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The role of body image in prenatal and postpartum depression: a critical review of the literature

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Abstract

Maternal depression increases risk of adverse perinatal outcomes, and recent evidence suggests that body image may play an important role in depression. This systematic review identifies studies of body image and perinatal depression with the goal of elucidating the complex role that body image plays in prenatal and postpartum depression, improving measurement, and informing next steps in research. We conducted a literature search of the PubMed database (1996–2014) for English language studies of (1) depression, (2) body image, and (3) pregnancy or postpartum. In total, 19 studies matched these criteria. Cross-sectional studies consistently found a positive association between body image dissatisfaction and perinatal depression. Prospective cohort studies found that body image dissatisfaction predicted incident prenatal and postpartum depression; findings were consistent across different aspects of body image and various pregnancy and postpartum time periods. Prospective studies that examined the reverse association found that depression influenced the onset of some aspects of body image dissatisfaction during pregnancy, but few evaluated the postpartum onset of body image dissatisfaction. The majority of studies found that body image dissatisfaction is consistently but weakly associated with the onset of prenatal and postpartum depression. Findings were less consistent for the association between perinatal depression and subsequent body image dissatisfaction. While published studies provide a foundation for understanding these issues, methodologically rigorous studies that capture the perinatal variation in depression and body image via instruments validated in pregnant women, consistently adjust for important confounders, and include ethnically diverse populations will further elucidate this association.

Keywords

Depression; Body image; Pregnancy; Postpartum

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Conflict of interest The authors declare that they have no conflicts of interest concerning this article.

Introduction

Perinatal depression is defined as depression affecting women during pregnancy or within the first 12 months following delivery (Gavin et al. 2005). Prevalence estimates vary between 5 and 25 % (Gavin et al. 2005) during pregnancy and 13–19 % (O'Hara and McCabe 2013) during postpartum depending on the population and time point studied. Prenatal depression (during pregnancy) has been linked with increased risk of postpartum depression (Robertson et al. 2004) as well as adverse maternal and fetal outcomes such as preterm birth, fetal growth restriction, preeclampsia, fetal death, and decreased breastfeeding initiation (Bansil et al. 2010; Grigoriadis et al. 2013). Furthermore, women with prenatal depression are less likely to engage in healthy behaviors such as regular prenatal visits, follow prenatal advice, or take supplements and are more likely to engage in negative behaviors such as smoking, alcohol, or drug use (Bowen and Muhajarine 2006). In the postpartum period, depression may adversely affect the physical and emotional health of the mother, including increased risk for future depressive episodes with a negative impact on parenting and caretaking behaviors, and the physical and cognitive development of the child (O'Hara and McCabe 2013).

Maternal anxiety, life stress, a history of prior depression, lack of social support, domestic violence, unintended pregnancy, relationship factors, and low socioeconomic status have been identified as important risk factors for prenatal depression (Lancaster et al. 2010). Risk factors for postpartum depression are similar and include prior depression, low self-esteem, stressful life events, marital stress, and low social support (O'Hara and McCabe 2013). There is increasing evidence that body image may play an important role in perinatal depression, with body image dissatisfaction increasing risk (Anderson et al. 1994; Clark et al. 2009; Downs et al. 2008; Duncombe et al. 2008; Rauff and Downs 2011; Sweeney and Fingerhut 2013). Alternatively, other studies suggest the reverse association: where perinatal depression leads to body image dissatisfaction (Clark et al. 2009; Downs et al. 2008; Rallis et al. 2007; Skouteris et al. 2005).

Pregnancy represents a time of rapid trimester-specific changes in body weight and size which occur within a relatively short period of time. Such sudden body changes which differ from pre-pregnancy may promote body image dissatisfaction (Skouteris et al. 2005). This is consistent with findings that body image dissatisfaction stems from poor appraisal of one's appearance, health, and fitness (Thompson 1990). While pregnancy has been posited as a period during which concerns about weight gain and shape may be considered less important, studies have found that pregnant women continue to acknowledge their pre-pregnancy standards for appearance during pregnancy and feel concern about meeting these standards after birth (Johnson et al. 2004). Consistent with these findings, body image dissatisfaction has been found to be relatively stable during pregnancy (Clark et al. 2009; Clark and Ogden 1999; Rocco et al. 2005; Skouteris et al. 2005) and tends to increase during postpartum (Clark et al. 2009; Rallis et al. 2007; Stein and Fairburn 1996), possibly due to physical and emotional challenges faced by women in returning to their pre-pregnancy appearance (Rallis et al. 2007).

The elucidation of the association between body image and depression is critical for the implementation of preventive programs and behavioral interventions. Therefore, our goal is to critically review prior studies of body image and perinatal depression in the context of the methodological differences among studies as well as their potential limitations. We also provide a summary of the evidence for the association and recommendations for future research.

Materials and methods

Articles included in this review were obtained by searching the PubMed database (January 1994–May 2014) for the following terms: (1) “depression” or “depressive symptoms” or “depressive disorders,” along with (2) “body image,” or “weight concern,” or “body shape attitude,” and (3) “pregnancy” or “postpartum.” Additional relevant articles cited in identified papers were also included. Eligibility criteria included availability in English and studies conducted in humans. In total, 19 studies were identified that fulfilled these criteria.

Eligible studies are shown in summary tables: cross-sectional studies on body image and depression are presented in Table 1; prospective cohort studies assessing whether body image predicted perinatal depression are presented in Table 2; while studies assessing the reverse association, that is the prospective association between perinatal depression and subsequent body image, are presented in Table 3. Each table lists the author and publication year, the instruments used to measure body image and depression, the timing of assessment (i.e., prenatal or postpartum), covariates, and results. Multivariable adjusted results are presented when available. Associations were classified as not statistically significant “n.s.” if statistical significance was not achieved at the $P < .05$ level. Although many of the studies examined a variety of associations, for the purposes of this review, we only abstracted results that related directly to our associations of interest.

Results

Nineteen English language articles examined the association between body image and depression in the perinatal period (Abraham et al. 2001; Anderson et al. 1994; Birkeland et al. 2005; Chou et al. 2003; Clark et al. 2009; Dipietro et al. 2003; Downs et al. 2008; Duncombe et al. 2008; Gjerdingen et al. 2009; Green et al. 2006; Haedt and Keel 2007; Jenkin and Tiggemann 1997; Kamysheva et al. 2008; Rallis et al. 2007; Rauff and Downs 2011; Skouteris et al. 2005; Stevens-Simon et al. 1993; Sweeney and Fingerhut 2013; Walker et al. 2002) between January 1994 and May 2014.

Study design

Ten studies (Abraham et al. 2001; Birkeland et al. 2005; Chou et al. 2003; Dipietro et al. 2003; Green et al. 2006; Haedt and Keel 2007; Jenkin and Tiggemann 1997; Kamysheva et al. 2008; Stevens-Simon et al. 1993; Walker et al. 2002) were cross-sectional (Table 1), while nine (Anderson et al. 1994; Clark et al. 2009; Downs et al. 2008; Duncombe et al. 2008; Gjerdingen et al. 2009; Rallis et al. 2007; Rauff and Downs 2011; Skouteris et al. 2005; Sweeney and Fingerhut 2013) were prospective cohort studies (Table 2 and 3).

Of the ten cross-sectional studies, five examined the association between body image and prenatal depression (Chou et al. 2003; Dipietro et al. 2003; Haedt and Keel 2007; Kamysheva et al. 2008; Stevens-Simon et al. 1993) and five examined the association between body image and postpartum depression (Abraham et al. 2001; Birkeland et al. 2005; Green et al. 2006; Jenkin and Tiggemann 1997; Walker et al. 2002).

Of the nine prospective cohorts, six studies (Anderson et al. 1994; Clark et al. 2009; Downs et al. 2008; Duncombe et al. 2008; Rauff and Downs 2011; Sweeney and Fingerhut 2013) examined the prospective association between pregnancy body image and incident perinatal depression, while five (Clark et al. 2009; Downs et al. 2008; Gjerdingen et al. 2009; Rallis et al. 2007; Skouteris et al. 2005) assessed the reverse association; that is the prospective association between perinatal depression and subsequent body image.

Study population

The majority of the studies were restricted to homogenous samples of White women (Chou et al. 2003; Haedt and Keel 2007; Rauff and Downs 2011) or those who were college-educated or with middle-to-high income levels (Clark et al. 2009; Downs et al. 2008; Duncombe et al. 2008; Gjerdingen et al. 2009; Haedt and Keel 2007; Kamysheva et al. 2008; Rallis et al. 2007; Rauff and Downs 2011; Skouteris et al. 2005). Only five studies included more than 15 % Hispanic (Birkeland et al. 2005; Walker et al. 2002) or African-American (Birkeland et al. 2005; Gjerdingen et al. 2009; Stevens-Simon et al. 1993; Sweeney and Fingerhut 2013; Walker et al. 2002) women. Ten studies were conducted in the USA and nine were international, with the majority conducted in Australia.

Assessment of body image

A range of validated self-report instruments was used to assess body image with the most common being the Body Attitudes Questionnaire (BAQ) or its four subscale measures of feeling fat, strength and fitness, salience of weight and shape, and attractiveness (Clark et al. 2009; Duncombe et al. 2008; Kamysheva et al. 2008; Rallis et al. 2007; Skouteris et al. 2005; Sweeney and Fingerhut 2013). The next most commonly used scales were the Body Areas Satisfaction Scale (BASS) (Downs et al. 2008; Rauff and Downs 2011) and the Pregnancy and Weight Gain Attitude Scale (PWGAS) (Dipietro et al. 2003; Stevens-Simon et al. 1993). Other validated scales included the Body Cathexis Scale (BCS) (Chou et al. 2003; Walker et al. 2002), the Body Dissatisfaction and Drive for Thinness Subscales of the Eating Disorder Inventory (EDI) (Birkeland et al. 2005), the eight-item Body Shape Questionnaire (Gjerdingen et al. 2009), and the ten-item version of the Body Shape Questionnaire (BSQ-R-10) (Haedt and Keel 2007).

Other studies adapted existing validated questionnaires, utilizing 16 clusters of items identified from the Attitudes Scale (Anderson et al. 1994) and weight and shape concerns modified for pregnancy from the Eating Disorder Examination (Abraham et al. 2001). Finally, two studies used questionnaires for body weight and shape satisfaction which had not been validated (Green et al. 2006; Jenkin and Tiggemann 1997).

Studies differed in their assessment of body image dissatisfaction, with some capturing satisfaction with specific body areas via the BASS (Downs et al. 2008; Rauff and Downs

2011), BSQ (Gjerdingen et al. 2009; Haedt and Keel 2007), BCS (Chou et al. 2003; Walker et al. 2002), and the EDI (Birkeland et al. 2005), whereas others measured overall weight-related attitudes via the BAQ (Clark et al. 2009; Duncombe et al. 2008; Kamysheva et al. 2008; Rallis et al. 2007; Skouteris et al. 2005; Sweeney and Fingerhut 2013), PGWAS (Dipietro et al. 2003; Stevens-Simon et al. 1993), Attitudes Scale (Anderson et al. 1994), and questions assessing body weight and shape satisfaction (Green et al. 2006; Jenkin and Tiggemann 1997).

Assessment of depression

Various validated self-report instruments were used to measure symptoms of depression, with the most common being the Beck Depression Inventory (BDI) (Anderson et al. 1994; Clark et al. 2009; Duncombe et al. 2008; Kamysheva et al. 2008; Rallis et al. 2007; Skouteris et al. 2005), followed by the Centers for Epidemiological Studies-Depression (CES-D) scale (Chou et al. 2003; Downs et al. 2008; Rauff and Downs 2011; Stevens-Simon et al. 1993; Walker et al. 2002), the Edinburgh Postnatal Depression Scale (EPDS) (Abraham et al. 2001; Birkeland et al. 2005; Green et al. 2006; Haedt and Keel 2007; Sweeney and Fingerhut 2013), and the Patient Health Questionnaire (PHQ-9) (Gjerdingen et al. 2009). Other studies used the Profile of Mood States (POMS) (Dipietro et al. 2003) for depression affective state and Rosenberg's six-item index for depressive affect (Jenkin and Tiggemann 1997). Of these instruments, only the EPDS and the POMS have been validated for use in pregnant women (Nast et al. 2013). None of the studies relied on clinical diagnosis of depression.

Timing of assessment

There was marked variation in the timing of assessment of body image and depression across the cross-sectional studies (Abraham et al. 2001; Birkeland et al. 2005; Chou et al. 2003; Dipietro et al. 2003; Green et al. 2006; Haedt and Keel 2007; Jenkin and Tiggemann 1997; Kamysheva et al. 2008; Stevens-Simon et al. 1993; Walker et al. 2002). Some studies focused on pregnancy (Chou et al. 2003; Dipietro et al. 2003; Haedt and Keel 2007; Kamysheva et al. 2008; Stevens-Simon et al. 1993), while others examined this association in the postpartum period (Abraham et al. 2001; Birkeland et al. 2005; Green et al. 2006; Jenkin and Tiggemann 1997; Walker et al. 2002). Prospective studies either measured the associations only during pregnancy (Downs et al. 2008; Duncombe et al. 2008; Rauff and Downs 2011; Skouteris et al. 2005) or spanning the pregnancy to postpartum period (Anderson et al. 1994; Clark et al. 2009; Downs et al. 2008; Gjerdingen et al. 2009; Rallis et al. 2007; Sweeney and Fingerhut 2013).

Studies also differed with respect to timing of assessment within the pregnancy and postpartum periods. Pregnancy studies either measured depressive symptoms at multiple time points during pregnancy (Downs et al. 2008; Duncombe et al. 2008; Rauff and Downs 2011) or measured depressive symptoms only once in early (Chou et al. 2003; Stevens-Simon et al. 1993), mid- (Haedt and Keel 2007; Kamysheva et al. 2008; Skouteris et al. 2005), or late (Clark et al. 2009; Dipietro et al. 2003) pregnancy. Postpartum studies either measured depressive symptoms once at 1 week (Abraham et al. 2001; Walker et al. 2002), 4 weeks (Jenkin and Tiggemann 1997), 8 weeks (Sweeney and Fingerhut 2013), 6 months

postpartum (Downs et al. 2008; Rallis et al. 2007), across the first year postpartum (Anderson et al. 1994; Birkeland et al. 2005), or at multiple times postpartum (Clark et al. 2009; Gjerdingen et al. 2009; Green et al. 2006; Walker et al. 2002).

Covariates

Few studies adjusted for a comprehensive list of potential confounders. Those studies that did address confounders included pre-pregnancy or pregnancy body mass index (Downs et al. 2008; Kamyshева et al. 2008; Rallis et al. 2007; Rauff and Downs 2011; Skouteris et al. 2005), and parity (Haedt and Keel 2007; Walker et al. 2002). Behaviors included eating behaviors or disordered eating (Abraham et al. 2001) and exercise and daily physical activity (Abraham et al. 2001; Downs et al. 2008). No studies adjusted for actual weight or weight change during pregnancy, cigarette smoking and alcohol consumption, or physical pregnancy-related symptoms (e.g., sleep, fatigue, morning sickness, nausea).

While sociodemographic factors included education (Downs et al. 2008; Rauff and Downs 2011), income (Walker et al. 2002), race or ethnicity (Rauff and Downs 2011; Walker et al. 2002), and marital/partner status (Walker et al. 2002), no studies adjusted for maternal age. In terms of psychosocial factors, only one study evaluated the effect of social comparison tendencies, perceived sociocultural pressures, or perception of teasing as potential confounders (Skouteris et al. 2005). No studies adjusted for social or family support or comorbid psychosocial factors such as prenatal psychosocial stress and anxiety.

Cross-sectional study findings

In terms of the five prenatal studies, all reported statistically significant positive associations between body image dissatisfaction and prenatal depression. Chou et al. in a population of 113 women in Texas found that body image dissatisfaction measured by the BCS was positively associated ($r=0.21$, $P<.05$) with depression in early pregnancy (mean±standard deviation (SD) 59±17.2 days gestation) (Chou et al. 2003). Haedt and Keel, in a population of 196 women in the Midwest found a positive association between body image dissatisfaction as measured by the BSQ and depressive symptoms across all trimesters of pregnancy ($r=0.39$, $P<.001$) (Haedt and Keel 2007). In another study, among 99 ethnically diverse pregnant adolescents in Colorado, Stevens-Simon et al. (Stevens-Simon et al. 1993) found that those with higher body image satisfaction (using the Pregnancy and Weight Gain Attitudes Scale) had lower levels of depressive symptoms (measured by CES-D) ($r=-0.26$, $P=0.004$) during early pregnancy (mean±SD= 15.2±7.2 weeks gestation). The association remained statistically significant after adjusting for family support. Similarly, DiPietro et al. observed that higher positive pregnancy body image scores were associated with fewer depressive symptoms ($r=-0.20$, $P<.01$) at 36 weeks gestation among 130 nonsmoking, healthy, well-educated pregnant predominantly non-Hispanic White (86 %) women (DiPietro et al. 2003).

The five postpartum cross-sectional studies (Abraham et al. 2001; Birkeland et al. 2005; Green et al. 2006; Jenkin and Tiggemann 1997; Walker et al. 2002) were consistent in finding statistically significant positive associations between body image dissatisfaction and postpartum depression. Abraham et al. (Abraham et al. 2001) additionally found that eating

and weight gain concerns before ($\beta=0.84, P=0.01$) and during pregnancy ($\beta=1.28, P=0.004$) assessed retrospectively via the Eating Disorder Examination modified for pregnancy were significantly associated with postpartum depression (measured using the EPDS) in a sample of 181 Australian women. Similarly, weight ($r=-0.25, P<.05$) and shape satisfaction ($r=-0.29, P<.01$) assessed using 5-point scales were inversely associated with depression at 4 weeks postpartum (measured via the Rosenberg's six-item index) among 115 primiparous Australian women (Jenkin and Tiggemann 1997).

Three cross-sectional studies (Birkeland et al. 2005; Green et al. 2006; Walker et al. 2002) that were conducted among diverse populations found similar results. For example, in a cross-sectional study among 283 low-income African-American (25 %), White (27 %), and Hispanic (48 %) new mothers, Walker et al. found that body image dissatisfaction was positively associated with depressive symptoms post-delivery for all ethnic groups ($r=0.29-0.39, P<.05$) and with 6 weeks postpartum depressive symptoms for all ethnic groups except African-American women ($r=0.30-0.39, P<.01$). In hierarchical regression models, body image dissatisfaction was significantly associated with depressive symptoms post-delivery ($\beta=0.34, P<.01$) and at 6 weeks postpartum ($\beta=0.32, P<.01$), after adjusting for ethnicity, marital status, income, and parity (Walker et al. 2002). Similarly, in a diverse sample (46 % Caucasian, 32 % African-American, 19 % Hispanic) of 149 mostly single, adolescents, Birkeland et al. found that weight/shape disturbance ($\beta=0.20, P=0.004$) measured via the Body Dissatisfaction subscale of EDI was significantly associated with postpartum depressive symptoms measured using the EPDS (Birkeland et al. 2005). Finally, negative body image ($\chi^2=11.14, P=0.03$) at 3 months postpartum was significantly associated with higher depressive symptom scores (EPDS>13) in a sample of 125 Arab women (Green et al. 2006), although these findings were attenuated and no longer statistically significant at 6 months postpartum.

In summary, cross-sectional studies were consistent in finding a positive association between body image dissatisfaction and prenatal and postpartum depression.

Prospective cohort study findings

Body image and incident depression—Of the six prospective cohort studies (Anderson et al. 1994; Clark et al. 2009; Downs et al. 2008; Duncombe et al. 2008; Rauff and Downs 2011; Sweeney and Fingerhut 2013) that examined the impact of body image on incident depression, two (Duncombe et al. 2008; Rauff and Downs 2011) focused on incident prenatal depression, whereas the remaining studies (Anderson et al. 1994; Clark et al. 2009; Downs et al. 2008; Sweeney and Fingerhut 2013) focused on incident prenatal and postpartum depression (Table 2).

The prospective studies that evaluated incident prenatal depression reported a consistent positive association between body image dissatisfaction and prenatal depression (Duncombe et al. 2008; Rauff and Downs 2011). Rauff and Downs (Rauff and Downs 2011) conducted a prospective study among 115 well-educated and middle to high-income pregnant White women. The authors found an inverse (Rauff and Downs 2011) relationship between first trimester body image satisfaction and second trimester depressive symptoms ($\beta=-0.22, P<.05, r=-0.26, P<.05$). Similarly, second trimester body image satisfaction predicted third

trimester depressive symptoms ($\beta=-0.33, P<.0001, r=-0.35, P<.01$) (Rauff and Downs 2011). In another prospective study among 158 well-educated pregnant Australian women, Duncombe et al. found that early (16–23 weeks gestation) pregnancy body attitudes toward feeling fat ($r=0.32, P<.001$), salience of weight and shape ($r=0.31, P<.001$), attractiveness ($r=-0.29, P<.001$), and strength and fitness ($r=-0.30, P<.001$) were pro-spectively associated with prenatal depressive symptoms measured at 32–38 weeks via the BDI (Duncombe et al. 2008).

The prospective studies that evaluated incident postpartum depression reported consistent positive associations between body image dissatisfaction and postpartum depression (Anderson et al. 1994; Downs et al. 2008; Sweeney and Fingerhut 2013) (Table 2). In a longitudinal study conducted among 30 predominantly White Canadian women, third trimester negative body image was associated with higher depression scores (measured by BDI) at 8 weeks postpartum ($r=0.43, P<.05$) (Anderson et al. 1994). Similar positive associations between body image satisfaction and depression were reported among 116 pregnant women in Australia ($r=0.03-0.15$ for depression and feeling fat) after adjusting for depression at each immediately preceding time point; however, findings were not statistically significant (Clark et al. 2009). In another longitudinal study among 230 predominantly White pregnant women, third trimester body image satisfaction predicted lower postpartum depressive symptoms ($\beta=-0.34, P<.01$), when adjusted for depressive symptoms during the third trimester (Downs et al. 2008). In the cumulative model, pregnancy (first + second + third trimester) body image satisfaction strongly predicted lower postpartum depressive symptoms ($\beta=-0.37, P<.001$). Finally, in a diverse sample (52.2 % non-Hispanic White, 26.1 % African-American, 8.7 % Hispanic, 4.3 % Asian) of mostly middle-class and married women, body dissatisfaction assessed during the third trimester of pregnancy using the BAQ was a significant predictor of depressive symptoms at 2 months postpartum ($\beta=0.49, P<.01$), after adjusting for established risk factors for postpartum depression (Sweeney and Fingerhut 2013).

In summary, all of the prospective studies that evaluated the impact of body image on incident depression found a positive relationship between body image dissatisfaction and incident prenatal depression as well as postpartum depression ranging from post-delivery to 12 months postpartum. Findings were consistent across all the studies and statistically significant for all but one (Clark et al. 2009). In addition, findings were consistent for widely varying attributes of body image satisfaction ranging from feeling fat, salience of weight and shape, strength and fitness, attractiveness, body image attitudes, and satisfaction with specific body areas. Only three studies (Clark et al. 2009; Downs et al. 2008; Sweeney and Fingerhut 2013) adjusted for prior depressive symptoms.

Depression and subsequent body image—Five prospective studies (Clark et al. 2009; Downs et al. 2008; Gjerdingen et al. 2009; Rallis et al. 2007; Skouteris et al. 2005) examined the reverse association; that is, whether depression leads to body image dissatisfaction (Table 3).

Among these studies, two focused on the pregnancy period (Downs et al. 2008; Skouteris et al. 2005). Among 128 healthy pregnant participants from the Pregnancy and Wellbeing

study in Australia, depressive symptoms (measured by BDI) at 16–23 weeks gestation significantly predicted less strength and fitness (measured by BAQ) during late pregnancy (32–39 weeks gestation) ($\beta=-0.21, P<.05$) (Skouteris et al. 2005). Additionally, depression at 16–23 weeks gestation was a partial predictor of lower attractiveness and increase in feeling fat at 32–39 weeks gestation. In another longitudinal study among 230 predominantly White pregnant women, Downs et al. (2008) found that first trimester depressive symptoms (measured by the CES-D) were negatively associated with body image satisfaction (measured by the BASS) in the second ($r=-0.40, P<.01$) and third ($r=-0.38, P<.01$) trimesters. Similarly, second trimester depressive symptoms were negatively associated with third ($r=-0.38, P<.01$) trimester body satisfaction.

Three of these studies focused on the postpartum period (Clark et al. 2009; Gjerdingen et al. 2009; Rallis et al. 2007) (Table 3). Among a sample of women ($n=79$) from the Pregnancy and Wellbeing study who were followed until 12 months postpartum, depressive symptoms at 6 months postpartum were inversely associated with strength and fitness at 12 months postpartum ($\beta=-0.34, P<.01$) (Rallis et al. 2007). In another longitudinal study among 116 pregnant women in Australia, depressive symptoms at 32–35 weeks gestation positively predicted feeling fat at 6 weeks ($\beta=0.35, P<.01$), 6 months ($r=0.26, P<.01$), and 12 months postpartum ($r=0.20, P<.01$), after adjusting for feeling fat at 32–35 weeks gestation (Clark et al. 2009). In the largest prospective study conducted among a diverse sample of 506 participants (67 % White, 17.6 % African-American, 6.7 % Asian), Gjerdingen et al. (2009) found that PHQ-9 depressive symptom scores at 0–1 months were not significantly associated with body dissatisfaction at 9 months postpartum (results not provided).

In summary, findings are inconsistent for the association between depression and subsequent body image, with studies suggesting an impact on some but not all aspects of body image satisfaction. While greater prenatal depressive symptoms predicted lower overall body image satisfaction and lower strength and fitness during pregnancy, depressive symptoms were not significantly associated with feeling fat, salience of weight and shape, and attractiveness. Similarly, while two studies found that prenatal and early postpartum depressive symptoms predicted later postpartum body image dissatisfaction, one other study found no statistically significant association.

Discussion

Overall, 19 studies examined the association between body image and depression during pregnancy and the postpartum period. Approximately half of the studies were cross-sectional by design and found consistent positive associations. Prospective studies found that body image dissatisfaction was consistently but weakly associated with the onset of prenatal and postpartum depression. Prospective studies that examined the reverse association found that depression influenced the onset of some aspects of body image dissatisfaction during pregnancy, but few evaluated the postpartum onset of body image dissatisfaction. Given the unique body changes during pregnancy, the association between body image and depression may depend on the extent to which pregnant women are able to accept differences from their established self-image during pregnancy. Thus, the weak associations observed between body image and depression during pregnancy may be

reflective of somewhat less strict standards for body image during pregnancy. In contrast, the stronger associations between body image and depression observed during the postpartum period are consistent with findings that body image dissatisfaction increases during postpartum (Clark et al. 2009; Rallis et al. 2007; Stein and Fairburn 1996) and is therefore likely to influence these associations in the same manner as it would outside of the pregnancy period.

It is important to consider these findings in light of the association between depression and obesity. A recent systematic review and meta-analysis found dose-response relationships between depression and body mass index during pregnancy and postpartum (Molyneaux et al. 2014); however, the authors did not assess the role of body image in this relationship. Findings among non-pregnant women suggest a bidirectional pathway between obesity and depression (Markowitz et al. 2008) and that body image dissatisfaction, and weight and shape concerns, significantly modify the association between obesity and depression (Markowitz et al. 2008; Preiss et al. 2013). Specifically, recent reviews have found that obese individuals with a greater perception of being overweight were more likely to be depressed than obese individuals who did not perceive themselves to be overweight (Markowitz et al. 2008; Preiss et al. 2013). These findings highlight the importance of accounting for body mass index when assessing the relationship between body image and depression. However, few studies included in this review adjusted for pre-pregnancy (Kamysheva et al. 2008; Rauff and Downs 2011; Skouteris et al. 2005) and pregnancy BMI (Downs et al. 2008) or BMI change (Kamysheva et al. 2008; Rallis et al. 2007).

While the studies included in this review provide a foundation for understanding the association between body image and perinatal depression, this review revealed several key gaps in the existing literature.

Body image assessment

Studies used a wide range of self-reported questionnaire-based instruments to measure differing aspects of body image dissatisfaction, reflective of the increasing number of new and revised measures of this construct. An important issue limiting comparability of findings across studies is the use of general versus specific body image instruments. More global measures include the BAQ, PGWAS, and Attitudes Scale. For example, the BAQ or its four subscales, which measures overall weight-related attitudes, were the most commonly used measures of body image dissatisfaction. However, although body image is a multidimensional construct, a number of studies included in this review assessed site-specific satisfaction with certain body areas or parts (e.g., via the BASS).

Overall, while results appear to be generally consistent across studies in this review, the widely varying instruments may, in fact, be measuring different constructs. Body dissatisfaction measures related to esthetics and appearance appear to be more resilient to the effects of depression during pregnancy, while depression consistently predicted low strength and fitness during pregnancy and the postpartum period. While such physical functioning measures may not be viewed as typical body image factors, they are important factors influencing attitudes regarding the body's external appearance (Ben-Tovim and Walker 1991). Our findings that depression influenced the onset of some aspects of body

image dissatisfaction to a greater degree than others suggest that further examination of this relationship is warranted. Future research could consider the use of multiple measures of body image with broad representation of the relevant dimensions of interest that capture a wider range of feelings and attitudes toward the body. However, the issue of collinearity or degree of overlap among the related measures would need to be addressed (Thompson 2004).

Finally, none of these instruments have been validated in pregnant populations. The PGWAS is the only instrument that measures attitudes and behaviors toward pregnancy-related weight gain and is validated for use in pregnant women; however, the PGWAS was used in only two studies (Dipietro et al. 2003; Stevens-Simon et al. 1993). In one (Stevens-Simon et al. 1993) of these two studies, the PGWAS was used to measure weight-related attitudes and behaviors during pregnancy among adolescent mothers despite not being validated for use among adolescents. The dynamic nature of pregnancy weight and in turn body image satisfaction justifies a need for use of state, or more immediate measure of body image, as opposed to a more general trait measure, via appropriate instruments that are validated for use during the perinatal period.

Depression assessment

All the studies relied on self-reported questionnaire-based instruments to assess elevated pregnancy and postpartum depressive symptoms which may not correlate with a diagnosis of depression and thus may be subject to potential misclassification. While the majority of studies used the BDI and CES- D, the EPDS is known to rely less on somatic symptoms (e.g., fatigue, sleep disturbances, and appetite changes) typically observed in the perinatal period, thus avoiding overestimates of depression (Davis et al. 2013). Indeed, a recent review (Nast et al. 2013) of tools designed to measure depressive symptomatology during pregnancy identified the EPDS as the best available instrument based on its high reliability (Cronbach's $\alpha=0.76-0.98$ (Adewuya et al. 2006; Adouard et al. 2005; Felice et al. 2006; Grant et al. 2008)) and validity (concurrent validity for major depression indicated by sensitivity=100 % and specificity=96 % (Murray and Cox 1990)). Despite these advantages, few studies (Abraham et al. 2001; Birkeland et al. 2005; Haedt and Keel 2007) used the EPDS to assess prenatal and postpartum depressive symptoms.

Finally, although, most studies used validated instruments, the majority of the depression questionnaires were not validated among pregnant women. An instrument's appropriateness may be influenced by environmental, psychological, and physiological characteristics of the pregnancy period (Nast et al. 2013). For example, as mentioned earlier, somatic symptoms such as (sleep disturbances) commonly seen during depression are also experienced during pregnancy. In addition, the validity of the self-reported depression tools may vary according to the racial/ethnic composition of the study population (Gaynes et al. 2005), which is not always taken into account, resulting in additional challenges to depression assessment and comparability of findings.

Timing of assessment and direction of association

There was a broad range of time points of body image and depression assessments during pregnancy and the postpartum period, which further limits comparability of findings across studies. Pregnancy is a dynamic phase, and women experience changes (hormonal, psychosocial, and physical) throughout pregnancy and after delivery that could influence these measures. Prior research suggests body image concerns are greatest in early pregnancy, tend to decrease during later stages of pregnancy, and resurface during the postpartum period (Clark et al. 2009; Duncombe et al. 2008; Goodwin et al. 2000; Skouteris et al. 2005). Given this dynamic nature of body image and psychosocial changes during pregnancy and postpartum, the relationship between body image dissatisfaction and depression is likely to vary at different time periods, which justifies a need for collection of multiple measures throughout the perinatal period.

Another issue relating to the timing of assessment is the direction of association. Several psychosocial theories such as Beck's cognitive theory (Clark et al. 2009; Suttie 1998) and the biopsychosocial model of health (Welsh 2009) support a bidirectional association between body image dissatisfaction and depression. According to Beck's cognitive theory (Beck 1967), depression is caused by a triad of negative cognitive patterns namely negative views of self, ongoing experiences or current circumstances, and the future. Body image dissatisfaction from pregnancy-associated weight and shape changes could lead to self-deprecation or inadequacy, negative views of current body appearance, and negative perceptions of the ability to return to pre-pregnancy body ideals post-delivery. On the other hand, the reverse direction of association is supported by the cognitive model of depression, where individuals' cognitions are derived from attitudes developed from prior experiences or events (Thompson 1990). For example, depressed individuals may concentrate on negative body features such as the most disliked body parts or areas, thus increasing overall body dissatisfaction (Clark et al. 2009).

Cross-sectional studies, by design, examine associations at specific pregnancy and postpartum stages, thus likely restricting any inferences on the findings to that time period. In contrast, prospective cohort studies enable the assessment of temporality and potential direction of association. While the majority of studies evaluated the prospective association between body image and incident depression, few studies evaluated the reverse direction of association; that is, the impact of perinatal depression on body image. These studies in general found a consistent positive relationship between body image dissatisfaction and incident prenatal as well as postpartum depression, while partially supporting the reverse association.

Confounding and effect modification

Few of the studies adjusted for potential confounders of the relationship between body image and perinatal depression, resulting in the possibility of residual confounding. Importantly, no studies examined the effect of prior depression or use of antidepressants prior to or during pregnancy. Prior depression has been identified as an important risk factor for prenatal (Lancaster et al. 2010) and postpartum depression (O'Hara and McCabe 2013). Three studies (Clark et al. 2009; Downs et al. 2008; Sweeney and Fingerhut 2013) adjusted

for depression in the prior pregnancy time period. Few studies considered pre-pregnancy body image dissatisfaction (Clark et al. 2009; Skouteris et al. 2005) or prior depression (Downs et al. 2008) as a confounder of the association between depression and body dissatisfaction across pregnancy. In addition, no studies addressed the effect of social support on the association between body image and depression. Social support has been observed to protect against both body image dissatisfaction (Chou et al. 2003) as well as depression during pregnancy (Lancaster et al. 2010) and it is therefore essential to assess its effect as a potential confounder.

Finally, no studies adjusted for comorbid psychosocial factors such as stress or anxiety, and it is critical to take these factors into account to isolate the independent effects of depression from those of stress or anxiety and examine potential mediating or moderating effects.

Study population

Women's attitudes toward body image may be derived from cultural ideals and concepts from their racial/ethnic backgrounds. However, most of the studies were restricted to homogenous samples of White women. Considerable evidence supports significant racial/ethnic differences in body image attitudes among women outside of pregnancy (Flynn and Fitzgibbon 1998; Gordon et al. 2010; Halpern et al. 1999; Kemper et al. 1994; Rucker and Cash 1992). In general, White women demonstrate greater body image dissatisfaction as compared to African-American women. However, these differences in body image attitudes are less pronounced between White and Hispanic women. Studies show that Hispanic women exhibit similar levels of body image dissatisfaction and personal ideals for body shape when compared with White women (Cash and Henry 1995; Gordon et al. 2010; Robinson et al. 1996). Although literature is sparse, similar racial/ethnic differences in body image dissatisfaction are observed in the perinatal period (Carter-Edwards et al. 2010; Walker et al. 2002). These cultural differences could potentially modify the relationship between body image dissatisfaction and depression. Walker et al. (Walker et al. 2002) found that African-American ethnicity was associated with higher depressive symptoms in the postpartum period; however, neither African-American nor Hispanic ethnicity significantly moderated the relationship between body image attitudes and depressive symptoms in tests of interactions. As noted by the authors, the differences in the strengths of the associations across ethnic groups may not have been large enough to reach statistical significance. A number of studies included in this review were conducted on small convenience samples, which raises concerns about the internal and external validity of their findings. Due to lack of studies on more ethnically and socioeconomically diverse samples, generalizability is thus limited. Finally, due to small sample sizes in most studies, any interaction effects were not examined.

Recommendations for future research

We suggest the following recommendations to improve studies in this research area.

- There is a need for larger and more robust longitudinal representative studies that prospectively follow women from pregnancy until postpartum (longer follow up post-delivery), to allow tracking of the dynamic relationship between body image satisfaction and depression.

- Future studies with prospective repeated assessments of body image and depression are necessary to elucidate the complex temporal ordering of associations among these factors during pregnancy and the postpartum period.
- Studies should consistently use depression instruments that rely less on somatic or physical symptoms and are validated for use in the perinatal period to better facilitate comparison of findings across the literature.
- Body image satisfaction measures need to be developed and validated for use in pregnant and postpartum women to capture attitudes toward the unique somatic changes associated with pregnancy.
- Future studies need to consistently control for important confounders such as sociodemographic, behavioral, pre-pregnancy obstetrical history, pregnancy-related, and other comorbid psychosocial factors. In particular, prior history of depression and body image dissatisfaction should be consistently adjusted for to isolate the independent effects of depression or body image dissatisfaction during pregnancy and postpartum.
- Further, there is a need to evaluate whether the association between depression and body image dissatisfaction differs according to presence or absence of comorbid factors, such as stress, anxiety, and actual weight and weight gain (e.g., effect modification).
- There is a need for replication of studies among racially and socioeconomically diverse populations to assess the impact of ethnic and cultural ideals on the association between depression and body image dissatisfaction.

Conclusion

In summary, there is theoretical and epidemiological evidence supporting an association between body image satisfaction and depression in the perinatal period. The majority of the studies have found that body image dissatisfaction is consistently, but weakly, associated with prenatal and postpartum depression. However, these studies are limited by the differences in study design, choice of instruments used to measure depression and body image dissatisfaction, the timing of assessment, sample size and diversity, and lack of consideration of important confounding factors. Further, findings may not be generalizable to populations with diverse ethnic groups or of low socioeconomic background. Importantly, evidence is lacking on the causal direction of the association and future methodologically rigorous studies are needed to facilitate a better understanding of the relation between body image dissatisfaction and perinatal depression.

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References

Abraham S, Taylor A, Conti J. Postnatal depression, eating, exercise, and vomiting before and during pregnancy. *Int J Eat Disord*. 2001; 29:482–487. [PubMed: 11285587]

- Adewuya AO, Ola BA, Dada AO, Fasoto OO. Validation of the Edinburgh Postnatal Depression Scale as a screening tool for depression in late pregnancy among Nigerian women. *J Psychosom Obstet Gynaecol.* 2006; 27:267–272. [PubMed: 17225628]
- Adouard F, Glangeaud-Freudenthal NM, Golse B. Validation of the Edinburgh Postnatal Depression Scale (EPDS) in a sample of women with high-risk pregnancies in France. *Arch Womens Ment Health.* 2005; 8:89–95. [PubMed: 15883653]
- Anderson VN, Fleming AS, Steiner M, Steiner M. Mood and the transition to motherhood. *J Reproduct Infant Psychol.* 1994; 12:69–77.
- Bansil P, Kuklina EV, Meikle SF, Posner SF, Kourtis AP, Ellington SR, Jamieson DJ. Maternal and fetal outcomes among women with depression. *J Women's Health (2002).* 2010; 19:329–334.
- Beck, AT. *Depression: clinical, experimental, and theoretical aspects vol. 32, book, whole.* New York: University of Pennsylvania Press; 1967.
- Ben-Tovim DI, Walker MK. The development of the Ben-Tovim Walker Body Attitudes Questionnaire (BAQ), a new measure of women's attitudes towards their own bodies. *Psychol Med.* 1991; 21:775–784. [PubMed: 1946865]
- Birkeland R, Thompson JK, Phares V. Adolescent motherhood and postpartum depression. *J Clin Child Adolesc Psychol : Off J Soc Clin Child Adolesc Psychol, Am Psychol Assoc Div.* 2005; 53(34):292–300.
- Bowen A, Muhajarine N. Antenatal depression. *Can Nurse.* 2006; 102:26–30. [PubMed: 17168096]
- Carter-Edwards L, Bastian LA, Revels J, Durham H, Lokhnygina Y, Amamoo MA, Ostbye T. Body image and body satisfaction differ by race in overweight postpartum mothers. *J Women's Health (2002).* 2010; 19:305–311.
- Cash TF, Henry PE. Women's body images: the results of a national survey in the USA. *Sex Roles.* 1995; 33:19–28.
- Chou FH, Lin LL, Cooney AT, Walker LO, Riggs MW. Psychosocial factors related to nausea, vomiting, and fatigue in early pregnancy. *J Nurs Scholar : Off Public Sigma Theta Tau Int Honor Soc Nursing / Sigma Theta Tau.* 2003; 35:119–125.
- Clark M, Ogden J. The impact of pregnancy on eating behaviour and aspects of weight concern. *Int J Obes Relat Metab Disord : J Int Assoc Stud Obes.* 1999; 23:18–24.
- Clark A, Skouteris H, Wertheim EH, Paxton SJ, Milgrom J. The relationship between depression and body dissatisfaction across pregnancy and the postpartum: a prospective study. *J Health Psychol.* 2009; 14:27–35. [PubMed: 19129334]
- Davis K, Pearlstein T, Stuart S, O'Hara M, Zlotnick C. Analysis of brief screening tools for the detection of postpartum depression: comparisons of the PRAMS 6-item instrument, PHQ-9, and structured interviews. *Arch Women's Mental Health.* 2013; 16:271–277.
- Dipietro JA, Millet S, Costigan KA, Gurewitsch E, Caulfield LE. Psychosocial influences on weight gain attitudes and behaviors during pregnancy. *J Am Diet Assoc.* 2003; 103:1314–1319. [PubMed: 14520249]
- Downs DS, DiNallo JM, Kirner TL. Determinants of pregnancy and postpartum depression: prospective influences of depressive symptoms, body image satisfaction, and exercise behavior. *Ann Behav Med : Public Soc Behav Med.* 2008; 36:54–63.
- Duncombe D, Wertheim EH, Skouteris H, Paxton SJ, Kelly L. How well do women adapt to changes in their body size and shape across the course of pregnancy? *J Health Psychol.* 2008; 13:503–515. [PubMed: 18420758]
- Felice E, Saliba J, Grech V, Cox J. Validation of the Maltese version of the Edinburgh Postnatal Depression Scale. *Arch Women's Mental Health.* 2006; 9:75–80.
- Flynn KJ, Fitzgibbon M. Body images and obesity risk among black females: a review of the literature. *Ann Behav Med : Public Soc Behav Med.* 1998; 20:13–24.
- Gavin NI, Gaynes BN, Lohr KN, Meltzer-Brody S, Gartlehner G, Swinson T. Perinatal depression: a systematic review of prevalence and incidence. *Obstet Gynecol.* 2005; 106:1071–1083. [PubMed: 16260528]
- Gaynes BN, et al. Perinatal depression: prevalence, screening accuracy, and screening outcomes. *Evid Rep/Technol Assess (Summary).* 2005; 119:1–8.

- Gjerdingen D, Fontaine P, Crow S, McGovern P, Center B, Miner M. Predictors of mothers' postpartum body dissatisfaction. *Women Health*. 2009; 49:491–504. [PubMed: 20013517]
- Goodwin A, Astbury J, McMeeken J. Body image and psychological well-being in pregnancy. A comparison of exercisers and non-exercisers. *Austral NZ J Obstet Gynaecol*. 2000; 40:442–447.
- Gordon KH, Castro Y, Sitnikov L, Holm-Denoma JM. Cultural body shape ideals and eating disorder symptoms among White, Latina, and Black college women. *Cult Divers Ethnic Minor Psychol*. 2010; 16:135–143.
- Grant KA, McMahan C, Austin MP. Maternal anxiety during the transition to parenthood: a prospective study. *J Affect Disord*. 2008; 108:101–111. [PubMed: 18001841]
- Green K, Broome H, Mirabella J. Postnatal depression among mothers in the United Arab Emirates: socio-cultural and physical factors. *Psychol Health Med*. 2006; 11:425–431. [PubMed: 17129919]
- Grigoriadis S, et al. The impact of maternal depression during pregnancy on perinatal outcomes: a systematic review and metaanalysis. *J ClinPsychiatr*. 2013; 74:e321–e341.
- Haedt A, Keel P. Maternal attachment, depression, and body dissatisfaction in pregnant women. *J Reprod Infant Psychol*. 2007; 25:285–295.
- Halpern CT, Udry JR, Campbell B, Suchindran C. Effects of body fat on weight concerns, dating, and sexual activity: a longitudinal analysis of black and white adolescent girls. *Dev Psychol*. 1999; 35:721–736. [PubMed: 10380863]
- Jenkin W, Tiggemann M. Psychological effects of weight retained after pregnancy. *Women Health*. 1997; 25:89–98. [PubMed: 9253140]
- Johnson S, Burrows A, Williamson I. 'Does my bump look big in this?' the meaning of bodily changes for first-time mothers-to-be. *J Health Psychol*. 2004; 9:361–374. [PubMed: 15117536]
- Kamysheva E, Skouteris H, Wertheim EH, Paxton SJ, Milgrom J. Examination of a multi-factorial model of body-related experiences during pregnancy: the relationships among physical symptoms, sleep quality, depression, self-esteem, and negative body attitudes. *Body Imag*. 2008; 5:152–163.
- Kemper KA, Sargent RG, Drane JW, Valois RF, Hussey JR. Black and white females' perceptions of ideal body size and social norms. *Obes Res*. 1994; 2:117–126. [PubMed: 16353613]
- Lancaster CA, Gold KJ, Flynn HA, Yoo H, Marcus SM, Davis MM. Risk factors for depressive symptoms during pregnancy: a systematic review. *Am J Obstet Gynecol*. 2010; 202:5–14. [PubMed: 20096252]
- Markowitz S, Friedman MA, Arent SM. Understanding the relation between obesity and depression: causal mechanisms and implications for treatment clinical psychology. *Sci Pract*. 2008; 15:1–20.
- Molyneaux E, Poston L, Ashurst-Williams S, Howard LM. Obesity and mental disorders during pregnancy and postpartum: a systematic review and meta-analysis. *Obstet Gynecol*. 2014; 123:857–867. [PubMed: 24785615]
- Murray D, Cox JL. Screening for depression during pregnancy with the Edinburgh Depression Scale (EDDS). *J Reprod Infant Psychol*. 1990; 8:99–107.
- Nast I, Bolten M, Meinlschmidt G, Hellhammer DH. How to measure prenatal stress? A systematic review of psychometric instruments to assess psychosocial stress during pregnancy. *Paediatr Perinat Epidemiol*. 2013; 27:313–322. [PubMed: 23772932]
- O'Hara MW, McCabe JE. Postpartum depression: current status and future directions. *Annu Rev Clin Psychol*. 2013; 9:379–407. [PubMed: 23394227]
- Preiss K, Brennan L, Clarke D. A systematic review of variables associated with the relationship between obesity and depression. *Obes Rev : Off J Int Assoc Stud Obes*. 2013; 14:906–918.
- Rallis S, Skouteris H, Wertheim EH, Paxton SJ. Predictors of body image during the first year postpartum: a prospective study. *Women Health*. 2007; 45:87–104. [PubMed: 17613464]
- Rauff EL, Downs DS. Mediating effects of body image satisfaction on exercise behavior, depressive symptoms, and gestational weight gain in pregnancy. *Ann Behav Med : Public Soc Behav Med*. 2011; 42:381–390.
- Robertson E, Grace S, Wallington T, Stewart DE. Antenatal risk factors for postpartum depression: a synthesis of recent literature. *Gen Hosp Psychiatry*. 2004; 26:289–295. [PubMed: 15234824]
- Robinson TN, et al. Ethnicity and body dissatisfaction: are Hispanic and Asian girls at increased risk for eating disorders? *J Adolesc Health*. 1996; 19:384–393. [PubMed: 8969369]

- Rocco PL, Orbitello B, Perini L, Pera V, Ciano RP, Balestrieri M. Effects of pregnancy on eating attitudes and disorders: a prospective study. *J Psychosom Res.* 2005; 59:175–179. [PubMed: 16198191]
- Rucker CE, Cash TF. Body images, body-size perceptions, and eating behaviors among African-American and white college women. *Int J Eat Disord.* 1992; 12:291–299.
- Skouteris H, Carr R, Wertheim EH, Paxton SJ, Duncombe D. A prospective study of factors that lead to body dissatisfaction during pregnancy. *Body Imag.* 2005; 2:347–361.
- Stein A, Fairburn CG. Eating habits and attitudes in the postpartum period. *Psychosom Med.* 1996; 58:321–325. [PubMed: 8827794]
- Stevens-Simon C, Nakashima I, Andrews D. Weight gain attitudes among pregnant adolescents. *J Adolesc Health : Off Public Soc Adolesc Med.* 1993; 14:369–372.
- Suttie, JS. Body image issues in postpartum women and their relationship to postpartum depression. University of San Francisco; 1998.
- Sweeney AC, Fingerhut R. Examining relationships between body dissatisfaction, maladaptive perfectionism, and postpartum depression symptoms. *J Obstet, Gynecol, Neonat Nurs : JOGNN / NAACOG.* 2013; 42:551–561.
- Thompson, JK. Body image disturbance: assessment and treatment. Elmsford: Pergamon Press; 1990.
- Thompson JK. The (mis) measurement of body image: ten strategies to improve assessment for applied and research purposes. *Body Imag.* 2004; 1:7–14.
- Walker L, Timmerman GM, Kim M, Sterling B. Relationships between body image and depressive symptoms during postpartum in ethnically diverse, low income women. *Women Health.* 2002; 36:101–121. [PubMed: 12539795]
- Welsh, AC. A biopsychosocial model of body image in new mothers. College Park: University of Maryland; 2009.

Table 1

Cross-sectional studies of perinatal body image and depression

Author, year	Study population	Body image instrument	Depression instrument	Timing of assessment			Results
				Prenatal	Postpartum	Covariates	
Chou et al. 2003	113 women (72.5 % non-Hispanic White); TX, USA	BCS: higher scores indicate greater dissatisfaction	CES-D: higher scores indicate more severe depressive symptoms	Mean±SD: 59±17.2; range 28–136 days	None	$r=0.21^*$	
Haedt and Keel 2007	196 women (88.2 % Caucasian); Midwest, USA	BSQ-R-10: higher scores indicate greater dissatisfaction	EPDS: higher scores indicate more severe depressive symptoms	Mean±SD: 23.71 ±9.86; range 2–0 weeks First trimester: 23.5 % Second trimester: 35.7 % Third trimester: 40.8 %	Parity	$r=0.39^*$	
Kamyshveva et al. 2008	215 women; Australia	BAQ subscales: Feeling fat Saliency. Attractiveness. Strength	BDI short form: higher scores indicate more severe depressive symptoms	15–25 weeks	Pre-pregnancy BMI. BMI change	Feeling fat: $r=0.21^*$ Saliency: $r=0.21^*$ Attractiveness: $r=-0.34^*$ Strength: $r=-0.29^*$ $r=-0.26^*$	
Stevens-Simon et al. 1993	99 women (58 % non-Hispanic White); CO, USA	PGWAS: higher scores indicate more positive attitudes	CES-D: higher scores indicate more severe depressive symptoms	Mean±SD: 15.2±7.2 weeks	None	$r=-0.20^*$	
Dipietro et al. 2003	130 women (86 % non-Hispanic White); MD, USA	PGWAS: higher scores indicate more positive attitudes	POMS: higher scores indicate greater depression	36 weeks	None		
Abraham et al. 2001	181 women; Australia	Eating disorder examination modified for pregnancy: fear of weight gain and shape	EPDS: higher scores indicate more severe depressive symptoms	D: postnatal week Bf: recalled pre-pregnancy (immediately before pregnancy and pregnancy (6–7 months)	Low intensity exercise, concentration difficulty due to food-related thoughts	Fear (pre-pregnancy): $\beta=0.84^*$ (yes vs. no) Fear (6–7 months): $\beta=-0.187^{ns}$ (1–9 vs. 0 day/month) $\beta=1.28^*$ 10 vs. 0 day/month)	
Walker et al. 2002	283 women (47.7 % Hispanic); TX, USA	BCS: higher scores indicate more dissatisfaction	CES-D: higher scores indicate more severe depressive symptoms	Post-delivery 6 weeks	Parity, marital/partner status, income, race/ethnicity	Post-delivery: $\beta=0.34^*$ 6 weeks: $\beta=0.32^*$	
Jenkin and Tiggemann 1997	115 women; Australia	Questionnaire: Body weight satisfaction; shape satisfaction	Rosenberg's Self esteem six-item index	4 weeks	None	Weight satisfaction: $r=-0.25^*$ Shape satisfaction: $r=-0.29^*$	

Author, year	Study population	Body image instrument	Depression instrument	Timing of assessment			Results
				Prenatal	Postpartum	Covariates	
Birkeland et al. 2005	149 adolescent women (46 % Caucasian); FL and MN, USA	Subscales of EDI: weight/shape disturbance	EPDS: higher scores indicate more severe depressive symptoms		3–12 months	Role restriction, social isolation, self-efficacy	$\beta=0.20^*$
Green et al. 2006	125 women; United Arab Emirates	Negative body image; unhappy with weight	EPDS>13		3 months 6 months	None	3 months: Negative body image: $\chi^2=H-14^*$ Unhappy with weight: $\chi^2=9.56^{n.s}$ 6 months: n.s. (results not shown)

BI body image, *BCS* 30-item Body Cathexis Scale, *BSQ-R-10* ten-item Body Shape Questionnaire, *BAQ* Body Attitudes Questionnaire, *PGWAS* Pregnancy and Weight Gain Attitude Scale, *EDI* Eating Disorder Inventory.

D depressive symptoms, *CES-D* Center for Epidemiologic Studies-Depression, *EPDS* Edinburgh Postnatal Depression Scale, *BDI* Beck Depression Inventory, *POMS* Profile of Mood States, *BMI* body mass index.

n.s. not statistically significant

* Results statistically significant at $P < .05$

Table 2

Prospective cohort studies of the impact of perinatal body image on risk of depression

Author, year	Study population	Body image				Depression				Covariates	Results
		Instrument		Timing of assessment		Instrument		Timing of assessment			
		Prenatal	Postpartum	Prenatal	Postpartum	Prenatal	Postpartum	Prenatal	Postpartum		
Rauff and Downs 2011	151 women (92 % Caucasian); PA, USA	BASS; higher scores indicate greater satisfaction	First trimester Second trimester	First trimester Second trimester	CES-D; higher scores indicate more severe depressive symptoms	Second trimester Third trimester	Second trimester Third trimester	Pre-pregnancy BMI, education, race/ethnicity	First trimester BI and Second trimester D: $\beta = -0.22^*$ Second trimester BI and Third trimester D: $\beta = -0.33^*$		
Duncombe et al. 2008	158 women; Australia	BAQ subscales: Feeling fat Saliency. Attractiveness. Strength	Pre-pregnancy (retrospective) 16–23 weeks 24–31 weeks	16–23 weeks 32–38 weeks	BDI short form; higher scores indicate more severe depressive symptoms	16–23 weeks 32–38 weeks	None	Feeling fat: $r = 0.32-0.45^*$ Saliency: $r = 0.31-0.38^*$ Attractiveness: $r = -0.29$ to -0.46^* Strength: $r = -0.26$ to -0.34^* $r = 0.43^*$			
Anderson et al. 1994	30 women (97 % Caucasian); Canada	Attitudes scale: higher scores indicate more negative attitudes	Third trimester (2–94 days before birth)	Third trimester (8–21.9 weeks)	BDI; higher scores indicate more severe depressive symptoms	Mean: 13.2 (8–21.9 weeks)	None				
Clark et al. 2009	116 women; Australia	BAQ subscales: feeling fat Saliency. Attractiveness, Strength	17–21 weeks 32–35 weeks	6 weeks 12 months	BDI short form; higher scores indicate more severe depressive symptoms	32–35 weeks 6 weeks 12 months	Prior D	Feeling fat: $r = 0.03-0.15^{ns}$ Other subscales: n.s. (results not shown)			
Downs et al. 2008	230 women (92 % Caucasian); PA, USA	BASS; higher scores indicate greater satisfaction	First trimester Second trimester Third trimester	Second trimester Third trimester	CES-D; higher scores indicate more severe depressive symptoms	Second trimester Third trimester	6 months Exercise behavior, first trimester BMI, prior D	First trimester BI and second trimester D: $\beta = -0.10^{ns}$ Second trimester BI and third trimester D: $\beta = -0.19^*$ Third trimester BI and			

Author, year	Study population	Body image				Depression				Covariates	Results
		Timing of assessment		Instrument	Timing of assessment		Instrument	Timing of assessment			
		Prenatal	Postpartum		Prenatal	Postpartum		Prenatal	Postpartum		
Sweeney et al. 2014	46 women (52 % non-Hispanic Caucasian); PA, USA	BAQ: higher scores indicate greater dissatisfaction	Third trimester (>28 weeks)	EPDS: higher scores indicate more severe depressive symptoms	2 months	Postpartum depression predictors, maladaptive perfectionism	postpartum D: $\beta = -0.34^*$ First + second + third trimester BI and postpartum D: $\beta = -0.37^*$ $\beta = -0.49^*$				

BI body image, BASS Body Areas Satisfaction Scale, BAQ Body Attitudes Questionnaire, D depressive symptoms, CES-D Center for Epidemiologic Studies-Depression, BDI Beck Depression Inventory, EPDS Edinburgh Postnatal Depression Scale.

BMI body mass index,

n.s. not statistically significant

* Results statistically significant at $P < .05$

Table 3

Prospective cohort studies of the impact of perinatal depression on body image

Author, year	Study population	Depression				Body image				Results
		Timing of assessment		Instrument	Timing of assessment		Instrument	Covariates		
		Prenatal	Postpartum		Prenatal	Postpartum				
Skouteris et al. 2005	128 women; Australia	BDI short form: higher scores indicate more severe depressive symptoms	16–23 weeks	BAQ subscales: Feeling fat Saliency. Attractiveness. strength	32–39 weeks	Pre-pregnancy BMI, social comparison tendency sociocultural pressure, self-consciousness, perception of teasing	Feeling fat: $\beta=0.14^{n.s}$ Saliency: $\beta=0.07^{n.s}$ Attractiveness: $\beta=0.16^{n.s}$ Strength: $\beta=-0.21^*$			
Downs et al. 2008	230 women (85 % Caucasian); PA, USA	CES-D: higher scores indicate more severe depressive symptoms	First trimester Second trimester	BASS: higher scores indicate greater satisfaction	Second trimester Third trimester	None	First trimester D and second trimester BI: $r=-0.40^*$ First trimester D and third trimester BI: $r=-0.38^*$ Second trimester D and third trimester BI: $r=-0.38^*$			
Rallis et al. 2007	79 women; Australia	BDI short form: higher scores indicate more severe depressive symptoms	6 months	BAQ subscales: Feeling fat Saliency. Attractiveness. Strength	12 months	BMI change, psychological variables	Feeling fat: $\beta=0.15^{n.s}$ Saliency: $\beta=-0.01^{n.s}$ Attractiveness: $\beta=-0.22^{n.s}$ Strength: $\beta=-0.34^*$			
Clark et al. 2009	116 women; Australia	BDI short form: higher scores indicate more severe depressive symptoms	32–35 weeks	BAQ subscales: Feeling fat Saliency. Attractiveness. strength	6 weeks 12 months	Concurrent BI	6 weeks: feeling fat: $r=0.35^*$ 6 weeks: attractiveness $r=-0.21^*$ 6 weeks: salience $r=0.31^*$ 6 weeks: strength $r=-0.30^*$ 6 months: feeling fat $r=0.26^*$			

Author, year	Study population	Depression		Body image		Timing of assessment			Covariates	Results
		Instrument	Prenatal	Postpartum	Instrument	Prenatal	Postpartum			
Cjerdingen et al. 2009	506 women (67 % non-Hispanic White); MN, USA	PHQ-9; higher scores indicate more severe depressive symptoms		0-1 month 9 months	Eight-item Body Shape Questionnaire	9 months	Not shown	12 months: feeling fat 12 months: * feeling fat No other prospective associations (results not shown)	0-1 month: n.s. (results not shown) 9 months: n.s. (results not shown)	

BI body image, *BAQ* body attitudes questionnaire, *BASS* Body Areas Satisfaction Scale, *D* depressive symptoms, *BDI* Beck Depression Inventory, *CES-D* Center for Epidemiologic Studies-Depression, *EPDS* Edinburgh Postnatal Depression Scale, *PHQ-9* nine-item patient health questionnaire

BMI body mass index

n.s. not statistically significant

* Results statistically significant at $P < .05$