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Loss-of-Control Eating Following Sleeve Gastrectomy Surgery

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Abstract

Background—Post-operative loss-of-control (LOC) eating is related to poorer weight loss outcomes following bariatric surgery, but little is known about LOC eating following sleeve gastrectomy surgery.

Objectives—To examine LOC eating severity and weight loss following sleeve gastrectomy.

Setting—University School of Medicine, U.S.

Methods—Participants were 71 individuals (84.5% female; $n=60$) who underwent sleeve gastrectomy surgery within the previous 4–9 months and reported LOC eating at least once weekly during the previous 28 days. LOC eating was assessed using the Eating Disorder Examination (EDE) Bariatric Surgery Version. Current mean age and body mass index were 47.3 ($SD=10.1$) years and 37.9 ($SD=8.2$) kg/m². Two groups, bariatric binge-eating disorder (Bar-BED) and loss-of-control eating only (LOC-Only) were created based on modified binge-eating disorder (BED) criteria, which excluded the “unusually large quantity of food” criterion due to limited gastric capacity post-surgery. Bar-BED criteria mirrored BED criteria and consisted of the following: at least 12 LOC eating episodes over the prior three months (once weekly), 3 of 5 associated symptoms, marked distress over LOC eating, and lack of regular compensatory behaviors.

Results—Based on these revised criteria, 49.3% ($n=35$) were classified as the Bar-BED group and 50.7% ($n=36$) as the LOC-Only group. Compared to the LOC-Only group, the Bar-BED group had significantly greater EDE global and subscale scores and lower percent weight loss by six months post-surgery.

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Conclusions—Findings suggest LOC eating that parallels BED post-surgery is associated with poorer outcomes following sleeve gastrectomy including poorer weight loss and greater severity of eating-disorder psychopathology.

Keywords

Sleeve gastrectomy; Bariatric Surgery; Loss-of-Control Eating; Binge Eating; Obesity

Introduction

Bariatric surgery is the most effective treatment for severe obesity resulting in substantial weight loss and robust improvements in obesity-related medical comorbidities long-term^(1, 2). Despite these impressive overall findings, there is tremendous variability in weight loss outcomes following bariatric surgery. For example, studies estimate that 50% of gastric bypass⁽³⁾ and 59% of sleeve gastrectomy⁽⁴⁾ surgery patients experience some level of weight regain and approximately half of gastric bypass surgery patients regain greater than 20% of maximum initial weight lost⁽⁵⁾.

In light of these findings, research has explored *pre-operative* patient characteristics hypothesized to predict bariatric weight loss outcomes⁽⁶⁾. In particular, binge-eating behaviors and binge-eating disorder (BED), which are common among bariatric surgery candidates^(7, 8) have received much empirical attention as potential prognostic indicators for bariatric outcomes^(e.g., 9, 10, 11). Contrary to expectations, however, research reliably found that pre-operative characteristics, including binge eating and BED, are largely unrelated to bariatric surgery outcomes^(6, 11–13).

Research attention has begun to focus on *post-operative* factors⁽¹¹⁾ and specifically on maladaptive eating behaviors, including loss of control (LOC) eating and picking/nibbling, as prognostic indicators for bariatric outcomes⁽¹⁰⁾. LOC eating, a core feature of binge eating, is defined as the subjective sense that one cannot stop eating or control what or how much one is eating. Binge eating includes LOC eating plus eating an unusually large quantity of food in a discrete period of time⁽¹⁴⁾. Due to physical restrictions imposed by bariatric surgeries, however, eating an unusually large quantity of food post-operatively is quite difficult. Thus, reports of post-surgical binge-eating behavior and BED (defined using the “unusually large” definition for binge eating) are quite low whereas LOC eating (without eating an unusually large amount of food) is common post-operatively^(15, 16). Although relatively few studies have examined LOC eating following bariatric surgery, recent research has indicated the subjective sense of LOC while eating may be an important indicator of eating problems following surgery, regardless of the amount of food ingested⁽¹⁵⁾. In a cross-sectional study comparing *different* cohorts of bariatric patients (assessed pre-operatively and at two post-operative periods), LOC eating was associated with greater body mass index (BMI), poorer weight loss, weight regain, and greater psychological impairment⁽¹⁷⁾ and nibbling/picking was also associated with weight regain⁽¹⁸⁾. In a longitudinal prospective study, White and colleagues⁽¹⁵⁾ found that post-operative LOC eating significantly predicted poorer postsurgical weight loss and psychosocial outcomes 12 and 24 months following gastric bypass surgery.

Collectively, converging lines of evidence suggest that disturbances in eating post-operatively, specifically LOC eating and nibbling/picking, may be good signals for detecting poorer weight loss outcomes following bariatric surgery although further research is clearly needed⁽¹⁰⁾. First, little is known about LOC eating following sleeve gastrectomy surgery, which has now surpassed gastric bypass surgery as the most commonly performed bariatric surgery⁽¹⁹⁾. Second, LOC eating severity has not been examined, which is important given that a recent prospective study found that the relationship between post-operative LOC eating and weight loss outcomes was accounted for by eating-disorder psychopathology⁽¹²⁾. We hypothesized that post-operative patients with LOC eating who met BED criteria *without* the large quantity of food criterion (referred to here as “Bariatric-BED”) would have poorer outcomes relative to post-operative patients who experience LOC eating without associated symptoms and distress (key criteria for BED). Finally, the relationship between LOC eating and nibbling/picking has not been examined among sleeve gastrectomy surgery patients. Thus, the present study examined LOC eating severity among individuals reporting LOC eating following sleeve gastrectomy surgery. Specifically, we examined LOC eating severity, associated eating-disorder psychopathology, and weight loss outcomes following sleeve gastrectomy.

Materials and Method

Participants

Participants were 71 individuals seeking treatment for eating concerns and reporting LOC eating four to nine months following sleeve gastrectomy surgery. Participants underwent laparoscopic sleeve gastrectomy surgery from one of three faculty-level surgeons at the Yale Bariatric/Gastrointestinal Surgery Center of Excellence. Participants were either referred by the bariatric surgery team or responded to mailings or flyers soliciting patients with post-operative eating concerns. The 71 participants in this study represent roughly 12.4% of the total sleeve gastrectomy procedures performed over the 19-month recruitment period. Assessments were completed independently from the bariatric surgery program. Inclusion criteria required LOC eating (defined as having a sense of loss of control while eating and/or difficulty stopping while eating at least once weekly over the past four weeks *regardless of quantity eaten*) and age 18 to 65 years. Exclusion criteria were minimal and included medications that influence weight/eating and current substance dependence or severe psychiatric illness that required immediate treatment. All participants provided consent for this IRB-approved study. The majority of participants were female (n=60; 84.5%); 54.9% (n=39) were White, 31.0% (n=22) Black, 12.7% (n=9) Hispanic, and 1.4% (n=1) “Other”. Participant mean age and BMI were 47.3 (*SD*=10.1) years and 37.9 (*SD*=8.2) kg/m², respectively.

Assessments

The Eating Disorder Examination (EDE⁽²⁰⁾) is a semi-structured, investigator-based interview which assesses various overeating behaviors, including objective binge episodes (OBES; eating an unusually large quantity of food with a subjective sense of LOC while eating), subjective binge episodes (LOC eating without eating an unusually large quantity of food), and eating-disorder psychopathology. The EDE is comprised of a global score of

eating-disorder psychopathology and four subscales: restraint, eating concern, weight concern, and shape concern. The EDE–Bariatric Surgery Version (EDE-BSV), adapted and modified for bariatric surgery^(8, 12, 21), was further modified to capture distress and associated symptoms related to SBEs (in addition to distress and associated symptoms related to OBEs). Original EDE items were used to calculate EDE global and subscale scores. The EDE has demonstrated good inter-rater and test-retest reliability in clinical studies of patients with obesity and BED⁽²²⁾, although psychometrics of the EDE-BSV have not yet been published. The EDE, in addition to assessing features of eating-disorder psychopathology, was also used to generate current diagnoses of BED and bulimia nervosa.

The Mini International Neuropsychiatric Interview⁽²³⁾ version 7.0 for DSM-5 was used to assess lifetime BED and bulimia nervosa.

Weight was measured using a high-capacity digital scale and height was measured using a stadiometer. Per recommended reporting guidelines⁽²⁴⁾, the following formulas were used to examine weight change over time: 1) BMI Change = Initial BMI Pre-Surgery – Postop BMI, 2) %TWL = [(Initial Weight) – (Postop Weight)] / [(Initial Weight)] * 100, and 3) %EWL = [(Initial Weight) – (Postop Weight)] / [(Initial Weight) – (Ideal Weight)] * 100. Ideal weight was defined based on weights equivalent to a BMI of 25 kg/m².

Creation of study groups

The “Bariatric-BED” (Bar-BED) group was created based on criteria that parallel BED criteria. In order to be classified as Bar-BED, participants were required to meet all BED criteria (except for the large quantity of food criterion): 1) weekly LOC eating over the past three months, 2) three of five associated symptoms, 3) marked levels of distress, and 4) lack of regular inappropriate compensatory behaviors. Distress and associated symptoms were asked in reference to LOC eating, not only OBEs which is standard EDE protocol. Participants with LOC eating who did NOT meet criteria 2–4 were categorized as the LOC-Only group.

2.4. Statistical analysis

Chi-square and Analysis of Variance (ANOVA) statistics were performed for categorical and dimensional variables, respectively. ANCOVAs adjusted for LOC eating onset and LOC eating duration when the groups significantly differed on these variables. We covaried for LOC eating onset and duration to adjust for the possibility that lengthier durations or perceived chronicity of LOC eating may have contributed to psychological distress. Effect sizes, partial η^2 or phi, were calculated as appropriate.

Results

Rates of Bar-BED and eating disorders

Among this participant group with LOC eating following sleeve gastrectomy surgery, 11.3% (n=8) met full BED criteria (including the large quantity of food criterion) pre- and post-surgery. Of those who met lifetime BED criteria, 81.8% (n=36) did *not* meet full BED criteria post-operatively. Bar-BED was met by 49.3% (n=35) of the participant group, while

50.7% experienced LOC eating, but did not meet criteria for Bar-BED (LOC-Only). Of those who met Bar-BED criteria, 80.0% (n=28) met lifetime BED criteria. Five (7.0%) participants met lifetime criteria for bulimia nervosa (three in the Bar-BED group and two in the LOC-Only group).

Group differences based on Bar-BED classification

The two groups with and without Bar-BED did not significantly differ in age ($F=0.06$, $p=.814$), sex ($\chi^2=0.08$, $p=.782$), race ($\chi^2=0.14$, $p=.705$), or time since surgery ($F=2.16$, $p=.146$). Table 1 summarizes frequency of BED criteria, eating-disorder psychopathology, weight change, and LOC eating onset overall and separately for the two study groups. Notably, the Bar-BED group reported significantly more SBEs, significantly more associated symptoms, and greater levels of distress than the LOC-Only group. Chi-square analyses revealed that the Bar-BED group was significantly more likely to report eating rapidly, eating when not physically hungry, and feeling disgusted, depressed, or very guilty about LOC eating episodes than the LOC-Only group. The Bar-BED group had significantly higher scores on all EDE global and subscales (restraint, eating concern, weight concern, and shape concern). Nibbling/picking did not significantly differ between the two study groups.

LOC eating onset began earlier for the Bar-BED group at 3.5 months post-surgery compared with the LOC-Only group at 4.5 months post-surgery. While the two groups significantly differed in LOC eating onset, the two groups did not significantly differ in duration of LOC eating post-surgery (defined as length of time between onset of post-operative LOC eating and initiating treatment for eating concerns following bariatric surgery).

The Bar-BED group had significantly less %TWL than the LOC-Only group. The Bar-BED group had a statistically non-significant trend for less %EWL ($p=.056$) and less BMI change ($p=.064$) than the LOC-Only group. ANCOVAs adjusting for post-operative LOC eating onset revealed a similar pattern of findings except that group differences in %TWL and nibbling/picking were no longer statistically significant. Effects sizes for EDE variables ranged from small (restraint) to large (marked levels of distress), while effect sizes for weight change variables were small (.050–.066). When adjusting for postoperative LOC eating onset, effect sizes were not attenuated.

Group differences based on lifetime history of BED

The two groups with and without lifetime BED did not significantly differ in age ($F=0.05$, $p=.827$), sex ($\chi^2=0.31$, $p=.737$), race ($\chi^2=3.16$, $p=.075$), or time since surgery ($F=0.08$, $p=.781$). Table 2 summarizes group differences in BED criteria, eating-disorder psychopathology, weight change, and LOC eating onset by lifetime BED status. The BED-Lifetime group had significantly greater OBEs during the past 3 months and greater levels of distress over LOC eating than the group without lifetime BED; the two groups, however, did not differ in SBEs or number or types of associated symptoms. ANOVAs revealed significant group differences in EDE global and subscale scores, but not nibbling/picking. The two groups did not significantly differ in BMI change, %TWL, or %EWL. The two groups significantly differed in onset or duration of LOC eating post-surgery. ANCOVAs

adjusting for LOC onset and duration revealed similar patterns except group differences in EDE weight concern became non-significant. Effect sizes were not greatly attenuated when adjusting for LOC onset or duration.

Percent total weight loss and eating behaviors

Percent total weight loss was significantly correlated with post-operative LOC eating month of onset ($r=.259$, $p=.032$), Bar-BED status ($r=-.257$, $p=.033$), and SBE frequency ($r=-.292$, $p=.015$), but not with nibbling/picking ($r=-0.193$, $p=.112$).

Discussion

Among treatment-seeking individuals with LOC eating following sleeve gastrectomy surgery, LOC eating began, on average, four months post-operatively. While only a small minority of the participant group met full BED criteria, nearly half met criteria for “Bariatric BED” (BED without the objectively large food criterion required for a BED diagnosis; DSM-5⁽¹⁴⁾). The Bar-BED group had significantly more SBEs, greater distress, and more associated symptoms (eating rapidly, eating when not physically hungry, and feeling disgusted, depressed, or very guilty about LOC eating episodes) relative to those with LOC eating who did not meet Bar-BED criteria. Nibbling/picking was common, but did not significantly differ between these groups. The Bar-BED group had greater levels of overall eating-disorder psychopathology and less %TWL by six months post-surgery compared to the LOC-Only group. LOC eating began as early as 3.5 months post-operatively for the Bar-BED group, which was about one month earlier than onset for the LOC-only group. After controlling for post-operative LOC eating month of onset, however, %TWL was not significantly different between the two groups ($p=.090$). Nonetheless, a Bar-BED “diagnosis” and LOC eating onset were each significantly correlated with %TWL such that earlier onset of post-operative LOC eating was related to poorer weight loss. Our findings are consistent with two recent prospective studies from the Longitudinal Assessment of Bariatric Surgery Research Consortium (LABS) suggesting that *post*-operative disordered eating, and particularly post-operative BED⁽¹¹⁾ and LOC eating⁽¹²⁾, are related to poorer weight loss outcomes following bariatric surgery and that level of eating-disorder psychopathology, beyond LOC eating alone, may contribute to poorer outcomes⁽¹²⁾. Our findings further extend the literature by focusing on sleeve gastrectomy outcomes, while the two previous LABS studies^(11, 12) included only gastric bypass and lap-band bariatric outcomes.

Alternatively, lifetime BED (BED before surgery) was *not* related to poorer weight loss outcomes six months post-operatively. While group differences in eating-disorder psychopathology were observed based on lifetime BED status, the magnitude of these differences reflected small effect sizes, whereas the magnitude of differences based on Bar-BED status reflected medium to large effect sizes. Thus, our findings provide further support for assessing *post*-surgical eating pathology⁽¹⁰⁾ and extend the literature by illustrating the importance of assessing post-operative LOC eating severity regardless of the quantity of food consumed.

This study has several strengths and limitations. This is the first study to examine LOC eating severity and “Bariatric BED” in post-sleeve gastrectomy patients using rigorous assessment methods. In addition to assessing full BED criteria, assessing “Bariatric BED” may identify many more individuals struggling with eating and weight loss post-operatively. Very few individuals meet full BED criteria during the first 1–2 years following bariatric surgery⁽¹¹⁾, but in our participant group with LOC eating, nearly half met criteria for Bariatric BED. We also adjusted for post-operative LOC eating onset and duration to control for the possibility that those in the LOC-Only group did not perceive their LOC eating as particularly chronic or severe, which did not change the pattern of findings. Our findings may not generalize to non-treatment seeking surgical patients with LOC eating or other forms of bariatric surgery. For example, it is possible that different bariatric surgery procedures may be characterized by different patterns of disordered eating behavior post-operatively (e.g., different rates or different temporal patterns). Our study did not collect surgical data such as sleeve volume or shape and therefore, are unable to correlate technical surgical data with our clinical and behavioral findings. Moreover, our assessments did not include any hormonal or metabolic functioning data. Additionally, our findings are cross-sectional and our sample size is limited. Future research should examine the prognostic significance of Bar-BED with a large sample of post-operative patients with and without LOC eating.

Within the context of these limitations, we offer the following assessment and treatment recommendations. Our findings suggest early detection of LOC eating may have clinical utility and assessments should be planned as early as three months post-surgery (refer to EDE for specific LOC eating assessment items⁽²⁰⁾). Beyond LOC eating, clinicians should also assess distress related to LOC eating and the aforementioned associated symptoms. Assessment of full BED will miss most individuals struggling with LOC eating due to the large quantity of food criterion required for binge eating and binge-eating disorder, whereas assessment of LOC eating and associated features seems to capture greater number of individuals with greater pathology.

Conclusion

Post-operative LOC eating and associated eating-disorder psychopathology is associated with poorer outcomes following sleeve gastrectomy including poorer weight loss and greater eating-disorder psychopathology. Thus, post-operative patients should be monitored closely for LOC eating and associated features. Post-operative BED and “Bariatric BED” may signal the need for further monitoring and referral to treatment. Future research should examine long-term outcomes of patients with greater LOC severity and develop appropriate treatments and prevention programs.

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References

1. Chang SH, Stoll CR, Song J, Varela JE, Eagon CJ, Colditz GA. The effectiveness and risks of bariatric surgery: an updated systematic review and meta-analysis, 2003–2012. *JAMA Surg.* 2014; 149(3):275–87. [PubMed: 24352617]
2. Sjostrom L. Review of the key results from the Swedish Obese Subjects (SOS) trial - a prospective controlled intervention study of bariatric surgery. *J Intern Med.* 2013; 273(3):219–34. [PubMed: 23163728]
3. Magro DO, Geloneze B, Delfini R, Pareja BC, Callejas F, Pareja JC. Long-term weight regain after gastric bypass: a 5-year prospective study. *Obes Surg.* 2008; 18(6):648–51. [PubMed: 18392907]
4. Felsenreich DM, Langer FB, Kefurt R, Panhofer P, Schermann M, Beckerhinn P, et al. Weight loss, weight regain, and conversions to Roux-en-Y gastric bypass: 10-year results of laparoscopic sleeve gastrectomy. *Surg Obes Relat Dis.* In Press.
5. Yanos BR, Saules KK, Schuh LM, Sogg S. Predictors of Lowest Weight and Long-Term Weight Regain Among Roux-en-Y Gastric Bypass Patients. *Obes Surg.* 2015; 25(8):1364–70. [PubMed: 25519772]
6. Livhits M, Mercado C, Yermilov I, Parikh JA, Dutson E, Mehran A, et al. Preoperative predictors of weight loss following bariatric surgery: systematic review. *Obes Surg.* 2012; 22(1):70–89. [PubMed: 21833817]
7. Kalarchian MA, Marcus MD, Levine MD, Courcoulas AP, Pilkonis PA, Ringham RM, et al. Psychiatric disorders among bariatric surgery candidates: relationship to obesity and functional health status. *Am J Psychiatry.* 2007; 164(2):328–34. [PubMed: 17267797]
8. Mitchell JE, Selzer F, Kalarchian MA, Devlin MJ, Strain GW, Elder KA, et al. Psychopathology before surgery in the longitudinal assessment of bariatric surgery-3 (LABS-3) psychosocial study. *Surg Obes Relat Dis.* 2012; 8(5):533–41. [PubMed: 22920965]
9. White MA, Masheb RM, Rothschild BS, Burke-Martindale CH, Grilo CM. The prognostic significance of regular binge eating in extremely obese gastric bypass patients: 12-month postoperative outcomes. *J Clin Psychiatry.* 2006; 67(12):1928–35. [PubMed: 17194271]
10. Meany G, Conceicao E, Mitchell JE. Binge eating, binge eating disorder and loss of control eating: effects on weight outcomes after bariatric surgery. *Eur Eat Disord Rev.* 2014; 22(2):87–91. [PubMed: 24347539]
11. Kalarchian MA, King WC, Devlin MJ, Marcus MD, Garcia L, Chen JY, et al. Psychiatric Disorders and Weight Change in a Prospective Study of Bariatric Surgery Patients: A 3-Year Follow-Up. *Psychosom Med.* 2016; 78(3):373–81. [PubMed: 26569540]
12. Devlin MJ, King WC, Kalarchian MA, White GE, Marcus MD, Garcia L, et al. Eating pathology and experience and weight loss in a prospective study of bariatric surgery patients: 3-year follow-up. *Int J Eat Disord.* In Press.
13. Niego SH, Kofman MD, Weiss JJ, Geliebter A. Binge eating in the bariatric surgery population: a review of the literature. *Int J Eat Disord.* 2007; 40(4):349–59. [PubMed: 17304586]
14. American Psychiatric Association. Diagnostic and statistical manual of mental disorders (DSM-5). 5. Washington DC: 2013.
15. White MA, Kalarchian MA, Masheb RM, Marcus MD, Grilo CM. Loss of control over eating predicts outcomes in bariatric surgery patients: a prospective, 24-month follow-up study. *J Clin Psychiatry.* 2010; 71(2):175–84. [PubMed: 19852902]
16. Kalarchian MA, Marcus MD, Wilson GT, Labouvie EW, Brolin RE, LaMarca LB. Binge eating among gastric bypass patients at long-term follow-up. *Obes Surg.* 2002; 12(2):270–5. [PubMed: 11975227]
17. Conceicao E, Bastos AP, Brandao I, Vaz AR, Ramalho S, Arrojado F, et al. Loss of control eating and weight outcomes after bariatric surgery: a study with a Portuguese sample. *Eat Weight Disord.* 2014; 19(1):103–9. [PubMed: 24065351]
18. Conceicao E, Mitchell JE, Vaz AR, Bastos AP, Ramalho S, Silva C, et al. The presence of maladaptive eating behaviors after bariatric surgery in a cross sectional study: importance of picking or nibbling on weight regain. *Eat Behav.* 2014; 15(4):558–62. [PubMed: 25213792]

19. Spaniolas K, Kasten KR, Brinkley J, Sippey ME, Mozer A, Chapman WH, et al. The Changing Bariatric Surgery Landscape in the USA. *Obes Surg*. 2015; 25(8):1544–6. [PubMed: 26072171]
20. Fairburn, CG., Cooper, Z. In *Binge eating: nature, assessment, and treatment*. New York: Guilford Press; 1993. The Eating Disorder Examination; p. 317-60.
21. de Zwaan M, Hilbert A, Swan-Kremeier L, Simonich H, Lancaster K, Howell LM, et al. Comprehensive interview assessment of eating behavior 18–35 months after gastric bypass surgery for morbid obesity. *Surg Obes Relat Dis*. 2010; 6(1):79–85. [PubMed: 19837012]
22. Grilo CM, Masheb RM, Lozano-Blanco C, Barry DT. Reliability of the Eating Disorder Examination in patients with binge eating disorder. *Int J Eat Disord*. 2004; 35(1):80–5. [PubMed: 14705160]
23. Sheehan DV, Lecrubier Y, Sheehan KH, Amorim P, Janavs J, Weiller E, et al. The Mini-International Neuropsychiatric Interview (M.I.N.I): the development and validation of a structured diagnostic psychiatric interview for DSM-IV and ICD-10. *J Clin Psychiatry*. 1998; 59(Suppl 20): 22–33. quiz 4–57.
24. Brethauer SA, Kim J, el Chaar M, Papasavas P, Eisenberg D, Rogers A, et al. Standardized outcomes reporting in metabolic and bariatric surgery. *Surg Obes Relat Dis*. 2015; 11(3):489–506. [PubMed: 26093765]

Table 1
Eating and weight variables for the overall participant group and between the Bar-BED and LOC-Only groups

	Overall	Bar-BED (n=35)	LOC-Only (n=36)	F	p-value	Effect Size	ANCOVA LOC Onset Effect Size
OBE's past 3 months	2.2 (6.0)	3.3 (6.5)	1.3 (5.3)	2.02	.160	.028	.032
SBE's past 3 months	44.4 (39.7)	63.0 (45.2)	26.4 (21.9)	19.07	<.0005	.217	.181
# Associated symptoms	3.6 (1.3)	4.1 (0.8)	3.1 (1.4)	12.54	.001	.154	.156
Eat more rapidly	55 (77.5%)	31 (88.6%)	24 (66.7%)	4.88 ^a	.027	.262	--
Eat until uncomfortably full	56 (78.9%)	30 (85.7%)	26 (72.2%)	1.94 ^a	.164	.165	--
Eat when not physically hungry	51 (71.8%)	30 (85.7%)	21 (58.3%)	6.58 ^a	.010	.304	--
Eat alone due to embarrassment	29 (40.8%)	16 (45.7%)	13 (36.1%)	0.68 ^a	.411	.098	--
Feel disgust, guilt, depressed	62 (87.3%)	35 (100%)	27 (75.0%)	10.02 ^{ab}	.002 ^b	.376	--
Marked levels of distress	3.5 (1.0)	4.3 (0.5)	2.8 (0.6)	120.87	<.0005	.637	.620
LOC Eating							
Post-Op Month of Onset	4.0 (1.8)	3.5 (1.8)	4.4 (1.7)	4.43	.039	.060	--
LOC Length (Months)	2.4 (1.7)	2.5 (1.8)	2.2 (1.7)	0.70	.406	.010	--
Restraint	2.1 (1.3)	2.5 (1.3)	1.7 (1.1)	8.24	.005	.107	.092
Eating Concern	1.7 (1.3)	2.4 (1.2)	0.9 (0.8)	37.94	<.0005	.355	.323
Weight Concern	2.6 (1.3)	3.2 (1.3)	2.1 (1.1)	17.01	<.0005	.198	.161
Shape Concern	2.6 (1.6)	3.5 (1.4)	1.8 (1.4)	24.12	<.0005	.259	.227
Global	2.3 (1.1)	2.9 (1.0)	1.6 (0.9)	31.41	<.0005	.313	.277
Nibbling/Picking	3.1 (2.1)	3.6 (1.9)	2.6 (2.1)	3.99	.050	.055	.044 ^c
Weight							
BMI Current	37.9 (8.2)	37.9 (7.9)	37.8 (8.6)	0.00	.975	.000	.000
BMI Pre-Surgical	47.7 (9.5)	47.2 (8.9)	48.2 (10.1)	0.19	.662	.003	.002
BMI Change	9.9 (4.0)	9.0 (4.0)	10.8 (3.9)	3.78	.056	.053	.034
%TWL	20.7 (6.7)	19.0 (7.0)	22.4 (6.0)	4.74	.033	.066	.043 ^c
%EWL	46.6 (17.1)	42.7 (17.1)	50.3 (16.5)	3.56	.064	.050	.031

N=71.

^aChi-Square

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Fisher's Exact Test
 p
 c not significant;

Bar-BED="Bariatric BED"; LOC-Only=Loss-of-Control Eating; BMI=Body Mass Index, %TWL=Percent Total Weight Loss; %EWL=Percent Excess Weight Loss; EDE=Eating Disorder Examination

Table 2

Eating and weight variables for Lifetime BED and No Lifetime BED groups

	BED Lifetime	No BED Lifetime	F	p-value	Effect Size	ANCOVA LOC Length Effect Size	ANCOVA LOC Onset Effect Size
OBE's past 3 months	3.6 (7.3)	0.1 (0.4)	6.10	.016	.081	.091	.068
SBE's past 3 months	47.0 (41.6)	40.2 (36.9)	0.50	.483	.007	.000	.002
# Associated symptoms	3.7 (1.0)	3.3 (1.5)	2.02	.160	.028	.027	.056
Eat more rapidly	37 (84.1%)	18 (66.7%)	2.91 ^a	.088	.202	--	--
Eat until uncomfortably full	37 (84.1%)	19 (70.4%)	1.89 ^a	.169	.163	--	--
Eat when not physically hungry	31 (70.5%)	20 (74.1%)	0.11 ^a	.742	.039	--	--
Eat alone due to embarrassment	18 (40.9%)	11 (40.7%)	0.00 ^a	.989	.002	--	--
Feel disgust, guilt, depressed	41 (93.2%)	21 (77.8%)	3.59 ^{ab}	.075	.225	--	--
Marked levels of distress	3.8 (0.9)	3.1 (0.9)	8.00	.006	.104	.079	.105
LOC Eating							
Post-Op Month of Onset	3.6 (1.8)	4.6 (1.6)	5.57	.021	.075	--	--
LOC Length	2.8 (1.8)	1.7 (1.4)	7.29	.009	.096	--	--
EDE							
Restraint	2.4 (1.3)	1.6 (1.1)	6.48	.013	.086	.078	.071
Eating Concern	2.0 (1.3)	1.1 (1.0)	10.37	.002	.131	.147	.098
Weight Concern	2.9 (1.3)	2.2 (1.2)	5.27	.025	.071	.055 ^c	.041 ^c
Shape Concern	3.1 (1.6)	1.9 (1.3)	12.51	.001	.154	.152	.120
Global	2.6 (1.1)	1.7 (0.9)	12.62	.001	.155	.149	.117
Nibbling/Picking	3.0 (2.0)	3.3 (2.2)	0.45	.503	.007	.007	.015
Weight							
BMI Current	37.8 (8.5)	37.9 (8.0)	0.00	.983	.000	.000	.000
BMI Pre-Surgical	47.9 (9.3)	47.4 (10.0)	0.05	.829	.001	.001	.001
BMI Change	10.2 (4.0)	9.5 (4.0)	0.53	.469	.008	.011	.027
%TWL	21.3 (7.1)	19.9 (6.2)	0.76	.385	.011	.016	.038
%EWL	47.6 (18.3)	45.0 (15.3)	0.37	.547	.005	.010	.024

N=71.

^aChi-Square;

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Fisher's Exact Test;
 p
 c not significant;

Bar-BED=,Bariatric BED*, LOC-Only=Loss-of-Control Eating; BMI=Body Mass Index; %TWL=% Total Weight Loss; %EWL=% Excess Weight Loss; EDE=Eating Disorder Examination