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Research report

Mindfulness and eating behaviour styles in morbidly obese males and females ☆

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ABSTRACT

*Background*Morbid obesity is a highly prevalent condition that is associated with a high risk of various diseases and high health care costs. Understanding determinants of eating behaviours that are characteristic of many morbidly obese persons is important for the development of new interventions aimed at changing eating behaviour after bariatric surgery. Dispositional mindfulness seems promising as one such potential determinant. Therefore, the association between mindfulness and eating behaviour was examined in females and males with morbid obesity.

*Methods*Outpatients with morbid obesity who were candidates for bariatric surgery (N = 335; 78.8% female) completed the Dutch Eating Behaviour Questionnaire (DEBQ), the Freiburg Mindfulness Inventory (FMI) and the Hospital Anxiety and Depression Scale (HADS), in addition to the collection of relevant demographic and medical data.

*Results*Three separate multiple regression analyses with three eating behaviour styles (restrained, emotional, external) as dependent variables showed that mindfulness was positively associated with restrained eating behaviour (Beta = .28, $p \leq .001$), and negatively associated with emotional (Beta = –.22, $p \leq .001$) and external (Beta = –.32, $p \leq .001$) eating behaviours, independent of sex, age, educational level, Body Mass Index and affective symptoms.

*Conclusion*Dispositional mindfulness was associated with more restrained, and less emotional and external eating behaviour in morbidly obese outpatients, above and beyond affective symptoms. Future studies, establishing the causal direction of the associations, are needed.

Introduction

In the past decades, the prevalence of *morbid* obesity (Body Mass Index: BMI ≥40) has increased dramatically. Sturm (Sturm, 2007; Sturm & Hattori, 2013) calls for more attention to *morbid* obesity, because in recent years its prevalence is rising much faster compared to obesity. For example, in the USA, the prevalence of morbid obesity increased by 70% between 2000 and 2010 with 6.6% of the Americans classified as morbidly obese (Sturm & Hattori, 2013). In The Netherlands, 11.2% males and 12.4% females were obese in 2009, whereas the prevalence of morbid obesity was estimated at approximately 1–1.5% (Van Binsbergen et al., 2010). Extreme overweight is related to a high risk for diseases, such as type 2 diabetes, hypertension and heart disease, and to high financial costs for the individuals, and for society (Avenell et al., 2004; Powers, Rehrig, & Jones, 2007).

Obesity is a multifactorial condition; genetic, physiological, environmental, psychosocial, cultural and cognitive factors all contribute to its aetiology in a complex way (Heitmann et al., 2012; Sarwer, Dilks, & West-Smith, 2011). Estimates of BMI heritability range from 0.47 to 0.90 in twin studies and from 0.24 to 0.81 in family studies (Elks et al., 2012). Besides genetic factors, the seductive food environment is also an essential factor in the increasing rates of obesity. Therefore it is important to understand which individual characteristics could magnify or minimize the genetic and environmental risks (Blundell et al., 2005; French, Epstein, Jeffery, Blundell, & Wardle, 2012; French, Jeffery, Folsom, Williamson, & Byers, 1995). Differences in energy intake are influenced by inter-individual differences in eating behaviours and morbidly obese patients often have disturbed eating behaviours (Sarwer et al., 2011; Van Hout, Verschure, & van Heck, 2005; Wardle, 2007). Patients acknowledge that their eating behaviours contribute to being overweight, but many also

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perceive these behaviours as difficult to change (da Silva & da Costa Maia, 2012).

The long term ineffectiveness of weight control treatment is a fundamental problem of behavioural interventions for obesity (Wilson, 1994). Bariatric surgery is therefore recommended for obese patients with a BMI above 40 (or above 35 and suffering from other significant diseases) when adequate non-surgical interventions, such as behavioural interventions, have failed to reach long term effects (NICE, 2006). Eating behaviour might influence success after weight loss surgery.

There are many different ways to conceptualize and define eating behaviours (Blundell et al., 2005). One way is the classification into emotional, external and restraint eating behaviour styles (French et al., 2012; van Strien, Frijters, Bergers, & Defares, 1986; Wardle, 1987). The bases for this classification are the psychosomatic, externality, and restraint theories, respectively, and the concepts of emotional, external and restraint eating having a firm place in aetiology models of obesity (van Strien et al., 1986; Van Hout et al., 2005). Understanding which factors contribute to a higher risk of disturbed eating behaviours provides opportunities to develop interventions that may influence eating behaviours and thereby the energy intake of morbidly obese outpatients after bariatric surgery. Therefore it is important to examine determinants of eating behaviours in persons who are morbidly obese.

One such determinant may be a person's degree of mindfulness. The concept of mindfulness, originally from Buddhist thinking, is introduced in the area of psychology by Kabat-Zinn, who defines it as "*the process of becoming intentionally aware of thoughts and actions in the present moment*" (Kabat-Zinn, 2005). It is a way of paying attention in which all mental states, including emotions, are perceived, but not judged. It is claimed that mindfulness enhances the self-observation of internal states which improves internal regulatory processes (Walach, Buchheld, Buttenmüller, Kleinknecht, & Schmidt, 2006). Dispositional mindfulness is considered to be a trait which, however, may be influenced by mindfulness-based treatment, designed to increase levels of dispositional mindfulness (Brown & Ryan, 2003). In 1986, van Strien et al. (1986) reported that, according to both psychosomatic and externality theory, individuals' misperceptions of internal states contribute to emotional eating, i.e., eating in response to emotional states, and external eating, i.e., eating in response to external cues. Furthermore, a continuous struggle against hunger, when using restrictive control over food to lose weight (restraint eating), can also lead to loss of contact with internal states (van Strien et al., 1986). Dispositional mindfulness, being more aware of thoughts, emotions, and actions in the present moment is associated with awareness of emotions and internal bodily states (Kabat-Zinn, 2005), leading to healthier eating behaviours (Kristeller & Wolever, 2011). More specifically, higher dispositional mindfulness may be associated with less misperception of emotions as hunger (emotional eating), and/or eating less in response to external cues instead of bodily cues such as hunger (external eating). Although Kearney et al. (2012) found no evidence that a general mindfulness-based stress reduction programme was associated with positive changes in eating behaviour, several other authors do report positive results of mindfulness-based interventions specifically aimed at eating behaviours in different groups of patients with disturbed eating behaviours. For instance, Leahey, Crowther, & Irwin (2008) described positive effects of a group intervention based on cognitive-behavioural and mindfulness principles on symptoms of binge eating and depression, emotion regulation and motivation to change maladaptive eating behaviours in bariatric surgery patients after the surgical intervention. A more recent randomized controlled trial of mindfulness training in overweight women focused on awareness of body experiences related to physical hunger, satiety, taste satisfaction and emotional triggers for overeating and showed that the mindfulness group decreased more in emotional and external eating, while no change was found in restraint eating (Daubenmier et al., 2011). Evidence from recent reviews also suggest positive effects of mindfulness-based interventions on eating behaviour in patients with eating disorders (Kristeller & Wolever, 2011; Wanden-Berghe, Sanz-Valero, & Wanden-Berghe, 2011).

However, many studies discussed are limited because of a lack of the use of active control groups. Consequently, one cannot conclude whether mindfulness was the causal factor in improving eating behaviour. In addition, some studies examined the association between mindfulness and *symptoms of eating pathology* in students (Lavender, Gratz, & Tull, 2011; Lavender, Jardin, & Anderson, 2009; Masuda, Price, & Latzman, 2012). These studies indicated positive associations between various mindfulness facets (acting with awareness, non-reactivity to unpleasant thoughts, non-judging one's mental phenomena, and describing one's thoughts and sensations, as measured with the Five Facet Mindfulness Questionnaire (Lavender et al., 2011)), and general mindlessness (the opposite of mindfulness, as measured with the Mindful Attention Awareness Scale (Lavender et al., 2009; Masuda et al., 2012)) and eating pathology. To the best of our knowledge, however, only one study has been published on the association between mindfulness and *eating behaviours* (Lattimore, Fisher, & Malinowski, 2011). In female college students and women from the local community, dispositional mindfulness (measured with the short form of the Kentucky Inventory of Mindfulness Skills) was found to correlate negatively with emotional and uncontrolled (highly similar to external) eating, while no significant associations were found with cognitive restraint (Lattimore et al., 2011). Moreover, a recent literature search indicates a lack of non-intervention studies on patients with morbid obesity. Therefore, the aim of this exploratory study was to examine whether mindfulness is associated with eating behaviours in both female and male morbidly obese patients.

In the association between mindfulness and eating behaviour styles, depressive and anxious symptoms may act as possible confounding variables, as they have often been found to be associated with both mindfulness and less favourable eating behaviours, although the direction of causality is uncertain (Baer, Smith, Hopkins, Krietemeyer, & Toney, 2006; Brown & Ryan, 2003). Although evidence on a causal role of depression in the development of obesity is inconsistent (Atlantis & Baker, 2008; Blaine, 2008) and no definitive conclusion on anxiety as a causal factor can be drawn from the existing literature (Gariepy, Nitka, & Schmitz, 2010), both anxious and depressive symptoms are highly prevalent in morbid obesity (Sarwer, Wadden, & Fabricatore, 2005; Zijlstra et al., 2012). Because associations between affective states and eating behaviours are found in women concerned with their weight (Ouwens, van Strien, & van Leeuwe, 2009) and obese women with binge eating disorder (Schulz & Laessle, 2010), depressive and anxious symptoms may be associated with eating behaviours in this patient group.

Based on the theoretical considerations and empirical results in other samples presented above, it is hypothesized that mindfulness will be positively associated with less emotional and external, but not with restraint eating behaviour, in these patients.

Methods

Study population and procedure

The sample consisted of outpatients with morbid obesity who wanted to be a candidate for bariatric surgery. All patients were in a multidisciplinary diagnostic screening process at the Obesity Centre Midden-Brabant (OCMB), part of the Elisabeth-TweeSteden teaching hospital in Tilburg and Waalwijk, The Netherlands. At the moment of inclusion into the current study, patients did not know

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