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Psychometric evaluation of disordered eating measures in bariatric surgery patients

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ABSTRACT

Introduction: Bariatric surgery is considered the most effective weight loss intervention for obese persons. However, accurate assessment is essential to identify disordered eating that may impair achievement of optimal post-surgical outcomes. Measures of disordered eating are yet to be thoroughly psychometrically evaluated in bariatric surgery patients, therefore their utility is unknown.
Methods: Participants were 108 adults who completed psychological measures approximately 12 months after bariatric surgery. The fit of the original scale structures was tested using Confirmatory Factor Analysis (CFA) and alternative factor solutions were generated using Exploratory Factor Analysis (EFA). Reliability (internal consistency) and construct validity (convergent and divergent) were also assessed.
Materials: Eating Disorder Examination Questionnaire (EDE-Q), Questionnaire of Eating and Weight Patterns Revised (QEWP-R), Three Factor Eating Questionnaire (TFEQ) and Clinical Impairment Assessment (CIA).
Results: CFA revealed none of the original disordered eating measures met adequate fit statistics. EFA produced revised scales with improved reliability (original scales $\alpha = 0.47–0.94$; revised scales $\alpha = 0.76–0.98$) and correlational analyses with measures of psychological wellbeing and impairment demonstrated adequate convergent validity. Reported prevalence of disordered eating behaviours differed between the EDE-Q and QEWP-R.
Conclusions: Psychometric evaluation did not support the use of the commonly used disordered eating measures in bariatric patients in their original form. The revised version of the EDE-Q replicates findings from recent research in bariatric surgery candidates. The alternate structures of the CIA and TFEQ suggest differences in the manifestation of disordered eating following surgery. Results suggest that revised measures are required to overcome the limitations of existing measures.

1. Introduction

Bariatric surgery is the most effective intervention for sustained weight loss in obese adults (Christou et al., 2004; Colquitt, Picot, Loveman, & Clegg, 2009; NHMRC, 2013). Nonetheless, weight loss, medical and psychological outcomes following surgery are variable (Chapman et al., 2004; Dodsworth, Warren-Forward, & Baines, 2010; Herpertz, Kielmann, Wolf, Hebebrand, & Senf, 2004; Livhits et al., 2012; Niego, Kofman, Weiss, & Geliebter, 2007; Pataky, Carrard, & Golay, 2011), and not all patients achieve optimal outcomes. While attempts to demonstrate a predictive relationship between pre-surgical disordered eating and weight loss have produced inconsistent findings (Herpertz et al., 2004; Livhits et al., 2012; Niego et al., 2007), post-surgical disordered eating is one of the few consistent predictors of weight loss outcome (Herpertz et al., 2004). Research indicates that post-surgical disordered eating has a detrimental impact on weight loss, complications and psychological outcomes (Busetto et al., 2005; Colles, Dixon, & O'Brien, 2008a; Mitchell et al., 2001; Niego et al., 2007; Sallet et al., 2007). Therefore valid post-surgical assessment and monitoring have a critical role in identifying disordered eating that may impair successful biopsychosocial outcomes following bariatric surgery.

Four key assessment challenges exist in the post-bariatric surgical population. Firstly, the most frequently used measures are those designed for traditional eating disorder populations (i.e., Anorexia Nervosa and Bulimia Nervosa), which have no or extremely limited psychometric evaluation in the post-surgical population (Parker, O'Brien, & Brennan, 2014). Second, the modified gastrointestinal system following surgery creates a unique eating context which may not be validly assessed by existing measures. The post-surgical physiologically-imposed restriction is likely to impact the ability to eat unusually large amounts of food as required for diagnosis of binge eating (APA, 2013),

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and may also alter perceptions of loss of control of eating given that some patients perceive that surgery provides control over eating (Ogden, 2005). Thirdly, post-surgery recommendations including reducing portion sizes, eating slowly and chewing thoroughly (O'Brien, 2007) mimic some disordered eating symptoms (e.g., rigid dietary restriction) assessed by existing measures. Fourthly, maladaptive eating symptoms including vomiting, regurgitation, diarrhoea and other gastrointestinal complications can arise from a failure to adhere to post-surgical eating recommendations (Brown, Korin, & Burton, 2009; Burton et al., 2011) and may appear very similar to disordered eating (e.g., vomiting as purging). In contrast to psychologically-driven disordered eating behaviours, these symptoms are the result of physiological and behavioural maladaptation to the altered gastrointestinal system. Combined, these challenges mean that existing measures may not adequately capture the extent of disordered eating and detect the differences in function between psychological disordered eating and behavioural maladaptive eating in the post-surgical population.

Ongoing patient review and assessment following surgery are a critical part of the after-care process (Mechanick et al., 2013; O'Brien, 2007), where identification and treatment of disordered eating help prevent poor biopsychosocial outcomes (Herpertz et al., 2004). Validated measures are fundamental to this process and facilitate evidence-based recommendations for optimal post-surgical patient care. Conversely, inaccurate and/or inconsistent measures have the potential to misdiagnose symptoms (e.g., failing to distinguish disordered eating from maladaptive eating) and may fail to identify clinically significant symptoms that have the potential to negatively impact post-surgical weight loss, complications and psychological wellbeing (Busetto et al., 2005; Colles et al., 2008a; Herpertz et al., 2004; Livhits et al., 2012; Mitchell et al., 2001; Niego et al., 2007; Sallet et al., 2007). Thus inaccurate assessment not only has potential to inhibit the provision of necessary treatment for the individual, but also contributes to the lack of evidence-based assessment in the research literature and inconsistency in reported findings, and impacts the evaluation of disordered eating interventions. Validation of measures must be established in the population of interest (Nunnally & Bernstein, 1994), however as yet there are no studies investigating the factor structure of disordered eating measures in the post-bariatric surgery population, and few measures have undergone any psychometric evaluation (Parker, O'Brien, & Brennan, 2014). This lack of evaluation means that the psychometric properties, validity and utility of these measures in bariatric surgery patients is not established.

The aim of this study was to comprehensively assess the psychometric properties of commonly used disordered eating measures in patients following bariatric surgery. This will provide evidence to inform the use of current measures of disordered eating, and guide the development of improved measures for this population where required. Evidence-based assessment will promote greater consistency in research and clinical evaluations and inform treatment that has the potential to improve biopsychosocial outcomes following surgery. The following research questions were addressed:

1. Are the original factor structures of disordered eating measures valid in patients following bariatric surgery?
2. Which factor solutions provide the best fit to the data in post-surgical patients?
3. Which measures meet adequate reliability and validity criteria in post-surgical patients?

2. Methods

2.1. Participants

Post-surgical patients from a specialised bariatric surgery clinic in Melbourne, Australia, were invited to participate in an assessment following surgery. Participants included in the current study were 108 adults (87 females, 80.6%; 21 males, 19.4%) who had undergone Laparoscopic Adjustable Gastric Banding (LAGB) an average of 13.0 months (SD = 2.1; 10.3–20.3) prior to assessment. Participant age ranged from 22 to 70 years (M = 46.0; SD = 12.2) with a body mass index (BMI) ranging from 24.0 to 50.6 kg/m^2 (M = 33.6; SD = 6.2) and weight ranging from 54.5 to 146.5 kg (M = 94.2; SD = 18.2). Mean weight loss since surgery was 25.6 kg (SD = 14.2), with a mean percentage excess weight loss (EWL) of 54.5% (SD = 23.7; range = 5.0–106.0%) and mean BMI decrease of 9.0 kg/m^2 (SD = 4.5).

2.2. Materials

Assessment included measures of disordered eating thoughts, feelings and behaviours, degree of disordered eating clinical impairment, and psychological measures of body image, depression and quality of life. Height and weight measurements were taken by the clinic nurse. The following self-report measures were administered.

2.3. Disordered eating measures

2.3.1. Eating Disorder Examination Questionnaire (EDE-Q6) (Fairburn & Beglin, 2008)

Adapted from the Eating Disorder Examination (EDE) investigator-based interview (Fairburn, Cooper, & O'Connor, 2008), the 28-item EDE-Q assesses behavioural components of disordered eating including the frequency of objective overeating episodes (OOEs, i.e., consumption of an objectively large amount of food without a sense of lack of control) and objective binge episodes (OBEs, i.e., consumption of an objectively large amount of food accompanied by a sense of lack of control). The EDE-Q also assesses the four domains of Dietary Restraint, Eating Concern, Shape Concern and Weight Concern, where higher scores indicate greater severity. Items were added to assess Subjective Binge Episodes (SBEs, i.e., a sense of lack of control while consuming an amount of food not regarded as unusually large) and grazing (i.e., eating or nibbling continuously). Additional items were also included to identify binge eating in the context of a gastric band (e.g., eating what other people would regard as an unusually large amount of food for someone who has had weight-loss surgery), and to better differentiate disordered eating from maladaptive eating (e.g., how many times have you made yourself sick (vomit) to avoid food getting stuck or physical discomfort?) (refer to Figs. S1 and S2). The items regarding SBEs, grazing and eating in the context of a gastric band were derived from previous modifications to disordered eating measures for bariatric surgery patients (Colles et al., 2008a; De Zwaan et al., 2010; Kofman, Lent, & Swencionis, 2010).

2.3.2. Questionnaire of Eating and Weight Patterns Revised (QEWP-R) (Spitzer et al., 1993)

The 28-item QEWP-R assesses behavioural components of disordered eating, including frequency of OBEs and diagnostic information. Items assessing SBEs, grazing and binge eating in the context of a gastric band were added to the QEWP-R (to align with the items added to the EDE-Q). This measure does not include additional constructs or provide a scaled severity score of disordered eating, but was administered to provide cross-validation with the EDE-Q.

2.3.3. Clinical Impairment Assessment Questionnaire (CIA) (Bohn & Fairburn, 2008)

The 16-item CIA assesses the severity of psychosocial impairment due to eating disorder features across three domains (Personal Impairment, Social Impairment and Cognitive Impairment). Higher scores indicate a greater level of impairment.

2.3.4. Three Factor Eating Questionnaire (TFEQ) (Stunkard & Messick, 1985)

The 51-item TFEQ assesses three scales of Cognitive Restraint of eating, Disinhibition and Hunger and is the most frequently used measure