg, 2014), and high scores on persistence (De Panfilis et al., 2006, 2014) and self-directedness (Leombruni et al., 2007) were related to greater short-term weight loss. However, other studies were not able to find any association between personality traits and poor or good weight loss outcome (Herpertz et al., 2004; Larsen et al., 2004).

Taking into account the existing literature, the present study attempted to overcome the limitations of the previous studies by including a large sample of consecutive referred severely obese patients that underwent different techniques of BS. Fur- thermore, we were interested in assessing the relationship be- tween psychological factors and BS outcome, not only weight loss but also metabolic improvement. Therefore, the main goals of the present prospective study were as follows: (1) to assess the weight loss and the comorbidities remission in se- verely obese patients following BS and (2) to assess and iden- tify clinical, psychopathological and personality predictors of short-term treatment outcome (regarding %EWL and meta- bolic conditions), after controlling for relevant variables, such as type of BS.

Materials and methods

Participants

The sample included 139 severely obese participants [31 men (22.3%) and 108 women (77.7%)] who underwent various BS procedures at the University Hospital of Bellvitge, Barce- lona, Spain (Referral and Tertiary University Hospital). Par- ticipants were consecutively admitted for assessment prior to surgery at the Department of Psychiatry at the University Hospital of Bellvitge. Participant ages were 18 to 62 years, with a mean age of 40.6 (SD= 10.3) years. The mean BMI at recruitment was 46.3 (SD= 6.4). Most participants were employed (56.8%), and most of them were married or had a partner (55.4%). Four different surgical procedures were used, including gastric bypass (n= 43, 30.9%), biliary pancre- atic diversion with duodenal switch (n= 28, 20.1%), vertical SG (n= 58, 41.7%) and laparoscopic gastric plication (n= 10, 7.2%). The description of their baseline clinical, psy- chopathological and personality values are shown in Table S1 (online Supporting Information).

The inclusion criteria for the study according to NIH (NIH, 1992) were as follows: (1) BMI> 40 or BMI> 35 with obesity- related comorbidities [dyslipidaemia (DLP), T2DM, AHT and OSA]; (2) age between 18–65 years; (3) having undergone hypocaloric diet controlled by a nutritionist but with a lack of ex- pected weight loss; (4) capacity to understand the processes in- volved; and (5) motivation for surgery. Likewise, the exclusion criteria were significant psychiatric disorders (such as schizophre- nia, other psychotic disorders, bipolar disorder and active alcohol or substance abuse). The psychiatric disorder diagnosis was assessed by means of a clinical interview and psychopathological interview (which includes somatic personal antecedents, ED/abnormal eating and current or lifetime psychiatric treat- ments) conducted by experienced psychologists and psychiatrists.

The study was approved by the Ethics Committee of the Uni- versity Hospital of Bellvitge, and all patients signed a written in- formed consent.

Assessment

Eating Disorder Inventory-2 (EDI-2) (Garner, 1991)

This is a reliable and valid 91-item multidimensional self- report questionnaire that assesses different typical cognitive and behavioural characteristics for ED. The EDI-2 retains the 64 items grouped into 11 scales: drive for thinness, body dissatisfaction, bulimia, ineffectiveness, perfectionism, interpersonal distrust, in- teroceptive awareness, maturity fears, asceticism, impulse regula- tion and social insecurity. All of these scales are answered on a 6-point Likert scale and provide standardized subscale scores. This instrument was validated in a Spanish population (Garner, 1998). For the sample of the current study, the internal consis- tency was very good for the total score (α=0.91) and moderate for the primary scales (mean α=0.69).

Symptom Checklist-90 Items-Revised (SCL-90-R; Derogatis, 1994)

This is a 90-item questionnaire widely used for assessing self- reported psychological distress and psychopathology. The test scored on nine primary symptom dimensions: somatization, obsessive–compulsive, interpersonal sensitivity, depression, anxi- ety, hostility, phobic anxiety, paranoid ideation and psychoticism and three global indices: Global Severity Index, Positive Symptom Total and Positive Symptom Distress Index. This instrument was validated in a Spanish population (Derogatis, 2002). For the sam- ple of the current study, the internal consistency was good to excellent, and ranged between α=0.76 for paranoid ideation to α=0.98 for global indexes scales.

Temperament and Character Inventory-Revised (TCI-R; Cloninger, 1999)

The TCI-R is a 240-item questionnaire with a 5-point Likert scale format. This questionnaire is a reliable and valid measure of four temperaments (Harm Avoidance, Novelty Seeking, Reward Dependence and Persistence) and three character dimensions (Self-Directedness, Cooperativeness and Self- Transcendence) of personality. This questionnaire has been validated in a Spanish population (Gutiérrez-Zotes et al., 2004). In our own study sample, internal consistency ranged be- tween α= 0.73 for novelty seeking scale to α=

0.88 for self- transcendence.

Barratt Impulsiveness Scale-11 (BIS-11; Patton, Stanford, & Barratt, 1995)

The BIS-11 assesses different aspects of impulsiveness as a per- sonality trait. The questionnaire consists of 30 items to be rated on a 4-point Likert scale ranging from 1 (rarely/never) to 4 (almost often). The items are divided into three subscales—attentional im- pulsiveness (cognitive instability and inattention); motor impul- siveness (acting on the spur of the moment and lack of perseverance); and non-planning impulsiveness (intolerance of cognitive complexity and lack of self-control)—and generate a to- tal score. This can range from 30 to 120, with a higher score indi- cating more impulsiveness. For the sample of our study, the internal consistency was α=0.68 for the total scale.

Procedure

All participants were assessed by experienced psychologists and psychiatrists at the Department of Psychiatry of the University Hospital of Bellvitge, in order to screen for any major current or lifetime psychiatric disorders. In addition to the comprehensive clinical and psychological assessment (questionnaires previously described), further demographic–clinical information including age, marital status, occupation, education and clinical psycho- pathological variables were also obtained.

Anthropometric and nutritional variables (such as weight, height, AHT, T2DM, DLP and OSA) were assessed before and 3months after the surgery, as well as at 6, 12, 18 and 24-month follow-up appointments, by a highly trained team of endocrinol- ogy specialists and surgeons at the Department of Endocrinology and at the Bariatric and Metabolic Surgery Unit of the University Hospital of Bellvitge. Outcome was defined according to the re- mission criteria (regarding weight loss and metabolic outcome) published by Brethauer et al. (2015). The mean percentage excess weight loss is the standard in BS nomenclature. This calculation is derived from the formula: %EWL= (weight loss / excess weight) × 100, with excess weight being the total preoperative weight minus the ideal weight. Successful weight loss was defined as losing at least 50% of excess body weight.

Statistical analysis

Statistical analysis was carried out with SPSS 20 for Windows. Step- wise logistic regression estimated the best predictive model for a good %EWL outcome, adjusting for the BS type and considering the following variables as potential predictors: sociodemographic features (sex, age, civil status and employment status), metabolic comorbidities at baseline (AHT and DM), BMI at baseline and psychometrical features at intake (EDI-2, BIS-11, SCL-90-R and TCI-R scores). Generalized estimated equations (GEE, a procedure that extends the generalized linear models to allow for repeated measurements) also estimated the best predictive models for the course of the %EWL levels and for the evolution of metabolic co- morbidities (DLP, OSA, DM and AHT) during the months 3 and 24 of follow-up. GEE were obtained through stepwise procedure, adjusted for covariate BS subtype and considering the same set of potential predictors for the binary regression. GEE defined as within-subject measure the value of each participant during the follow-up (at months 3, 6, 12, 18 and 24), used the linear model type (specifies the distribution as normal and identity as the link- function) for the quantitative outcome %EWL level and the binary logistic model type (specifies binomial as the distribution and logit as the link-function) for the binary outcomes.

Results

Evolution of the measures registered between months 3 and 24 of follow-up

The first graph of Figure 1 (left) shows the evolution of the mean values for the %EWL, percentage of total weight loss and percent- age of pre–post BMI differences during the follow-up (months 3 to 24). A positive linear trend was obtained for the three measures ($p< .01$) (mean values tended to increase during the next 2 years after the surgery), as well as a quadratic trend ($p< .01$) (increases were not constant during the follow-up).

The second graph of Figure 1 (right) shows the prevalence of metabolic comorbidities during months 3 to 24 of follow-up. A negative linear trend was achieved for DLP ($p= .008$), OSA ($p< .001$) and AHT ($p= .05$): the probability of concurrent met- abolic conditions decreased in the 2 years following the surgery for these disorders.

Predictors of a good outcome (%EWL>50%) Table 1 shows the final model of the stepwise logistic regression with the best predictors for %EWL outcome >50% after BS. Adjusted for the surgery subtype, good outcome was found to increase for married patients, younger ages, higher TCI-R cooperativeness scores, lower depression levels and higher anxiety symptoms. This model achieved goodness of fit (Hosmer– Lemeshow test: p= .296) and good predictive capacity (Nagelkerke's pseudo R2 adjusted to the covariate surgery type was .26 and the area under the roc curve was AUC=0.85 with 95% CI=0.73–0.98).

Predictors of the evolution for the %EWL between months 3 and 24 of follow-up

Table 2 shows the final GEE model with the best predictors of the evolution of the %EWL levels during months 3 to 24. Adjusted for the BS type, increases in the %EWL measure were statistical sig- nificantly associated with younger age and lower BMI at baseline.

Predictors of the presence of metabolic comorbidities during the follow-up

Table 3 shows the final GEE with the best predictor for the pres- ence of these comorbidities during follow-up, adjusted for the co- variate BS type. The probability of DLP persistence was higher for older patients and for those with lower somatization levels and higher depression symptoms. The presence of OSA during follow-up increased for older patients with higher BMI before BS. Persistence of DM was associated with higher scores on the EDI-2: Drive for Thinness subscale. Finally, AHT at follow-up was more likely in patients who were older and reported higher EDI-2 Perfectionism scores and presented this comorbid condition at baseline.

Discussion

The present study aimed to identify baseline clinical, psychopath- ological and personality predictors of successful BS outcome in severely obese patients. Our results suggest the existence of psy- chopathological and personality traits associated with both weight loss and improvement of metabolic comorbidities following BS.

First, our results confirm previous findings regarding the effect of BS on weight loss and on the remission of metabolic comorbid- ities (Ricci, Gaeta, Rausa, Macchitella, & Bonavina, 2014). We found that surgical patients achieved a 50–80% EWL in the first year, with the stabilization of this %EWL after 12months. These results are similar to those from a prior review assessing weight loss across various surgeries (Elder & Wolfe, 2007) suggesting that patients experience a period of rapid weight loss after BS procedures, but this weight loss tends to stabilize after about 12– 18months (ASBS Public/Professional Education Committee, 2008). Also, the presence of related metabolic comorbidities showed a significant and continuous decrease, at least until 2 years after BS. Patients with DLP, AHT and OSA experienced complete remission or improvement as a result of BS, which has been well documented in previous studies (Buchwald et al., 2004). In the case of T2DM, our findings show that although an improvement was observed after BS, T2DM tended to recur after the first year. The results in the literature are rather heterogeneous, and remis- sion rates vary depending on the type of surgery (Chikunguwo et al., 2010; DiGiorgi et al., 2015; Sjöström et al., 2004). It has been widely reported that T2DM improvements after BS are not only related to weight loss but also to changes in gastrointestinal anatomy that modifies hormonal relationships related to glucose homeostasis. There are also factors related to the evolution of the diseases in each patient that may modify the capability of the patient to improve after BS and weight loss (e.g. disease duration and pancreatic function). Moreover, the criteria to de- fine T2DM remission or improvement after BS usually differ from one paper to another. In 2014, the American Diabetes Association defined a universal criteria to be used. We have observed T2DM relapse in 50% of the patients who had had disease remission. This named recurrent/de novo T2DM may be associated with in- sufficient, late postoperative incretin/adipokine response and worse preoperative β-cell function (Malkani, 2015). Nevertheless, our findings showed that although the percentage of DM in- creases at 2 years, the prevalence did not reach the preoperative levels. Further studies with longer follow-up are needed to clarify this issue.

Second, in accordance with the literature, our findings high- light that the %EWL was associated with some demographic variables such as age, civil status and baseline BMI (Livingston & Langert, 2006; Thalheimer et al., 2009). Accordingly, our findings showed that married patients, younger patients and those with lower pre-surgical BMI achieved the best weight loss outcomes. (Herpertz et al., 2004; Ma et al., 2006; Vallis &

Ross, 1993; van Hout et al., 2005) were those who achieved better weight loss out- comes. However, while some authors have found that women have better prognosis than men (Thalheimer et al., 2009), we were not able to find any association between gender and weight loss (Courcoulas et al., 2015).

Third, when considering pre-surgery psychopathological vari- ables, and in concordance with previous studies, our results showed that higher scores on anxiety (Herpertz et al., 2004) and lower scores on depression (Kinzl et al., 2006) were predictors of successful weight loss. Although the scores in the anxiety scale of our BS candidates were within the normal range, our data sug- gest that milder symptoms of anxiety, distress or worry, may be positively related to good adherence to eating and physical activity patterns, and may be a positive predictor of successful surgical outcome (Herpertz et al., 2004; Vallis & Ross, 1993). Concerning depression, albeit Averbukh et al. (2003) found a positive associ- ation between higher depression and good outcome, most of the studies are in concordance with our findings (Kinzl et al., 2006; Rydén, Hedenbro, & Frederiksen, 1996), suggesting that baseline pre-surgery depressive symptoms are consistently correlated with less weight loss, even after a 3-year follow-up (Rydén et al., 1996).

Fourth, when considering temperament and character personal- ity traits, our findings suggest that greater cooperativeness was related to better BS outcome. Although it has previously been stated that this personality trait was more pronounced in BS candidates than in obese individuals from the general population (Gerlach, Herpertz, & Loeber, 2015), this is the first time, to our knowledge, that greater cooperativeness has been noted as predictor of success- ful weight loss after medium-term follow-up in BS patients. Individ- uals with higher cooperativeness are described as empathic, tolerant and conceive themselves as social (Cloninger, Svrakic, & Przybeck, 1993). These features are advantageous in social groups, and there- fore, these individuals usually seek more social support. Hence, one possible explanation may be that those who are more socially oriented have higher social support and may have better treatment adherence to diet and lifestyle changes, whereas those with lower cooperativeness tend to bemore socially isolated and present a great risk of treatment dropout, as described in other populations with abnormal eating behaviours (Fassino, Daga, Pierò, & Rovera, 2002).

Finally, our findings suggest that some clinical and psychosocial factors may predict not only weight loss but also improvement in associated metabolic comorbidities. In agreement with previous literature (Nagendran et al., 2015; Sugerman, Wolfe, Sica, & Clore, 2003), our results showed that younger age was a predictor of DLP, OSA and AHT remission. With respect to DLP, greater depressive symptoms and lower somatization were associated with a greater presence of DLP after BS. These findings are in ac- cordance with other authors who found that depression was re- lated to adverse lipoprotein patterns (van Reedt Dortland et al., 2010) and to an increased risk of DLP (van Reedt Dortland, Giltay, van Veen, Zitman, & Penninx, 2013). However, we must be very cautious in this interpretation because patients with de- pressive traits present certain lifestyle factors (e.g. stress, use of tobacco and low physical activity) that could mediate this associ- ation (Van Reedt Dortland et al., 2013). Likewise, the association between somatization and remission in DLP may indicate that people who somatize often pay more attention to their physical health and therefore follow lipid control more strictly. On the other hand, high scores on the Drive for Thinness subscale were associated with a greater presence of DM. These results are in ac- cordance with those reported by other authors suggesting that a Drive for Thinness was more often reported by T2DM patients (Herpertz et al., 2001; Young-Hyman & Davis, 2010) and may in- dicate a higher risk of poor metabolic control in subjects with ex- cessive concern with dieting, preoccupation with weight and low self-esteem (Khan & Montgomery, 1996). Finally, regarding AHT, our results revealed that the best predictors of remission are pre-surgical levels of AHT and lower perfectionism levels. In this sense, literature on this topic suggests that hypertensive indi- viduals show manifestations of dysfunctional perfectionism that prevents them from coping well with stress or being able to relax.

Overall, the current findings have some implications for clinical practice. Because obesity is a multifactorially caused disease, it de- serves multidisciplinary treatment (NIH, 1992; Krug et al., 2013; Villarejo et al., 2014;Meule et al., 2015;Manasse et al., 2014). Given the complex health problems and psychological issues affecting BS patients, it is of great importance to detect psychological predictive factors ofBSoutcome to improve patient selection, optimize patient care and todevelop cost-effectivepsychological treatments thatpro- mote increased BS effect and ensure weight loss maintenance. Spe- cifically, the developing of group therapies focused on increasing cooperativeness, as well as detecting

and treating depressive symp- toms and general psychopathologymight enhance the success ofBS.

The present study should be evaluated within the context of sev- eral limitations. First, the results have to be interpreted cautiously, as psychological assessment is a precondition to be eligible for BS, patients might attempt to present themselves as psychologically healthy in order to be approved for surgery. Second, there are long waiting lists, occasionally 2 to 3 years for BS, which do not allow us to generalize our results as we do not know what happens to pa- tients who drop out (e.g. because they have surgery in private hospitals). Third, the relatively small sample size for the individual procedures did not allow us to evaluate/compare each specific BS technique. Finally, we only assessed the participants for 24months of follow-up, and there is no way of knowing the extent to which these effects may persist over time. Future research should aim to overcome the aforementioned limitations, expanding the sam- ple size for each procedure, and include long-term follow-up.

In spite of these limitations, the current study also presented several strengths. This study was designed to address limitations in the current literature by using a comprehensive pre-surgical psychological assessment that included socio-demographics fea- tures, dysfunctional eating patterns, psychological and psychopathological factors, and a complete medical evaluation, both pre-surgery and post-surgery. Furthermore, most previous studies assessing psychosocial predictors of BS have measured outcome by excess weight loss only, and they have not taken into account other important outcome measures including medical complica- tions and the improvement of comorbid diseases. Therefore, this study has addressed, for the first time, not only predictors of weight loss but also metabolic comorbidities improvement.

In conclusion, our findings confirm that, besides clinical and surgical factors, specific psychopathological and personality traits might affect weight loss after BS and their associated met- abolic comorbidities. In light of our results, we suggest that age, baseline BMI and some psychopathological factors (mainly low depression and milder symptoms of anxiety), as well as high cooperativeness were positively associated with successful BS outcome.

REFERENCES

Angrisani, L., Santonicola, A., Iovino, P., Formisano, G., Buchwald, H., & Scopinaro, N. (2015). Bariatric surgery worldwide 2013. Obesity Surgery. 10.1007/s11695-015-1657-z.

Averbukh, Y., Heshka, S., El-Shoreya, H., Flancbaum, L., Geliebter, A., Kamel, S., et al. (2003). Depression score predicts weight loss following Roux-en-Y gastric bypass. Obesity Surgery, 13, 833– 836. 10.1381/096089203322618605.

Basterra-Gortari, F. J., Beunza, J. J., Bes-Rastrollo, M., Toledo, E., García-López, M., & Martínez-González, M. A. (2011). Increasing trend in the prevalence of morbid obesity in Spain: From 1.8 to 6.1 per thousand in 14 years. Revista Española de Cardiología (English Edition), 64, 424–426. 10.1016/j.rec.2010.06.015.

Brethauer, S. A., Kim, J., el Chaar, M., Papasavas, P., Eisenberg, D., Rogers, A., et al. (2015). Standardized outcomes reporting in metabolic and bariatric surgery. Obesity Surgery, 25, 587–606. 10.1007/s11695-015-1645-3.

Buchwald, H., Avidor, Y., Braunwald, E., Jensen, M. D., Pories, W., Fahrbach, K., et al. (2004). Bariatric surgery: A system- atic review and meta-analysis. JAMA, 292, 1724–1737. 10.1001/jama.292.14.1724.

Buchwald, H., Estok, R., Fahrbach, K., Banel, D., Jensen, M. D., Pories, W. J., et al. (2009). Weight and type 2 diabetes after bariatric surgery: Systematic review and meta-analysis. The American Journal of Medicine, 122, 248–256 e5. 10.1016/j. amjmed.2008.09.041.

Buchwald, H., & Oien, D. M. (2013). Metabolic/bariatric surgery worldwide 2011. Obesity Surgery, 23, 427–436. 10.1007/s11695- 012-0864-0.

Canetti, L., Berry, E. M., & Elizur, Y. (2009). Psychosocial predictors of weight loss and psychological adjustment following bariatric surgery and a weight-loss program: The mediating role of emo- tional eating. The International Journal of Eating Disorders, 42, 109–117. 10.1002/eat.20592.

Chau,W., Schmidt,H.,Kouli,W.,Davis,D.,Wasielewski,A.,&Ballan- tyne,G. (2005). Patient characteristics impacting excessweight loss following laparoscopic adjustable gastric banding.Obesity Surgery, 15, 346–350.

Chikunguwo, S., Wolfe, L., Dodson, P., Meador, J., Baugh, N., Clore, J., et al. (2010). Analysis of factors associated with du- rable remission of diabetes after Roux-en-Y gastric bypass. Surgery for Obesity and Related Diseases, 6, 254–259. 10.1016/j.soard.2009.11.003.

Claes, L., Vandereycken, W., Vandeputte, A., & Braet, C. (2013). Per- sonality subtypes in female pre-bariatric obese patients: Do they dif- fer in eating disorder symptoms, psychological complaints and coping behaviour? European Eating Disorders Review: The Journal of the Eating Disorders Association, 21, 72–77. 10.1002/erv.2188.

Cloninger, C. R. (1999). The temperament and character inventory- revised. St Louis, MO: Center for Psychobiology of Personality, Washington University.

Cloninger, C. R., Svrakic, D. M., & Przybeck, T. R. (1993). A psycho- biological model of temperament and character. Archives of Gen- eral Psychiatry, 50, 975–990.

Colquitt, J. L., Pickett, K., Loveman, E., & Frampton, G. K. (2014). Surgery for weight loss in adults. The Cochrane Database of Sys- tematic Reviews, 8, CD003641. http://onlinelibrary.wiley.com/10.1002/14651858.CD003641.pub4/abstract.

Courcoulas, A. P., Christian, N. J., O'Rourke, R. W., Dakin, G., Patchen Dellinger, E., Flum, D. R., et al. (2015). Preop- erative factors and 3-year weight change in the Longitudi- nal Assessment of Bariatric Surgery (LABS) consortium. Surgery for Obesity and Related Diseases, ▪▪, 1–10. 10.1016/j.soard.2015.01.011.

De Panfilis, C., Cero, S., Torre, M., Salvatore, P., Dall'Aglio, E., Adorni, A., et al. (2006). Utility of the Temperament and Char- acter Inventory (TCI) in outcome prediction of laparoscopic ad- justable gastric banding: Preliminary report. Obesity Surgery, 16, 842–847. 10.1381/096089206777822278.

De Panfilis, C., Generali, I., Dall'Aglio, E., Marchesi, F., Ossola, P., & Marchesi, C. (2014). Temperament and one-year outcome of gastric bypass for severe obesity. Surgery for Obesity and Related Diseases: Official Journal of the American Society for Bariatric Sur- gery, 10, 144–148. 10.1016/j.soard.2013.09.018.

De Zwaan, M., Enderle, J., Wagner, S., Mühlhans, B., Ditzen, B., Gefeller, O., et al. (2011). Anxiety and depression in bariatric sur- gery patients: a prospective, follow-up study using structured clinical interviews. Journal of Affective Disorders, 133, 61–68. 10.1016/j.jad.2011.03.025.

Derogatis, L. R. (1994). SCL-90-R: Symptom checklist-90-R. Adminis- tration, scoring and procedures manual—II for the revised version. Towson; MD: Clinical Psychometric Research.

Derogatis, L. R. (2002). SCL-90-R. Cuestionario de 90 síntomas- Manual. Madrid: TEA Editorial.

DiGiorgi, M., Rosen, D., Choi, J., Milone, L., Schrope, B., Olivero-Rivera, L., et al. (2015). Re-emergence of diabetes after gastric bypass in pa- tients with mid- to long-term follow-up. Surgery for Obesity and Related Diseases, 6, 249–253. 10.1016/j.soard.2009.09.019.

Elder, K. A., & Wolfe, B. M. (2007). Bariatric surgery: A review of procedures and outcomes. Gastroenterology, 132, 2253–2271. 10.1053/j.gastro.2007.03.057.

Fassino, S., Daga, G. A., Pierò, A., & Rovera, G. G. (2002). Dropout from brief psychotherapy in anorexia nervosa. Psychotherapy and Psychosomatics, 71, 200–206 63645.

Gade, H., Rosenvinge, J. H., Hjelmesæth, J., & Friborg, O. (2014). Psychological correlates to dysfunctional eating patterns among morbidly obese patients accepted for bariatric surgery. Obesity Facts, 7, 111–119. 10.1159/000362257.

Gallus, S., Lugo, A., Murisic, B., Bosetti, C., Boffetta, P., & La Vecchia, C. (2015). Overweight and obesity in 16 European countries. European Journal of Nutrition, 54, 679–689. 10.1007/ s00394-014-0746-4.

Garb, J., Welch, G., Zagarins, S., Kuhn, J., & Romanelli, J. (2009). Bariatric surgery for the treatment of

morbid obesity: a meta-analysis of weight loss outcomes for laparoscopic adjustable gas- tric banding and laparoscopic gastric bypass. Obesity Surgery, 19, 1447–1455. 10.1007/s11695-009-9927-2.

Garner, D. M. (1991). Eating disorder inventory—2. Odessa: Psycho- logical Assessment Resources.

Garner, D. M. (1998). Inventario de Trastornos de la Conducta Alimentaria (EDI-2)-Manual. Madrid: TEA.

Gerlach, G., Herpertz, S., & Loeber, S. (2015). Personality traits and obesity: A systematic review. Obesity Reviews, 16, 32–63. 10.1111/ obr.12235.

Gloy, V. L., Briel, M., Bhatt, D. L., Kashyap, S. R., Schauer, P. R., Mingrone, G., et al. (2013). Bariatric surgery versus non- surgical treatment for obesity: A systematic review and meta- analysis of randomised controlled trials. BMJ (Clinical Research Ed.), 347, f5934. 10.1136/bmj.f5934.

Gutiérrez-Zotes, J. A., Bayón, C., Montserrat, C., Valero, J., Labad, A., & Cloninger, C. R. (2004). Temperament and Character Inventory-Revised (TCI-R). Standardization and normative data in a general population sample. Actas Españolas de Psiquiatría, 32, 8–15.

Herpertz, S., Albus, C., Kielmann, R., Hagemann-Patt, H., Lichtblau, K., & Köhle, K., et al. (2001). Comorbidity of diabetes mellitus and eating disorders: A follow-up study. Journal of Psychosomatic Research, 51, 673–678.

Herpertz, S., Kielmann, R., Wolf, A. M., Hebebrand, J., & Senf, W. (2004). Do psychosocial variables predict weight loss or mental health after obesity surgery? A systematic review. Obesity Re- search, 12, 1554–1569. 10.1038/oby.2004.195.

Khan, Y., & Montgomery, A. M. (1996). Eating attitudes in young fe- males with diabetes: Insulin omission identifies a vulnerable sub- group. The British Journal of Medical Psychology, 69, 343–353.

Kinzl, J., Schrattenecker, M., Traweger, C., Mattesich, M., Fiala, M., & Biebl, W. (2006). Psychosocial predictors of weight loss after bariatric surgery. Obesity Surgery, 16, 1609–1614. 10.1381/ 096089206779319301.

Korenkov, M., Sauerland, S., & Adams, T. (2007). Clinical update: Bariatric surgery. Lancet, 370, 1988–1990. 10.1016/S0140-6736 (07)61844-3.

Krug, I., Villarejo, C., Jiménez-Murcia, S., Perpiñá, C., Vilarrasa, N., Granero, R., et al. (2013). Eating-related Environmental Factors in Underweight Eating Disorders and Obesity: Are There Com- mon Vulnerabilities During Childhood and Early Adolescence? European Eating Disorders Review, 21, 202–208. 10.1002/ erv.2204.

Kwok, C. S., Pradhan, A., Khan, M. A., Anderson, S. G., Keavney, B. D., Myint, P. K., et al. (2014). Bariatric surgery and its impact on cardiovascular disease and mortality: A systematic review and meta-analysis. International Journal of Cardiology, 173, 20–28. 10.1016/j.ijcard.2014.02.026.

Larsen, J. K., Geenen, R., Maas, C., De Wit, P., Van Antwerpen, T., & Brand, N., et al. (2004). Personality as a predictor of weight loss maintenance after surgery for morbid obesity. Obesity Research, 12, 1828–1834.

Leombruni, P., Pierò, A., Dosio, D., Novelli, A., Abbate-Daga, G., & Morino, M., et al. (2007). Psychological predictors of outcome in vertical banded gastroplasty: A 6 months prospective pilot study. Obesity Surgery, 17, 941–948.

Livingston, E. H., & Langert, J. (2006). The impact of age andMedicare status on bariatric surgical outcomes. Archives of Surgery, 141, 1115–1120 discussion 1121. 10.1016/S1073-5437(08)70019-6.

Ma, Y., Pagoto, S. L., Olendzki, B. C., Hafner, A. R., Perugini, R. A., Mason, R., et al. (2006). Predictors of weight status following lap- aroscopic gastric bypass. Obesity Surgery, 16, 1227–1231. 10.1381/096089206778392284.

Malkani, S. (2015). An update on the role of bariatric surgery in di- abetes management. Current Opinion in Endocrinology & Diabetes and Obesity, 22, 98–105. 10.1097/MED.0000000000000143.

Manasse, S. M., Juarascio, A. S., Forman, E. M., Berner, L. A., Butryn, M. L., Ruocco, A. C. (2014).

Executive Functioning in Overweight Individuals with and without Loss-of-Control Eating. European Eating Disorders Review, 22, 373–377. 10.1002/ erv.2304.

Marcus, M. D., Kalarchian, M. A., & Courcoulas, A. P. (2009). Psy- chiatric evaluation and follow-up of bariatric surgery patients. American Journal of Psychiatry, 166, 285–291. 10.1176/appi. ajp.2008.08091327.

Meule, A., Hermann, T., & Kübler, A. (2015). Food Addiction in Over- weight and Obese Adolescents Seeking Weight-loss Treatment. European Eating Disorders Review, 23, 193–198. 10.1002/erv.2355.

Meany, G., Conceição, E., & Mitchell, J. E. (2014). Binge eating, binge eating disorder and loss of control eating: Effects on weight outcomes after bariatric surgery. European Eating Disorders Re- view, 22, 87–91. 10.1002/erv.2273.

Müller, A., Claes, L., Wilderjans, T. F., & de Zwaan, M. (2014). Tem- perament subtypes in treatment seeking obese individuals: A la- tent profile analysis. European Eating Disorders Review, 22, 260– 266. 10.1002/erv.2294.

Nagendran, M., Carlin, A. M., Bacal, D., Genaw, J. A., Hawasli, A. A., Birkmeyer, N. J., et al. (2015). Self-reported remission of ob- structive sleep apnea following bariatric surgery: Cohort study. Surgery for Obesity and Related Diseases: Official Journal of the American Society for Bariatric Surgery, 11, 697–703. 10.1016/j. soard.2014.10.011.

NAOS Strategy. (2013). Assessment and monitoring of the NAOS strategy: Minimum set of indicators. Spanish Food Safety and Nutrition Agency. Ministry of Health, Social Services and Equal- ity. Madrid.

Niego, S. H., Kofman, M. D., Weiss, J. J., & Geliebter, A. (2007). Binge eating in the bariatric surgery population: A review of the literature. The International Journal of Eating Disorders, 40, 349–359. 10.1002/eat.20376.

NIH (1992). Gastrointestinal surgery for severe obesity: National institutes of health consensus development con- ference Statement. The American Journal of Clinical Nutri- tion, 55, 615S–619S.

NIH (2000). North American Association for the study of obesity and the National Heart, Lung, and Blood Institute. The practical guide. Identification, evaluation, and treatment of overweight and obesity in adults. Bethesda, Md: National Institutes of Health. NIH pub- lication 00-4084.

Patton, J. H., Stanford, M. S., & Barratt, E. S. (1995). Factor structure of the Barratt Impulsiveness Scale. Journal of Clinical Psychology, 51, 768–774. 10.1037/t05661-000.

Pories, W. J. (2008). Bariatric surgery: Risks and rewards. The Journal of Clinical Endocrinology and Metabolism, 93, S89–S96. 10.1210/ jc.2008-1641.

Ricci, C., Gaeta, M., Rausa, E., Macchitella, Y., & Bonavina, L. (2014). Early impact of bariatric surgery on type ii diabetes, hy- pertension, and hyperlipidemia: A systematic review, meta- analysis and meta-regression on 6587 patients. Obesity Surgery, 24, 522–528. 10.1007/s11695-013-1121-x.

Rubio, M., Salas-Salvadó, J., & Barbany, M. (2007). Consenso SEEDO 2007 para la evaluación del sobrepeso y la obesidad y el establecimiento de criterios de intervención terapéutica. Rev Esp Obes, 5, 135–175.

Rydén, O., Hedenbro, J. L., & Frederiksen, S. G. (1996). Weight loss after vertical banded gastroplasty Can Be predicted: A prospective psychological study. Obesity Surgery, 6, 237–243. 10.1381/ 096089296765556827.

Sjöström, L., Lindroos, A.-K., Peltonen, M., Torgerson, J., Bou- chard, C., Carlsson, B., et al. (2004). Lifestyle, diabetes, and cardiovascular risk factors 10 years after bariatric surgery. The New England Journal of Medicine, 351, 2683–2693. 10.1056/NEJMoa035622.

Sugerman, H. J., Wolfe, L. G., Sica, D. A., & Clore, J. N. (2003). Di- abetes and hypertension in severe obesity and effects of gastric bypass-induced weight loss. Annals of Surgery, 237, 751–756 dis- cussion 757–758. . 10.1097/01.SLA.0000071560.76194.11.

Thalheimer, A., Bueter, M., Wierlemann, A., Lager, C., Jurowich, C., Germer, C.-T., et al. (2009). Predictability of outcome in laparo- scopic gastric banding. Obesity Facts, 2, 27–30.

Vallis, M., & Ross, M. (1993). The role of psychological factors in bariatric surgery for morbid obesity: Identification of psycholog- ical predictors of success. Obesity Surgery, 3, 346–359.

Van Hout, G. C. M., Verschure, S. K. M., & van Heck, G. L. (2005). Psychosocial predictors of success following bariatric surgery. Obesity Surgery, 15, 552–560. 10.1381/0960892053723484.

Van Reedt Dortland, A., Giltay, E., van Veen, T., Zitman, F., & Penninx, B. W. (2013). Longitudinal relationship of depres- sive and anxiety symptoms with dyslipidemia and abdominal obesity. Psychosomatic Medicine, 75, 83–89. 10.1097/ PSY.0b013e318274d30f.

Van Reedt Dortland, A. K. B., Vreeburg, S. A., Giltay, E. J., Licht, C. M. M., Vogelzangs, N., Van Veen, T., et al. (2013). The impact of stress systems and lifestyle on dyslipidemia and obesity in anxiety and depression. Psychoneuroendocrinology, 38, 209–218. 10.1016/ j.psyneuen.2012.05.017.

Van Reedt Dortland, A. K., Giltay, E. J., van Veen, T., van Pelt, J., Zitman, F. G., & Penninx, B. W. J. H. (2010). Associations between serum lipids and major depressive disorder: Results from the Netherlands Study of Depression and Anxiety (NESDA). The Journal of Clinical Psychiatry, 71, 729–736. 10.4088/JCP.08m04865blu.

Villarejo, C., Jiménez-Murcia, S., Álvarez-Moya, E., Granero, R., Penelo, E., Treasure, J., et al. (2014). Loss of Control over Eating: A Description of the Eating Disorder/Obesity Spectrum in Women. European Eating Disorders Review, 22, 25–31. 10.1002/ erv.2267.

Wadden, T. A., Faulconbridge, L. F., Jones-Corneille, L. R., Sarwer, D. B., Fabricatore, A. N., Thomas, J. G., et al. (2011). Binge eating disorder and the outcome of bariatric surgery at one year: A prospective, observational study. Obesity (Silver Spring, Md.), 19, 1220–1228. 10.1038/oby.2010.336.

WHO. (2014). World Health Organization. Obesity and overweight fact sheet no. 311. Update January 2015.

Wimmelmann, C. L., Dela, F., & Mortensen, E. L. (2014). Psy- chological predictors of mental health and health-related quality of life after bariatric surgery: A review of the recent research. Obesity Research & Clinical Practice, 8, e314–e324. 10.1016/j.orcp.2013.11.002.

Young-Hyman, D. L., & Davis, C. L. (2010). Disordered eating behavior in individuals with diabetes: Importance of context, evaluation, and classification. Diabetes Care, 33, 683–689. 10.2337/dc08-1077.

Figure 1

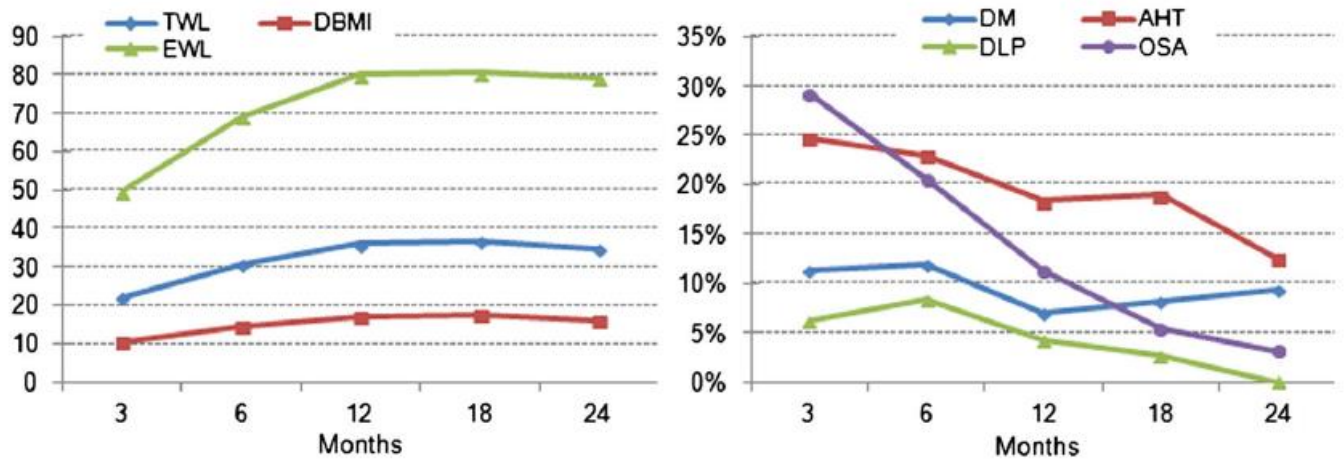

Table 1

	B	SE	χ^2	*df*	*p*	OR	95% CI	
Constant	*−3.078*	*3.483*	*0.781*	*1*	*.377*	*0.05*		
**Bariatric surgery type*			*5.996*	*3*	*.112*			
Gastric bypass	*3.097*	*1.492*	*4.310*	*1*	*.038*	*22.14*	*1.19*	*40.61*
Duodenal switch	*0.931*	*1.415*	*0.433*	*1*	*.511*	*2.54*	*0.16*	*172.6*
Vertical sleeve	*2.246*	*1.482*	*2.295*	*1*	*.130*	*9.45*	*0.52*	*64.73*
Married	2.014	1.100	3.354	1	.044	7.50	1.00	64.73
Age (years)	−0.125	0.051	6.040	1	.005	0.88	0.80	0.97
TCI-R: cooperativeness	0.049	0.023	4.628	1	.022	1.05	1.00	1.10
SCL-90: depression	−1.484	0.769	3.724	1	.047	0.23	0.05	1.00
SCL-90: anxiety	2.628	1.263	4.331	1	.014	13.85	1.17	164.5

Table 2

	B	SE	χ^2	*df*	*p*	95% CI (B)	
(Intercept)	*88.487*	*24.875*	*12.654*	*1*	*<.001*	*39.73*	*137.2*
**Bariatric surgery type*			*6.242*	*3*	*.014*		
Gastric bypass	*19.457*	*12.601*	*2.384*	*1*	*.123*	*−5.24*	*44.15*
Duodenal switch	*8.131*	*12.931*	*0.395*	*1*	*.530*	*−17.21*	*33.47*
Vertical sleeve	*14.728*	*12.005*	*1.505*	*1*	*.220*	*−8.80*	*38.26*
Age (years)	−0.549	0.224	6.004	1	.014	−0.99	−0.11
BMI (baseline)	−0.952	0.284	11.262	1	.001	−1.51	−0.40
TCI-R: cooperativeness	0.225	0.120	3.495	1	.062	−0.01	0.46

Table 3

	B	SE	χ^2	*df*	*p*	OR	95% CI (OR)	
Model for DLP								
(Intercept)	*−10.97*	*5.64*	*3.78*	*1*	*.052*	*0.00*	*0.00*	*1.10*
Bariatric surgery type			*2.157*	*3*	*.541*			
Gastric bypass	*0.95*	*2.23*	*0.18*	*1*	*.672*	*2.57*	*0.03*	*203.4*
Duodenal switch	*1.15*	*2.40*	*0.23*	*1*	*.632*	*3.16*	*0.03*	*350.7*
Vertical sleeve	*2.31*	*2.42*	*0.91*	*1*	*.340*	*10.06*	*0.09*	*115.5*
Age (years)	0.11	0.06	3.98	1	.046	1.12	1.00	1.25
DM at baseline	2.47	1.39	3.15	1	.076	11.78	0.77	179.82
SCL-90: somatization	−2.66	1.14	5.39	1	.020	0.07	0.01	0.66
SCL-90: depression	2.31	1.13	4.16	1	.041	10.05	1.09	92.46
Model for OSA								
(Intercept)	*−8.216*	*2.347*	*12.249*	*1*	*.000*	*0.00*	*0.00*	*0.03*
Bariatric surgery type			*4.269*	*3*	*.234*			
Gastric bypass	*−1.181*	*0.654*	*3.264*	*1*	*.071*	*0.31*	*0.09*	*1.11*
Duodenal switch	*−1.175*	*0.739*	*2.524*	*1*	*.112*	*0.31*	*0.07*	*1.32*
Vertical sleeve	*−0.537*	*0.640*	*0.702*	*1*	*.402*	*0.58*	*0.17*	*2.05*
Age (years)	0.077	0.027	7.888	1	.005	1.08	1.02	1.14
BMI (baseline)	0.093	0.041	5.063	1	.024	1.10	1.01	1.19
Model for DM								
(Intercept)	*−2.697*	*1.211*	*4.958*	*1*	*.026*	*0.07*	*0.01*	*0.72*
Bariatric surgery type			*7.690*	*3*	*.053*			
Gastric bypass	*−1.832*	*0.961*	*3.636*	*1*	*.057*	*0.16*	*0.02*	*1.05*
Duodenal switch	*−1.388*	*1.014*	*1.871*	*1*	*.171*	*0.25*	*0.03*	*1.82*
Vertical sleeve	*−2.336*	*0.880*	*7.053*	*1*	*.008*	*0.10*	*0.02*	*0.54*
EDI-2: drive for thinness	0.177	0.088	4.018	1	.045	1.19	1.00	1.42
Model for AHT								
(Intercept)	*−10.298*	*2.158*	*22.769*	*1*	*.000*	*0.00*	*0.00*	*0.00*
Bariatric surgery type			*3.707*	*3*	*.295*			
Gastric bypass	*−0.984*	*0.956*	*1.059*	*1*	*.303*	*0.37*	*0.06*	*2.43*
Duodenal switch	*0.284*	*1.200*	*0.056*	*1*	*.813*	*1.33*	*0.13*	*13.97*
Vertical sleeve	*0.239*	*0.991*	*0.058*	*1*	*.809*	*1.27*	*0.18*	*8.87*
AHT at baseline	3.042	0.774	15.464	1	<.001	20.95	4.60	95.41
Age (years)	0.140	0.031	19.845	1	<.001	1.15	1.08	1.22
EDI-2: perfectionism	0.290	0.134	4.645	1	.031	1.34	1.03	1.74