



Psychosocial predictors of gestational weight gain and the role of mindfulness



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ABSTRACT

Objective: To identify the psychosocial factors (i.e., stress, anxiety, depression, social support) that are associated with gestational weight gain (GWG) and the relationship of mindfulness with GWG during each trimester of pregnancy.

Design: In this cross-sectional study, an online survey that assessed physical and mental health and wellness practices was administered to pregnant women.

Participants: Pregnant women ≥ 8 weeks gestation, ≥ 18 years old, and could read and write in English.

Measurement and findings: Women who responded to the survey ($N=1,073$) were on average 28.7 ± 4.6 years old. Findings from a regression analysis suggest that increased levels of depression may be predictive of increased GWG in the second trimester and decreased levels of mindfulness may be predictive of increased GWG in the first trimester. Anxiety, stress, and overall social support were not associated with GWG in any trimester.

Key conclusions: Mindfulness-based strategies (e.g., yoga) may have the potential to manage both depression and excessive GWG and may be beneficial for and preferred by pregnant women. More research is warranted to determine clear relationships between psychosocial health, mindfulness, and GWG.

Implications for practice: Health care providers are encouraged to screen for depression in early pregnancy (i.e., first or second trimester) and provide resources to manage symptoms of depression and GWG to promote optimal birth outcomes. Health care providers may want to counsel patients on how to manage depression and/or GWG by suggesting mindfulness-based approaches.

Introduction

Over 50% of women in the U.S. exceed the 2009 Institute of Medicine's (IOM) gestational weight gain (GWG) recommendations for healthy weight gain during pregnancy (Deputy et al., 2015; Yaktine and Rasmussen, 2009). Excessive GWG contributes to negative maternal and fetal health outcomes. For the mother, excessive GWG increases the likelihood of post-partum weight retention which may contribute to the future development of obesity and/or metabolic dysfunction, and increases the risk of negative labor and birth outcomes (e.g., cesarean delivery, labor induction, gestational diabetes) (Guelinckx et al., 2008; Leddy et al., 2008; Rooney and Schauberg, 2002; Walsh et al., 2014). For the fetus, excessive GWG may increase the risk for congenital abnormalities (Leddy et al., 2008; Lee and Koren, 2010) and obesity/metabolic dysfunction later in life (e.g., childhood, adolescence, adulthood) (Langer, 2008; Leddy et al., 2008; Walsh et al., 2014).

Additionally, excessive GWG adversely affects breastfeeding initiation and duration (Hilson et al., 2006), behaviors that have been shown in literature to attenuate post-partum weight retention (Kac et al., 2004) and childhood obesity (Adamo et al., 2013; Goldfield et al., 2006). One study reported that children of pregnant women who experience excessive GWG are four times more likely to be obese by age three (Oken et al., 2007).

Behavioral interventions aimed at reducing excessive GWG in pregnant women typically target improving diet and physical activity habits but many have shown limited efficacy and inconsistent findings (Skouteris et al., 2010). A review by Skouteris et al. (2010) found that interventions focused on only improving nutrition habits or physical activity were often *not* successful in reducing excessive GWG alone. Given this, researchers and the IOM suggest that a combination of behavioral and psychosocial factors (i.e., stress, anxiety, depression, social support) should be considered when designing interventions to

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prevent excessive GWG (Skouteris et al., 2010; Yaktine and Rasmussen, 2009). Poor psychosocial health (Hartley et al., 2014) may not only increase the risk of negative maternal and fetal health outcomes but may influence changes in behaviors (e.g. poor sleep quality, lack of physical activity) that contribute to excessive GWG (Hickey, 2000). Many pregnant women report experiencing stress and symptoms of anxiety and/or depression throughout their pregnancy. Prevalence rates of stress vary based upon the type of self-report assessment tool used. Rates of stress are as high as 78% for low-to-moderate stress and 6% for high levels of stress (Woods et al., 2010). Anxiety symptoms in pregnant women have been reported in 25% (Claesson et al., 2010; Ross and McLean, 2006), and up to 50% for depressive symptoms (Bennett et al., 2004). Additionally, pregnant women with low levels of social support may be more susceptible to poor mental health and excessive GWG (Elsenbruch et al., 2007; Gjerdingen et al., 1991; Olson and Strawderman, 2003). Often, pregnant women with poor psychosocial health fail to recognize or report distress because of similarities with common pregnancy complaints (i.e., fatigue, sleep disturbance, appetite changes) (Matthey and Ross-Hamid, 2011) and many of these issues are overlooked (Dietrich et al., 2003; Leiferman et al., 2008).

When poor psychosocial health is not addressed, pregnant women may exhibit negative health behaviors (e.g., poor sleep quality, lack of physical activity) (Hickey, 2000). Studies suggest that pregnant women who exhibit heightened symptoms of stress and depression have poorer sleep quality and are less physically active (Urizar Jr et al., 2006), both of which have been linked to excessive GWG (Ferraro et al., 2014; Restall et al., 2014). In addition, poor psychosocial health, for the mother, may increase the risk of cesarean section, post-partum weight retention (Bogaerts et al., 2013; Herring et al., 2008; Whitaker et al., 2014), and the development of major mental disorders (Dunkel Schetter and Tanner, 2012), and decrease the likelihood to breastfeed (Liou, 2014). For the fetus, adverse outcomes may span across the lifecycle (i.e., in-utero to adulthood) and include, miscarriage (Yonkers et al., 2009), disorganized sleep (Liou, 2014), preterm birth (i.e., < 37 weeks gestation), low birth weight (i.e., ≤2500 g) (U.S. Department of Health and Human Services, 2016), impaired cognitive/motor development, and behavioral/emotional problems (Dunkel Schetter and Tanner, 2012).

Though a relationship between psychosocial health (i.e., stress, anxiety, depression, social support) and excessive GWG during pregnancy has been suggested, little empirical evidence exists. In a recent systematic review, Hartley et al. (2014) investigated studies evaluating psychosocial risk factors for excessive GWG in pregnant women. Researchers reviewed 12 studies; eight studies longitudinal, two cross-sectional and two randomized controlled trials (RCTs). Significant associations were found between depression, body image dissatisfaction, and social support with excessive GWG suggesting that increased levels of depression, body image dissatisfaction, and social support may increase GWG. No significant associations were found for stress or anxiety. However, researchers concluded that the relationship between psychosocial factors and excessive GWG is complex and further research is needed to identify how screening for, and responding to, psychosocial risk factors for excessive GWG can be incorporated into antenatal care. More research is warranted in order to understand these relationships during pregnancy to inform experimental studies.

Recently, mindfulness (i.e., non-judgmental awareness that arises through paying attention, on purpose in the present moment (Kabat-Zinn, 2003) has been posited to be a protective factor against poor psychosocial health and weight gain in the general population (Bowlin and Baer, 2012; Keng et al., 2011; Olson and Emery, 2015). Studies have shown that mindfulness may induce long-term changes in the brain by mechanisms that reduce stress-signaling molecules and increase dopamine levels that together improve better control over emotions, mood, and anxiety (Field et al., 2013; Louie, 2014). The role of mindfulness in GWG has yet to be explored but may be beneficial to

help pregnant women manage psychosocial health and behaviors that contribute to excessive GWG. The relationship between mindfulness and excessive GWG warrants further exploration. Therefore, the purpose of this study was to identify the psychosocial factors (i.e., stress, anxiety, depression, social support) that are associated with GWG during each trimester of pregnancy. A secondary purpose of this study was to identify associations of mindfulness with GWG during each trimester of pregnancy. We hypothesize that increased levels of stress, anxiety, and depression and decreased levels of social support and mindfulness will be associated with increased levels of GWG.

Material and methods

The Institutional Review Board of a large university in the south-western United States approved this study.

Participant selection

Women were included in the study if they were: 1) currently pregnant (≥8-weeks gestation), 2) 18 years and older, 3) a US resident, and 4) able to read and write in English.

Procedures

This was a descriptive, cross-sectional study using a purposive non-probabilistic sample. Research staff contacted medical centers (e.g., WIC Clinics, public hospitals, pregnancy centers), mother and baby retail stores, and pregnancy websites (e.g., babycenter.com) and asked them to advertise the study by posting provided recruitment information (e.g., flyers, blurbs) to their social media sites and/or websites, emailing listservs, or by displaying flyers at their location. Local and national organizations agreeing to advertise for the study were sent recruitment information via email. Recruitment for the study occurred between April and June of 2015 via social media (e.g., Facebook, Twitter), listservs, and websites that cater to women who are pregnant.

Women who were interested in participating were asked to complete an online survey that assessed their general physical and psychosocial health during pregnancy as well as their perceptions, uses of, and interests in complementary health approaches (e.g., yoga, meditation, mindfulness). After women were confirmed eligible to participate, they were informed of how the data would be used, confidentiality of their responses, and that completion of the survey indicated their consent to be in the study. The online survey was labeled the Pregnancy and Wellness Survey (PAWS) and was implemented using Qualtrics (Provo, Utah), a web-based survey tool. The PAWS took women approximately 30 minutes to complete. Participants who completed the PAWS were offered a \$10 Target gift card to compensate for their time participating in the study (limited to the first 350 due to funding). The remaining participants were entered into a drawing to win one Jawbone UP Band or Fitbit Flex (winner's choice) as compensation for their time.

Survey

The PAWS consisted of two parts. Part 1 includes multiple reliable and valid scales to describe general physical health (e.g., amount of GWG in each trimester), behavioral factors (e.g., physical activity, diet), psychosocial factors (i.e., stress, anxiety, depression, social support) and mindfulness. A detailed description of the scales are below. PAWS Part 2 includes investigator-developed questions to identify the wellness practices (i.e., perceptions, uses of, interests in complementary health approaches) of pregnant women. More information and data collected from the PAWS Part Two is reported elsewhere (Matthews et al., 2016). Demographics were collected at the end of PAWS Part 2.

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