Published in final edited form as:

Surg Obes Relat Dis. 2016 ; 12(8): 1622–1625. doi:10.1016/j.soard.2016.09.008.

Conceptualizing and studying binge and loss of control eating in bariatric surgery patients—Time for a paradigm shift?

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Binge eating is characterized primarily by a loss of control (LOC) over eating⁽¹⁾, and may be accompanied by the consumption of an unambiguously large amount of food (objective binge eating; OBE), or an amount of food that is not unambiguously large, but is considered excessive by the respondent (subjective binge eating; SBE). Although the prevalence varies widely depending on the population and assessment methods, binge eating presents in up to 60% of bariatric surgery (BS)-seeking patients with severe obesity^(2, 3), a markedly higher prevalence rate than that reported in community-based adults with obesity (i.e., approximately 30%⁽⁴⁾). Although binge eating behaviors, particularly OBE, typically decrease initially following BS, some patients continue to or begin to engage in SBE over time⁽⁵⁾. These patients are at risk for poorer weight outcomes⁽⁶⁾, and thus may also experience initially smaller and/or more rapid deterioration of improvements in obesity-related comorbidities and health-related quality of life. Therefore, post-BS binge eating may ultimately, to some extent, undermine the efficacy of BS.

While binge eating increases risk for suboptimal outcomes and thus clearly requires additional study, it has been difficult to operationalize due to its complexity and variability in phenotypic presentation. These difficulties may be compounded after BS due to surgery-related constraints around the amount and types of food consumed, by necessity and based on clinical recommendations, as well as a poor understanding of the subjective experience of LOC following BS. We argue that paradigms and tools currently used to conceptualize and assess binge eating, which were designed for non-BS populations, may be inappropriate and

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Conflicts of Interest Disclosure Statement

The authors wish to disclose the receipt of salary support from the following sources: the National Institutes of Health; the Fundação para a Ciência e Tecnologia, Portugal; Norman Prince Neurosciences Institute; The Miriam Hospital Foundation; Applied VR; KetoThrive; Weight Watchers International, Inc.; and Medtronic, Inc.

insufficient to fully capture its presence, phenomenology, and trajectory in the BS population. Therefore, in the current paper we describe the challenges inherent in operationalizing binge eating and its core constructs—overeating and LOC—in BS populations, and propose potential solutions to this problem with the hopes of stimulating further research in this area.

Operationalization and assessment of binge eating

Currently, binge eating is defined in the diagnostic nomenclature as “eating, in a discrete period of time (e.g., within any 2-hour period), an amount of food that is definitely larger than most people would eat in a similar period of time under similar circumstances... [accompanied by] a sense of lack of control over eating during the episode (for example, a feeling that one cannot stop eating or control what or how much one is eating)”⁽¹⁾. Recurrent OBE, as defined above, is the hallmark feature of binge eating disorder (BED) and bulimia nervosa (BN). Because of quantity-related boundaries inherent in the operationalization of binge eating, individuals who report SBE in the absence of OBE may fail to meet criteria for an eating disorder diagnosis and, potentially, to receive appropriate treatment referrals, despite experiencing similar levels of distress, impairment, and weight-related difficulties as those with recurrent OBE⁽⁷⁾.

Historically, operationalizing OBE has been complicated by a lack of consensus as to what constitutes an unambiguously large amount of food, as well as inter- and intra-individual variability in reported eating episodes⁽⁸⁾. Although guidelines exist to aid assessors in classifying unambiguously large episodes within adult samples, no such guidelines exist for BS patients. Measurement complications may be compounded in BS patients for several reasons. First, the amount of food one can consume may differ depending on factors such as the type of procedure (including pouch size) and time elapsed since BS (since gastric capacity may increase in the years following BS)⁽⁹⁾. Thus, thresholds for unambiguously large may need to be tailored to account for these factors, which in turn presents challenges for developing systematic and reliable definitions. Second, BS procedures, through various mechanisms beyond restriction and malabsorption (e.g., changes in appetite-regulating gut hormones such as glucagon-like peptide-1, taste sensitivity and preferences, bile acids, bowel microbiota, and food hedonics/liking and reward/wanting)⁽¹⁰⁾, may limit the amount and types of foods that can be consumed, and therefore patients may not be able to tolerate eating a large amount of food in a discrete time period without experiencing adverse consequences (e.g., visceral illness)^(10, 11). Relatedly, the social comparison inherent in the definition of OBE (“... definitely larger than *most people would eat...*”) may not be applicable to post-BS patients since their ingestive capacity and/or motivation to eat may differ substantially from that of their peers (especially when considering both surgical *and* non-surgical reference groups). Finally, because guidelines vary as to the recommended energy intake or meal patterns for BS patients, there is no consistent definition of “normative” eating episodes against which to compare potentially pathological eating episodes. For these reasons, it is unclear what constitutes an “objectively large” amount of food in BS populations.

Although SBE involving the consumption of a self-perceived “excessive” (but not unambiguously large) amount of food is relatively common post-BS⁽⁵⁾, imposing constraints around quantities of food in characterizing LOC episodes may not be appropriate for BS populations. It is possible that some BS patients experience LOC while eating amounts of food that fall within clinical recommendations, and which they perceive to be relatively small; these episodes therefore would not be classified as SBE. Nevertheless, recurrent LOC while ingesting small amounts of food may lead to excess energy intake and subsequent weight-regain. Furthermore, it is unclear how surgically-imposed limitations around eating behavior influence perceptions of control over eating, and/or the subjective experience of eating for patients who experienced LOC prior to BS.

Binge eating is typically assessed via questionnaire or semi-structured interview, both of which require respondents to recall what and how much they ate over the past 1–6 months⁽¹²⁾. While some assessments may be more appropriate for BS patients than others due to their comprehensive assessment of LOC and overeating constructs, even the most well-validated instruments have modest reliability in the assessment of binge eating, particularly SBE⁽¹²⁾. Compounding these general measurement issues, individuals presenting for BS may feel compelled to conceal binge eating problems due to concerns about being rejected for BS or having to complete additional pre-surgical requirements (e.g., counseling). Moreover, until recently, the assessment of binge eating in BS samples was primarily constrained to OBE only, and therefore failed to consider that post-BS patients may continue to experience LOC over smaller amounts of food (e.g., while grazing⁽¹³⁾). Indeed, LOC as conceptualized in this manner appears to predict poorer longer-term outcomes⁽⁵⁾; however, the impact of BS on the quality and quantity of binge eating episodes has heretofore been largely under-explored⁽¹⁴⁾.

Taken together, we argue that the primary methodologies for assessing binge eating in its current conceptualization have significantly impeded our understanding of the nature of this construct in BS populations and, consequently, have limited our ability to harness the BS process as a meaningful, naturalistic tool for understanding its course and mechanisms. As to this latter point, one predominant theory of binge eating suggests that cognitive and/or behavioral efforts to restrict one’s food intake for weight control contribute to feelings of deprivation and encourage a reliance on cognitive regulation of eating rather than physiological cues⁽¹⁵⁾. Thus, when these efforts are interrupted (e.g., by breaking a dietary rule), chronic dieters are at risk for bouts of uncontrolled eating. Paradoxically, BS imposes an involuntary restriction on the amount and types of food one can eat, yet it typically results in a drastic reduction in binge eating⁽⁵⁾. Because BS may exert effects on eating behavior via various pathways (including hormonal changes in hunger and satiety signals, somatosensory changes in taste processing, conditioned aversions to surgery-incompatible foods, and secondary changes in mood, quality of life, and activity patterns), it may present a useful context in which to better understand mechanisms promoting the maintenance and changing manifestations of binge eating.

Developing a BS-specific classification scheme for binge eating

With these issues in mind, we propose the following considerations to move the field forward in its conceptualization and assessment of binge eating in the BS population. A critical first step is to refine and systematize the operationalization of binge eating in BS populations. This presents a challenging feat, given that the constructs involved in binge eating have not been clearly operationalized in the general literature, and therefore there is little in the way of historical precedence to guide the field. Qualitative data collection may present a logical methodology for helping researchers gain a better initial understanding of the experience and manifestations of overeating and LOC in post-surgical patients as compared to non-eating disordered samples and other groups with binge eating, such as those with BN. Interviewing patients and clinicians about what constitutes an excessive amount of food in the post-operative period may help determine empirically-supported thresholds for defining “unambiguously large.” However, a risk inherent in developing BS-specific size thresholds is that this would compromise consistency in the definition of binge eating across samples, and from pre- to post-BS. Thus, an alternative to developing BS-specific size thresholds is to remove size-related distinctions that (perhaps arbitrarily) delineate “large” and “not large” episodes, given that LOC appears to be the defining feature of binge eating that is most strongly associated with distress, impairment, and BS weight outcomes^(6, 7). In this latter proposal, it will be important to examine whether LOC is best defined by some form of a continuous severity scale, or by a categorical rating, which would enable researchers and clinicians to identify different forms of LOC eating that are traditionally neglected in BS research.

An important next step would be to validate the operationalization of binge eating, beyond the large/not-large distinction, in BS populations by investigating its behavioral, experiential, and physiological indicators (e.g., five features of binge eating episodes included in the BED diagnostic criteria⁽¹⁾) using more objective methodologies. Secondary to this task, it will be necessary to investigate whether the phenomenology of binge eating differs by type of BS procedure, sex, time elapsed since surgery, and other factors. Our group is currently pairing objective sensors of eating behavior (i.e., bite counters) with real-time self-report data collected via ecological momentary assessment to elucidate the context of eating episodes in post-BS patients (R01 DK108579). Such methodology could be utilized to identify objective momentary markers (e.g., bite velocity) of self-reported LOC in the natural environment. Other potentially viable methodologies for collecting objective data regarding the nature of binge eating include administering laboratory test meals during which patients are instructed to eat as they would during a typical LOC episode, and conducting neuroimaging, electroencephalographic, or electrophysiologic studies utilizing real or imagined exposure to food cues and/or LOC triggers.

Finally, once a standardized, empirically-validated definition of binge eating is agreed upon, questionnaire- and interview-based assessments should be tailored to the BS population, as has been proposed for other problematic eating-related behaviors that are frequently observed in this population⁽¹³⁾. Such assessments should include guidelines to aid clinicians and investigators in determining the severity of LOC, in addition to its presence/absence and behavioral features, and should reflect the experience of BS patients while also adhering to

standards of reliability and validity. More specifically, such assessment tools should correspond to other methods of data collection and predict relevant outcomes (e.g., weight-related and psychosocial data) in order to be of use to clinicians and researchers.

Conclusions

BS is the most efficacious treatment for severe obesity and related metabolic comorbidities, yet some behaviors may complicate post-surgical health-related outcomes. Research has begun to highlight binge eating as one such behavior, but understanding of this behavior in BS populations is poor: only a few research groups are currently investigating binge eating in BS populations, and studies have been mostly limited to self-report data collected over relatively short-term follow-up. Consequently, there is not a clear understanding of how binge eating tracks over longer periods of time, nor of its presentation and changes thereof during the post-BS process, which may limit the delivery of healthcare services to those impacted by binge eating and concomitant poorer BS outcomes. Thus, novel research is needed to address unanswered questions about the nature of binge eating in this unique population. Ultimately, such research should inform the development of evidence-based assessment and treatment recommendations to improve the weight-related and psychosocial outcomes of BS patients.

Acknowledgments

This work was supported by National Institutes of Health (NIH) grants K23-DK105234 (Dr. Goldschmidt) and R01-DK108579 (Drs. Bond and Thomas), and by Fundação para a Ciência e a Tecnologia/Foundation for Science and Technology (Dr. Conceição) through a European Union COMPETE program grant (IF/01219/2014) and co-financed by FEDER under the PT2020 Partnership Agreement (UID/PSI/01662/2013).

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