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Loss of Control Eating and Eating Disorders in Adolescents Before Bariatric Surgery

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Abstract

Objective—This study assessed loss of control (LOC) eating and eating disorders (EDs) in adolescents undergoing bariatric surgery for severe obesity.

Method—Pre-operative baseline data from the Teen Longitudinal Assessment of Bariatric Surgery (Teen-LABS) multisite observational study (n=242; median BMI=51 kg/m²; mean age=17; 76% female adolescents; 72% Caucasian) included anthropometric and self-report questionnaires, including the Questionnaire of Eating and Weight-Patterns – Revised (QEWP-R), the Night Eating Questionnaire (NEQ), the Beck Depression Inventory (BDI-II), and the Impact of Weight on Quality of Life-Kids (IWQOL-Kids).

Results—LOC eating (27%) was common and ED diagnoses included binge eating disorder (7%), night eating syndrome (5%), and bulimia nervosa (1%). Compared to those without LOC eating, those with LOC eating reported greater depressive symptomatology and greater impairment in weight-related quality of life.

Discussion—Prior to undergoing bariatric surgery, adolescents with severe obesity present with problematic disordered eating behaviors and meet diagnostic criteria for EDs. LOC eating, in particular, was associated with several negative psychosocial factors. Findings highlight targets for assessment and intervention in adolescents prior to bariatric surgery.

Few studies have examined disordered eating behaviors, such as binge eating and loss of control (LOC) eating, in adolescents undergoing bariatric surgery. Binge eating, in the form of objective binge eating episodes (OBEs), is required for a DSM-5 diagnosis of bulimia nervosa (BN) or binge eating disorder (BED)¹. OBEs are characterized by eating an amount

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of food in any two-hour period that is “definitely larger” than what most people would eat in the same amount of time and that is accompanied by a sense of LOC¹. LOC is a subjective sense of being unable to stop or control one’s eating regardless of the type or amount of food being eaten². Importantly, LOC eating may be more clinically relevant than binge eating in adolescents³ and it is thought to be a better marker of eating-related psychopathology in adolescents than OBEs^{4–5}. Research from non-bariatric samples suggests that LOC eating is a problematic behavior in youth, as it is associated with emotional distress, weight gain, and the development of BED^{4,6–7}. Yet, only two studies have examined LOC eating in adolescent bariatric samples. One reported that 24% of their sample endorsed LOC eating prior to bariatric surgery⁸, while another found that LOC eating predicts less optimal post-operative weight change⁹. Notably, though, one of these studies examined LOC eating only within the context of OBEs, as measured by the Questionnaire of Eating and Weight-Patterns – Revised (QEWPR)⁸. While the QEWPR may also be used to assess LOC within the context of continuous eating episodes, it does not assess LOC within the context of subjective binge eating episodes (SBEs). Thus, more research is needed to better understand LOC eating, independent of the quantity of food being eaten, in adolescents undergoing bariatric surgery.

In general, disordered eating appears common in adolescents undergoing bariatric surgery, with 20–48% of candidates reporting binge eating, eating more rapidly than usual, feeling guilty in relation to eating, eating until uncomfortably full, eating in the absence of hunger, and eating alone⁸. One study using latent class analysis found that, compared to low psychopathology and non-specific psychopathology subgroups, 13.6% of adolescent bariatric candidates could be classified into a distinct subgroup characterized by elevated levels of disordered eating¹⁰. This subgroup had the most elevated levels of depressive symptoms, anxiety symptoms, emotional and behavioral problems, and comorbid psychiatric diagnoses, as well as poor quality of life, suggesting that disordered eating in this population is associated with a host of other problems¹⁰. This finding is consistent with research in non-bariatric samples of obese adolescents demonstrating that disordered eating is associated with a myriad of psychological and psychosocial impairments¹¹. Given the paucity of studies investigating disordered eating in adolescent bariatric samples, it is unclear whether psychosocial impairments are uniquely linked to specific behaviors, such as LOC eating.

With regard to eating disorder (ED) diagnoses in adolescents undergoing bariatric surgery, no study to date has reported on rates of BN or night eating syndrome (NES). A previous study utilizing the same dataset as the present study reported that baseline rates of BED were 15.4%¹². Although this rate is consistent with the rate of BED (15.7%) seen in adult bariatric surgery candidates¹³, it must be noted that both of these studies used a relatively low threshold of marked distress about binge eating in determining whether participants met criteria for BED. Specifically, on a five-point Likert scale ranging from “not at all” to “extremely” distressing, these studies utilized “moderately” distressing as the threshold for marked distress about binge eating, which may have resulted in overestimates of BED. This is particularly important given that no participants met criteria for BED in a prior study examining disordered eating behaviors⁸. Thus, replication of BED rates in the current study using a more conservative threshold is warranted.

While little is known about ED diagnoses in this population, a growing body of evidence indicates that disordered eating is a pertinent problem in adolescents with severe obesity prior to bariatric surgery. LOC eating may be a particularly problematic disordered eating behavior. As bariatric surgery becomes more common and acceptable as a weight loss treatment for adolescents^{14–16}, it is imperative to develop a better understanding of the pre-operative eating-related psychopathology in this population. This information may ultimately help clinicians recognize and provide targeted interventions for eating-related problems both before and after surgery. Therefore, the current study is descriptive and exploratory and uses data from the multisite Teen Longitudinal Assessment of Bariatric Surgery (Teen-LABS) study to assess the prevalence of LOC eating and EDs and to compare the psychosocial functioning of those with and without LOC eating. To encompass LOC eating episodes associated with any quantity of food, this study will utilize a definition of LOC eating based on reported episodes of continuous eating rather than OBEs or SBEs.

METHOD

Study Design and Procedure

The Teen-LABS study is an ongoing, prospective observational cohort study of adolescents (ages 13–19) who were enrolled and underwent bariatric surgery from 2007–2012. Participants completed baseline assessments within 30-days of their scheduled surgery date. The original study was approved by the institutional review board at each of the five study sites and written informed consent and assent were obtained from all participants. Additional information about the study protocol, including recruitment, assessment, and bariatric procedures is provided in the original report ([clinicaltrials.gov](https://clinicaltrials.gov/ct2/show/study/NCT00474318) identifier NCT00474318)¹⁷.

Baseline Assessments

Questionnaire of Eating and Weight-Patterns – Revised (QEWP-R)—Items from the QEWP-R were used to identify LOC eating and to derive diagnostic algorithms for DSM-IV BED and BN (Table 1)¹⁸. The QEWP-R has been shown to discriminate between clinical and non-clinical binge eating¹⁹ and has good test-retest reliability²⁰. Although extant research in youth has defined LOC eating within the context of OBEs and/or SBEs, the current study utilized a definition based on continuous eating, which allowed for examination of LOC eating episodes that were independent of the amount of food eaten. Specifically, participants were asked, “During the past 6 months, have you had times when you eat continuously during the day or parts of the day without planning what and how much you would eat?” If this item was endorsed “yes”, the participant was then asked, “Did you experience a loss of control, that is, you felt like you could not control your eating?”

Night Eating Questionnaire (NEQ)—Items from the NEQ were used to derive DSM-IV diagnoses of night eating syndrome (NES; Table 1)¹⁸. The NEQ has been shown to discriminate between those with and without NES²¹.

Beck Depression Inventory (BDI-II)²²—The BDI-II was used to assess the presence of depressive symptoms during the past two weeks. The BDI-II has been shown to have good factorial validity and internal consistency²³.

Impact of Weight on Quality of Life-Kids (IWQOL-Kids)²⁴—The IWQOL-Kids was used to measure quality of life. The IWQOL-Kids is a 27-item self-report measure that assesses the impact of weight on physical comfort, body esteem, social life, and family relations. The IWQOL-Kids has been shown to have good discriminate validity and test-retest reliability^{24–25}.

Statistical Analyses

All analyses were conducted using SPSS (version 19)²⁶. In calculating the prevalence of LOC eating and EDs, 3.3% (n=8) of cases were missing data. Missing data for all other variables ranged from 0%–8%. All analyses were based upon available data. Descriptive statistics are reported for categorical data using frequencies and percentages. Continuous variables were centered at the mean and descriptive statistics are reported using measures of central tendency. To compare baseline differences between participants meeting LOC eating criteria and those without LOC eating, chi square tests were conducted for categorical variables and Mann-Whitney U tests were conducted for continuous variables. Alpha was set at .01.

RESULTS

Participants

Participants were adolescents (n=242) with a mean age of 17.1 years (range 13–19; SD 1.6) at the time of bariatric surgery. There were n=183 (75.6%) female adolescents and n=59 (24.4%) male adolescents. Most were Caucasian (n=174; 71.9%) and n=54 (22.3%) were black, n=1 (0.4%) was Asian, n=1 (0.4%) was American Indian or Alaskan Native, and n=12 (5%) were >1 race/ethnicity. The sample was 93% (n=225) non-Hispanic and 7.0% (n=17) Hispanic. The median BMI was 50.5 kg/m² (range 34.0 – 87.7 kg/m²), which is consistent with other published reports of adolescent samples undergoing bariatric surgery^{27–28}. N=50 (20.7%) participants had a BMI 60 kg/m² at the time of study enrollment.

Eating Disorders and LOC Eating

The most common problematic eating behavior in this sample was LOC eating, which was reported by 26.9% (n=65) of the sample. Based upon the definitions used in this study (see Table 1), n=2 (1%) participants met criteria for current BN and n=16 (6.6%) met criteria for current BED. There were n=12 (5%) participants who met criteria for current NES.

Psychosocial Functioning in those with and without LOC Eating

There were no significant between-group differences in age, sex, race, ethnicity, or BMI. In comparisons of psychosocial functioning, those with LOC had more depressive symptomatology on the BDI-II ($U=6,736.50$, $p<.01$) and greater impairment on the IWQOL total score ($U=3,457.00$, $p<.001$) and the body-esteem ($U=3,597.00$, $p<.001$) and social life ($U=3,529.50$, $p<.001$) subscales. These results are presented in Table 2.

DISCUSSION

Despite an increasing understanding of the link between disordered eating and obesity, our knowledge of LOC eating and EDs in the subset of adolescents who are candidates for bariatric surgery remains limited. Findings from this study demonstrate that prior to bariatric surgery over a quarter of adolescents reported LOC eating. Furthermore, those who reported LOC eating had greater impairments in psychosocial functioning than those who did not report LOC eating.

BED was reported in nearly 7% of the sample, which is similar to rates of BED reported in non-bariatric pediatric obesity samples (5.3%)²⁹. Notably, the prevalence estimate found in this study was less than the 15.4% found in a previous study utilizing the same data¹². This difference resulted because a more conservative definition of *marked distress* regarding binge eating was used in the present study. Specifically, the present study required participants to endorse feeling “greatly” or “extremely” distressed about episodes of binge eating. BN and NES were relatively less common, occurring in 1% and 5% of the sample, respectively. This is the first study to report the prevalence of BN and NES in a severely obese adolescent sample undergoing bariatric surgery and thus, there is no literature with which to compare these rates. However, the rate of BN in adolescents is consistent with adult bariatric samples (2%)¹³, while the rate of NES in adolescents is in the lower range compared to adult bariatric samples (4%-18%)^{13,29}. Of note, the prevalence estimate in our sample may have been impacted by the inclusion of male adolescents, which made up nearly a quarter of the sample (24%) and is a population subgroup known to have a lower prevalence of BN than female adolescents³⁰. Nevertheless, findings indicate that these disorders are present in pre-operative adolescent bariatric samples and treatment teams should thoroughly assess for them.

LOC eating was the most common disordered eating behavior and was present in over a quarter (27%) of participants, which is within the range (4–45%) typically reported by non-bariatric youth samples^{4,7,31}. The rate in the current study is concerning given LOC eating in non-bariatric youth persists over time^{7,32} and consistently predicts weight gain^{6,33}. Evidence also suggests that LOC eating predicts poorer weight outcomes in adolescents who have undergone bariatric surgery⁹. Thus, this eating behavior may be particularly important to assess and target in adolescents seeking bariatric surgery.

A growing body of evidence suggests that the presence of disordered eating in adolescents with obesity is associated with negative physical and psychological correlates and poorer health-related quality of life^{11,34}. Our findings add to this literature and suggest that compared to those without LOC eating, those with LOC eating had greater impairments on almost all psychosocial variables, including greater depressive symptomatology and greater impairment in weight-related quality of life. In contrast to previous research showing LOC eating in youth is associated with maladaptive family functioning^{35–36}, our findings did not show significant differences in family relationships between those with and without LOC eating. Nevertheless, given the extent of problematic psychosocial functioning in those with LOC eating, future research should investigate whether this behavior persists post-operatively and which intervention strategy most optimally improves treatment outcomes.

Several limitations of this study should be noted. First, this study focused on adolescents undergoing bariatric surgery and therefore may not be representative of adolescents with severe obesity seeking less invasive interventions. Second, this study did not test a priori hypotheses. Rather, it was intended to be descriptive and hypothesis-generating. Finally, the validity of our results are limited by our assessment measures. The current study relied on retrospective recall and self-report to screen for LOC eating and EDs, which may result in overestimated prevalence estimates³⁷. Future investigation of eating-related psychopathology in adolescents seeking bariatric surgery may protect against this by using semi-structured diagnostic interviews. In addition, the definition of LOC eating utilized in this study differed from definitions commonly used in the literature. Thus, the validity of this approach is unknown. Future research examining the assessment and definition of LOC eating in adolescent bariatric samples may be beneficial, particularly given the QEWP-R is commonly used to assess disordered eating in this population.

Currently, it is unknown whether the high rates of disordered eating behaviors in adolescent bariatric candidates pre-operatively persist or develop after surgery and thus have the potential to impact post-operative outcomes. Future research may expand upon current findings by aiming to identify the relationship between disordered eating and/or EDs and bariatric surgery outcomes in adolescents. Ultimately, our findings demonstrate that disordered eating behaviors and EDs are pervasive and have a multitude of negative psychosocial correlates in adolescents with severe obesity undergoing bariatric surgery. While it remains unclear whether LOC eating or EDs should preclude adolescents from bariatric surgery eligibility, it is important for providers to identify these problems pre-operatively and make appropriate treatment referrals. Utilization of multidisciplinary treatment teams and/or coordinated care may be particularly beneficial in addressing the myriad of challenges faced by adolescents with obesity who are seeking bariatric surgery.

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Table 1

Operationalization of LOC eating, NES, and DSM-IV Eating Disorder Diagnoses

ED	Measure	Item Content	Corresponding DSM-IV Diagnostic Criteria
BED	QEWPR	In past 6 months, eating what others would consider an unusually large amount of food within any two-hour period (endorsed "YES") During these episodes how often did you feel that your eating was out of control (endorsed 1× per week) Eating more rapidly than usual, eating until uncomfortably full, eating when not physically hungry, eating alone due to embarrassment, feeling disgusted, depressed or guilty (endorsed 3 of these items) How upset/distressed were you (endorsed "greatly")	Recurrent episodes of binge eating in past 6 months characterized by eating in a discrete period of time a definitely large amount of food With a sense of lack of control over eating (feeling of being unable to stop or control what or how much is being eaten) Episodes are associated with 3 or more associated features Marked distress regarding binge eating is present
BN	QEWPR	Importance of weight/shape on self-evaluation (endorsed "main" or "most" important things) In past 3 months, any episodes of objective binge eating (endorsed "YES") In past 3 months, ever vomited, used laxatives, diuretics, fasting, or excessive exercise to prevent weight gain (endorsed "YES" to at least 1 item and endorsed frequency of 2× per week)	Self-evaluation is unduly influenced by body shape and weight Recurrent episodes of binge eating in the past 3 months characterized by eating in a discrete period of time a definitely large amount of food with a sense of loss of control Recurrent inappropriate compensatory behaviors to prevent weight gain at least 2× per week for 3 months
LOC	QEWPR	In past 6 months, any episodes of eating continuously during all or parts of the day without planning what or how much you would eat (endorsed "YES") If endorsed "YES" above, did you feel that your eating was out of control?	A sense of lack of control over eating (feeling of being unable to stop or control what or how much is being eaten)
NES	NEQ	In past 3 months, how much of your daily food intake did you consume after suppertime (endorsed "up to a quarter") In past 3 months, how often did you have trouble falling asleep (endorsed "about half the time") In past 3 months, how often did you get up at least 1× in middle of night (endorsed 1× per week) When you got up in middle of night (per above), how often did you snack (endorsed "sometimes") and how aware were you of your eating (endorsed "somewhat")	

Table 2

Psychosocial Factors in LOC Eating vs. Non-LOC Eating

	LOC Eating (N = 65)		Non-LOC Eating (N = 177)		p
	M n	SD %	M n	SD %	
BDI-II total score	11.3	10.3	7.1	7.6	.001*
IWQOL-Kids					
Total Score	54.7	16.3	66.1	17.7	<.001**
Physical Comfort	46.4	24.7	55.3	24.8	.021
Body-Esteem	34.6	24.1	51.3	27.8	<.001**
Social Life	58.7	23.7	72.7	23.1	<.001**
Family Relations	88.9	18	66.1	17.7	.025

Note: LOC, Loss of Control; BDI-II, Beck Depression Inventory; IWQOL-Kids, Impact of Weight on Quality of Life-Kids.

* p .01;

** p .001