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REFINING THE EDINBURGH POSTPARTUM DEPRESSION SCREENING: IS THERE A DISTINCT ROLE FOR ANXIETY?

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REFINING THE EDINBURGH POSTPARTUM DEPRESSION SCREENING:
IS THERE A DISTINCT ROLE FOR ANXIETY?

BY
MEADA DALY-CANO

A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE
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OF

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Abstract

Anxiety and depressive symptoms were investigated using the Edinburgh Postpartum Depression Scale (EPDS) in a convenience sample of 371 mothers who were referred to a maternal mentoring program for mothers with, or at risk for, postpartum depression. Social support is considered a protective factor for postpartum mothers at risk for depression but there is less research about the connection between postpartum anxiety and social support.

A factor analysis of the EPDS provided evidence of a two-factor correlated model with a three-item anxiety subscale and six-item depression subscale. Comparisons, using chi-square tests, were done of risk factors, associated with postpartum depression and anxiety to determine if the three-item anxiety subscale could be used to identify mothers at risk for PPD and anxiety. The risk factors assessed were history of mental health problems, pregnancy health problems and education level. MANOVA and MANCOVA procedures were conducted to determine if levels of family social support were different based on the mother's classification as above or below cutoffs when using the three-item cutoff versus the cutoffs for ten-item, nine-item or six-item EPDS scales.

Using the six-item cutoff resulted in better construct validity than the three-item, nine-item or the 10-item scale. Mothers identified as above the cutoff for the six-item scale were more likely to have a history of postpartum depression and depression in pregnancy than mothers below the cutoff. The cutoffs for the six-item depression scale demonstrated statistically significant differences in family social support. Pairwise comparisons showed that mothers with high anxiety and low depression reported greater levels of family social support and spouse support in comparison to mothers with both

high anxiety and high depression. In this sample, the three-item anxiety subscale was not a better predictor of risk factors associated with postpartum depression and anxiety. A nine-item two-factor scale was an improvement over the original 10-item and three-item scales.

Further refinement of the EPDS subscale of anxiety and refinement of the family social support scale would help to answer existing questions. Further research related to the correlates of anxiety would be beneficial in order to demonstrate construct validity of the anxiety portion of the EPDS. The constructs related to anxiety such as excessive reassurance-seeking and perception of control during childbirth may be promising lines of research. The family social support scale needs refinement in multiple areas. The subscales of family support, social groups, and professional support have low Cronbach's alphas .609, .602, and .632 respectively. Improvement of the internal consistency of the scale will help with the validity of the scale. This will help with the predictive validity as well. Support from different family members, spouse/partner versus own parents, may have different benefits for mothers.

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Chapter 1

Introduction

The Edinburgh Postpartum Depression Screening (EPDS) is a commonly used screening for pregnant and postpartum women (Siu et al., 2016). The use of the EPDS and other screenings has increased the identification of mothers with postpartum depression (PPD), but less attention has been dedicated to screening for the presence of anxiety symptoms (Brockington, MacDonald & Wainscott, 2006; Dennis, Brown, Falah-Hassani, Marini & Vigod, 2017; Matthey, Barnett, Howie, & Kavanagh, 2003). The purpose of a screening tool is to identify a disease or condition that may be present in a person without their knowledge and to take steps to ameliorate or prevent the condition from worsening (Dennis, 2003). Identifying anxiety in the postpartum period may help new mothers obtain services and treatments that improve clinical outcomes.

Research suggests that anxiety disorders are common among mothers in the postnatal period with and without depressive symptoms (Brockington, et al., 2006; Dennis et al. 2017; Falah-Hassani, Shiri, & Dennis, 2016; Matthey, et al., 2003; Schofield, Battle, Howard, & Ortiz-Hernandez, 2014). Postpartum depression (PPD) is a mood disorder, equivalent to a major depressive episode, with onset four weeks to six months after childbirth (Jones & Cantwell, 2010). To meet the diagnostic criteria of PPD symptoms of sadness, anxiety and exhaustion must be present for two weeks and interfere with activities of daily functioning (Robertson et al., 2004). Postpartum anxiety can consist of constant worry, racing thoughts, sleep and appetite disturbances, and physical symptoms of dizziness, hot flashes and nausea (Ross, Evans, Sellers & Romach, 2003).

Successful treatments for depression, anxiety and comorbid anxiety and

depression are different among the non-pregnant population (Zimmerman, McDermut, & Mattia, 2000). For instance, some medications work better for people with depression but may make people with anxiety feel worse (Papakostas, Trivedi, Alpert, Seifert, Krishen, Goodale, & Tucker, 2008). The treatment needs among the postpartum population are likely to be different as well depending on the presence or absence of anxiety.

Miller, Pallant and Negri (2006) suggested that symptoms of anxiety might be overlooked in the EPDS scale if depression is not present. The EPDS was designed to be a one-factor scale with a cutoff of ≥ 13 (Cox, Holden & Sagovsky, 1987). Subsequent research has identified a two-factor scale with depression and anxiety subscales in the EPDS (Bina & Harrington, 2016; Kabir, Sheeder & Kelly, 2008; Matthey, 2008; Phillips, Charles, Sharpe, & Matthey, 2009). Other researchers identified a three-factor scale of anxiety, depression and anhedonia, a reduction of interest in pleasurable activities or less ability experience pleasure (Chiu, Sheffield, Hsu, Goldstein, Curtin & Wright, 2017; Tuohy & McVey, 2008).

In the current study principal component analysis and confirmatory factor analysis were conducted to investigate the factor structure of the EPDS. It was hypothesized that a two-factor model of anxiety and depression would be a better fit than a one-factor 10-item model. This allowed the researcher to compare four groups of mothers based on their symptoms of anxiety and depression using the EPDS as a two-factor scale with a cutoff for anxiety and a cut off for depression. After these groups were made, risk factors were compared to see if mothers with high anxiety based on the three-item anxiety scale had more risk factors related to anxiety and depression than mothers who were above and below the cutoff for depression and anxiety when using the traditional one factor 10-item

scale, a nine-item scale, and a six-item depression scale. The risk factors investigated were history of a mental health diagnosis, history of physical health problems related to pregnancy and delivery, education level of the mother and family social support. In the prevention research field a risk factor is a variable that increases the probability of a negative outcome (Durlak, 1998). Social support is an outcome of interest because it is associated with positive health behaviors in many fields of research (Taylor, 2010). It is also of interest because it is considered a variable that is more amenable to change (Durlak, 1998).

Justification for and Significance of the Study

Maternal postpartum depression and anxiety, at a minimum, decreases a mother's ability to function and enjoy the birth of her new child (Robertson et al., 2004). Maternal distress including depression and anxiety not only impacts the mother, it also increases the likelihood of development difficulties in school age children (Kingston & Tough, 2014). Maternal depression and anxiety may affect the stress response in mothers which impacts maternal infant relationship factors and infant outcomes of crying, stress in novel situations, social responsiveness and physiological responses (Britton 2011; Goodman, Watson & Stubbs 2016). Additionally, women who have an episode of postpartum depression have a 25% risk of recurrence with subsequent births (Wisner, Perel, Peindl, Hanusa, Findling, & Rapport, 2001). There is less research about the risk of recurrent anxiety in the postpartum period but history of an anxiety disorder and anxiety in pregnancy is associated with postpartum anxiety and depression (Martini et al., 2015; Reck, 2008; Reck, Noe, Gerstenlauer & Stehle, 2012). Heron et al. (2004) suggested that anxiety might occur before depression in mothers and may be predictive of depression.

It is believed that depression and anxiety are comorbid among the general population (Zimmerman, et al., 2000), but there is a need to understand how these conditions present in the postpartum period (Tuohy & McVey, 2008). Review studies of postpartum anxiety and depression in women have found that these health problems affect 7% to 15% of women (Goodman, et al., 2016; Ko, Farr, Dietz & Robbins, 2012; Robertson et al., 2004). Prevalence of past year depression in a nationally representative sample of non-pregnant women ($N = 8,657$) in the U.S. ages 18 - 44 years was 11% (Ko, et al., 2012). Rates of one or more anxiety disorders occurring during postpartum were estimated to be 8.5% from a review of 46 studies (Goodman, et al. 2016).

In the following chapter the literature of postpartum depression, anxiety and social support will be reviewed. Definitions will be given for variables in the current study. Previous factor analyses of the EPDS and varying cutoff points will be discussed. Previous factor analyses of the Family Social Support Scale will be reviewed. Finally, particular attention will be paid to risk factors related to depression, anxiety and comorbid depression and anxiety.

Chapter 2

Review of the Literature

Definition of Postpartum Depression

Postpartum depression (PPD) is equivalent to a major depressive episode, but onset occurs between four weeks to six months after childbirth (Robertson et al., 2004). To meet the diagnostic criteria, PPD must be continuously present for at least two weeks and interfere with activities of daily functioning. Mothers with PPD typically report feeling guilt, agitation, and mood fluctuations, along with difficulty in adjusting to their new parenting role. Sleep deprivation and weight gain or weight loss can be symptoms of depression in the non-pregnant population but are common during the postpartum year. PPD lasts about three to six months on average (Robertson et al., 2004). Rates of suicide ideation and suicidality are lower among postpartum women than the general population of women (Lindahl, Pearson & Colpe, 2005). Specific populations of mothers have higher rates of suicidality such as mothers with a previous psychiatric diagnosis, and teen mothers (Lindahl et al., 2005).

Postpartum depression can be distinguished from both the “baby blues,” which occurs in 50 - 85% of the population, and postpartum psychosis, which occurs in 1-2% of the population (Robertson, 2004). The “baby blues” is considered a transient and normal process of childbirth occurring within the first 10 days postpartum and can last for as little as two or three hours or up to two weeks. Symptoms include mood lability, irritability, crying and difficulties with sleep and appetite. Postnatal blues are mild and do not require treatment other than reassurance. Postpartum psychosis is also categorized separately from PPD. It is more severe and less common. Symptoms are rapid

fluctuations in mood from elation to depression, disorganized behavior, delusions, hallucinations, and suicidal ideation. Clinical onset is rapid. Symptoms are sometimes present within 48 to 72 hours after birth, but can occur within four weeks of delivery. It can last for a few months and hospitalization is normally required for recovery (Sit, Rothschild, & Wisner, 2006).

Definition of Postpartum Anxiety

Anxiety is highly comorbid with depression and is sometimes viewed as a symptom of depression (Himmelhoch, Levine & Gershon, 2001). Symptoms of postpartum anxiety (PPA) are constant worry, racing thoughts, sleep and appetite disturbances, and physical symptoms of dizziness, hot flashes and nausea (Ross et al., 2003).

Predictors of Postpartum Depression

Researchers have used meta-analyses of large-scale studies to investigate risk factors for PPD (Beck, 2001; Chojenta, Lucke, Forder & Loxton, 2016; Robertson et al., 2004). The most consistent predictors of PPD were prenatal depression and anxiety, history of depression, stressful life events, low levels of social support, and quality of marital relationships, (Beck, 2001; Chojenta et al., 2016; Robertson et al, 2004). Robertson et al. (2004) conducted a meta-analysis using 10,000 participants and found that the following factors have no relationship with PPD: maternal age (not including mothers under 18), level of education, number of births, and length of relationship with partner. Individual studies have provided some evidence in conflict with the meta-analyses. Predictors of PPD were: employment (Gjerdingen et al., 2014); low maternal education, type of delivery, (Martini et al., 2015); child sleep problems, maternal sleep

problems (Clout & Brown, 2015); quality of marital relationships (McVey & Touhy, 2007); and man/made or sexual trauma (Martini et al. 2015).

Predictors of Postpartum Anxiety

Studies of risk factors for PPA are less common (Falah-Hassani et al., 2016). In studies that investigated predictors of anxiety disorders, the following risk factors were identified: prior pregnancy loss, or multiple losses (Giannandrea, Cerulli, Anson, & Chaudron, 2103), women with more children compared to first time mothers, trait anxiety during the third trimester (Grant et al., 2012), maternal age less than 25, 10th grade education or less, anxiety disorder or depressive disorder during pregnancy, lack of social support during pregnancy, and partnership satisfaction during pregnancy (Martini et al., 2015). Stress during pregnancy, smoking, difficult childbirth and premature childbirth (less than or equal to 27 weeks gestation), were also identified as risk factors for postpartum anxiety (Farr, Dietz, O'Hara, Burley & Ko, 2014; & Giakoumaki, Vasilaki, Lili, Skouroliakou & Liosis, 2009).

Predictors of the Comorbidity of Postpartum Anxiety and Depression.

Fewer studies have investigated the comorbidity of postpartum anxiety and depression during the postpartum period. A longitudinal study ($N = 8,323$) suggested that anxiety and depression were highly related in each of the four assessments conducted (two pre-natal and two postnatal) by researchers Heron, O'Connor, Evans, Golding and Glover (2004). The EPDS was used to measure depression and the Crown Crisp experiential index was used to evaluate anxiety. The correlations for anxiety and depression were high at all time points, ranging from $r = .74$ at 18 weeks gestation to $r = .77$ at eight months postnatal (Heron, et al., 2004). After controlling for depression at 18

and 32 weeks, prenatal anxiety was associated with a greater than three times increase in postnatal depression (Heron et al., 2004). Predictors of comorbid PPD and PPA were: self-esteem, partner satisfaction, (Martini et al., 2015), and maternal self-confidence (Reck et al. 2012).

Physical Health predictors of PPD and PPA

High risk pregnancies are associated with anxiety and depression (Adouard et al. 2005; Denis, Michaux, & Callahan, 2012;). Adouard et al., (2005) identified the following high risk indicators preterm labor, hypertension, gestational diabetes, polyhydramnios, Rh incompatibility, and foetal growth retardation. Indicators of high risk pregnancies in Denis et al. (2012) were: miscarriage, abortion, fertility treatment, ectopic pregnancy.

Definition of Social Support

Social support is seen as a key feature of family functioning. Social support is the perception that you are loved, valued, appreciated, and part of a social network of mutual assistance and obligations (Cohen & Wills, 1985). An individual's community is a source for exchange of resources and supports (Dunst, Trivette, & Hamby 1994). Cohen and Wills theorize that large social networks provide persons with positive experiences and a set of stable socially rewarding roles in the community (1985). Social support consists of tangible assistance, emotional support, informational support, and social companionship. Tangible or instrumental support is the provision of financial aid, material resources or needed services (Cohen & Wills, 1985). Emotional support, or esteem support, consists of communicating that a person is valued for their worth and experiences (Cohen & Wills, 1985). Social companionship is spending time with others for affiliation (Cohen &

Wills, 1985). Esteem and informational support are thought to be helpful for many stressful events. Instrumental and companionship support are linked to specific needs such as a need for a service, material good or loss of companionship. Informational support, advice or appraisal support, helps the recipient define, understand and cope with problematic events (Cohen & Wills, 1985). Informational support may be one of the key benefits of social support programs in navigating health care systems and encouraging health seeking behaviors (Dunkel-Schetter, Sagrestano, Feldman, & Killingsworth, 1996).

Social Support and Depression

Social support has been consistently associated with postpartum depression PPD: (Gjerdingen et al., 2014; Leahy-Warren, McCarthy & Corcoran 2011; Martini et al., 2015; McVey & Tuohy, 2007; Reid & Taylor, 2015; Surkan, Peterson, Hughes & Gottlieb, 2006). Mothers who report high levels of social support report low levels of PPD. McVey and Tuohy (2007) found that high levels of depressive symptoms were associated with reduced quality of marital relationships, high support availability, and low support satisfaction. Symptoms of anhedonia were associated with marital support but not support availability or support satisfaction.

Types of social support were related differently with PPD. Spouse/partner support was consistently associated with PPD, friend and family support was significantly related in some studies and professional support was only significantly related in one study. Reid and Taylor (2015) examined social support, stress and PPD using path analysis. Results showed that high social support was associated with lower levels of PPD for all family types (single, single and cohabitating, and married). Specific

sources were more important depending on the family type. For example, spousal support had more influence on married or cohabitating women. Partner support and friend and family support had equal influence on single women. Hopkins and Campbell (2008) found that partner support was significantly lower for mothers with depression at four different time points compared to mothers without depression. The same mothers rated the support from their friends, parents, in-laws, and extended family and there were only significant differences between the depressed and non-depressed mothers at one time point, six months. These results indicate that depressed mothers did not view all of their social support from a negative perspective, which would indicate a cognitive bias common to people with depression (Hollon, Lumry & Kendall, 1986). Leahy-Warren et al (2011) found that family support and friend support were associated with depression symptoms but not professional support. In contrast, social support from non-partner sources was associated with lower maternal depressive symptoms in research by Gjerdingen et al. (2014). Support from a perinatal community health worker was found to be associated with lower PPD levels but only among mothers who indicated a positive therapeutic relationship with their health worker (Mundorf, 2018). Finally, Surkan et al. (2006) found that both the quality of social support and the number of people in one's social network were inversely associated with depression. Quality of social support was measured with items about types of social support, emotional, informational, positive interaction, tangible, and affection (Sherbourne & Stewart, 1991).

Social Support and Anxiety

Social support and anxiety have been studied together (Furtado, Van Lieshout, Van Ameringen, Green, & Frey, 2019; Martini et al., 2015; Mercer and Ferketich, 1998;

Unique risk factors for PPA were: low maternal age, premenstrual syndrome, and child health problems (Martini et al., 2015). Consistent risk factors were low maternal education (Britton 2008; and Martini et al., 2015). High levels of self-reported depressive symptoms and compulsive symptoms during third trimester or pregnancy were associated with anxiety worsening in the postpartum period (Furtado et al., 2019). Asselmann Wittchen, Erler, and Martini (2016) assessed social support, anxiety, depression and comorbid anxiety and depression at three time points (22-24 weeks gestation, 4 months postpartum, and 16 months postpartum). Perceived social support and network size for practical and emotional support decreased from pregnancy to the postpartum assessments (Asselmann et al., 2016). Network size additionally decreased from four to 16 months postpartum. Women with comorbid anxiety and depression had lower levels of perceived support compared to all other groups. Their social support declined more than women without anxiety or depression.

Factor Analyses of EPDS

Kabir et al. (2008) used the three-item anxiety subscale of the EPDS as a quick screener to identify mothers with anxiety only, depression only, and with both depression and anxiety. Kabir et al. (2008) used ≥ 3 as the cutoff for the three-item scale with a range from zero to nine. The cutoff for the 7-item depression was ≥ 7 with a range of 0-21. When using the EPDS three-item anxiety subscale, Kabir et al. (2008) identified 16% more mothers with probable depression in comparison to using the EPDS total score. Matthey (2008), using the EPDS anxiety subscale, identified 7.6% (18) of mothers who met the criterion for generalized anxiety disorder (GAD), panic disorder, or obsessive-compulsive disorder (OCD). Of the 18 women, 12 did not meet the criteria for a

depressive disorder (Matthey, 2008). Further evidence of an anxiety subscale in the EPDS was provided by a study of postpartum women with unsettled infants (Phillips et al., 2009). The anxiety subscale detected the presence of an anxiety disorder with a sensitivity of 63%, specificity of 70%, positive predicted value of 45% and negative predictive value of 81% (Phillips et al., 2009)

The three items from the EPDS related to anxiety: “*I have blamed my self unnecessarily when things have gone wrong*”, “*I have been anxious and worried for no good reason*”, and “*I have felt scared or panicky for no good reason*,” have consistently grouped together in previous factor analyses (Adouard, et al., 2005; Brouwers, van Baar & Pop, 2001; Guedeney & Fermanian, 1998; Grigoriadas et al., 2011; Jomeen & Martin, 2005; Kabir et al., 2008; Matthey, 2008; Moran, Polanin, & Wenzel, 2014; Phillips et al., 2009; Ross et al., 2003; Swalm, Brooks, Doherty, Nathan, & Jacques (2010).; Tuohy & McVey, 2008).

The studies mentioned above did not identify the same factor structures in the EPDS and there were a variety of cutoff points. Two of these studies identified a three-factor solution (Ross et al., 2003; Tuohy & McVey 2008). Six of these studies identified two-factor solutions (Adouard et al., 2005; Brouwers et al., 2001; Grigoriadas et al., 2011; Guedeney & Fermanian, 1998; Jomeen & Martin, 2005; Phillips et al., 2009; Swalm et al., 2010). The different factor analysis results may be attributed to small sample size, sample makeup and variable timing of administration.

The following studies identified the anxiety subscale and gave a cutoff score and Cronbach’s alpha for the scales used. Kabir et al., (2008) used the three-item anxiety scale (cutoff of ≥ 3) with a Cronbach’s α of .78 and the 10-item scale with a Cronbach’s α

of .89. Three studies used the three-item anxiety scale with a cutoff of ≥ 4 . (Grigoriadas et al., (2011) used the three-item scale (cutoff ≥ 4) and the seven-items scale (cutoff ≥ 7). Phillips et al., (2009) used the three-item scale (cutoff ≥ 4) with Cronbach's α of .77 and the seven-item subscale was $\alpha = .83$, the ten-item Cronbach's α was .87. Swalm et al., (2010) used the three-item scale (cutoff ≥ 4) with a Cronbach's α of .74 and the 10-item scale with a Cronbach's α of .85. Two studies used the three-item anxiety scale with a cutoff ≥ 6 . Moran et al. (2104) used the 3-item anxiety scale (cutoff ≥ 6) with a Cronbach's α of .74 and the 10-item scale with a Cronbach's α of .84. Matthey et al., (2003) used the three-item scale (cutoff ≥ 6) and the ten-item scale with Cronbach's α of .857. Ross et al., (2003) used the EPDS measurement at the end of the third trimester, at six weeks postpartum, and at 16 weeks postpartum. The mean of the EPDS at the end of the third trimester was 5.52 (SD = 4.59), at six weeks postpartum it was 5.43 (SD = 4.59) and 4.97 (SD = 4.97). Anxiety was highest at the end of the third trimester. The proportion of the EPDS composed of the three-item anxiety scale was .47, .38 and .43 at each time point respectively (Ross et al., 2003).

Theoretical Framework of the Family Support Scale

The Family Support Scale (FSS) was developed as an 18-item questionnaire with five factors to measure a parent's perception of help from different sources of support when caring for young children (Dunst, Jenkins & Trivette, 1994). The FSS measure was originally developed for use with parents of children with disabilities based on Bronfenbrenner's ecological model (Dunst et al., 1994). The ecological model is conceived of as concentric levels embedded within one another. The center level of the model is the individual and the microsystem is the next level. Dunst et al. (1994)

operationalized the FSS to examine sources of support that typically constitute a parent's microsystem such as: formal and informal kinship members, neighborhoods, churches, social organizations, professional helpers, social groups, human service professionals and agencies.

In the original Dunst et al. (1994) study a principal component analysis was done with varimax rotation of the FSS in a sample of 224 mothers and fathers of children with disabilities. They identified five factors which accounted for 55% of the variance: (1) Informal kinship $\alpha = .62$ with the items: friends, spouse's friends, own children, other parents, and church members; (2) Spousal/partner support $\alpha = .69$ with the items: spouse, spouse's parents, and spouse's relatives/kin; (3) Social organizations $\alpha = .6$ with the items: social groups, parent groups, school/daycare, and co-workers; (4) Formal kinship $\alpha = .74$ with the items: own relatives, and own parents; (5) Professional services $\alpha = .56$ with the items: Early Intervention programs, professional helpers, family/child's physician, and professional agencies. The support sources were rated using a scale of NA (*not available*), 1 (*not at all helpful*), 2 (*sometimes helpful*), 3 (*generally helpful*), 4 (*very helpful*), and 5 (*extremely helpful*). They did not indicate how they scored items marked not available. They reported that all 224 parents had scores that ranged from one to five, meaning that none of the parents chose "not available." The mean score was 48.24 with a range of 24 – 77. The Cronbach's alpha for the total score was .79.

Other researchers have used the FSS to measure perceptions of family support in a variety of family types (i.e., families in a Head Start program, and relatives who become foster parents) but they have identified different subscales (Hanley, Tasse, Aman, & Pace, 1998; Kondrat, Swanke, Littlewood, & Strozier, 2014).

Hanley et al. (1998) conducted a PCA with a varimax rotation in a sample of families who had a child enrolled in Head Start. They used the measure as a 5-point scale starting with 0 (*not at all helpful*) and ending with 4 (*extremely helpful*) as opposed to Dunst et al., 1994. They indicated that parents could choose “NA = *not available*” but do not indicate how these choices were scored. Hanley et al. (1998) found that their sample fit a five-factor structure of 17 items and accounted for 61% of the variance with a Cronbach’s alpha of .85 for the total scale. Twelve of the 18 items fell in the same factor groupings as the Dunst et al. factor analysis (Hanley et al., 1998). The factors were: (1) community $\alpha = .74$ with the items: parent groups, social groups, church and professional agencies; (2) spouse and in-laws $\alpha = .78$ with the items: spouse’s parents, spouse, and spouse’s relatives; (3) friends $\alpha = .73$ with the items: friends, spouse’s friends, co-workers, and other parents, (4) specialized/professional $\alpha = .60$ with the items: family/child’s physician, early intervention program, school daycare, and professional help; (5) own parents and extended family $\alpha = .65$ with two items: parents, and relatives/kin. They did not provide the mean score of the total items or the means for each item.

Kondrat et al. (2014) tested a CFA based on an exploratory factor analysis done by Littlewood et al. (2013). Both of the samples were 255 foster parents who were caring for the child of a relative. They identified a four-factor model and a hierarchical model as the best fit. They scored the items on a scale of 1 (*not at all helpful*) to 5 (*extremely helpful*) and included NA (*not available*). It was not indicated how they utilized the “NA” responses. The Cronbach’s alpha for the total scale was .78 and the four-factor solution explained 50.4% of the total variance. The four subscales were: (1) Spouse/Partner

support $\alpha = .77$ with the items: spouse's relatives, spouse's parents, spouse or partner and spouse's friends; (2) Familial support $\alpha = .68$ with the items: my parents, my relatives, my friends, my own children and co-workers; (3) Formal Support $\alpha = .66$ with the items: family/child's physician, Early Intervention program, school/daycare, professional helpers, and professional agencies; and (4) Informal Support $\alpha = .66$ with the items: other parents, social clubs/groups, church members. Eleven items fell in the same factor groupings as the Dunst et al. (1994) factor analysis.

Rationale for Study

The purpose of this study is to determine if different mothers identified with depression only, anxiety only and comorbid depression and anxiety, using the EDPS, do risk factors in these groups vary and therefore would the treatment vary. Anxiety and depression have many overlapping symptoms (e.g. easily fatigued, sleep disturbances, irritability, agitation or feeling "keyed up," and difficulty concentrating) (DSM-V). Anxiety specific symptoms are excessive worry that is difficult to control and muscle tension. Depression specific symptoms are depressed mood (feeling sad, empty or hopeless), loss of interest or pleasure in daily activities, feeling worthless or having excessive guilt, and recurrent thoughts of death or suicide ideation (DSM-V).

Lack of social support is a risk factor that is amenable to change in comparison to history of depression or anxiety. Family support programs are designed to strengthen individual and family functioning by helping families to better utilize their existing supports and to develop larger networks of support (Dunst et al., 1994). Theoretically mothers with low social support should show signs of depression and or anxiety. Feelings of helplessness, a symptom of depression, can develop because of the perceived inability

to cope with a stressor (Cohen & Wills, 1985). Lack of self-esteem or feelings of competence are both associated with depression and anxiety (Cohen & Wills, 1985). Stress and anxiety arise when one thinks that a situation is threatening or demanding and that he or she does not have the appropriate skills or coping response (Cohen & Wills, 1985). Loss of esteem may occur when one thinks that failure to cope is related to one's ability or personality traits rather than an external cause.

The current study investigated the relationship of social support, anxiety and depression by continuing the work of Matthey et al. (2003), Bina et al., (2016), Kabir et al., (2008) and Phillips et al., (2009) to identify a three-factor anxiety subscale in the EPDS. Construct validity of the anxiety and depression subscales was assessed by evaluating the risk factors of mental health history (history of depression in pregnancy, history of postpartum depression) pregnancy health problems (labor and delivery complications, and breastfeeding complications) and family social support. Education and mental health history were included, as covariates in MANCOVA analyses to determine if a relationship between social support existed with anxiety or depression when controlling for education or mental health history. Education was included as control because it was associated with postpartum anxiety but not postpartum depression (Britton 2008; and Martini et al., 2015).

Hypotheses:

The following hypotheses were investigated:

Hypothesis 1. The EPDS consists of two factors—depressive symptoms and anxiety symptoms.

Hypothesis 2. The Family support Scale consists of five factors (Dunst et al. 1994)

Hypothesis 3. The three-item anxiety subscale will identify mothers with high levels of anxiety who were considered below the cutoff for depression when screened with the ten-item EPDS.

Hypothesis 4a. – 4d. The cutoff points associated with the three-item anxiety scale will better differentiate mothers with risk factors related to postpartum depression and anxiety than the ten-item scale, nine-item scale, and six-item scale.

4a. There are significant group differences in mental health history, and physical health problems when using the three-item scale to create cutoff points in comparison to the ten-item scale, nine-item scale, and six-item scale.

4b. There are significant group differences in family social support when using the three-item scale to create cutoff points in comparison to the ten-item scale, nine-item scale, and six-item scale.

4.c There are statistically significant differences between the groups when controlling for education.

4d. There are statistically significant group differences when controlling for mental health history.

Chapter 3

Method

Study Procedure

The present study was a secondary data analysis from de-identified data utilized as part of a program evaluation for a non-profit mentoring program serving mothers with or at risk for postpartum depression. The majority of mothers were referred to the mentoring program by health care professionals (27%, 147), the postpartum day hospital (25%, 138), and the visiting nurses program (20%, 109). The remaining referrals (26%, 145) came from word of mouth or advertisement. Licensed mental health professionals conducted in home psychiatric assessments of mothers using a clinical interview. The data for this cross-sectional study were drawn from clinical intake interviews of mothers conducted during the years 2007-2015. Five hundred and thirty nine pregnant or postpartum women were screened for depression in the process of being enrolled in a program that paired mothers with a volunteer mentor. The mentoring program was located in an urban Northeast community serving mothers from seven counties in two neighboring states.

Participants

Almost three quarters (371) of the 539 mothers met the inclusion criteria: having given birth within the last 12 months and intake records that were at least 90% complete. The postpartum period is defined as the first year after giving birth (Stewart, Robertson, Dennis, Grace & Wallington, 2003). Mothers were excluded for the following reasons:

pregnant at first evaluation ($n = 91$), the target child was over one year of age ($n = 27$), and missing more than 10% of the data ($n = 50$). A conservative approach was taken to address missing data; mean imputations were done for participants missing less than 10% of the data (Tabachnick & Fidell, 1996).

Mothers were, on average, 89 days or three months postpartum ($SD = 77.80$) at the initial screening, with a range of 14 – 359 days. The mean age of the sample mothers was 30 years ($SD = 6.28$) with a range from 15 to 46. Approximately 66% (277) of mothers in the eligible sample were married or in a committed relationship. Mothers reported their income in one of six categories ranging from less than \$10,000 to more than \$100,000. The median income of this sample fell in the range of \$25,000 to \$49,000. Approximately 65% (243) of mothers in the final sample were white, 11% (40) were Latina, 9% (32) were Black, 5% (19) were Asian, 4% (17) identified as other, 2% (8) were American Indian, and 3% (12) did not indicate an ethnicity. There was a wide range of education levels among the sample. The plurality of mothers, 35% (134), had a college degree or higher. The second largest group, 28% (106), was mothers with an associate's degree or some college. The third group, 24% (87), was mothers with a GED or high school diploma. The remaining mothers, 8.6% (34), had less than a high school degree, and 3% (10) were missing education level. See Table 1 for sample description.

Measures

The complete intake questionnaire, measures, and psychiatric evaluation are included in the appendix (Appendix Figure 1). The following variables and measures were used.

Maternal Characteristics. The intake questionnaire asked for demographic information about the participants. Age, race/ethnicity, marital status, education, and income were assessed using single items. Age was determined by subtracting birth date from the date of assessment. Mothers reported their ethnic background and the program coded these as White/Caucasian, Black, Hispanic Latina, Asian, Other or Missing. Education was reported in six categories: less than high school degree, high school or GED, some college, college degree, Master's and higher, or missing. Income was reported in the following categories: less than 10,000, 10,000 to 24,999, 25,000 to 49,999, 50,000 to 74,999, 75,000 to 99,999, 100,000 or more, or missing. Marital status was reported in four categories: single, married, committed relationship and divorced, widowed, or separated.

Pregnancy health and postpartum history items were collected from the Intake Psychiatric Evaluation, completed by a licensed mental health clinician, as part of the intake interview. The full psychiatric evaluation consisted of a health history (17 yes/no items with qualitative explanations), a risks/safety assessment, (19 yes/no items with qualitative explanations), a psychiatric history, (nine yes/no items with qualitative explanations), a Mental Status Examination (19 categories with check box descriptors and space for qualitative responses). The DSM Diagnoses Axis I-V, the preliminary treatment plan, and referrals made. Physical health problems during pregnancy (i.e. pregnancy complications, delivery complications and problems with breastfeeding) that have been associated with anxiety and depression were combined into one item with a range of zero – three. Mothers reported a variety of pregnancy related health problems such as high blood pressure, preeclampsia, and gestational diabetes. Common delivery

complications reported were emergency C-section, premature birth, low heart rate of baby, and other health problems with baby. Examples of breastfeeding complications reported were problems with latching on, inadequate weight gain of baby, mastitis of mother, etc. Scores were summed (*zero = no pregnancy complications*) (*1 = one pregnancy complication*), (*2 = two pregnancy complications*) and (*3 = three or more pregnancy complications*). This is similar to the Peripartum Events Scale in the study by Britton (2008). Stressful events related to childbirth, recorded in the medical records of each mother infant dyad, were summed. These events consisted presence of medical risk factors, obstetric risk factors, progress in labor, method of delivery and infant problems.

History of depression in pregnancy, and history of postpartum depression are risk factors for PPD and anxiety. This was made into a summed score of mental health history with a range of 0 - 2.

Edinburgh Postpartum Depression Scale. This study used the Edinburgh Postpartum Depression Scale (EPDS), a 10-item self-report screening measure, for assessing depressive symptoms (Cox, Holden & Sagovsky, 1987). The EPDS consists of statements that describe experiences representative of symptoms of depression within the past seven days such as, depressed mood, anhedonia, guilt, anxiety, and suicidal ideation (Cox et al., 1987).

Sample items include: “I have been able to laugh and see the funny side of things.” and “I have looked forward with enjoyment to things.” Each item had four possible responses: 0 (*not at all*), 1 (*not very often*), 2 (*yes, sometimes*), and 3 (*yes, most of the time*). Answers were summed to yield a total score, with a maximum score of 30, and higher scores indicate more depressive symptoms.

The EPDS was developed to screen for PPD in home visits conducted by health workers in Edinburgh. The EPDS was derived from the Irritability, Depression and Anxiety Scale (IDAP by Snaith et al. (1978), the Hospital Anxiety and Depression Scale (HADS) by Zigmond and Snaith (1983) and the Anxiety and Depression Scale of Bedford Foulds (1978). Significant modifications were made to the items from those scales to exclude or change items that made reference to somatic symptoms of depression (e.g., fatigue, changes in appetite, and aches and pain) that are typical of postpartum women.

Clinicians use the 10-item EPDS (Cox et al., 1987) to determine which mothers are at risk for PPD. Those who score above a cutoff point are referred for further evaluation and those scoring below are considered to be at low risk for PPD. The cutoff score is based on the original analysis by Cox et al., (1987) of the receiver-operating characteristic (ROC) of the EPDS, which determines the proportion of true positives and true negatives. To determine the cutoff score they gave 84 mothers the EPDS measure and then interviewed the mothers using Goldberg's Standardized Psychiatric Interview (Cox et al., 1987).

At the cutoff of ≥ 13 , the EPDS correctly identifies mothers with depression (true positives) 86% of the time. Mothers without depression (true negatives) were identified 78% of the time. The internal reliability was assessed using Cronbach's alpha with a result of .87 (Cox et al., 1987). Validity was assessed with split half reliability of .88 (Cox et al., 1987). Furthermore, a synthesis of 23 studies ($N = 5398$) using the EPDS with a cutoff score of 13 identified sensitivity scores that ranged from .67 (95% CI, 0.18, 0.96) to 1.00 (95% CI, 0.67, 1.00), and specificity scores for Major Depressive Disorder

of 90% or more (O'Connor et al., 2016). Touhy and McVey (2008) reported a Cronbach's alpha of .90 in their study of 440 postpartum mothers. Beck and Gable (2001) reported a Cronbach's alpha of .89 in their study of 150 postpartum mothers.

In the current study, creating a fraction where $\geq 13/30$ is equal to $x/9$ and solving for x maintained the ratio of items to cutoff scores. Using the same ratio for the depression symptoms factor this would make the cut off score nine or above for the 7-item scale (i.e., 0 - 8 low risk of depressive only symptoms = 0, 9 - 21 high risk of depressive only symptoms = 1). The cut off score for the three-item anxiety symptoms factor would be 4 or above (i.e., 0 - 3 low risk of anxiety symptoms and 4 - 9 high risk of anxiety symptoms).

Family Support Scale. The family support scale was an 18-item measure with four to five factors. Parents were asked to rate how helpful each source of support has been during the past three to six months. For example "How helpful were your parents to your family in the past three to six months?" and "How helpful were your co-workers to your family in the past three to six months?" The scale consisted of: 0 (*not available*), 1 (*not at all helpful*), 2 (*Sometimes helpful*), 3 (*Generally helpful*), 4 (*Very helpful*) and 5 (*Extremely helpful*). High scores indicate more perceived social support. For this research the choice was made to be consistent with the scoring of the Dunst et al. (1994) study and the Kondrat et al. (2014) study but any "0" response was recoded as "1" so as not to lose that data. This impacted the scores of many mothers in the current sample. Number and percent of mothers reporting zero are given for each item of the final 13-item scale: My parents (90, 24%); My spouse or partner's parents, (114, 31%); My relatives or kin (104, 28%); My spouse or partner's relatives (141, 38%); Spouse or partner (68, 18%); My

friends 70, 19%; My spouse or partner's friends (172, 46%); Co-workers (249, 67%); Parent groups (290, 79%); Social groups (315, 84%); My family or child's physician (59, 16%); Professional helpers (142, 38%); Professional agencies (186, 50%). The 5-factor scale in the Dunst et al., study accounted for 55% of the variance.

In the Kondrat et al. study a four-factor solution was found with a Cronbach's alpha for the whole scale of .79. The first factor Spouse/Partner Support (4-items) had a Cronbach's alpha of .82. Formal Professional Support (5-items) had a Cronbach's alpha of .63. The third factor, Informal Community Support (4-items) had a Cronbach's alpha of .64. The fourth factor, Familial and Peer Support (5-items) had a Cronbach's alpha of .59. The factor structure explained 50.4% of the variability in the total support score.

Analyses

Hypothesis 1. The EPDS consists of two factors—depressive symptoms and anxiety symptoms.

A two-step model approach was taken to examine the psychometric properties of the Edinburgh Postpartum Depression Scale (EPDS). The first step consisted of exploratory analyses of the EPDS scale using principal components analysis (PCA) with maximum likelihood (ML) and varimax rotation. Component retention was determined with minimum average partial correlation (MAP) procedures (Velicer, 1976) and parallel analysis (Horn, 1965). The MAP procedure consists of a complete principal component analysis followed by an examination of a series of matrices of partial correlations (Velicer, 1976). Using the matrix of partial correlations the average of the squared partial correlation is calculated after the m component, a reduced set of variables from the

observed variables, has been partialled out (Zwick & Velicer, 1986). The average squared partial correlation reaches a minimum when the residual matrix and the identity matrix most closely resemble each other (Zwick & Velicer, 1986). Parallel analysis allows the researcher to compare their own data to a normally distributed random set of numbers (Horn, 1965). These methods are considered to be an improvement upon traditional factor extraction methods of Eigen values greater than one and visual inspection of scree plots (Velicer, Eaton, & Fava, 2000).

Factor analytic procedures perform better when communalities are high because low communalities may indicate high levels of random error (Fabrigar & Wegener, 2012). When communalities are high (.70 or higher) and there are three to five measured variables without complex loadings a sample size of 100 can be adequate to determine a factor solution (Fabrigar & Wegener, 2012). When communalities are low (.4 or less) a sample size of 400 may be necessary to identify a factor solution (Fabrigar & Wegener, 2012).

The second step consisted of multiple confirmatory factor analyses (CFA) using structural equation modeling (SEM) procedures. The EPDS scale data were divided so that 36% (Sample 1 = 143) of the data were utilized in the EFA and 64% (Sample 2 = 252) in the CFA. Multiple measures of fit were evaluated because each one provides information about the model. Sample size can impact the χ^2 value, as such; fit was determined by a low χ^2 value relative to degrees of freedom. Values for the comparative fit index (CFI) of .80 to .89 indicate good fit and values of .90 or better indicate good or excellent fit (Hu & Bentler, 1999). A root mean square error of approximation (RMSEA) at or below .06 indicates an excellent fit (Kline, 2011). Goodness of fit index of .90 or

greater, and a standardized root mean square residuals (SRMR) at or below .05 (Kline, 2011), also indicate good fit.

Hypothesis 2. The Family support Scale consists of five factors (Dunst et al. 1994)

The Family Support Scale was evaluated using CFAs of the full sample for two models from previous research --a correlated four-factor model and a correlated five-factor model. These models were a poor fit. As a result a series of EFAs were conducted to determine the best factor structure. Although it was expected that the items were correlated, a varimax rotation was used for the initial explorations as this allowed the identification of complex items that loaded on two or more factors. Items were removed one at a time for the following reasons: (1) a majority of participants indicated support “not available”; (2) loadings were below .3; (3) and complex loadings. Tabachnick and Fidell (1996) consider .32 as a minimum loading of an item, and complex loadings as items that load .32 or higher on two or more factors.

Hypothesis 3. The three-item anxiety subscale will identify mothers with high levels of anxiety who were considered below the cutoff for depression when screened with the ten-item EPDS.

The cases of mothers who screen positive using the EPDS total scale will be compared to the cases of mothers who screen positive using the anxiety and depression subscales separately. No analysis was done at this stage. If there are mothers who are high in anxiety but fall below the traditional ≥ 13 cutoff, the identification of this group will allow comparisons of mothers with anxiety symptoms only to the rest of the sample.

Hypothesis 4a. – 4d. The cutoff points associated with the three-item anxiety scale will better differentiate mothers with risk factors related to postpartum depression and anxiety than the ten-item scale, nine-item scale, and six-item scale.

(4a.) There are significant group differences in mental health history, and physical health problems.

(4b) There are significant group differences in family social support when using the three-item scale to create cutoff points in comparison to the ten-item scale, nine-item scale, and six-item scale.

(4c) There are statistically significant differences between the groups when controlling for education because low education level has been associated with increased anxiety symptoms but not depression.

(4d) There are statistically significant group differences when controlling for mental health history.

Chi-square tests were used to compare the groups in regard to demographic factors, pregnancy health problems and mental health history. During their clinical interviews mothers were asked if they had a history of postpartum depression (yes/no), a history of depression in pregnancy (yes/no), a previous psychiatric diagnosis (yes/no). History of postpartum depression and depression in pregnancy were summed to make a scale of zero to two called mental health history for inclusion as an indicator variable in the subsequent MANOVAS. The variable of previous psychiatric diagnosis was not included in the summed score because of missing value, (n = 135). Mothers were also asked about the presence of any pregnancy complications, delivery complications, and breastfeeding complications. This was made into a summed score of pregnancy health

problems with a range of zero to three for inclusion as an indicator variable in the subsequent MANOVAS.

Hypothesis 4 b. Two MANOVAs were done: the first using the 10-item EPDS cutoff point and the second using the 9-item EPDS cutoff points. This was done to investigate the difference in the scale when taking out the suicide ideation item. Then a 2 x 2 MANOVA was used to evaluate group differences in perceptions of family social support between mothers rated above and below the three-item anxiety EPDS cutoff and the six-item depression EPDS cutoff.

Hypothesis 4 c. Education was found have a significant relationship with anxiety in research by Martini et al., (2015). The objective of this step was to compare the groups when controlling for education. Two MANCOVAs controlling for education were done with the same groups as the MANOVAs. Then a 2 x 2 MANCOVA was done with the three-item anxiety EPDS cutoff and the six-item depression EPDS cutoff while controlling for education and history of postpartum depression.

Hypothesis 4 d. History of depression and depression in pregnancy were the most common predictors of PPD (Beck, 2001; Chojenta et al., 2016; Robertson et al, 2004). The objective of this step was to compare the groups when controlling for mental health risk factors of history of depression and depression in pregnancy. Two MANCOVAs controlling for mental health risk factors were done with the same groups as the MANOVAs. Then a 2 x 2 MANCOVA was done with the three-item anxiety EPDS cutoff and the six-item depression EPDS cutoff while controlling for mental health risk factors.

Chapter 4

Results

Prior to analysis, age of baby, age of mother, depression screening scores, health complications, income, ethnicity, and education were examined through SPSS for Mac version 24 for outliers, missing data, and adherence to assumptions of multivariate analysis. All SEM procedures were conducted in EQS 6.2. Descriptive statistics, including mean, standard deviation, min/max and kurtosis and skewness were calculated for each item (Table 2).

Hypothesis 1. The EPDS consists of two factors—depressive symptoms and anxiety symptoms.

The EPDS was randomly split into an “exploratory” and “confirmatory” sample to cross-validate the EPDS measure. The “exploratory” sample consisted of 36% of the data (Sample 1 = 143) and the “confirmatory” sample consisted of 64% (Sample 2 = 252). Sample size was adequate based on existing literature (Kline, 2011). Marital status, income levels, ethnicity and education of the two subsamples were compared. None of the chi-square tests reached statistical significance at the $p < .05$ level.

Step one, Exploratory Analyses. Exploratory structural analyses, conducted in SPSS version 24.0, included PCA procedures using the varimax rotation method. All extracted communalities ranged from .408 to .736, except for item 10 which had a communality of .045. Communality is the proportion of the variance accounted for by the common factors (Fabrigar & Wegener, 2012). Communalities with high values are well represented in the common factor space those with low values are not. The MAP test indicated a one-factor solution. The parallel analysis indicated a one-factor and possibly

two-factor model. The first two factors accounted for 60% of the total variance. The initial eigenvalues for the first two factors were 4.88 and 1.12. A table of simulation data indicated that the first and second eigenvalues for a sample size of 150 with 10 items were 1.43. and 1.29 (Lautenschlager, 1989). The eigenvalues from the PCA of the EPDS were well above the average value for the first factor and the second was slightly under. The Cronbach's alpha for a one-factor scale with all 10 items was .876. At this point the Cronbach's alpha for the two-factor scales were .857 for the 7-item scale and .752 for the 3-item scale. The loadings of item 10 were .127 and .233.

A second PCA was run without item 10, "The thought of harming myself has occurred to me." Item 10 had higher skewness and kurtosis than the other items, and did not load well onto either factor. The low communality of item 10 meant that it had very little common variance with the other items. Suicide ideation is an important indicator on its own but it did not fit into either factor. The MAP test indicated a one-factor solution. The parallel analysis indicated a one-factor and possibly two-factor model. The first two factors now accounted for 66% of the total variance. The initial eigenvalues for the first two factors were: 4.83 and 1.12. The eigenvalues from the study data in the first factor were well above the average value but the second was still slightly under. The reliability improved for the nine item one-factor model with a Cronbach's alpha of .887. The two-factor model with depression as one six-item factor resulted in a Cronbach's alpha of .883 (1, 2, 6, 7, 8, 9) and anxiety as the other three-item factor resulted in a Cronbach's alpha of .755 (3, 4, 5). The PCA ruled out a three-factor model but the results suggested a one-factor model or a two-factor model with nine items. Table 3 shows the factor loadings for the two-factor scale.

Step 2, Confirmatory Analyses. The objective of the second step, using Sample 2, was to compare the fit of the following models: (1) a one factor model, all items loading on one latent factor, representing depressive symptoms, (2) a two uncorrelated factor model, items loading on two, uncorrelated latent factors, representing anxiety (three-items) and depressive symptoms (six-items), (3) a two correlated factor model (Figure 1), items loading on two correlated latent factors representing anxiety (three-items) and depressive symptoms (six-items). A hierarchical factor model (Figure 2) contingent upon a significantly correlated factor model was then run with a second-order factor model (items loading onto two first order factors representing anxiety (three-items) and depressive symptoms (six-items) and one higher order factor).

The measures of the fit of the first uncorrelated one-factor model and the two-factor models were in the average to good range. The two-factor correlated and the second-order models were in the good to excellent range based on fit measures. In each consecutive analysis the χ^2 value lowered substantially.

One-factor model. In the one-factor model convergence of an optimal set of parameter estimates was achieved in six iterations. All parameter estimates that were not fixed at one were significantly different from zero by the z-test on the critical ratio. The results of the one-factor model were $\chi^2 = (27, n = 253) = 188.6, p < .001$, CFI = .849, RMSEA = .154 (90% CI .134, .175), GFI = .846, and SRMR = .077.

Two-factor uncorrelated model. Model convergence was reached in five iterations for the uncorrelated two-factor model. All parameter estimates that were not fixed at one were significantly different from zero by the z-test on the critical ratio. The results of the uncorrelated two-factor model were $\chi^2 = (27, n = 253) = 162.90, p < .001$,

CFI = .873, RMSEA = .142 (90% CI .121, .162), GFI = .892, and SRMR = .253. In this model the CFI and GFI improved but are only in the good range. The RMSEA and SRMR were lower than the previous model but not in the acceptable range.

Two-factor correlated model. Model convergence was reached in six iterations for the two-factor correlated model. The results for the correlated two-factor model were $\chi^2(26, n = 253) = 62.7, p < .001$. The chi-square value became smaller in relation to the one-factor model indicating that the one-factor model was under-identified. The CFI of .966 and the GFI of .947 were in the excellent range. The RMSEA of .075 (90% CI .051, .099) was acceptable and the SRMR of .049 also indicated a good fit. The correlation of the anxiety and depressive subscales was .66 indicating that they are related constructs. Figure 3 gives the standardized parameter estimates.

Second-order model. The correlation of the two factors (.66) indicated that the anxiety and depressive symptoms are part of a higher-order factor. A second-order factor analysis with the same degrees of freedom was run, with equality constraints put on the disturbances of the two first-order factors. The second-order factor was fixed at one, which allows for the covariance of the two first-order factors (which now become dependent variables) to be modeled. Normally one first-order factor would be fixed at one and the remaining two or more first-order factors are free to be estimated (Bentler, 2004). Model convergence was reached in six iterations for the second-order model. All of the fit indexes were the same as the correlated two-factor model (see Table 4). The covariance between the second-order factor and depressive symptoms was .80 and the correlation between second-order factor and anxiety was .83, resulting in a covariance of .663. Figure 4 shows the standardized parameter estimates.

Hypothesis 2. The Family support scale consists of five factors (Dunst et al. 1994)

Confirmatory Analysis. Since previous factor analyses of the Family Support scale identified different factor structures (Dunst et al., 1994; Kondrat et al., 2014) the first step was to confirm the factor structure. Both the Dunst et al. (1994) correlated five-factor and Kondrat et al. (2014) correlated four-factor models were tested using confirmatory factor analysis (CFA) with the full sample ($N = 371$). The FSS scale was first changed from a 6-point scale (0 - 5) to a 5-point scale (1 - 5). All responses coded as a “0” were recoded as a “1.” This was done in order to retain as many participants as possible for the CFA. The Dunst et al. five factors were: Informal kinship (Items 6, 7, 8, 9 and 13); Spouse/Partner Support (Items 2, 4 and 5); Social Organizations (Items 10, 11, 12 and 16); Formal Kinship (Items 1 and 3); and Professional Services (Items 14, 15, 17 and 18). The mean of the full scale using the current data was 35 with a standard deviation of 8.8. The item means and total means are in Table 5. This resulted in a poor fitting model, $\chi^2 = (125, N = 371) = 373.72, p < .001, CFI = .767, RMSEA = .074$ (90% CI .065, .082), GFI = .897, and SRMR = .081. The Kondrat et al. (2014) four factors were: Familial Support (Items 1, 3, 6, 8, and 10); Spouse/Partner Support (Items 2, 4, 5, and 7); Informal Support (Items 9, 11, 12, 13); Formal Professional Support (Items 14, 15, 16, 17 and 18). This also resulted in a poor fitting model. The results were $\chi^2 = (132, N = 371) = 395.04, p < .001, CFI = .754, RMSEA = .074$ (90% CI .065, .082), GFI = .890, and SRMR = .091.

Exploratory Factor Analysis. The split half procedure, of the PCA and CFA, used for the EPDS scale was not used with the FSS scale because the above two CFAs resulted in poor fitting models. A series of EFAs were conducted using principal

components analysis with varimax rotation. Items were removed because of low loadings or because a majority of the sample indicated that the source of support was not available. “Church members” was removed because of low loadings. The following four items were removed because more than 70% of the sample indicated that these sources of support were not available: “My own children,” “School or daycare,” “Early childhood intervention” and “Other parents”.

Final Scale. The revised FSS scale consisted of 13 items and four factors (Table 6) which accounted for 58% of the variance. The Cronbach’s alpha for the full 13-item scale was .712. The four subscales were: spousal support (4 items), $\alpha = .71$; my family (4 items), $\alpha = .609$; social groups (2 items), $\alpha = .602$; and professional support (3 items), $\alpha = .632$. The CFA of the revised correlated 4-factor model was a better fit: $\chi^2 = (59, N = 371) = 184.797, p < .001, CFI = .861, RMSEA = .076$ (90% CI .064, .088), GFI = .927, and SRMR = .074. The hypothesized model in Figure 5 and the standardized parameter estimates are in Figure 6. The means and standard deviations for each item are in Table 7. Table 8 consists of the means and standard deviations for the four subscales and the total Family Support Scale. All variables have low skewness and kurtosis except for the two-item Social Support factor with a kurtosis of 8.4. The kurtosis of the two-item social groups subscale was slightly higher than the kurtosis of EPDS item 10 about suicide ideation (7.16). Despite this, the social groups subscale was included in the analysis because “parent groups” and “social groups” are commonly suggested to new parents as sources of family support (Dunst et al. 1994). As such it is relevant to measure the contribution of these items to overall family support scale. The correlations, shown in Table 9, of the 4-factor model were in the low to mid range.

Hypothesis 3. The three-item anxiety subscale will identify mothers with high levels of anxiety who were considered below the cutoff for depression when screened with the 10-item EPDS.

The 10-item EPDS screening was developed for clinicians (Cox et al., 1987) to determine which mothers are at risk for PPD and should be further evaluated. Cox et al. (1987) indicated that those who score 13 and above should be referred for further evaluation. In the full sample, 181 (48%) mothers were at risk for PPD and 190 (51%) of the mothers were considered to be at low risk for PPD based on the 10-item screening. Using the nine-item scale with a cutoff point of 12 and above resulted in a seven percent increase of women at risk for depression. Over half of the mothers would be considered at risk for depression (203) and 168 would be considered at low risk. Lowering the cutoff by one point after removing one item in a 10-item scale is a conservative approach to adjusting for the removal of the item. Finally using the three-item anxiety scale with a cutoff of ≥ 4 resulted in 272 (73%) of the mothers in the current sample at risk for anxiety a 28% increase from the 10-item scale depression. The cutoff for the three-item scale and six-item scale are based on the ratio of the cutoff score with the number of items. The three item cutoff is consistent with the research by Grigoriadas et al., (2011) Phillips et al., (2009) & Swalm et al., (2010). The six-item depression scale with a cutoff of ≥ 8 resulted in twenty fewer mothers in the “at risk for depression group,” 161 compared to 181 (See Table 10). These varying cutoffs allowed for a comparison of the mothers when conducting chi-square tests and MANOVAs.

Hypotheses 4a. Chi-square tests were done of the demographic variables to determine if income level, education, marital status and ethnicity were significantly different when

using the cutoffs from the ten-item EPDS, the nine-item EPDS, three-item anxiety and the six-item depression scale. All chi-square tests were not significant for the demographic variables of income, education, ethnicity, age of mother, and marital status.

All risk factor variables were examined using chi-square tests. A two-way contingency table analysis was done to evaluate if mothers above the 10-item cutoff had more mental health history (MHH) risk factors and more pregnancy health problems (PHP) than mothers below the ten-item cutoff. Levels of MHH were: zero instances of MHH, one instance of MHH, 2 or more instances of MHH. There was a significant association between mental health history and depression scores when grouping the mothers by those above cutoff of 13 and higher (181) for 10-item scale and those below (190). The chi-square test was significant $\chi^2 (2, N = 371) = 14.9, p < .001$ phi .200, <.001. Levels of PHP were: no pregnancy health problems, one pregnancy health problem and 2 or more pregnancy health problems. There was no significant association between depression scores and pregnancy complications when grouping the mothers by those above cutoff of 13 and higher (181) for 10-item scale and those below (190). The chi-square test for the 10-item cutoff was not significant $\chi^2 (2, N = 371) = 1.18, p = .555$. See Table 11.

There was a significant association between mental health history and depression scores when grouping mothers by those above cutoff of 12 and higher (203) for the nine-item EPDS and those below (168). The chi-square test was significant $\chi^2 (2, N = 371) = 17.67, p < .001$ phi .210, < .001. There was no significant association between depression scores and pregnancy complications when grouping the mothers by those above cutoff of

12 and higher (203) for the nine-item EPDS and those below (168). The chi-square test for the nine-item cutoff was not significant $\chi^2(2, N = 371) = 3.38, p = .185$. See Table 12.

There was a significant association between depression scores and mental healthy history when grouping the mothers by those above cutoff of four and higher (272) for the three-item EPDS and those below (99). The chi-square test for the three-item cutoff was significant $\chi^2(2, N = 371) = 6.96, p < .031, \phi .137, < .031$. There was no significant association between depression scores and pregnancy complications when grouping the mothers by those above cutoff of 4 and higher (272) for the 3-item EPDS and those below (99). The chi-square test for the three-item cutoff was not significant $\chi^2(2, N = 371) = 1.046, p = .593$. See Table 13.

The chi-square test was significant for mental health history when grouping mothers by those above the cutoff of 8 and higher (161) for the six-item depression scale and those below the cut off (210). The chi-square test was $\chi^2(2, N = 371) = 13.03 p < .001 \phi .187, < .001$. The chi-square test approached significance when grouping mothers by those above the cutoff of 8 and higher (161) for the six-item depression scale and those below the cut off (210). The chi-square test was $\chi^2(2, N = 371) = 5.95 p = .051$. See Table 14.

Hypothesis 4b. Multivariate analyses of variance were conducted to determine levels of family support for mothers below cutoff versus above cutoff for depression when using the 10-item scale, the nine-item scale and the three-item and six-item subscales. Results of evaluations of assumptions of normality, multicollinearity, homogeneity of variance-covariance matrices, were acceptable. The skewness and kurtosis of the Family Support scales were less than |.755| except for the two item Social

Support scale which had a skewness of 2.83 and kurtosis of 8.44. The four empirically derived subscales of: my family support, spouse/partner support, professional help and social support, had low but significant correlations. The Pearson correlations ranged from .079 to .309 indicating that multicollinearity was unlikely.

Testing the 10-item EPDS and nine-item EPDS. There were not statistically significant differences in my family support, professional help and social support between mothers above the cutoff versus mothers below the cutoff using the 10-item and nine-item EPDS. There were statistically significant differences for spouse/partner support in both the 10-item and nine-item EPDS scales. In the first MANOVA two groups were created using the original cutoff for the EDPS of 13 and above with 190 mothers at low risk for depression and 181 mothers at risk or above the cutoff. The Box's M was $p = .926$, indicating acceptable homogeneity of the covariance matrices. The homogeneity of the variances was also acceptable as assessed by the Levene's Test. At the macro-level, the Wilks' lambda test was not significant, $\Lambda = .984$, $F(4, 366) = 1.53$ $p = .193$, multivariate $\eta^2 = .016$. All dependent variables were $p > .05$ except for Spousal Support which was significant $F(1, 369) 5.18$ $p < .023$. Mothers below the cutoff reported higher spousal support ($M = 9.2$) versus mothers above the cutoff ($M = 8.3$). The mean of My Family Support was higher for the mothers below the cutoff ($M = 8.76$) versus those above the cutoff ($M = 8.3$). Mothers below the cutoff reported greater Professional Support ($M = 7.7$) than mothers above cutoff ($M = 7.3$). The mean of Social Support was also higher for mothers below the cutoff ($M = 2.6$) versus mothers above the cutoff ($M = 2.5$) but none of these reached a significant level.

In the second MANOVA, the nine-item EPDS with a cutoff or ≥ 12 points was used, 168 mothers were at low risk for depression and 203 were considered at risk. The Box's M was $p = .90$. The Levene's test was not significant for all variables indicating that the homogeneity of the variances was acceptable. At the macro-level, the Wilks' lambda test was not significant, $\Lambda = .982$, $F(4, 366) = 1.719$ $p = .193$, multivariate $\eta^2 = .018$. All dependent variables were $p > .05$ except for Spousal Support which was significant $F(1, 369) = 6.7$ $p < .01$. R-squared was .018 and adjusted R-squared was .015 with 95% C.I. 8.42, 9.2. Spousal support was higher for mothers below the cutoff for depression ($M = 8.7$) versus mothers above the cutoff ($M = 8.4$). The mean of My Family Support was higher for the mothers below the cutoff ($M = 8.70$) versus those above the cutoff ($M = 8.45$). Mothers below the cutoff reported greater Professional Support ($M = 7.7$) than mothers above cutoff ($M = 7.5$). The mean of Social Support was also higher for mothers below the cutoff ($M = 2.6$) versus mothers above the cutoff ($M = 2.5$) but did not reach a significant level.

Testing the three-item anxiety and six-item depression scales. The next step consisted of a 2 X 2 between subjects MANOVA with two independent variables -- the EPDS consisting of two factors -- mother's depression scores and mother's anxiety scores -- and four dependent variables -- family social support, spouse/partner support, professional support, and social group support.

Assumptions of normality were checked again. The homogeneity of the covariance matrices was acceptable, the Box's M was not significant ($p = .069$). The Levene's test was significant for the Social subscale 3.73 ($p < .012$) but not the other subscales. The type II sum of squares MANOVA was used because it is recommended

for unbalanced data without significant interactions (Langsrud, 2003; Maxwell & Delaney, 2018). Prior to this, a series of ANOVAs were done using type II and type III sum of squares approaches and the interaction of depression and anxiety was not significant. At the macro-level there was a statistically significant effect for depression and the FSS scales, Wilks' $\Lambda = .959$, $F(4, 364) = 3.93$, $p < .004$, multivariate $\eta^2 = .041$, but not for anxiety and the FSS scales, Wilks' $\Lambda = .984$, $F(4, 364) = 1.53$, $p = .194$, multivariate $\eta^2 = .016$. The interaction effect was also non-significant.

Follow-up ANOVAs were done of the six-item depression scale and the four family support variables. There was a statistically significant main effect for depression and My Family Support, $F(1, 367) = 7.571$, $p < .006$, $\eta^2 = .020$ and Spouse/Partner Support, $F(1, 370) = 8.46$, $p < .004$, $\eta^2 = .023$. The Professional Help Scale was significant $F(1, 367) = 6.294$, $p < .013$, $\eta^2 = .017$. The Social Support Scale was not significant $F(1, 367) = 1.99$, $p = .159$, $\eta^2 = .005$.

Follow-up pairwise comparisons were conducted for the significant ANOVAs. The mean differences for My Family Support was, 1.069 (95% CI, .022, 2.12), $p < .05$ between mothers with high anxiety and low depression ($M = 9.281$, $SD = 3.2$) versus mothers with high anxiety and high depression ($M = 8.21$, $SD = 3.34$) The mean difference for Spouse/Partner Support approached significance, at 1.09 (95% CI, -.09, 2.23), $p < .08$ between mothers with high anxiety and low depression ($M = 9.3$, $SD = 3.7$) versus mothers with high anxiety and high depression ($M = 8.25$, $SD = 3.82$).

Hypothesis 4c. Correlation coefficients were computed with the demographic variables of income level, education, age of mother, marital status and ethnicity were associated with the dependent variables of the four-factor Family Social Support scale

(See Table 16). Education and age were correlated ($r = .493, p < .01$), income level and age of mother were correlated ($r = .405, p < .01$), education and income were correlated ($r = .592, p < .01$). The number of pregnancy and postpartum health complications was positively correlated with income ($r = .144, p < .01$) and education ($r = .111, p < .05$). Education was examined as a covariate in relation to family social support. The FSS subscale of My Family Support (4-items) was not correlated with any of the demographic risk factors, mental health history (MHH), or Pregnancy Health problems (PHP). Spouse or Partner support (4-items) was positively correlated with income ($r = .206, p < .01$) and education ($r = .186, p < .01$) and negatively correlated with MHH ($r = -.172$). Professional support (three-items) was not significantly correlated with any of the risk factors except for MHH ($r = .135, p < .01$). Social Support (2-items) was positively correlated with income ($r = .201, p < .01$) and education ($r = .161, p < .01$). The subscale of My Family Support was positively correlated with Spouse/Partner Support ($r = .329, p < .01$). Professional Support was positively correlated with My Family Support ($r = .244, p < .01$) and Spouse/Partner Support ($r = .161, p < .01$). Social Support was positively correlated with Professional Support ($r = .182, p < .01$).

Testing the 10-item EPDS with education. The first MANCOVA assessed group differences of family support between mothers with high or low depression determined by the original EPDS-10 item scale while controlling for education. The two groups were 183 mothers with low EPDS scores and 178 mothers with scores of 13 and higher. The homogeneity of the covariance matrices was acceptable, the Box's M was not significant, $p = .915$. The Levene's test was not significant for all dependent variables. There was no

statistically significant difference between the groups in family support when controlling for education, Wilks' $\Lambda = .985$, $F(4, 354) = 1.31$ $p = .266$, multivariate $\eta^2 = .015$.

Testing the nine-item EPDS with education. The second MANCOVA used the nine-item EPDS cutoff of under 11 for the low risk group (161 mothers) and 12 and over for the at risk group (200 mothers). The Box's M was not significant ($p = .937$). There were no statistically significant differences in the depression groups when controlling for education, Wilks' $\Lambda = .984$, $F(4, 354) = 1.44$ $p = .221$, multivariate $\eta^2 = .016$.

Testing the three-item anxiety and six-item depression scales with education. The third procedure was a 2 x 2 MANCOVA with the three-item anxiety scale and the six-item depression scale and the covariate of education. The Box's M was $p = .038$, indicating that the homogeneity of the covariance matrices were not equal across the groups. The homogeneity of the variances was acceptable as assessed by the Levene's Test. There was a statistically significant difference when using the cutoff for the six-item depression scale, Wilks' $\Lambda = .963$, $F(4, 354) = 3.42$ $p < .009$, but not the three-item anxiety cutoff Wilks' $\Lambda = .981$, $F(4, 354) = 1.74$ $p = .199$.

The follow up ANCOVAs resulted in significant differences for three of the dependent variables with the six-item depression cutoff, My Family, Spouse/Partner Support, and Professional Help. The statistically significant differences were for My family $F(1, 357) = 6.60$ $p < .011$, partial $\eta^2 = .018$ with adjusted estimated marginal means for low depression of 8.82 (95% CI 8.35, 9.23) and high depression of 7.8 (95% CI 7.14, 8.5). The Spouse/Partner Support factor was significant, $F(1, 357) = 5.20$ $p < .023$, partial $\eta^2 = .014$, with estimated marginal means for low depression of 9.18 (95% CI 8.7, 9.7) and high depression of 8.20 (95% CI 7.5, 8.9). Professional Support was also

significant $F(1, 357) = 7.83$ $p < .005$, partial $\eta^2 = .021$, with estimated marginal means for low depression of 7.86 (95% CI 7.4, 8.3) and high depression of 6.77 (95% CI 6.12, 7.4).

Follow up pairwise comparisons were made by creating a variable with four groups, low anxiety and low depression (86), high anxiety and low depression (118), low anxiety and high depression (8), and high anxiety and high depression (149). The Levene's test was not significant $p = .524$. The mean difference of professional help was 1.20 $p < .004$ (95% CI .393, 2.01) between the mothers with high anxiety and low depression ($M = 8.4$, $SD = 3.35$) and mothers with high anxiety and high depression ($M = 7.2$, $SD = 3.2$). The univariate test for family support was not significant, $F(3, 356) = 2.5$ $p = .052$ partial $\eta^2 = .021$. The univariate test for spouse/partner support was not significant, $F(3, 356) = 2.07$ $p = .104$ partial $\eta^2 = .017$.

Hypothesis 4 d. *Testing the three-item anxiety and six-item depression scales with mental health history.* A 2 x 2 MANCOVA was conducted with the three-item anxiety scale and the six-item depression scale with the covariate of mental health history. The homogeneity of the covariance matrices was acceptable as the Box's M was not significant, $p = .069$. The Levene's test was not significant for all dependent variables. There was a statistically significant difference when using the cutoff for the six-item depression scale, Wilks' $\Lambda = .961$, $F(4, 364) = 3.7$, $p < .006$, multivariate $\eta^2 = .039$, but not the three-item anxiety cutoff Wilks' $\Lambda = .983$, $F(4, 364) = 1.54$, $p = .192$, multivariate $\eta^2 = .017$.

The follow up ANCOVAs resulted in significant differences for My Family, Spouse/Partner Support, and Professional Help when controlling for mental health history. The statistically significant differences for My family were $F(1, 367) = 6.45$ $p <$

.012, partial $\eta^2 = .017$ with adjusted estimated marginal means for low depression of 8.8 (95% CI 8.28, 9.22) and high depression of 7.8 (95% CI 7.12, 8.5). Spouse/Partner Support was significant, $F(1, 367) = 6.11$ $p < .014$, partial $\eta^2 = .016$ with adjusted estimated marginal means for low depression of 9.1 (95% CI 8.5, 9.6) and high depression of 8.1 (95% CI 7.3, 8.7). Professional Support was also significant, $F(1, 367) = 8.67$ $p < .003$, partial $\eta^2 = .023$, with adjusted estimated marginal means for low depression of 7.9 (95% CI 7.5, 8.7) and high depression of 6.82 (95% CI 6.19, 7.5).

Follow up comparisons were made by creating a variable with four groups, low anxiety and low depression (89), high anxiety and low depression (121), low anxiety and high depression (10), and high anxiety and high depression (151). These group sizes are slightly higher than the MANOVA with education. Some participants did not indicate an education level and were dropped from the previous analysis. The first comparison was done with the dependent variable my family support. The Levene's test was not significant $p = .405$. The $F(3, 367) = 2.85$ $p < .04$ partial $\eta^2 = .023$. The significant mean difference of family support was 1.016 $p < .014$ (95% CI .204, 1.827) between the mothers with high anxiety and low depression and mothers with high anxiety and high depression. Spouse/partner support was not compared because the overall test was not significant. The univariate test result was $F(3, 367) = 2.22$ $p = .09$ partial $\eta^2 = .018$. The second comparison was done with professional help. The Levene's test was not significant $p = .303$. The univariate test result was $F(3, 367) = 3.32$ $p < .02$ partial $\eta^2 = .026$. The significant mean difference of professional help was 1.27 $p < .002$ (95% CI .447, 2.07) between the mothers with high anxiety and low depression ($M = 8.31$, $SD = 3.4$) and mothers with high anxiety and high depression ($M = 7.13$, $SD = 3.2$).

Chapter 5

Discussion

Hypothesis 1. Edinburgh Postpartum Depression Scale

A two factor correlated scale consisting of three anxiety and six depression items was identified using exploratory and confirmatory factor analysis with a split sample for replication. Theory and empirical evidence suggest that anxiety and depression are correlated in postpartum populations (Astbury, Brown, Lumley, and Small 1994; Hartley, Barroso, Rey, Pettit, & Bagner 2014; Matthey 2008) and the wider population (Clark and Watson 1991). Three items consistently loaded together as anxiety symptoms and two depression items consistently loaded together as depression symptoms across many studies of the EPDS (Astbury et al. 1994; Brouwers et al. 2001; Kabir et al., 2008; Matthey, 2008; Phillips et al. 2009; and Tuohy & McVey 2008). These items were consistent with the scales from which they were developed. The items “I have been anxious and worried for no good reason” and “I have felt scared or panicky for no good reason” were derived from the anxiety scale of the HADS. The third anxiety item was, “I have blamed my self unnecessarily when things have gone wrong.” The GAD-7 and PDSS have similar items in their scales. The first two items “I have been able to laugh and see the funny side of things” and “I have looked forward with enjoyment to things” were derived from the depression factor of the HADS. The Postpartum Depression Screening Scale (PDSS) has similar items (Beck & Gable, 2000).

A two-factor correlated model with nine items was an improvement over the original one-factor model suggested by Cox et al. (1987). The reliability of the nine-item

model improved slightly compared to the 10-item model. The Cronbach's alpha of the nine-item scale was $\alpha = .895$ and the ten-item scale was $\alpha = .882$.

Finally, since a correlated model was identified this indicated that the two factors may be part of a higher order model (Bentler, 2004). In this study, constraining the second order factor and allowing the two first order factors to be estimated was done to identify the higher order factor. Theoretically the higher order factor could be negative emotionality but further research is needed to determine this. The higher order model is not practically relevant to this study but rather conceptually relevant for future scale development. If further research were done with additional items the second-order factor model would be more parsimonious than a group-factor model (Rindskopf & Rose, 1988).

The construct of suicide ideation is important in the context of postpartum depression but was not adequately measured with one item in this sample. The mean score of item 10 (The thought of harming myself has occurred to me) was .26 (SD .62). This is consistent with other postpartum studies. Swalm et al., (2010) reported that 3% of the 3,853 participants reported thoughts of harming themselves. Chiu et al. (2017) reported that item ten was rarely endorsed, .8% reported that they quite often thought of self-harm, in their sample of 515 postpartum mothers.

Hypothesis 2. Family Support Scale

An important finding of this research was that many of the mothers reported very little social support. By computing a total score using the original 18-item scale the mean of total score of family social support in the current sample was 26 with a standard deviation of 11. In comparison, the Dunst et al. (1994) sample of the 224 families had a

total mean score of 48.42 with a standard deviation of 10.73. Six of the items from the original 18-item scale had means lower than two out of a range one to five. If the researcher includes a source of support in a measure that is not available to the majority of parents this is useful information to practitioners. It can be an indication that the researchers assumptions do not fit with the population or that the sample being measured does not reflect the population. Furthermore, the creators of the scale measured social support that was “NA” not available, and “1” available but not helpful but did not indicate how to code this support. If mother’s spouse or parents are not available then they are likely to seek support from someone else. This is very different from a spouse or parent that is available but not helpful. This suggests a relationship that is not functioning well and may cause stress for mother (McVey & Tuohy, 2007).

The family support scale was designed to be used with parents of children with disabilities. Mothers with postpartum depression may have different sources of social support or be lacking in social support. The Dunst et al. (1994) study used a sample of parents of a child with a disability. Kondrat et al. (2014) measured the social support available to kinship caregivers of foster children. Many of these caregivers had adult children, and a social support network from previous parenting. The item “Early Intervention” is only available to families of children who have a disability. School can only be a source of support if an older child is a student. Daycare is only a source of support if the target child or an older child is attending. Mothers did not indicate if they had a child in daycare but 82.5% of the mothers were not working at the initial survey and 52% had only one child. One can assume that many of these families did not have a relationship with a daycare or school at the initial survey.

The Dunst et al., (1994) and Kondrat et al., (2014) factor analysis models were not replicable in the current sample. Differences in the factor analyses may be attributed to the sample differences and the need for further refinement of the scale. This scale is based on the Bronfenbrenner's ecological model (1979), which posits that development is influenced by one's interaction with social networks. The social networks exist in the microsystem, which is the environment (i.e. school, workplace, home, neighborhood, peer group) where the individual interacts with others on an everyday basis. In the current analyses the subscales grouped together based on the primary point person for the social support (i.e. connections who resulted from the spouse or partner and connections who resulted from the mother). For example co-workers and my friends fell into the subscale of "my family support" and my spouse's friends fell into the subscale of "my spouse/partner support." This makes it hard to determine if an intervention at the community level is more effective than an intervention at the family level or vice versa.

Hypothesis 3. The current study did find more mothers at risk for anxiety when using the three-item anxiety scale who were not identified when using the 10-item scale. In a previous study, Kabir et al., (2008) examined using the three-item anxiety scale as a quick screening rather than using all ten items. There was a 28% increase of mothers at risk for PPD (270, 73%) when using only the three-item anxiety scale. This indicated that there were 89 mothers who had high anxiety symptoms who were not detected as being at risk when using the ten-item EPDS (181, 49%).

Hypothesis 4a. Consistent with previous research, by Robertson (2004) the demographic variables of income, education, ethnicity, age of mother and marital status

were not significantly different between mothers with low depression scores on the EPDS and mothers with high depression scores.

Contrary to the hypothesis, higher scores on the three-item anxiety scale did not differentiate mothers with risk factor of mental health history and pregnancy health problems related to anxiety and postpartum depression. The ten-item, nine-item, and six-item scales all discriminated between mothers with previous mental health complications better than the three-item scale. The six-item cutoff split the groups in such a way that almost all risk factors reached significance. The risk factor of mental health history was significant and pregnancy health complications just approached significance in the six-item scale at $p = .051$. Pregnancy and delivery complications may be more related to short-term stress but not PPD. This is consistent with research by Mundorf, et al., (2018) who found that EPDS scores of mothers with pregnancy and delivery complications lowered from six weeks postpartum to six months postpartum.

Hypothesis 4b. Family Social support has been linked to postpartum depression and anxiety and was partially supported in this study. The MANOVAs using the cutoffs for the 10-item and nine-item scale were not significant. When the cutoffs for three-item scale and six-item scale were used to create two independent variables, one of high anxiety and low anxiety and the other of high depression and low depression significant differences were found using MANOVA procedures for the depression scale but not the anxiety. The effect sizes were small, the η^2 of .020 for My family support and η^2 of .023 for Spouse/Partner Support. Pairwise comparisons showed that mothers with high anxiety and low depression had greater levels of My family support and Spouse Support in comparison to mothers with both high anxiety and high depression. This is partially

consistent with research by Hopkins and Campbell (2008). They found that mother's perception of spousal support, but not family support, was lower in women with depression (Hopkins & Campbell, 2008). Asselman et al., (2016) also found that mothers with comorbid anxiety and depression had lower levels of social support than mothers with anxiety only. In contrast to the current study, mothers with depression only had the highest levels of social support Asselman et al., (2016). Bowlby theorized that individuals with anxious attachment might have interaction patterns characterized as excessive reassurance seeking and support seeking (Bowlby, 1982). This may explain the higher levels perceived support among mothers with anxiety.

Hypothesis 4c. The demographic variables were not significantly associated with anxiety or depression in the sample but they were significantly associated with the dependent variable of family support. Education was included as a covariate to control for a possible confounding effect in the same series of MANOVAs done with the family support scale to further investigate this relationship. The Box M procedure was significant when the analyses included education as a covariate. These results should be interpreted with caution.

Hypothesis 4d. The objective of this step was to compare the groups when controlling for mental health risk factors. Significant pairwise comparisons were found between the mothers with high anxiety and low depression and high anxiety high depression. Family support continued to be significantly different between the two groups when controlling for mothers' mental health history. The differences in the spouse support factor were not significant when controlling for maternal mental health history but the professional help scale was significant.

Limitations

As this is a cross-sectional study, the analyses may suggest a relationship between the indicators and depression and anxiety but do not provide evidence for a causal relationship. The group of mothers with low anxiety but high depression was very small, only 10 and eight when including education as a covariate. This made for unequal group sizes, which are associated with violating the assumption of homogeneity of variance and an increase in Type I error (Tabachnick & Fidell, 1996). The factor analysis of the Family Support Scale did not produce similar factors to Dunst et al. (1994) or Kondrat et al. (2014) studies limiting interpretability of the measure across studies. Some of the subscales (My family (4 items), $\alpha = .609$; Social Support (2 items), $\alpha = .602$; and Professional Support (3 items), $\alpha = .632$) had low Cronbach's alpha scores indicating low internal consistency.

Chapter 6

Conclusion

There were many strengths of this project. One was that the EPDS was used with its intended population, postpartum mothers in community settings. The mothers in the sample varied in terms of income, education, age and ethnicity. The large sample of postpartum women allowed the data to be split and analyzed separately using EFA and CFA procedures. The presence of two factors in the EPDS supports prior research indicating that the measure is composed of two related constructs, depression and anxiety. The correlation indicates that they are part of a higher order construct that could be described as negative emotionality (Watson, Gamez & Simms, 2005).

The six-item scale was significantly associated with mental health history and family social support and approached significance for pregnancy health problems. Family support and spouse support show the most significant differences for mothers with depression as measured by the six-item scale. These results support the research of (Adouard et al., 2005; Brouwers et al., 2001; Grigoriadas et al., 2011; Guedeney & Fermanian, 1998; Jomeen & Martin, 2005; Phillips et al., 2009; Swalm et al., 2010).) and demonstrate the benefit of a two-factor model of depression and anxiety symptoms. The six-item scale was better indicator of risk factors related to depression and anxiety symptoms than the 10-item, nine-item and three-item scales.

There is very little evidence to support the anxiety factor as a meaningful way to differentiate the maternal risk factors available for study in this sample. Farr et al. (2014) and Giakoumaki et al. (2009) found that pregnancy complications were related to higher levels of anxiety but not depression. Falah-Hassani et al. (2016) found that problems with

breastfeeding were related to comorbid depression and anxiety. In this sample they occurred at similar levels for mothers at risk for depression or anxiety and those who had low EPDS scores.

The Kabir et al. (2008) study found that the three-item anxiety scale worked effectively as an ultra-brief screening tool to identify mothers at risk for anxiety and/or depression but this was not the case in the current study. There are many differences between the Kabir, et al. sample (2008) and this study that may explain why the three-item anxiety scale was not a better identifier in the current sample. Mothers in the Kabir et al. study (2008) were between the ages of 14 and 26, moreover, 77% were less than 20 years old. The majority was: unmarried (96.4%), first time mothers (61%) with less than a high school education 70.6%. Anxiety symptoms may be higher among adolescent and young mothers that are not consistent with the mothers in the current sample.

Implications of research for mentoring programs of mothers at risk for anxiety or depression

Mothers in this study were enrolled in a mentoring program for mothers with postpartum depression. It is notable that when the EPDS is made into two factors with different cutoffs for anxiety and depression, 23% (89) mothers had neither anxiety nor depression, 33% (121) had high anxiety symptoms, 3% (10) had high depression symptoms, and 41% (151) had high anxiety and high depression symptoms. Over 56% (210) of the sample did not have high depression symptoms at enrollment to the program. It may be that the 33% (121) mothers with high anxiety symptoms had transient anxiety that was related to pregnancy and the adjustment to parenting. It also may be that the mothers with high anxiety symptoms were referred from the postpartum day program for

mothers with depression. They may not have been depressed at enrollment to the program but were anxious about a reoccurring depressive episode. The perinatal period is one where mothers have multiple contacts with medical professionals, which would make it easy to measure anxiety and depression to determine if it is a transient problem or an ongoing concern (Schofield, Battle, Howard, and Ortiz-Hernandez 2014). Monitoring mother's symptoms of postnatal anxiety is important because mothers with anxiety are less likely to seek help than women with postpartum depression (Woolhouse et al., 2009). This may be because there is more awareness of postpartum depression and the negative effects on mothers and children.

Mothers with high anxiety and low depression consistently had higher levels of perceived support than mothers with depression only or comorbid depression and anxiety. These mothers did not have the mental health, physical health or demographic risk factors that would indicate that their anxiety symptoms were a long-term problem. One explanation could be that mothers who were above the cutoff for anxiety but not depression were experiencing transient anxiety that was more related to the adjustment to parenting than an episode of an underlying condition of depression or anxiety. Another explanation might be that the attachment style of these mothers (Ikeda, Hayashi, & Kamibeppu 2014). Research by Ikeda et al. (2014) of postpartum women with depression found that mothers had attachment styles characterized by degree of security (marked, moderate, or mild) and their style of insecurity: Enmeshed or Fearful (Anxious) and Angry-Dismissive or Withdrawn (Avoidant). Mothers with anxious attachment style may seek out support for assurance that they are parenting "correctly." Mothers with depression and anxiety may have attachment styles that are Angry-Dismissive or

Withdrawn Avoidant, which would explain why they might perceive their social support to be low. Attachment style would be useful to investigate to determine if it predicts differences in anxiety and depression. It would also be useful to determine if this changes over time. Social support appears to decrease over time mothers with comorbid anxiety and depression (Asselman et al., 2016).

Implications for Family Social Support

The Family Support Scale differentiates sources of social support between family, spouse, social and professional support. Mothers in this sample had significantly low levels of support from community members and professionals. Social support provided in the home by a paraprofessional is theorized to be beneficial to new mothers for multiple reasons. It helps new mothers to utilize their existing support (spouse/partner and family) and build their support networks (friends, co-workers, other parents, professionals). The paraprofessional is also a source of support. Emotional support provided by the mentor may increase the mother's feelings of self-efficacy and competence as a parent. Informational support about parenting, child development and maternal health helps the mother to better understand typical development and to recognize potential health and developmental concerns, which should reduce anxiety. Support provided by a mentor may be critical at this time period as other support may decline over time. Longitudinal studies show that perceptions of support availability declined from pregnancy to the postpartum period even though anxiety levels decreased from pregnancy to the postpartum (Asselmann et al., 2016).

Future research

Future research of anxiety in the postpartum period could investigate other constructs that have been related to anxiety to improve the construct validity of the three-item anxiety scale. For example, excessive reassurance-seeking behaviors are thought to be more related to anxiety than depression (Brockington et al., 2006). Other research has found that low perceived control is related to higher anxiety levels (Chorpita & Barlow, 1998). For example displeasure or lack of control in the birth experience has been related to later anxiety symptoms (Shorten, Shorten, & Kennedy, 2014).

The Family Social support scale would benefit from further refinement. Parenting programs would benefit from knowing if encouraging families to increase their social networks in anticipation of becoming a parent is important. Or is it beneficial to improve one's relationship with existing sources of support such as spouse and family members. It would be useful to know if types of support (e.g. instrumental, emotional, or informational) were related to depression and anxiety differently in the postpartum period. Other social support measures only addressed friend and family support (Surkan et al. 2006). Support from different family members, spouse/partner versus own parents, may have different benefits for mothers. Informational support from one's own parents may have more impact because one's own parents may be perceived as having more expertise than one's spouse (Haslam, Pakenham & Smith 2006).

Table 1.

Descriptive characteristics of study participants.

				Skewness		Kurtosis	
Characteristic	Range	<i>M</i>	<i>SD</i>	Statistic	<i>SE</i>	Statistic	<i>SE</i>
Age of Mother	15 - 46	29.89	6.28	.033	.125	-.729	.24
Age of baby in days	0 - 359	89	77.80	1.63	.125	2.10	.24
Pregnancy/Delivery complications	0 - 3	.72	.83	.845	.125	-.211	.25
Mental Health history	0 – 2	.84	.83	.305	.125	-1.48	.25
				Frequency		Percent	
Income							
Less than 10,000				70		19	
\$10,000-24,999				63		17	
\$25,000-49,999				88		24	
\$50,000-74,999				56		15	
\$75,000-99,999				43		12	
\$100,000 or more				27		7	
Missing data				24		6	
Marital Status							
Single				114		31	
Married				193		52	
Committed relationship				54		14	

Missing	10	3
<hr/>		
Race/Ethnicity		
White	243	65
Black	32	9
Hispanic/Latina	40	11
Asian	19	5
Other	25	7
Missing	12	3
<hr/>		
Education		
Less than high school graduate	34	9
High school graduate or GED	87	24
Some College	106	28
College Degree	80	22
Master's+	54	14
Missing	10	3
<hr/>		
N = 371.		

Table 2.

Descriptive characteristics of EPDS.

Item	Range	<i>M</i>	<i>SD</i>	Skewness		Kurtosis	
				Statistic	<i>SE</i>	Statistic	<i>SE</i>
EPDS_1	0 - 3	.80	.77	.75	.12	.12	.25
EPDS_2	0 - 3	.98	.80	.48	.12	-.28	.25
EPDS_3	0 - 3	1.6	.97	-.39	.12	-.81	.25
EPDS_4	0 - 3	1.8	.92	-.63	.12	-.33	.25
EPDS_5	0 - 3	1.4	1.01	-.04	.12	-1.14	.25
EPDS_6	0 - 3	1.6	.75	-.36	.12	-.13	.25
EPDS_7	0 - 3	1.1	1.04	.40	.12	-1.12	.25
EPDS_8	0 - 3	1.4	.88	.13	.12	-.67	.25
EPDS_9	0 - 3	1.2	.88	.34	.12	-.57	.25
EPDS_10	0 - 3	.22	.56	2.73	.12	7.16	.25
EPDS_Total	0-30	12	6	.02	.12	-.67	.25

N = 371.

Table 3.

Factor Loadings for Principal Components Analysis of two factor EPDS Scale.

	Depressive Symptoms	Anxiety Symptoms	Communalities
1. I have been able to laugh and see the funny side of things	.838	.095	.534
2. I have looked forward with enjoyment to things	.831	.127	.554
3. I have blamed my self unnecessarily when things have gone wrong	.282	.700	.413
4. I have been anxious and worried for no good reason	.146	.822	.366
5. I have felt scared or panicky for no good reason	.260	.807	.473
6. Things have been too much for me	.623	.397	.543
7. I have been so unhappy that I have had difficulty sleeping	.674	.321	.537
8. I have felt sad or miserable	.742	.450	.747
9. I have been so unhappy that I have been crying	.754	.350	.664

Note: Varimax Rotation. Sample 1 = 143.

Figure 1.

Hypothesized correlated two-factor model.

Figure 2.

Hypothesized second-order factor model.

Figure 3.

Correlated two-factor model with standardized parameter estimates.

Sample 2 = 240.

Table 4.

Goodness of fit statistics for four alternative measurement models of the EPDS assessed.

Model	χ^2	df	CFI	GFI	RMSE	[90% CI]	SRMR	AIC
A								
1 factor	188.60*	27	.84	.84	.154	.134-.175	.077	134.61
			9	6				
2 uncorrelated	162.96*	27	.87	.89	.142	.121-.162	.253	108.96
			3	2				
2 correlated	62.73*	26	.96	.94	.075	.051-.099	.049	10.72
			6	7				
2nd nd order	62.73*	26	.96	.94	.075	.051-.099	.049	10.72
constrained			6	7				

Note. N = 240; χ^2 = chi square; * p < .001; df = degrees of freedom; CFI = comparative fit index; RMSEA = root mean square error of approximation; CI = confidence interval; SRMR = standardized root mean-square residuals; AIC = Akaike's Information Criterion;

Figure 4.

Second-order model with standardized parameter estimates.

Sample 2 = 240.

Table 5.

Descriptive characteristics of Family Support Scale.

Item	Range	<i>M</i>	<i>SD</i>	Skewness		Kurtosis	
				Statistic	<i>SE</i>	Statistic	<i>SE</i>
FSS_1	1 - 5	2.6	1.5	.41	.13	-1.35	.25
FSS_2	1 - 5	2.3	1.4	.75	.13	-.86	.25
FSS_3	1 - 5	2.1	1.3	.85	.13	-.41	.25
FSS_4	1 - 5	1.8	1.2	1.4	.13	-.72	.25
FSS_5	1 - 5	3.2	1.6	-.24	.13	-1.46	.25
FSS_6	1 - 5	2.4	1.2	.49	.13	-.82	.25
FSS_7	1 - 5	1.5	.94	1.98	.13	3.39	.25
FSS_8	1 - 5	1.8	1.3	1.5	.13	.72	.25
FSS_9	1 - 5	1.5	.96	2.19	.13	4.21	.25
FSS_10	1 - 5	1.4	.88	2.55	.13	6.05	.25
FSS_11	1 - 5	1.3	.87	2.67	.13	6.43	.25
FSS_12	1 - 5	1.2	.64	3.64	.13	13.62	.25
FSS_13	1 – 5	1.4	.90	2.7	.13	6.70	.25
FSS_14	1 - 5	2.8	1.2	0.11	.13	-1.23	.25
FSS_15	1 – 5	1.44	1.07	2.33	.13	4.11	.25
FSS_16	1 – 5	1.31	.933	3.13	.13	8.73	.25

FSS_17	1 - 5	2.6	1.6	.31	.13	-1.5	.25
FSS_18	1 - 5	2.2	1.5	.77	.13	-.96	.25
FSS_Total	18 – 90	35	8.8	.73	.13	.33	.25

Sample 2 = 240.

Table 6.

Factor Loadings for Principal Components Analysis with Varimax Rotation of four-factor correlated FSS.

Item	1	2	3	4	Communalities
1. My spouse or partner's parents	.796	.164	.038	-.113	.675
2. My spouse or partner's relatives	.789	.208	.141	-.098	.695
3. My spouse or partner	.669	-.089	.024	.209	.500
4. My spouse or partner's friends	.648	.252	-.044	.156	.510
5. My parents	.102	.725	.045	-.152	.561
6. My relatives other than parents	.165	.734	.042	-.168	.596
7. My friends	.106	.614	.072	.323	.498
8. Co-workers	.070	.536	.063	.219	.344
9. Parent groups	-.030	.051	.120	.805	.666
10. Social groups	.119	.019	.033	.789	.638
11. My family or child's physician	.171	.371	.508	.134	.442
12. Professional helpers	.014	.038	.830	.089	.689
13. Professional agencies	.007	.003	.849	.007	.720

Note. Rotation Method: Varimax.

Figure 5.

Hypothesized correlated model of Family Social Support.

Figure 6.

Family Social Support Correlated model with standardized parameter estimates.

Table 7.
Descriptive statistics for Family Support Scale items.

Char.	<i>M</i>	<i>SD</i>	Skewness	Kurtosis
			Statistic	Statistic
FSS_1	2.25	1.44	0.75	-0.86
FSS_2	1.79	1.19	1.39	0.72
FSS_3	3.21	1.56	-0.24	-1.46
FSS_4	1.51	.937	1.98	3.39
FSS_5	2.63	1.53	0.41	-1.35
FSS_6	2.14	1.27	0.86	-0.41
FSS_7	2.40	1.23	0.49	-0.82
FSS_8	1.4	.89	2.55	6.05
FSS_9	1.35	.87	2.68	6.05
FSS_10	1.20	0.64	3.64	13.62
FSS_11	2.81	1.38	0.11	-1.23
FSS_12	2.58	1.56	0.31	-1.49
FSS_13	2.19	1.47	0.77	-0.96

Table 8.

Descriptive statistics for Family Support Scale factors.

					Skewness	Kurtosis
	Min.	Max.	<i>M</i>	<i>SD</i>	Statistic	Statistic
FSS_Total	13	56	27.50	7.80	0.699	0.156
FSS Spouse	4	20	8.76	3.81	0.673	-0.075
FSS_My family	4	20	8.56	3.40	0.755	0.078
FSS_Social	2	10	2.55	1.29	2.830	8.440
FSS_Professional	3	15	7.59	3.36	0.453	-0.726

Table 9.

Correlations of the four-factor Family Support Scale.

	FSS My Family	FSS Spouse/Partner	FSS Professional	FSS Social
1 FSS My Family				
2 FSS Spouse/Partner	0.329**			
3 FSS Professional	0.244**	0.161**		
4 FSS Social	0.099	0.093	0.182**	

**Correlation is significant at the 0.01 level (2-tailed).

Table 10.

Cutoff points for EPDS variations.

	Mothers	Mothers	Scores	Scores Above
	Above Cutoff	Below cutoff	Below	
10-item scale	181 (49%)	190 (51%)	0-12	13-30
9-item scale	176 (48%)	195 (52%)	0 -12	13 -30
9-item scale	203 (55%)	168 (45%)	0 – 11	12 - 27
3-item Anxiety scale	272 (73%)	99 (27%)	0 - 3	4 - 9
six-item Depression scale	161 (43%)	210 (57%)	0 -7	8 - 18

Table 11.
Chi-square tests of health histories 10-item EPDS.

	≤ 12 % (N)	≥ 13 % (N)	<i>Total</i> % (N)	χ^2	Phi
No MHH	27 (99)	17 (63)	44 (162)	14.87**	.200**
MHH (1)	14 (53)	14 (53)	28 (106)		
MHH (2+)	10 (38)	18 (65)	28 (103)		
Postpartum Health Complications					
0	24 (89)	25 (93)	49 (182)	1.18	.056
1	17 (62)	16 (58)	32 (120)		
2	10 (39)	8 (30)	19 (69)		

** $p < .001$.

Table 12.
Chi-square tests of health histories 9-item EPDS.

	≤ 11 % (N)	≥ 12 % (N)	Total % (N)	χ^2	Phi
No MHH	25 (92)	19 (70)	19 (162)	17.67***	.218***
MHH (1)	12 (44)	17 (62)	17 (106)		
MHH (2+)	8 (32)	19 (71)	28 (103)		
Postpartum Health Complications					
0	21 (77)	28 (105)	49 (182)	3.38	.095
1	14 (53)	18 (67)	32 (120)		
2	10 (38)	8 (31)	19 (69)		

*** $p < .0001$.

Table 13.
Chi-square tests of health histories Three-item EPDS.

	≤ 3 % (N)	≥ 4 % (N)	Total % (N)	χ^2	Phi
No MHH	15 (54)	29 (108)	19 (162)	6.96*	.137*
MHH (1)	7 (25)	22 (81)	17 (106)		
MHH (2+)	5 (20)	22 (83)	28 (103)		
Postpartum Health Complications					
0	14 (52)	35 (130)	49 (182)	1.05	.053
1	8 (28)	25 (92)	32 (120)		
2	5 (19)	14 (50)	19 (69)		

* $p < .031$

Table 14.
Chi-square tests of health histories six-item EPDS.

	≤ 7 % (N)	≥ 8 % (N)	Total % (N)	χ^2	Phi
No MHH	29 (107)	15 (55)	19 (162)	13.03**	.187**
MHH (1)	16 (58)	13 (48)	17 (106)		
MHH (2+)	12 (45)	16 (58)	28 (103)		
Postpartum Health Complications					
0	25 (96)	23 (86)	49 (182)	5.95*	.127*
1	18 (66)	15 (54)	32 (120)		
2	13 (48)	6 (21)	19 (69)		

** $p < .001$. * $p = .051$.

Table 15.

Correlations of demographic variables and Family Support Scale.

Characteristic	1	2	3	4	5	6	7	8	9
1. Income ^a	1								
2. Education ^a	.592**	1							
3. Age of mom ^a	.405**	.493**	1						
4. PHP ^a	.144**	.111*	.070	1					
5. MHF ^a	-.158**	-.139**	.106*	.081	1				
6. FSS_My_family	-.004	.038	-.042	.058	-.077	1			
7. FSS_Spouse/Partner	.206**	.186**	-.029	.028	-.172**	.329**	1		
8. FSS_Professional	-.027	-.047	-.046	.099	.135**	.244**	.161**	1	
9. FSS_Social	.201**	.161**	.012	.067	-.052	.099	.093	.182**	1
1. Sample size varies because of missing data.									
2. Pregnancy health problems									
3. Mental health history									

* Correlation is significant at the 0.05 level (2-tailed).

**Correlation is significant at the 0.01 level (2-tailed).

Appendix

Figure 1.
Measures and clinical interview forms.

FFRI Mom ID #: _____

Edinburgh Scale

Next, we would like to know how you are feeling. Please check the answer that comes closest to how you have felt IN THE PAST 7 DAYS, not just how you feel today.

<p>1. I have been able to laugh and see the funny side of things.</p> <p>☐₀ As much as I always could</p> <p>☐₁ Not quite so much now</p> <p>☐₂ Definitely not so much now</p> <p>☐₃ Not at all</p>	<p>6. Things have been too much for me.</p> <p>☐₃ Yes, most of the time I haven't been able to cope at all</p> <p>☐₂ Yes, sometimes I haven't been coping as well as usual</p> <p>☐₁ No, most of the time I have coped quite well</p> <p>☐₀ No, I have been coping as well as ever</p>
<p>2. I have looked forward with enjoyment to things.</p> <p>☐₀ As much as I ever did</p> <p>☐₁ Somewhat less than I used to</p> <p>☐₂ A lot less than I used to</p> <p>☐₃ Hardly at all</p>	<p>7. I have been so unhappy that I have had difficulty sleeping.</p> <p>☐₃ Yes, most of the time</p> <p>☐₂ Yes, sometimes</p> <p>☐₁ Not very often</p> <p>☐₀ No, not at all</p>
<p>3. I have blamed myself unnecessarily when things went wrong.</p> <p>☐₀ No, not at all</p> <p>☐₁ Hardly ever</p> <p>☐₂ Yes, sometimes</p> <p>☐₃ Yes, very often</p>	<p>8. I have felt sad or miserable.</p> <p>☐₃ Yes, most of the time</p> <p>☐₂ Yes, quite often</p> <p>☐₁ Not very often</p> <p>☐₀ No, not at all</p>
<p>4. I have been anxious or worried for no good reason.</p> <p>☐₃ Yes, often</p> <p>☐₂ Yes, sometimes</p> <p>☐₁ No, not much</p> <p>☐₀ No, not at all</p>	<p>9. I have been so unhappy that I have been crying.</p> <p>☐₃ Yes, most of the time</p> <p>☐₂ Yes, quite often</p> <p>☐₁ Not very often</p> <p>☐₀ No, never</p>
<p>5. I have felt scared or panicky for no very good reason.</p> <p>☐₃ Yes, often</p> <p>☐₂ Yes, sometimes</p> <p>☐₁ No, not much</p> <p>☐₀ No, not at all</p>	<p>10. The thought of harming myself has occurred to me.</p> <p>☐₃ Yes, quite often</p> <p>☐₂ Sometimes</p> <p>☐₁ Hardly ever</p> <p>☐₀ Never</p>

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Family Support Scale

Listed below are people and groups that often are helpful to members of a family raising a young child. Please indicate how helpful each source is to your family. Place a checkmark in the column that best describes how helpful each source has been to your family during the past 3 to 6 months.

If a source of help has not been available to your family during this period of time, please check the "Not available" column.

		Not available	Not at all helpful	Sometimes helpful	Generally helpful	Very helpful	Extremely helpful
1	My parents						
2	My spouse or partner's parents						
3	My relatives or kin, other than parents						
4	My spouse or partner's relatives or kin						
5	Spouse or partner						
6	My friends						
7	My spouse or partner's friends						
8	My own children						
9	Other parents (not including mentor mom)						
10	Co-workers						
11	Parent groups						
12	Social groups or clubs						
13	Church members or minister						
14	My family or child's physician						
15	Early childhood intervention program						
16	School or day care provider						
17	Professional helpers, such as social workers, therapists, teachers, etc.						
18	Professional agencies, such as public health, social services, mental health, etc. (not including Moms for Moms)						
19	Moms for Moms, Families First RI						

Maternal Self-Report Inventory

Instructions: Please note how accurately the following statements describe how you feel. Read each item carefully and when you are sure you understand it, indicate your answer by circling the answer which best expresses the degree to which the statement is true for you. Please answer each item as honestly as you can, and work rapidly, as first impressions are as good as any. Try to answer every question, and if in doubt, circle the answer that comes closest to expressing your feelings. Although some of the statements seem to be similar, they are not identical, and should be rated separately. Please place an X in the box that corresponds to your response.

		CF Completely False	MF Mainly False	UN Uncertain or Neither True nor False	MT Mainly True	CT Completely True
		CF	MF	UN	MT	CT
1	I think that I will be a good mother.					
2	I am confident that I will have a close and warm relationship with my baby.					
3	I don't have much confidence in my ability to help my baby learn new things.					
4	Looking forward to having a baby gave me more pleasure than actually having one.					
5	I have real doubts about whether my baby will develop normally.					
6	I often worry that I may be forgetful and cause something bad to happen to my baby.					
7	I am confident that I will be able to work out any normal problems that I might have with my baby					
8	I am concerned that I will have trouble figuring out what my baby needs.					
9	I worry about whether my baby might like me.					
10	I expect that I won't mind staying at home to care for my baby.					
11	I am concerned about whether my baby will develop normally.					
12	I doubt that my baby could love me the way I am.					
13	It really makes me feel depressed to think about all there is to do as a mother.					
14	I worry that I will not know what to do if my baby gets sick.					
15	It is difficult for me to know what my baby wants.					
16	I am afraid I will be awkward and clumsy when handling my baby.					
17	I feel confident about being able to teach my baby new things.					
18	I am confident that my baby will be strong and healthy.					
19	I feel that I will do a good job taking care of my baby.					
20	I know enough to be able to teach my baby many things that he/she will have to learn.					
21	I worry about being able to fulfill my baby's emotional needs.					
22	I am confident that my baby will love me very much.					

PSYCHIATRIC EVALUATION

Name: _____ DOB: _____

Date of Evaluation: _____ Time: _____

Referral Source: _____ Accompanied by: _____

Identifying Information:

Age _____ Marital status _____ Ethnic background _____ Gender _____ Occupation _____

Spiritual Orientation _____ Lives with _____

Chief Complaint: _____**History of Present Illness** (Describe severity and duration of presenting problem and symptoms, precipitants, level of distress, and impairment in functioning)

Perinatal History:

Number of weeks gestation _____ EDD _____

Patient plans to: ☐ Continue to term (keep baby) ☐ Continue to term (adoption) ☐ Terminate pregnancy✕ Any pregnancy complications ☐ No ☐ Yes, please explain _____✕ Does patient have any concerns taking medications while pregnant? ☐ No ☐ Yes, please explain _____**Postpartum History:**Number of weeks postpartum _____ Mode of delivery ☐ SVD ☐ C/S✕ Any delivery complications? ☐ No ☐ Yes, please explain _____✕ Breastfeeding ☐ Yes ☐ No, why not breastfeeding? _____✕ Any problems with breastfeeding? ☐ No ☐ Yes, please explain _____✕ Did patient express concern about medications/breastfeeding? ☐ Yes ☐ No, patient open to medications

Gravida _____ Para _____ Live births _____ # of stillbirths _____ # of misc. _____ # of term _____

History of:✕ Depression in Pregnancy ☐ No ☐ Yes, _____✕ Postpartum Depression ☐ No ☐ Yes, _____✕ Psychotherapy ☐ No ☐ Yes, _____✕ Psychopharm ☐ No ☐ Yes, _____**Current Mental Health Clinicians** ☐ None

Clinician _____ Modality/frequency _____ Outcome _____ Last visit/contact _____

Bibliography

- Adouard, F., Glangeaud-Freudenthal, N. M. C., & Golse, B. (2005). Validation of the Edinburgh Postnatal Depression Scale (EPDS) in a sample of women with high-risk pregnancies in France. *Archives of Women's Mental Health*, 8(2), 89-95. doi: 10.1007/s00737-005-0077-9
- Astbury, J., Brown, S., Lumley, J., & Small, R. (1994). Birth events, birth experiences and social differences in postnatal depression. *Australian and New Zealand Journal of Public Health*, 18(2), 176-184. Retrieved from <https://doi.org/10.1111/j.1753-6405.1994.tb00222.x>
- Asselmann, E., Wittchen, H. U., Erler, L., & Martini, J. (2016). Peripartum changes in social support among women with and without anxiety and depressive disorders prior to pregnancy: A prospective-longitudinal study. *Archives of women's mental health*, 19(6), 943-952. DOI: 10.1007/s00737-016-0608-6.
- Beck, C. T. & Gable, R. K. (2000). Postpartum Depression Screening Scale: development and psychometric testing. *Nursing Research*, 49(5): 272-282. Retrieved from <https://journals.lww.com/nursingresearchonline/pages/default.aspx>
- Beck, C. T. (2001). Predictors of postpartum depression: an update. *Nursing Research*, 50(5), 275-285. Retrieved from <https://journals.lww.com/nursingresearchonline/pages/default.aspx>
- Bedford, A., & Foulds, G. (1978). *Delusional-symptoms-states inventory. State of anxiety and depression* (Manual) Windsor: National Foundation for Educational Research.

- Bentler, P. M. (2004). *EQS 6.2: Structural equations program manual*. Encino, CA: Multivariate Software, Inc.
- Bina, R., & Harrington, D. (2016). The Edinburgh Postnatal Depression Scale: Screening tool for postpartum anxiety as well? Findings from a confirmatory factor analysis of the Hebrew version. *Maternal and Child Health Journal*, 20(4), 904-914. doi: 10.1007/s10995-015-1879-7
- Bowlby, J. (1982). Attachment and loss: Retrospect and prospect. *American Journal of Orthopsychiatry*, 52(4), 664. Retrieved from <http://dx.doi.org.uri.idm.oclc.org/10.1111/j.1939-0025.1982.tb01456.x>
- Britton, J.R. (2011). Infant temperament and maternal anxiety and depressed mood in the early postpartum period. *Women & Health*, 51(1) 55-71. doi: 10.1080/03630242.2011.540741
- Britton, J. R. (2008). Maternal anxiety: course and antecedents during the early postpartum period. *Depression & Anxiety*, 25(9), 793–800. Retrieved from <https://doi-org.uri.idm.oclc.org/10.1002/da.20325>
- Brockington, I. F., Macdonald, E., & Wainscott, G. (2006). Anxiety, obsessions and morbid preoccupations in pregnancy and the puerperium. *Archives of Women's Mental Health*, 9(5), 253-263. doi: 10.1007/s00737-006-0134-z
- Brouwers, E. P., van Baar, A. L., & Pop, V. J. (2001). Does the Edinburgh Postnatal Depression Scale measure anxiety? *Journal of Psychosomatic Research*, 51(5), 659-663. Retrieved from [https://doi.org/10.1016/S0022-3999\(01\)00245-8](https://doi.org/10.1016/S0022-3999(01)00245-8)
- Chiu, Y. H. M., Sheffield, P. E., Hsu, H. H. L., Goldstein, J., Curtin, P. C., & Wright, R. J. (2017). Subconstructs of the Edinburgh Postnatal Depression Scale in a

- multi-ethnic inner-city population in the US. *Archives of Women's Mental Health*, 20(6), 803-810. doi: 10.1007/s00737-017-0765-2
- Chojenta, C. L., Lucke, J. C., Forder, P. M., & Loxton, D. J. (2016). Maternal health factors as risks for postnatal depression: A prospective longitudinal study. *PLoS ONE* 11(1): e0147246. doi:10.1371/ journal.pone.0147246.
- Chorpita, B. F., & Barlow, D. H. (1998). The development of anxiety: The role of control in the early environment. *Psychological Bulletin*, 124(1), 3–21. Retrieved from <https://doi-org.uri.idm.oclc.org/10.1037/0033-2909.124.1.3>
- Clark, L. A., & Watson, D. (1991). Tripartite model of anxiety and depression: psychometric evidence and taxonomic implications. *Journal of Abnormal Psychology*, 100(3), 316. Retrieved from <http://dx.doi.org.uri.idm.oclc.org/10.1037/0021-843X.100.3.316>
- Clout, D., & Brown, R. (2015). Sociodemographic, pregnancy, obstetric, and postnatal predictors of postpartum stress, anxiety and depression in new mothers. *Journal of Affective Disorders*, 188, 60-67. Retrieved from <https://doi.org/10.1016/j.jad.2015.08.054>
- Cohen, S., & Wills, T. A. (1985). Stress, social support, and the buffering hypothesis. *Psychological bulletin*, 98(2), 310. doi: <http://dx.doi.org.uri.idm.oclc.org/10.1037/0033-2909.98.2.310>
- Cox, J. L., Holden, J. M., & Sagovsky, R. (1987). Detection of postnatal depression: Development of the 10-item Edinburgh Postnatal Depression Scale. *The British Journal of Psychiatry*, 150(6), 782-786. Retrieved from <https://doi-org.uri.idm.oclc.org/10.1192/bjp.150.6.782>

- Denis, A., Michaux, P., & Callahan, S. (2012). Factors implicated in moderating the risk for depression and anxiety in high risk pregnancy. *Journal of Reproductive and Infant Psychology*, 30(2), 124-134. doi: 10.1080/02646838.2012.677020
- Dennis, C. L., Brown, H. K., Falah-Hassani, K., Marini, F. C., & Vigod, S. N. (2017). Identifying women at risk for sustained postpartum anxiety. *Journal of Affective Disorders*, 213, 131-137. Retrieved from <http://dx.doi.org/10.1016/j.jad.2017.02.013>
- Dennis, C. L. (2003). Detection, prevention, and treatment of postpartum depression. In Stewart, D. E., Robertson, E., Dennis, C.-L., Grace, S. L., & Wallington, T. (Eds.), *Postpartum depression: Literature review of risk factors and interventions*. (pp. 73-196). Retrieved from https://www.who.int/mental_health/prevention/suicide/lit_review_postpartum_depression.pdf
- Dunkel-Schetter, C., Sagrestano, L. M., Feldman, P. & Killingsworth, C. (1996). Social support and pregnancy. In *Handbook of social support and the family* (pp. 375-412). Springer, Boston, MA.
- Dunst, C. J., Trivette, C. M., & Hamby, D. W. (1994). Measuring social support in families with young children with disabilities. In C. J. Dunst, C. M. Trivette & A. G. Deal (Eds.), *Supporting & strengthening families: Methods, strategies and practices* (Vol. 1) (pp. 152-160). Cambridge, MA: Brookline Books, Inc.
- Durlak, J.A., (1998) Common risk and protective factors in successful prevention programs. *American Journal of Orthopsychiatry* 68(4) 512-520. Retrieved from <http://dx.doi.org.uri.idm.oclc.org/10.1037/h0080360>

- Fabrigar L.R., Wegener, D.T., (2012). Exploratory factor analysis, Understanding Statistics New York: NY, Oxford University Press.
- Falah-Hassani, K., Shiri, R., & Dennis, C. L. (2016). Prevalence and risk factors for comorbid postpartum depressive symptomatology and anxiety. *Journal of Affective Disorders*, 198, 142-147. Retrieved from <http://dx.doi.org/10.1016/j.jad.2016.03.010>
- Farr, S. L., Dietz, P. M., O'Hara, M. W., Burley, K., & Ko, J. Y. (2014). Postpartum anxiety and comorbid depression in a population-based sample of women. *Journal of Women's Health*, 23(2), 120-128. doi: 10.1089/jwh.2013.4438
- Furtado, M. Van Lieshout, R. J., Van Ameringen, M., Green, S. M., & Frey, B. N. (2019) Biological and psychosocial predictors of anxiety worsening in the postpartum period: A longitudinal study. *Journal of Affective Disorders* 250(1), 218-225. Retrieved from <https://doi.org/10.1016/j.jad.2019.02.064>
- Giannandrea, S. A., Cerulli, C., Anson, E., & Chaudron, L. H. (2013). Increased risk for postpartum psychiatric disorders among women with past pregnancy loss. *Journal of Women's Health*, 22(9), 760-768. doi: 10.1089/jwh.2012.4011
- Giakoumaki, O., Vasilaki, K., Lili, L., Skouroliahou, M., & Liosis, G. (2009). The role of maternal anxiety in the early postpartum period: Screening for anxiety and depressive symptomatology in Greece. *Journal of Psychosomatic Obstetrics & Gynecology*, 30(1), 21-28. doi: 10.1080/01674820802604839
- Gjerdingen, D., McGovern, P., Attanasio, L., Johnson, P. J., & Kozhimannil, K. B. (2014). Maternal depressive symptoms, employment, and social support. *The*

Journal of the American Board of Family Medicine, 27(1), 87-96. doi:
10.3122/jabfm.2014.01.130126

Goodman, J. H., Watson, G. R., & Stubbs, B., (2016). Anxiety disorders in postpartum women: A systematic review and meta-analysis. *Journal of Affective Disorders*, 203, 292-331. Retrieved from <http://dx.doi.org/10.1016/j.jad.2016.05.033>

Grant, K. A., Bautovich, A., McMahon, C., Reilly, N., Leader, L., & Austin, M. P. (2012). Parental care and control during childhood: associations with maternal perinatal mood disturbance and parenting stress. *Archives of Women's Mental Health*, 15(4), 297-305. doi: 10.1007/s00737-012-0292-0.

Grigoriadis, S., de Camps Meschino, D., Barrons, E., Bradley, L., Eady, A., Fishell, A., ... & Ross, L. E. (2011). Mood and anxiety disorders in a sample of Canadian perinatal women referred for psychiatric care. *Archives of Women's Mental Health*, 14(4), 325-333. DOI: 10.1007/s00737-011-0223-5.

Guedeney, N., & Fermanian, J. (1998). Validation study of the French version of the Edinburgh Postnatal Depression Scale (EPDS): New results about use and psychometric properties. *European Psychiatry*, 13(2), 83-89. Retrieved from [https://doi.org/10.1016/S0924-9338\(98\)80023-0](https://doi.org/10.1016/S0924-9338(98)80023-0)

Hanley, B., Tasse, M. J., Aman, M. G., & Pace, P. (1998). Psychometric properties of the family support scale with head start families. *Journal of Child and Family Studies*, 7(1), 69-77. Retrieved from <https://www.springer.com/psychology/child+%26+school+psychology/journal/10826>

- Hartley, C. M., Barroso, N., Rey, Y., Pettit, J. W., & Bagner, D. M. (2014). Factor structure and psychometric properties of English and Spanish versions of the Edinburgh Postnatal Depression Scale among Hispanic women in a primary care setting. *Journal of Clinical Psychology, 70*(12), 1240-1250. doi: 10.1002/jclp.22101
- Haslam, D. M., Pakenham, K. I., & Smith, A. (2006). Social support and postpartum depressive symptomatology: The mediating role of maternal self-efficacy. *Infant Mental Health Journal, 27*(3), 276-291. doi: 10.1002/imhj.20092
- Heron, J., O'Connor, T. G., Evans, J., Golding, J., Glover, V., & ALSPAC Study Team. (2004). The course of anxiety and depression through pregnancy and the postpartum in a community sample. *Journal of Affective Disorders, 80*(1), 65-73. doi:10.1016/j.jad.2003.08.004
- Himmelhoch, J., Levine, J., & Gershon, S. (2001). Historical overview of the relationship between anxiety disorders and affective disorders. *Depression and Anxiety, 14*(2), 53-66. Retrieved from <https://onlinelibrary.wiley.com/journal/15206394>
- Hollon, S. D., Kendall, P. C., & Lumry, A. (1986). Specificity of depressotypic cognitions in clinical depression. *Journal of Abnormal Psychology, 95*(1), 52-59. Retrieved from <https://doi-org.uri.idm.oclc.org/10.1037/0021-843X.95.1.52>
- Hopkins, J., & Campbell, S. B. (2008). Development and validation of a scale to assess social support in the postpartum period. *Archives of Women's Mental Health, 11*(1), 57-65. doi: 10.1007/s00737-008-0212-5

- Horn J. L. (1965) A rationale and tests for the number of factors in factor analysis. *Psychometrika*, 30(2): 179-185. doi: 10.1007/BF02289447.
- Hu, L. & Bentler, P. M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling*, 6(1), 1- 55. doi: 10.1080/10705519909540118.
- Ikeda, M., Hayashi, M., and Kamibeppu, K. (2014) The relationship between attachment style and postpartum depression. *Attachment & Human Development* 16(6) 557-572.
- Jomeen, J., & Martin, C. R. (2005). Self-esteem and mental health during early pregnancy. *Clinical Effectiveness in Nursing*, 9(1), 92-95. doi: 10.1080/02646830500129297
- Jones , I. Cantwell, R., (2010). The classification of perinatal mood disorders— suggestions for DSMV and ICD11. *Archives of Women's Mental Health*, 13(1), 33-36. doi: 10.1007/s00737-009-0122-1
- Kabir, K., Sheeder, J., & Kelly, L. S. (2008). Identifying postpartum depression: are three questions as good as ten? *Pediatrics*, 122(3), e696-e702. doi:10.1542/peds.2007-1759
- Kingston, D., & Tough, S. (2014). Prenatal and postnatal maternal mental health and school-age child development: A systematic review. *Maternal and Child Health Journal*, 18(7), 1728-1741. doi: 10.1007/s10995-013-1418-3
- Kline, R. B. (2011). *Principles and practices of structural equation modeling* (3rd ed.). New York, NY: Guilford Press.

- Ko, J. Y., Farr, S. L., Dietz, P. M., & Robbins, C. L. (2012). Depression and treatment among U.S. pregnant and non-pregnant women of reproductive age, 2005–2009. *Journal of Women's Health, 21*(8), 830-836. doi: 10.1089/jwh.2011.3466
- Kondrat, D., Swanke, J. R., Littlewood, K., & Strozier, A. (2014). Measuring social support among kinship caregivers: Confirming the factor structure of the Family Support Scale. *Child Welfare, 93*(3). Retrieved from <https://www.cwla.org/child-welfare-journal/>
- Langsrud, Ø. (2003). ANOVA for unbalanced data: Use Type II instead of Type III sums of squares. *Statistics and Computing, 13*(2), 163-167. Retrieved from <https://link.springer.com/journal/11222>
- Lautenschlager, G. J. (1989). A comparison of alternatives to conducting Monte Carlo analyses for determining parallel analysis criteria. *Multivariate Behavioral Research, 24*(3), 365-395. Retrieved from https://doi-org.uri.idm.oclc.org/10.1207/s15327906mbr2403_6
- Leahy-Warren, P., McCarthy, G., & Corcoran, P. (2011). First-time mothers: social support, maternal parental self-efficacy and postnatal depression. *Journal of Clinical Nursing, 21*(3-4), 388-397. doi: 10.1111/j.1365-2702.2011.03701.x
- Lee King, P. (2012). Replicability of structural models of the Edinburgh Postnatal Depression Scale (EPDS) in a community sample of postpartum African American women with low socioeconomic status. *Archives of Women's Mental Health, 15*(2), 77–86. Retrieved from <https://doiorg.uri.idm.oclc.org/10.1007/s00737-012-0260-8>

- Lindahl, V., Pearson, J. L., & Colpe, L. (2005). Prevalence of suicidality during pregnancy and the postpartum. *Archives of Women's Mental Health*, 8(2), 77-87. doi: 10.1007/s00737-005-0080-1
- Martini, J., Petzoldt, J., Einsle, F., Beesdo-Baum, K., Höfler, M., & Wittchen, H. U. (2015). Risk factors and course patterns of anxiety and depressive disorders during pregnancy and after delivery: A prospective-longitudinal study. *Journal of Affective Disorders*, 175, 385-395. Retrieved from <http://dx.doi.org/10.1016/j.jad.2015.01.012>
- Matthey, S. (2008). Using the Edinburgh postnatal depression scale to screen for anxiety disorders. *Depression and Anxiety*, 25(11), 926-931. doi: 10.1002/da.20415
- Matthey, S., Barnett, B., Howie, P., & Kavanagh, D. J. (2003). Diagnosing postpartum depression in mothers and fathers: Whatever happened to anxiety? *Journal of Affective Disorders*, 74(2), 139-147. Retrieved from <https://www.journals.elsevier.com/journal-of-affective-disorders>
- Maxwell, S. E., & Delaney, H. D. (2018). *Designing experiments and analyzing data: A model comparison perspective* (3rd ed). New York, NY: Routledge.
- McVey, C., & Tuohy, A. (2007). Differential effects of marital relationship and social support on three subscales identified within the Edinburgh Postnatal Depression Scale. *Journal of Reproductive and Infant Psychology*, 25(3), 203-209. doi: 10.1080/02646830701467256

- Miller, R. L., Pallant, J. F., & Negri, L. M. (2006). Anxiety and stress in the postpartum: Is there more to postnatal distress than depression? *BMC Psychiatry*, 6(1), 1. Retrieved from <https://bmcpsy psychiatry.biomedcentral.com>
- Moran, T. E., Polanin, J. R., & Wenzel, A. (2014). The postpartum worry-scale revised: An initial validation of the postpartum worry scale. *Archives of Women's Mental Health* 17(1) 41-48. doi: 10.1007/s00737-013-0380-9
- Mundorf, C., Shankar, A., Moran, T., Heller, S., Hassan, A., Harville, E., & Lichtveld, M. (2018). Reducing the risk of postpartum depression in a low-income community through a community health worker intervention. *Maternal and Child Health Journal*, 22(4), 520-528. doi: 10.1007/s10995-017-2419-4
- O'Connor E., Rossom R. C., Henninger M., Groom H. C., Burda B. U., Henderson J. T., Bigler, K. D., & Whitlock E. P. (2016). Screening for depression in adults: An updated systematic evidence review for the U.S. Preventive Services Task Force. Evidence Synthesis No. 128. AHRQ Publication No. 14-05208-EF-1. Rockville, MD: Agency for Healthcare Research and Quality. Retrieved from <https://www.ncbi.nlm.nih.gov/books/NBK349027/>
- Papakostas, G. I., Trivedi, M. H., Alpert, J. E., Seifert, C. A., Krishen, A., Goodale, E. P., & Tucker, V. L. (2008). Efficacy of bupropion and the selective serotonin reuptake inhibitors in the treatment of anxiety symptoms in major depressive disorder: A meta-analysis of individual patient data from 10 double-blind, randomized clinical trials. *Journal of Psychiatric Research*, 42(2), 134-140. Retrieved from <https://doi.org/10.1016/j.jpsychires.2007.05.012>

- Phillips, J., Charles, M., Sharpe, L., & Matthey, S. (2009). Validation of the subscales of the Edinburgh Postnatal Depression Scale in a sample of women with unsettled infants. *Journal of Affective Disorders, 118*(1), 101-112.
doi:10.1016/j.jad.2009.02.004
- Reck, C., Noe, D. Gerstenaluer, J., & Stehle, E. (2012). Effects of postpartum anxiety disorders and depression on maternal self-confidence. *Infant Behavior and Development 35*(2), 26-272. Retrieved from
<https://doi.org/10.1016/j.infbeh.2011.12.005>.
- Reck, C., Struben, K., Backenstrass, M., Stefenelli, U., Reinig, K., Fuchs, T., ... & Mundt, C. (2008). Prevalence, onset and comorbidity of postpartum anxiety and depressive disorders. *Acta Psychiatrica Scandinavica, 118*(6), 459-468.
- Reid K. M., & Taylor, M. G. (2015). Social support, stress, and maternal postpartum depression: A comparison of supportive relationships. *Social Science Research 54*, 246-262. Retrieved from <http://dx.doi.org/10.1016/j.ssresearch.2015.08.009>
- Rindskopf, D., & Rose, T. (1988). Some theory and applications of confirmatory second-order factor analysis. *Multivariate behavioral research, 23*(1), 51-67.
- Robertson, E., Grace, S., Wallington, T., & Stewart, D. E. (2004). Antenatal risk factors for postpartum depression: A synthesis of recent literature. *General Hospital Psychiatry, 26*(4), 289-295. Retrieved from
<https://doi.org/10.1016/j.genhosppsych.2004.02.006>
- Ross, L. E., Evans, S. G., Sellers, E. M., & Romach, M. K. (2003). Measurement issues in postpartum depression part one: Anxiety as a feature of postpartum

- depression. *Archives of Women's Mental Health*, 6(1), 51-57. Retrieved from <http://www.springer.com.uri.idm.oclc.org/us/>
- Schofield, C. A., Battle, C. L., Howard, M., & Ortiz-Hernandez, S. (2014). Symptoms of the anxiety disorders in a perinatal psychiatric sample: a chart review. *The Journal of Nervous and Mental Disease*, 202(2), 154-160. doi: 10.1097/NMD.0000000000000086
- Siu, A. L., Bibbins-Domingo, K., Grossman, D. C., Baumann, L. C., Davidson, K. W., Ebell, M., ... & Krist, A. H. (2016). Screening for depression in adults: U.S. Preventive Services Task Force recommendation statement. *Journal of the American Medical Association*, 315(4), 380-387. doi:10.1001/jama.2015.18392
- Sit, D., Rothschild, A. J., & Wisner, K. L. (2006). A review of postpartum psychosis. *Journal of Women's Health*, 15(4), 352-368. Retrieved from <http://www.springer.com.uri.idm.oclc.org/us/>
- Sherbourne, C. D., & Stewart, A. L. (1991). The MOS social support survey. *Social science & medicine*, 32(6), 705-714. Retrieved from [https://doi.org/10.1016/0277-9536\(91\)90150-B](https://doi.org/10.1016/0277-9536(91)90150-B)
- Shorten, A., Shorten, B., & Kennedy, H. P. (2014). Complexities of choice after prior cesarean: a narrative analysis. *Birth*, 41(2), 178-184. Retrieved from <https://doi-org.uri.idm.oclc.org/10.1111/birt.12082>
- Snaith, R. P., Constantopoulos, A. A., Jardine, M. Y., & McGuffin, P. (1978). A clinical scale for the self-assessment of irritability. *The British Journal of Psychiatry*, 132(2), 164-171. Retrieved from <https://doi-org.uri.idm.oclc.org/10.1192/bjp.132.2.164>

- Stewart, D. E., Robertson, E., Dennis, C. L., Grace, S. L., & Wallington, T. (2003). Postpartum depression: Literature review of risk factors and interventions. *Toronto: University Health Network Women's Health Program for Toronto Public Health*. Retrieved from http://www.who.int/mental_health/prevention/suicide/lit_review_postpartum_depression.pdf
- Surkan, P. J., Peterson, K. E., Hughes, M. D. & Gottlieb, B. R. (2006). The role of social networks and support in postpartum women's depression: a multiethnic urban sample. *Maternal and Child Health Journal* 10(4), 375-383. doi: 10.1007/s10995-005-0056-9
- Swalm, D., Brooks, J., Doherty, D., Nathan, E., & Jacques, A. (2010). Using the Edinburgh postnatal depression scale to screen for perinatal anxiety. *Archives of Women's Mental Health*, 13(6), 515-522. doi: 10.1007/s00737-010-0170-6.
- Tabachnick, B. G. & Fidell L. S. (1996). *Using Multivariate Statistics* (3rd ed). New York, NY: Harper Collins.
- Taylor, S.E. (2010). Health psychology. In R.F. Baumeister & E.J. Finkel (Eds.), *Advanced social psychology: The state of the science* (pp. 697-731). New York, NY: Oxford University Press.
- Tuohy, A., & McVey, C. (2008). Experience of pregnancy and delivery as predictors of postpartum depression. *Psychology, Health and Medicine*, 13(1), 43-47. doi:10.1080/13548500701294531

- Velicer, W. F. (1976). The relation between factor score estimates, image scores and principal components scores. *Educational and Psychological Measurement*, 136, 149-159. Retrieved from <https://journals.sagepub.com/home/epm>
- Velicer, W. F., Eaton, C. A., & Fava, J. L. (2000). Construct explication through factor or component analysis: A review and evaluation of alternative procedures for determining the number of factors or components. In Goffin, R. D., & Helms, E. (Eds.), *Problems and Solutions in Human Assessment: Honoring Douglas N. Jackson at Seventy*. (pp. 41-71). Boston, MA: Kluwer.
- Watson, D., Gamez, W., & Simms, L. J. (2005). Basic dimensions of temperament and their relation to anxiety and depression: A symptom-based perspective. *Journal of Research in Personality*, 39(1), 46-66. Retrieved from <https://doi.org/10.1016/j.jrp.2004.09.006>
- Wisner, K. L., Perel, J. M., Peindl, K. S., Hanusa, B. H., Findling, R. L. & Rapport, D. J. (2001). Prevention of recurrent postpartum depression: A randomized clinical trial. *The Journal of Clinical Psychiatry*, 62(2), 82-86. Retrieved from <https://www.psychiatrist.com/jcp/Pages/home.aspx>
- Woolhouse, H., Brown, S., Krastev, A., Perlen, S., & Gunn, J. (2009). Seeking help for anxiety and depression after childbirth: Results of the Maternal Health Study. *Archives of Women's Mental Health* 12 (2), 75-83. doi: 10.1007/s00737-009-0049-6
- Zigmond, A. S., & Snaith, R. P. (1983). The Hospital Anxiety and Depression Scale. *Acta Psychiatrica Scandinavica*, 67(6), 361-370. Retrieved from <https://onlinelibrary.wiley.com/journal/16000447>

Zimmerman, M., McDermut, W., & Mattia, J. I. (2000). Frequency of anxiety disorders in psychiatric outpatients with major depressive disorder. *American Journal of Psychiatry*, 157(8), 1337-1340. Retrieved from <https://ajp.psychiatryonline.org>

Zwick, W. R., Velicer, W. F. (1986). Comparison of five rules for determining the number of components to retain. *Psychological Bulletin* 99(3) 432-442.

Retrieved from

<http://dx.doi.org.uri.idm.oclc.org/10.1037/0033-2909.99.3.432>