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Examination of the reliability and validity of the Mindful Eating Questionnaire in pregnant women☆

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ABSTRACT

Objective: Mindfulness is theorized to affect the eating behavior and weight of pregnant women, yet no measure has been validated during pregnancy.
Methods: This study qualitatively and quantitatively evaluated the reliability and validity of the Mindful Eating Questionnaire (MEQ) in overweight and obese pregnant women. Participants completed focus groups and cognitive interviews. The MEQ was administered twice to measure test-retest reliability. The Eating Inventory (EI) and Mindful Attention Awareness Scale (MAAS) were administered to assess convergent validity, and the Neighborhood Environment Walkability Scale (NEWS) assessed discriminant validity.
Results: Participants were 20 ± 8 weeks gestation (mean ± SD), 30 ± 2 years old, and 55% were obese. The MEQ total score had good test-retest reliability ($r = .85$). The total score internal consistency reliability was poor (Cronbach's $\alpha = .56$). The external cues subscale (ECS) was not internally consistent ($\alpha = .31$). Other subscales ranged from $\alpha = .59–.68$. When the ECS was excluded, the MEQ total score internal consistency was acceptable ($\alpha = .62$). Convergent validity was supported by the MEQ total score (with and without ECS) correlating significantly with the MAAS and the EI disinhibition and hunger subscales. Discriminant validity of the MEQ was supported by the MEQ and NEWS total scores and subscales not being significantly correlated. The quantitative results were supported by the qualitative context and content analysis.
Conclusion: With the exception of the ECS, the MEQ's reliability and validity was supported in pregnant women, and most of the subscales were more robust in pregnant women than in the original sample of healthy adults. The MEQ's use with overweight and obese pregnant women is supported.

1. Introduction

Mindfulness generally refers to a non-judgmental attention and awareness in the present moment (Brown & Ryan, 2003; Shapiro, Carlson, Astin, & Freedman, 2006). The application of mindfulness to eating and body weight regulation is relatively new and has appeared in the scientific literature over the past decade. Mindful eating includes an unbiased awareness of sensations surrounding eating and could be used to help people eat in response to hunger cues and better control in response to satiety signals (Framson et al., 2009). It is thought that mindful eating could help manage food intake and impact energy balance and body weight (Barrington, Ceballos, Bishop, McGregor, & Beresford, 2012; Daubenmier et al., 2012; Mantzios & Giannou, 2014; Mantzios & Wilson, 2014; Mason et al., 2015; Thomas et al., 2014; van Berkel, Boot, Proper, Bongers, & van der Beek, 2014; van Berkel, Proper, Boot, Bongers, & van der Beek, 2011). Indeed, a 9-week Mindfulness Based Eating Awareness Training (MB-EAT) program that includes training in meditation and mindful eating (J.L. Kristeller, 2003; J. L. Kristeller & Wolever, 2011), has been found to reduce compulsive overeating among people who are obese and result in a ~7 pound weight loss (J.L. Kristeller, 2003; J. L. Kristeller & Wolever,

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2011), however not all studies demonstrate weight loss (K. L. Olson & Emery, 2015).

Maternal obesity and excess gestational weight gain are important health outcomes yet more than 50% of overweight and obese pregnant women exceed the gestational weight gain recommendations established by the Institute of Medicine (IOM) (IOM & NRC, 2009). Maternal obesity and weight gain above IOM guidelines (Keppel & Taffel, 1993) are thought to be associated with gestational diabetes, labor and delivery complications, and postpartum weight retention (Gore, Brown, & West, 2003; Rooney & Schauberger, 2002). Infants of overweight and obese mothers have a greater likelihood of being preterm (Beyerlein, Lack, & von Kries, 2010), large for gestational age (Frederick, Williams, Sales, Martin, & Killien, 2008), and increased risk for childhood obesity (Whitaker, 2004). Lifestyle interventions targeting healthy weight gain in overweight and obese pregnant women have not been very successful (Asbee et al., 2009; C. M. Olson, Strawderman, & Reed, 2004; Phelan et al., 2011; Polley, Wing, & Sims, 2002; Shirazian, Monteith, Friedman, & Rebarber, 2010). Thus understanding new strategies that could be deployed for more efficacious weight management including mindfulness during pregnancy are needed.

For over 35 years, researchers have found food selection changes during pregnancy (Hook, 1978). This may be due to changes in hormones, senses, or cultural or psychosocial factors (Cooksey, 1995; Hook, 1978; Orloff & Hormes, 2014). Certain foods are reported to cause nausea, a symptom reported by many women early in pregnancy, while later in pregnancy, many women report that foods are craved. In an RCT of obese women, gestational weight gain was associated with increased intake of added sugar. It was suggested craving of sweets and soft drinks caused increased gestational weight gain but food cravings were not tested (Renault et al., 2015). However others have found that food cravings increase during pregnancy (Belzer, Smulian, Lu, & Tepper, 2010; Orloff & Hormes, 2014; Pope, Skinner, & Carruth, 1992) leading to increased food intake and thereby increased gestational weight gain. Food cravings and emotional eating are thought to decrease with mindfulness (May, Andrade, Batey, Berry, & Kavanagh, 2010; Paolini et al., 2014) but this has not been empirically tested in pregnant women. Mindfulness may be especially helpful during pregnancy to promote healthier eating and decrease cravings and gestational weight gain in overweight and obese pregnant women.

To our knowledge, no measure has been validated to measure mindful eating in pregnant women and this is the first study to examine the reliability and validity of the MEQ in samples other than healthy adults. This study examined a questionnaire that was being utilized in a sample of overweight and obese pregnant women since simultaneously we were examining a lifestyle intervention ('Expecting Success') with the aim of keeping overweight and obese women within 2009 IOM guidelines for gestational weight gain. The Mindful Eating Questionnaire (MEQ) is a 28-item self-report instrument that measures five domains of mindful eating: disinhibition, awareness, external cues, emotional response, and distraction (Framson et al., 2009). A previous study found the MEQ to be a valid measure of mindful eating in healthy adults (Framson et al., 2009). Previously, the MEQ has been validated only in healthy adults (Framson et al., 2009). Framson et al. utilized 18–80 year old (mean was 42) males and females (80% female) to examine reliability and validity. Multiple regression was used to examine obesity and physical activity with the MEQ. Higher BMI was associated with lower mindfulness however there were weak associations with mindfulness and physical activity. The objective of the present study was to determine the reliability and validity of the MEQ in a sample of overweight and obese pregnant women. We hypothesized that the MEQ and its subscales would be valid and reliable in pregnant women. Furthermore, we hypothesized that the MEQ total score would be positively correlated with the Eating Inventory (EI) restraint subscale, negatively correlated with the EI disinhibition subscale, positively correlated with the Mindful Attention Awareness Scale (MAAS), and not correlated with any Neighborhood Environment Walkability Scale (NEWS) subscales.

2. Methods

The study reported herein was conducted according to the guidelines in the Declaration of Helsinki and all participants were given verbal and written explanations about the study, provided signed informed consent, and received a monetary stipend. The study was approved by the Pennington Biomedical Research Center's Institutional Review Board and was registered at clinical trials.gov NCT01734655.

2.1. Study population

Forty pregnant women were recruited from the Baton Rouge metro community. We utilized a variety of methods to recruit participants. This included targeted recruitment of pregnant women at local Hospital events and mothers groups, and advertising through Craigslist, the Pennington Biomedical Research Center Clinical Trials email list, and the Pennington Biomedical Research Center Clinical Trial Website.

Inclusion criteria were: 1) 18–40 years of age, 2) overweight or obese at time of conception based on self-report (BMI $\geq$ 25 and $<$ 40 kg/m^2), 3) willingness to participate in either the focus group or the individual interview, 4) established prenatal care by 12 weeks of gestation, 5) fluent in the English language, and 6) singleton pregnancy.

Exclusion criteria were: 1) current multiple gestation, 2) Type I diabetes, 3) self-reported gestational diabetes mellitus, 4) history or current psychotic disorder; current major depressive episode, bipolar disorder, or eating disorder, 5) HIV; 6) current smoking, alcohol or drug abuse, and 7) current enrollment in an ongoing lifestyle intervention called 'Expecting Success'.

2.2. Screening

Initial screening was conducted through an online screening survey. The survey captures contact information and provides answers to basic inclusion and exclusion questions such as 'are you pregnant'. Following completion of the webscreener, all eligible participants were scheduled for an in-person screening visit. Before initiating any study procedures, participants provided written informed consent. Self-reported pre-pregnancy weight was collected followed by measured current height and weight (pre-pregnancy and current BMI were calculated). Eligible participants then completed a screening health questionnaire and the MEQ and scheduled their next study visit. Study visit 1 occurred approximately 1 week following the screening visit but this varied, especially with the women who participated in the focus groups, but overall we limited the length of time between sessions.

2.3. Procedures

Originally the qualitative evaluation was to include a focus group with 10 participants followed by 30 individual cognitive interviews. However, due to the timing of participant enrollment during the study, 11 participants completed one of two focus groups followed by 29 participants who completed individual cognitive interviews. The first 11 participants were enrolled in the 2 focus groups. Two focus groups were performed to ensure we did not lose any eligible participants due to the birth of their child. The