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An examination of emotional and loss-of-control eating after Sleeve Gastrectomy surgery

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Abstract

Emotional eating has been identified as a predictor of poorer weight loss outcomes in non-bariatric clinical samples. It is unknown, however, whether emotional eating contributes to poorer weight loss outcomes after bariatric surgery or how it might be associated with loss-of-control (LOC) eating, a known predictor of post-surgical outcomes. This study examined the nature and significance of emotional eating among post-bariatric surgery patients with LOC eating. Participants ($N = 134$) were patients with LOC eating (at least once weekly) seeking treatment to help improve eating approximately 4–9 months following sleeve gastrectomy surgery. Participants were assessed with the Eating Disorder Examination-Bariatric Surgery Version interview, Yale Emotional Overeating Questionnaire, and Beck Depression Inventory. Emotional eating and LOC eating were significantly negatively correlated with post-surgical weight loss (p 's $< .05$), both variables had a small effect. Linear regression analyses revealed that both emotional eating and frequency of LOC eating were independently associated with weight loss ($R^2 = .041$ and $.049$, respectively). Our findings suggest that, among post-sleeve gastrectomy patients with LOC eating, greater frequency of LOC eating and LOC eating in response to emotions are associated with poorer weight outcomes.

Keywords

Emotional eating; Obesity; Bariatric surgery; Sleeve gastrectomy; Weight loss

1. Introduction

Emotional eating refers to the tendency to eat in response to negative emotions, such as sadness, fear, and anger (Arnow, Kenardy, & Agras, 1995; Van Strien, Rookus, Bergers, Frijters, & Defares, 1986). Emotional eating has been identified as a predictor of poorer weight loss outcomes in (non-surgical) clinical and community samples (Koenders & van Strien, 2011; Niemeier, Phelan, Fava, & Wing, 2007; Ricca et al., 2010). It is unknown, however, whether emotional eating contributes to poorer weight loss after bariatric surgery

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or how it might be associated with loss-of-control (LOC) eating. LOC eating is defined as a subjective sense of loss of control while eating (regardless of the amount consumed), difficulty stopping eating, or difficulty preventing oneself from eating. Research has found that post-surgical LOC eating is a significant predictor of poorer post-surgical outcomes (White, Kalarchian, Masheb, Marcus, & Grilo, 2010).

A review of eating behavior following bariatric surgery found that post-surgical disordered eating (i.e., binge or LOC eating, grazing, sweet eating, emotional eating, and nocturnal eating) predicted poorer weight loss outcomes, with binge/LOC eating appearing to have the strongest support (Sheets et al., 2015). Post-operative LOC eating was found to be a significant predictor of greater weight regain two years after gastric bypass and gastric banding procedures (Conceicao et al., 2017). Similarly, having a current eating disorder was associated with less weight loss 2 and 3 years after gastric bypass and gastric banding procedures (Kalarchian et al., 2016). Few studies, however, have evaluated post-surgical emotional eating within the bariatric population. The majority of postoperative emotional eating studies considered by Sheets et al (2015) were excluded because of small sample sizes and insufficient follow-up. A more recent review examined changes in eating behaviors pre- and postoperatively and identified a total of nine studies evaluating emotional eating, the majority of which were conducted among those who received Roux-en-Y gastric bypass (RYGB, n=7; Opozda, Chur-Hansen, & Wittert, 2016). Overall, the available research provided consistent evidence of significant reductions in emotional eating after RYGB and limited evidence after adjustable gastric band, but no studies have examined emotional eating following sleeve gastrectomy. Understanding post-operative eating behavior after sleeve gastrectomy is pertinent as it has recently become the most commonly performed weight loss surgery in the United States (Spaniolas et al., 2015). Moreover, emotional eating might contribute to poorer weight loss outcomes after sleeve gastrectomy. Thus, this research could inform whether emotional eating might be one possible target of treatment for disordered eating after surgery to improve post-surgical outcomes.

The association between post-operative emotional eating and weight outcomes in the bariatric population appears inconsistent and is limited by several factors related to the measurement of emotional eating itself. For instance, many studies report unclear criteria and/or utilize unvalidated instruments when assessing emotional eating (Opolski, Chur-Hansen, & Wittert, 2015; Opozda et al., 2016). Furthermore, the most commonly used validated measures of emotional eating often assess the 'urge' or 'need' to eat in response to emotions, rather than the occurrence or frequency of eating in response to emotions (Opolski et al., 2015). Likewise, difficulties in assessing binge/LOC eating in the bariatric population have been observed (Goldschmidt et al., 2016; Meaney et al., 2014). For instance, post-surgical physical constraints may limit the amount of food that can be consumed at a given time after bariatric surgery and studies which have only assessed objective binge-eating episodes (defined as the consumption of "an unusually large amount of food") might underreport or overlook LOC eating in bariatric patients (Meaney et al., 2014).

Thus, the aim of this study was to examine the nature and significance of emotional eating among post-sleeve gastrectomy surgery patients with LOC eating. Although limited, given that the existing data suggests that emotional eating is associated with poorer weight loss in

RYGB we hypothesized that more frequent LOC eating and emotional eating would be significantly related to poorer post-operative weight loss after sleeve gastrectomy surgery. Our study specifically examined the *frequency* of LOC eating in response to emotions, rather than the tendency or urge to eat in response to emotion, as well as associated eating disorder psychopathology and weight loss after sleeve gastrectomy.

2. Method

2.1. Participants

Participants were 134 individuals who were seeking treatment for eating concerns and reporting LOC eating (at least once weekly during the prior month) four to nine months ($M = 6.61$, $SD = 1.55$) following sleeve gastrectomy surgery. All participants underwent laparoscopic sleeve gastrectomy surgery at the Yale Bariatric/Gastrointestinal Surgery Center of Excellence. Participants were referred to the study directly from the bariatric team or responded to mailings or flyers soliciting patients with postoperative eating concerns. The assessments for this investigation were performed independently from the bariatric program. Participants were eligible if they were between the ages of 18 and 65 and reported LOC eating (defined as a sense of LOC while eating, difficulty stopping eating, or difficulty preventing themselves from eating) at least once weekly during the past four weeks regardless of the amount eaten. Exclusion criteria included using any current medications known to influence weight or eating, substance dependence, or severe psychiatric illness that required immediate treatment. This study received approval from the Yale University School of Medicine Institutional Review Board and all participants provided consent.

The majority of participants were female ($n=114$; 85.1%) and 53% were White ($n=71$), 35.1% were Black ($n=47$), and 10.4% were Hispanic ($n=14$). The mean age was 45.46 years old ($SD = 10.84$) and the mean current BMI was 37.7 kg/m² ($SD = 7.1$), while the mean pre-surgical BMI was 46.89 kg/m² ($SD = 8.89$).

2.2. Assessments

Participants were assessed with the Eating Disorder Examination-Bariatric Surgery Version (EDE-BSV), a semi-structured interview of eating-disorder symptomatology and overeating behaviors, including objective binge-eating episodes (OBE; eating an unusually large amount of food and experiencing a subjective sense of LOC while eating) and subjective binge-eating episodes (SBE; LOC eating without eating an unusually large quantity of food), adapted for bariatric surgery patients (de Zwaan et al., 2010; Devlin et al., 2016; Mitchell et al., 2012). The EDE-BSV assesses the standard EDE questions related to LOC eating and yields a global score, as well as four subscales including restraint, eating concern, weight concern, shape concern, according to the standard procedures (range = 0–6) and higher scores reflect greater frequency or severity of eating disorder psychopathology. For this investigation, LOC eating frequency was determined by the sum of any LOC eating, regardless of the quantity, as opposed to some studies which have exclusively focused on the presence of OBEs or SBEs in the bariatric population (see Meaney et al., 2014 review for examples).

Participants completed the Yale Emotional Overeating Questionnaire (EOQ; Masheb & Grilo, 2006), a 9-item self-report measure. Items on the EOQ assess the frequency of overeating eating in response to various emotions (e.g., sadness, happiness) during the past 28 days on a 7-point Likert scale (0 = No days, 1 = 1–5 days, 2 = 6–12 days, 3 = 12–15 days, 4 = 16–22 days, 5 = 23–27 days, 6 = Every day). For example, an EOQ score of 1.3 indicates overeating in response to emotion for 1–5 days during the past month, whereas a score 5.3 would indicate 23–27 days during the past month. For this investigation, the EOQ items were modified to assess the frequency of LOC eating, rather than overeating, in response to emotions, henceforth referred to as “emotional eating.” Higher scores are indicative of greater frequency of emotional eating. The Cronbach’s alpha obtained in the present investigation was 0.89. Participants also completed the Beck Depression Inventory-Second Edition (BDI-II; Beck, Steer, & Brown, 1996) to assess the presence and severity of depression symptoms. The Cronbach’s alpha obtained in the present investigation was 0.93.

2.3. Height and Weight

Weight was measured using a high-capacity digital scale and height was measured using a stadiometer. Current body mass index (BMI) was calculated using measured current weight and height. Pre-surgical BMI was calculated using measured pre-surgical weight and height. Weight change was calculated by subtracting the patients’ current measured weight (lbs) from their pre-surgical measured weight (lbs). Percent excess weight loss (%EWL) and percent total weight loss (%TWL) were also calculated.

3. Data Analysis

Frequencies of emotional eating and LOC eating were examined and bivariate correlations were conducted to examine the relationships between weight loss, LOC eating, emotional eating, depression, and eating disorder symptomatology. Linear regression analyses tested the joint and independent contributions of LOC eating and emotional eating in accounting for variance in weight loss. Three linear regression analyses were conducted to examine the impact of LOC eating on weight change, the impact of emotional eating on weight change, and last, both variables to examine the joint contribution on the impact on weight change.

4. Results

Participants reported an average of 20.73 ($SD = 19.36$) LOC eating episodes during the previous month and the average EOQ total score was 1.11 ($SD = 1.07$). Participants post-surgical weight loss ranged from 1.8 (lbs) to 162.30 (lbs) with an average weight loss of 55.98 lbs ($SD = 26.51$). Table 1 summarizes descriptive statistics (means and standard deviations) for participants’ scores on the EOQ. Participants reported emotional eating most often in response to anxiety ($M = 1.63$, $SD = 1.68$) with 69.4% of the overall sample reporting at least one day in the past month. The next most frequent emotions reported were boredom (64.2%), and sadness (59.7%). The least common reported emotion was in response to pain. To provide a more “clinical context,” for the EOQ findings, Figure 1 shows the percentage of patients who reported different frequencies of emotional eating in response to the three most commonly endorsed emotions (anxiety, boredom, and sadness) during the past 28 days.

EOQ scores were not significantly correlated with any demographic variables (i.e., age, gender, race, ethnicity), time since surgery, or current BMI. Greater LOC eating was significantly correlated with emotional eating in response to anxiety, sadness, loneliness, anger, happiness, guilt and boredom (r 's ranged from .13 to .40, p 's < .05). Table 2 summarizes the correlational analyses to examine relationships of emotional eating scores, LOC eating episodes, EDE-Global Score, BDI, current BMI, and post-surgical weight outcomes. Emotional eating was significantly negatively correlated with all post-surgical weight outcomes and positively correlated with LOC eating frequency (See Table 2). LOC eating frequency also displayed a significant negative correlation with post-surgical weight loss, but was not significantly related to %EWL or %TWL. EDE-Global Score, on the other hand, was unrelated to post-surgical weight outcomes.

Linear regression analyses revealed that both emotional eating ($p < .05$) and frequency of LOC eating ($p < .01$) were independently associated with post-surgical weight loss (See Table 3). In the final model, neither variable was significant, however, LOC eating demonstrated a trend with both contributing 7% of the overall variance in weight loss $F(2, 131) = 4.74, p = .057$.

5. Discussion

Our findings for post-sleeve gastrectomy surgery patients with LOC eating suggests that greater frequency of LOC eating is associated with poorer weight outcomes six months after surgery. These findings highlight the potential additional importance of LOC eating specifically in response to emotions after bariatric surgery. Our data suggest that some, but not all patients, who experience post-surgical eating concerns may experience LOC eating in response to negative emotions. On average, participants reported engaging in LOC eating in response to emotions from one to five days in the last month, most commonly in response to anxiety, boredom, and sadness. Frequencies of emotional eating in the current study were much lower than reported in the initial validation study of the EOQ which was conducted in a sample of patients with an overweight BMI seeking treatment for binge eating disorder (BED; Masheb & Grilo, 2006). The differences in reported frequency could perhaps reflect an overall difference in the severity of condition between these two different patient groups, as the majority of participants in the current study did not meet criteria for BED nor report objective binge episodes (as expected not generally physically possible so soon after surgery). Future treatment outcome studies should evaluate whether changes in emotional eating are associated with improvement in eating concerns as well as weight-related outcomes in post-bariatric patients.

Previous investigations examining emotional eating before and after weight loss surgery have yielded mixed findings. Some evidence suggests that pre-surgical emotional eating is associated with poorer weight loss postoperatively (e.g., Wedin et al., 2014), while other studies have found no relationship and no differences in outcomes among those low versus high levels of emotional eating pre-operatively (e.g., Fischer et al., 2007). Likewise, research on weight outcomes and post-operative emotional eating have been mixed with some evidence suggesting that greater postsurgical emotional eating is associated with poorer weight loss at one year follow-up (Canetti, Berry, & Elizur, 2009) while a similar study with

a 2-year follow-up found no relationship (Banerjee, Ding, Mikami, & Needleman, 2013). In addition to the variable follow-up periods, differences in findings across studies may be in part due to the variability in assessing emotional eating.

As hypothesized, both emotional eating and LOC eating were associated with poorer weight outcomes, depression, and eating disorder psychopathology following sleeve gastrectomy surgery. Thus, the present findings add to the growing literature that post-surgical problematic eating may negatively influence post-surgical outcomes, such as suboptimal weight loss, and weight regain after surgery (Sheets et al., 2015). One study specifically found that post-operative – but not pre-operative - LOC eating predicted poorer weight loss at 1-year and 2-year follow-ups after undergoing RGYB (White et al., 2010). Taken together, the existing findings suggest that emotional eating and LOC eating might be important post-surgical targets for treatment among bariatric surgery patients who are experiencing disordered eating as well as suboptimal weight loss, or weight regain. These results have important implications for providers involved in post-surgical care to improve outcomes among bariatric surgery patients.

We note potential limitations as context for the findings. All participants were recruited 4–9 months after surgery; while this was intended to allow for identification of problematic eating behaviors soon after surgery, the findings might not generalize to other or longer post-operative time frames. Further research is needed to determine the longer-term prognostic significance of these forms of disturbed eating and repeated-measures longitudinal designs should test mediational models. Our findings may not generalize to other forms of bariatric surgery or to the broader group of bariatric patients who do not experience LOC eating post-operatively or who do not seek treatment. The cross-sectional design limits the inferences of causality that can be made regarding the relationships between emotions, eating behavior, and weight loss. Assessment of emotional eating is complex, as the information being recalled is multi-faceted, and retrospective recall may be biased. For example, Evers and colleagues (2009) referred to a phenomenon known as the “triple recall bias” whereby individuals are required to recall negative emotions, food intake, and the association between the two. The use of the EOQ in this investigation may obviate this difficulty by assessing frequency of emotional eating, which may provide a clearer estimate of increased emotional eating, but the predictive validity has not yet been examined in an experimental design.

In sum, our study provides preliminary evidence that more frequent emotional eating in addition to LOC eating after sleeve gastrectomy surgery may be a negative prognostic indicator of weight loss outcomes. Greater attention to disordered eating during the post-surgical period is warranted. Future longitudinal research is needed identify when precisely post-surgical emotional eating may re-emerge and the long-term prognostic significance of LOC eating and emotional eating.

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Figure 1.
Frequencies of Emotional Eating in Response to Anxiety, Boredom, and Sadness During the Past 28 Days

Table 1

Means, standard deviations of Emotional Eating variables (N=134)

	<i>M</i>	<i>SD</i>
Anxiety	1.63	1.68
Sadness	1.42	1.61
Boredom	1.39	1.58
Loneliness	1.28	1.54
Anger	1.04	1.33
Guilt	1.03	1.57
Tiredness	.98	1.46
Happiness	.75	1.04
Pain	.45	1.19
Total Score	1.11	1.07

Table 2

Correlation coefficients for emotional eating, LOC eating, and weight variables (N=134)

	1	2	3	4	5	6	7	8
EOQ Total	-							
LOC Eating Episodes	.34**	-						
EDE-Global Score	.49**	.42**	-					
BDI	.65**	.41**	.57**	-				
Current BMI	.05	-.11	-.27**	.19*	-			
%EWL	-.17*	-.09	-.16	-.26**	-.64**	-		
%TWL	-.20*	-.17	-.02	-.20*	-.22**	.82**	-	
Weight	-.20*	-.22*	-.07	-.13	.24**	.46**	.83**	-

Note. EOQ = emotional overeating questionnaire. LOC = loss-of-control. EDE = Eating Disorder Examination. BDI = Beck Depression Inventory. BMI = body mass index. %EWL = percent excess weight loss. %TWL = percent total weight loss. Weight = change in weight.

^aN=134 for all variables except n=133 for BDI.

* $p < .05$.

** $p < .01$.

Table 3

Regression analyses predicting weight change as a function of LOC eating and emotional eating

	<i>B</i>	<i>SE B</i>	β	95% Confidence Interval		Sig.
				Lower Bound	Upper Bound	
Model 1						
LOC Eating Episodes	-.30	.12	-.22	-.53	-.07	.01
Model 2						
EOQ Total	-5.04	2.11	-.20	-9.22	-.86	.02
Model 3						
LOC Eating Episodes	-.24	.12	-.17	-8.00	.78	.11
EOQ Total	-3.61	2.22	-.15	-.48	.01	.06

Note. EOQ = emotional overeating questionnaire. LOC = loss-of-control.

R^2 for Model 1 = .049, R^2 for Model 2 = .041, R^2 for Model 3 = .068.