HHS Public Access

Author manuscript

Obes Surg. Author manuscript; available in PMC 2017 June 02.

Published in final edited form as:

Obes Surg. 2017 February ; 27(2): 548–551. doi:10.1007/s11695-016-2510-8.

Predictors of Attrition Before and After Bariatric Surgery

Margarita Sala[1], **Deborah L. Haller**[2], **Blandine Laferrère**[3], **Peter Homel**[4], and **James J. McGinty**[5]

[1]Department of Psychology, Southern Methodist University, 6116 N. Central Expressway, Suite 1300, Dallas, TX 75206, USA

[2]Department of Public Health Sciences, University of Miami Miller School of Medicine, Miami, FL, USA

[3]New York Obesity Research Center, Department of Medicine, Columbia University College of Physicians and Surgeons, New York, NY, USA

[4]Department of Medicine, Albert Einstein School of Medicine, New York, NY, USA

[5]Division of Bariatric and Minimally Invasive Surgery, Department of Surgery, Mount Sinai, St. Luke's Hospital, Icahn School of Medicine, Mt. Sinai, New York, NY, USA

Keywords

Bariatric surgery; Attrition

Bariatric surgery is considered the most effective approach to treating morbid obesity [1]. Despite this, a considerable number of individuals who initiate the preoperative evaluation process do not undergo surgery. Moreover, of the individuals who do have surgery, many are non-compliant with follow-up appointments. Attrition makes it difficult for clinicians to assess post-surgery outcomes and compromises the post-surgery lifelong medical surveillance required for optimal patient health and well-being.

The purpose of this study was to identify predictors of [1] surgery completion and [2] follow-up appointment attendance at 2-year post-surgery. On the basis of previously published studies, we hypothesized that [1] surgery completion would be related to higher baseline BMI, no current tobacco use, more medical co-morbidities, and fewer psychological comorbidities; and [2] attendance at the 2-year follow-up appointment would be related to older age, male gender, non-minority race/ethnicity, undergoing gastric banding, fewer medical and psychological co-morbidities, attendance at the 1-, 3-, and 6-month follow-up appointments, and greater weight loss at 1-, 3-, and 6-month following surgery.

Correspondence to: Margarita Sala.

Compliance with Ethical Standards: **Ethical Approval**: For this type of study, formal consent is not required. A waiver of consent was obtained by the St Luke's Roosevelt Hospital IRB prior to initiating the study.

Conflict of Interest: The authors declare that they have no conflict of interest.

Methods

Participants were candidates for bariatric surgery at Mt. Sinai St. Luke's Hospital, a hospital located in New York City that serves a predominantly African-American and Hispanic population. Eligibility criteria for surgery included either a BMI ≥40 or a BMI ≥35 kg/m^2 with at least one illness related to obesity (e.g., type 2 diabetes, hypertension). Ineligibility criteria included active smoking, alcohol or other drug misuse, unstable major psychiatric disorder, severe food intake disorder, and any medical contraindication to anesthesia (e.g., uncontrolled respiratory or cardiac failure). Patients typically initiate the program by signing up for a weekly orientation, attending the first consult (which happens immediately after the orientation), and receiving a psychological evaluation. Patients were counted in our denominator if they attended at least the psychological evaluation. Patients who initiated, withdrew, and reinitiated were counted only once.

After obtaining Institutional Review Board approval, a data abstractor reviewed medical charts for adults who initiated the weight loss surgery process between 2008 and 2010, extracting demographic information, BMI, date and type of surgery, dates of attended follow-up appointments, and body weight changes. Subsequently, a data manager merged these data with selected psychiatric and substance use information obtained during a mandatory preoperative psychological evaluation. Mental health information was collected using a secure web-based interface. Standardized measures included the Fagerstrom Test of Nicotine Dependence (FTND) [2], the Alcohol Use Disorders Identification Test (AUDIT) [3], the Drug Abuse Screening Test (DAST) [4], and a review of items reflecting the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) criteria for binge eating disorder (BED) [5]. Patients also completed a computerized version of the Millon Clinical Multiaxial Inventory-III (MCMI-III) personality test [6], which assesses for psychiatric syndromes (e.g., depression, anxiety, somatoform disorder, and psychosis) as well as clusters A, B, and C personality disorders during a face-to-face visit with the bariatric psychologist. Individuals with cluster A disorders are odd or eccentric, those with cluster B disorders are dramatic, emotional, and unstable, and those with cluster C disorders are anxious and fearful. Patients were classified as having a possible or likely disorder consistent with published cut scores based on population-based rates. Presence of personality disorders was assessed first by cluster, and then by individual disorder (e.g., histrionic, schizoid). SPSS version 21 was used for all analyses. Univariate and multivariate logistic regressions were used to evaluate possible predictors of [1] undergoing bariatric surgery once the medical evaluation was initiated and [2] follow-up appointment attendance at 2-year post-surgery.

Results

Please refer to Table 1 for demographic information. Of the 779 individuals who initiated the evaluation process and completed the psychological evaluation, 397 (50.1%) had surgery. No demographic differences were observed between patients who had or did not have surgery other than widowed status (Table 2), which remained significant in multivariate analyses (OR = 0.15, 95% CI = 0.03–0.66, $p = 0.01$). Of note, the number of patients in this category was extremely small. Surprisingly, patients with more psychiatric comorbidities, in particular, those with mood and clusters B and C personality disorders, were more likely to

have surgery. Analysis of individual disorders showed that only dysthymia (mood disorder) was a significant predictor for receiving surgery (Table 2). In contrast, none of the individual personality disorders comprising clusters B and C were a significant predictor. Dysthymia was the only psychiatric comorbidity that remained significant in multivariate analyses (OR = 2.35, 95% CI = 1.23–4.52, $p = 0.01$).

Of the 397 patients who underwent surgery, only 26.2% attended their 2-year follow-up appointment. Demographic variables, weight loss (at 1-, 3-, and 6-month post-surgery), and psychiatric/substance abuse comorbidity failed to predict attendance at the 1- and 2-year follow-up visit (Table 3). Although presence at the 3- and 6-month follow-up appointments and greater number of medical comorbidities predicted attendance at the 2-year follow-up visit in univariate analyses (Table 3), these variables were not significant in the multivariate analysis. Only gastric band procedure (OR = 2.16, 95% CI = 1.33–3.52, $p = 0.002$) and attendance at the 6-month follow-up visit (OR = 3.15, 95% CI = 1.62–6.15, $p = 0.001$) remained significant predictors of the 2-year attendance in multivariate analyses.

Discussion

In contrast to previous studies [7], demographic characteristics (BMI, gender, ethnicity, etc.) failed to predict either surgery completion or retention after surgery. However, a systematic review of prior findings revealed inconsistent associations between attrition and demographic characteristics across studies [8]. Reasons for these discrepancies may include differences in patient populations, distance to bariatric center, methodologies employed, length of follow-up period, definition of attrition, type of bariatric procedures, or race/ethnicity. For example, patients in our cohort were predominantly Hispanic and African-American, compared to other studies with predominantly Caucasian samples [9].

In contrast to previous studies [9], patients with psychiatric comorbidity were more likely to have surgery. Individuals with dysthymia may have been more motivated to lose weight in hope that this might improve their mood and overall quality of life. This possibility is in line with a previous study which found that individuals with greater presurgery depression lost more weight after surgery than individuals with lower presurgery depression [10]. Clusters B and C personality disorders predicted surgery completion. While this seems counter-intuitive, individuals with these personality disorders are often difficult to manage in the clinical setting (e.g., they may be very demanding) such that providers may feel more compelled to respond to them.

Of the individuals who underwent bariatric surgery, only 26.2% attended their 2-year follow-up appointment. This attendance rate is considerably lower than that previously reported. However, past studies were of much smaller scale, and often with only 12-month follow-up [8]. Having a greater number of medical comorbidities and undergoing gastric banding predicted greater likelihood of follow-up appointment attendance. Individuals with ongoing medical concerns may be more motivated to attend follow-up appointments. Similarly, individuals who received gastric banding surgery may be more likely to attend follow-up appointments to get their band adjusted; alternatively, they might have been more dissatisfied with their outcomes and were seeking advice, information, or alternatives.

The strengths of this study include the large sample size, examination of a sizeable battery of predictors including personality measures, a large and ethnically diverse sample, and a 2-year follow up period. Some limitations must also be acknowledged. First, this was a retrospective study. Second, this study examined only adherence to follow-up appointments rather than adherence to behavioral recommendations (e.g., diet or exercise). Third, we were unable to contact surgery noncompleters and post-surgery nonattenders to gather information on their reasons for not receiving the surgery and for not attending follow-up appointments, respectively. We can only speculate, therefore, on the reasons why individuals who seek surgery failed to have it or to attend follow-up appointments. Fourth, some psychological conditions may have been underreported (e.g., substance use, eating disorders) because the evaluation was being conducted to determine psychological suitability for surgery assessment. However, the personality measure that was used (MCMI-III) includes sensitive measures of over- and underreporting as well as fixed responding that make this possibility less likely. Fifth, we did not consider all relevant factors (e.g., socioeconomic status, geographical distance to the bariatric center). Finally, although about half of the patients who sought surgery did not get it, no data were available to identify patients who opted out for personal reasons as opposed to those who may have been turned down for medical or psychosocial reasons, who were denied insurance coverage, or who underwent surgery at another surgical center.

In conclusion, attrition rates were high during both the pre-and postoperative period and we found few strong predictors of attrition. Psychological factors played a significant role prior to surgery, but postoperative retention was predicted only by medical comorbidities, surgical procedure, and attendance at prior follow-up appointments. Accordingly, these factors should be given greater consideration so that interventions can be developed to help decrease dropout.

Acknowledgments

We would like to thank all the research assistants who helped with retrospective data collection for this study.

Funding: This research was funded by an award from The Associate Trustees of St. Luke's and Roosevelt Hospitals to Blandine Laferrère. Margarita Sala is supported by the National Science Foundation Graduate Research Fellowship under Grant No. DGE-1356109. Any opinion, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.

References

1. Maggard MA, Shugarman LR, Suttorp M, et al. Meta-analysis: surgical treatment of obesity. Ann Intern Med. 2005; 142(7):547–59. [PubMed: 15809466]
2. Heatherton TF, Kozlowski LT, Frecker RC. The Fagerström test for nicotine dependence: a revision of the Fagerstrom Tolerance Questionnaire. Br J Addict. 1991; 86(9):1119–27. [PubMed: 1932883]
3. Bush K, Kivlahan DR, McDonell MB, et al. The AUDIT alcohol consumption questions (AUDIT-C): an effective brief screening test for problem drinking. Arch Intern Med. 1998; 158(16):1789–95. [PubMed: 9738608]
4. Skinner HA. The drug abuse screening test. Addict Behav. 1982; 7(4):363–71. [PubMed: 7183189]
5. American Psychiatric Association. Diganostic and statistical manual of mental disorders. 5th. Washington, DC: 2013.
6. Millon, T., Millon, C., Davis, RD., et al. Millon clinical multiaxial inventory-III (MCMI-III): Manual. Pearson/PsychCorp; 2009.

7. Diamant A, Milner J, Cleghorn M, et al. Analysis of patient attrition in a publicly funded bariatric surgery program. J Am Coll Surg. 2014; 219(5):1047–55. [PubMed: 25256371]
8. Moroshko I, Brennan L, O'Brien P. Predictors of attrition in bariatric aftercare: a systematic review of the literature. Obes Surg. 2012; 22(10):1640–7. [PubMed: 22696275]
9. Merrell J, Ashton K, Windover A, et al. Psychological risk may influence drop-out prior to bariatric surgery. Surg Obes Relat Dis. 2012; 8(4):463–9. [PubMed: 22465088]
10. Averbukh Y, Heshka S, El-Shoreya H, et al. Depression score predicts weight loss following Roux-en-Y gastric bypass. Obes Surg. 2003 Dec; 13(6):833–6. [PubMed: 14738665]

Table 1
Demographic information at first presurgery visit

	All patients *n* (%)	Received surgery *n* (%)	No surgery *n* (%)
n	779	397	382
Age, years (M, SD)	38.0 (12.1)	38.5 (12.2)	37.6 (12.1)
BMI, kg/m^2 (M, SD)	46.6 (8.1)	46.5 (8.1)	46.8 (8.1)
Psych comorbidities (M, SD)	2.3 (2.1)	2.4 (2.3)	2.1 (1.7)
Gender			
Male	109 (18.0%)	61 (17.9%)	48 (18.1%)
Female	497 (82.0%)	280 (82.1%)	217 (81.9%)
Race/ethnicity			
Caucasian	89 (14.7%)	51 (15.0%)	38 (14.4%)
African-American	199 (32.8%)	107 (31.4%)	92 (34.7%)
Hispanic	318 (52.5%)	183 (53.7%)	135 (50.1%)
Marital status			
Single	288 (48.0%)	161 (47.8%)	127 (48.3%)
First marriage	151 (25.2%)	85 (25.2%)	66 (25.1%)
Separated	47 (7.8%)	29 (8.6%)	18 (6.8%)
Widowed	13 (2.2%)	2 (0.6%)	11 (4.2%)
Divorced	61 (10.2%)	34 (10.1%)	27 (10.3%)
Remarried	39 (6.5%)	26 (7.7%)	13 (4.9%)
Other	1 (0.2%)	0 (0.0%)	1 (0.4%)

M mean, *SD* standard deviation, *BMI* body mass index

Table 2
Univariate models of predictors of surgery completion

Variable	OR	95% CI	*p* value
Age	0.99	0.98–1.00	0.38
BMI	1.00	0.99–1.03	0.67
Number of psych comorbidities	1.09	1.01–1.19	0.04
Gender	0.99	0.65–1.50	0.94
White race	1.04	0.84–1.30	0.72
Widowed marital status	0.14	0.30–0.62	0.01
Mood disturbance	2.19	1.24–3.88	0.01
Bipolar mania	1.09	0.34–3.47	0.88
Depression	1.52	0.72–3.20	0.28
Dysthymia	2.50	1.31–4.79	0.01
Anxiety	1.54	0.99–2.40	0.06
Cluster A PD	1.50	0.97–2.32	0.07
Cluster B PD	1.57	1.18–2.09	0.00
Antisocial	2.59	0.83–8.03	0.10
Borderline	1.83	0.47–7.15	0.38
Histrionic	1.18	0.85–1.64	0.33
Narcissistic	0.87	0.62–1.23	0.43
Custer C PD	1.42	1.07–1.90	0.02
Avoidant	1.59	0.91–2.76	0.10
Dependent	1.67	0.86–3.22	0.13
Compulsive	0.83	0.60–1.15	0.26
Binge eating disorder	1.41	0.74–2.72	0.30
Drug abuse	0.95	0.87–1.05	0.34
Hazardous alcohol use	1.00	0.57–1.76	0.99
Nicotine dependence	1.12	0.95–1.32	0.17

n = 600–779, depending on missing data
OR odds ratio of surgery completion, *CI* confidence interval, *BMI* body mass index, *PD* personality disorder

Table 3
Univariate models of predictors of 24-month appointment follow-up attendance

Variable	OR	95% CI	*p* value
Age	0.99	0.97–1.01	0.36
BMI	1.01	0.98–1.04	0.39
Medical comorbidities	1.18	1.00–1.39	0.05
Psych comorbidities	0.94	0.84–1.06	0.32
Gender	0.94	0.50–1.76	0.84
White race	0.99	0.62–1.60	0.97
Marital status	1.06	0.92–1.23	0.41
Mood disturbance	1.16	0.59–2.27	0.68
Anxiety	0.65	0.32–1.31	0.23
Cluster A PD	1.03	0.55–1.96	0.92
Cluster B PD	1.17	0.75–1.83	0.49
Custer C PD	0.96	0.61–1.50	0.85
Binge eating disorder	0.77	0.28–2.13	0.61
Drug abuse	0.91	0.74–1.13	0.39
Hazardous alcohol use	0.37	0.13–1.08	0.07
Nicotine dependence	1.01	0.82–1.25	0.90
Procedure			
GB vs. GBP	2.36	1.47–3.80	<0.001
VSG vs. GBP	1.96	0.70–5.50	0.20
1-month total weight loss %	0.99	0.97–1.02	0.66
3-month total weight loss %	0.98	0.96–1.00	0.09
Present at 1 month	1.81	0.39–8.39	0.45
Present at 3 months	2.17	1.14–4.11	0.02
Present at 6 months	3.70	1.97–6.94	0.00

n = 341–397, depending on missing data
OR odds ratio of attending 24-month follow-up appointment, *CI* confidence interval, *BMI* body mass index, *PD* personality disorder, *GBP* gastric bypass, *GB* gastric band, *VSG* vertical sleeve