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Maternal Postnatal Depressive Symptoms and Its Effects on Infant Bonding

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Abstract

The objective of this thesis is to gain insight on precipitating factors that increase postpartum mother's depressive symptoms, including stress and anxiety, and how attachment is influenced. Maternal-infant bonding is defined as the emotional relationship and interaction between mother and infant. Postnatal depressive symptoms typically are under-diagnosed due to a lack of education and the stigma of believing that the effects are "normal" consequences of motherhood. Those affected may not seek professional help. Unrealistic expectations about bonding with their infants can have a negative mental health impact on mothers and influence infants' behaviors. High expectations of needing to be a perfect mother or not meeting certain goals for their child's care can make mothers feel unaccomplished, increase stress and frustration, lead to parental burnout, and in severe cases, resentment towards their infant. Many factors impact maternal experiences in the postpartum phase, including economic stressors and marital differences, but most importantly infant behaviors. Mothers who struggle to meet their infant's needs, such as feeding, diaper changes, or sleeping arrangements may encounter negative infant reactivity emotions, which only deepens their depression.

To investigate, primary research articles about mother-infant attachment and bonding and causes of ineffective attachment were examined. A plan for future study will include the Maternal Role Attainment Theory by Ramona Mercer. The study will use a prospective longitudinal mixed methods design. Two hundred pregnant women will be followed until one-year postpartum. Quantitative data collection will include surveys asking about mother's anxiety on a rating scale. Qualitative data will be gathered on infants' emotional reactivity when stressed and interventions used by mothers to console them. This research may offer insights that aids nurses in providing effective care for mothers with postpartum depression and their newborns.

Research Question

In women's experience of motherhood, what effects do maternal postnatal depressive symptoms, including stress and anxiety, have on infant bonding within the first year of life compared to mothers that do not report any symptoms?

Introduction

Some might say maternal attachment and infant bonding begins when a mother hears the fetus's heartbeat for the first time at an ultrasound visit or when she sees her newborn's face for the very first time after birth. Others may even say it begins as early as conception. Whether it be the prior or latter, building a trusting relationship will help with the process. In the first year of the infant's life, starting from the day they were born to their first birthday, maternal postnatal depression, including stress and anxiety, can affect the infant's temperaments and emotional reactivity, thus affecting maternal-infant bonding and attachment.

Symptoms of maternal postnatal depressive include postpartum depression, stress, and anxiety. According to the U.S Department of Health and Human Services, Office of Women's Health, postpartum depression occurs for longer than two weeks after childbirth (2021). Symptoms may include feeling hopelessness, emptiness, having sad or flat emotions, withdrawal from friends and family, or losing interest in activities. If any of the following occurs, a doctor's visit is advised to receive support and treatment, needed for the safety of the infant and mother. Risk factors include a history of depression (before pregnancy or previous pregnancy) or mood disorders, inadequate social support, or financial worries.

In birth settings, the enhancement of the growing bond begins in the first hour of life with skin-to-skin contact, where the newborn is placed on the mother's chest. It also referred to as the 'Golden Hour.' It provides stabilization in heart rate and temperature and helps the transition

from the womb to the outside world for the infant, promotes tactile interaction and interaction for the mother, and aids in initiating breastfeeds (Anderson, G., Bergman, N., Medley, N., & Moore, E., 2016). With healthy mother-infant relationships, trust is established, and a bond can develop. With maternal attachment, if a bond is successful, infants will respond with behaviors of eye-to-eye contact, following and focusing on the mother's movement, smiles, easily consolable, and predictable activities (Dagli, F., & Karakas, N., 2019).

When the infant's needs are not met and no trust is established, infants may present behaviors of avoidance of eye contact or uninterested in attention from mothers, bland facial expressions, inconsolable, and unpredictable schedules such as inconsistent awake and sleep routines. Maternal behaviors exhibited that reduce the chance for infant attachment and bonding include expressing verbal and nonverbal cues of displeasure or disappointment such as not attending and ignoring infant needs or cries, frowning at the infant, rough handling, and failure to identify the infant as a family member (Dagli & Karakas, 2019). An unhealthy relationship will put stress on both the mother and infant, affecting their physical and mental growth, as well as safety. The goal is to build a trusting relationship and provide a secure environment for the infant to develop and meet their developmental stages.

Some maternal depression does not affect infant bonding, but in severe cases, it does. The insecure attachment put the infant at risk for childhood development and growth issues. Maternal depression can begin prenatally. When mothers are not taking care of themselves, it puts the fetus at risk for a higher risk of preterm, birth, low birth weight, and in some cases, spontaneous abortion (Canadian Paediatric Society, 2004). Once born, the infant may have difficulty controlling their anger, poor attention span, or lower cognitive performance. This is due to maternal depression hindering interaction and coping with actions. A child will typically

mirror the mother's responses and actions. As the child grows older, many behavioral and academic issues may arise. Possible consequences include passive noncompliance, lower social interaction, anxiety and panic disorders, mood disorders, poor decision-making, or learning disabilities (Canadian Paediatric Society, 2004).

Literature Review

Search Strategy

To answer the following questions, a review of the literature was conducted:

1. What risk factors affect postpartum depressive symptoms, including stress and anxiety?
2. How can maternal expectations influence bonding and attachment behaviors?
3. Which interventions can health care professionals help improve maternal-infant bonding and attachment?

In finding the supporting articles for the research topic of *Maternal Depressive Symptoms in Relation to Maternal-Infant Bonding and Attachment,* six articles were reviewed and analyzed. The search terms consisted of maternal depressive symptoms, including *anxiety* and *postpartum depression*, *maternal expectations*, *infant behaviors*, and *bonding and attachment issues*. Most articles come from academic journals and meta-analyses that range from qualitative, quantitative, cross-sectional, and prospective longitudinal studies. The main goals were to find at least one article that included risk factors of maternal postnatal depressive symptoms and possible ways to prevent, observe and analyze the effects it has on infant behaviors and find interventions to reduce occurrences or prevent poor maternal-infant bonding and attachment. The articles will be grouped into three categories, (1) maternal risk factors, (2) impacts of infant temperament, and (3) interventions.

Category 1: Maternal Risk Factors for Impaired Maternal-Infant Bonding and Attachment

In summary, the two articles found explains the impact prenatal depressive symptoms have on the maternal postnatal experience. Motherhood can influence emotional, social, and physical outcomes. Mothers who have expectations of maternal-infant bonding and attachment before birth have reported unmet expectations during the postpartum period. At risk are mothers with postpartum depressive symptoms before pregnancy including stress and anxiety. Others include unplanned pregnancy, young maternal age, low education, low income, ethnic minorities, and history of psychopathology. Postpartum depression (PPD) may be influenced by marital discord and impaired occupational/social function, which can create less affectionate and withdrawn behavior toward their infants. Parenting stress and psychiatric symptoms restrict mothers from creating a safe and trusting bond with their infants.

In the prospective longitudinal study, named "*Maternal Perceived Bonding Towards the Infant and Parenting Stress in Women at Risk of Postpartum Psychosis With and Without a Postpartum Relapse"* (Biaggi, Conroy, Dazzan, Fuste, Hazelgrove, Howard, Mehta, Miele, Seneviratne, Pariante, Pawlby, & Waites, 2021), followed a group of individuals over a certain amount of time and focused on how parenting stress and psychiatric symptoms affect maternal bonding. Their hypotheses:

1. Women at risk for postpartum depression will report unmet infant expectations with increased parenting stress.
2. Maternal stress and childhood maltreatment affect maternal-infant bonding quality.

The study followed a total of 75 mothers from 25 weeks gestation to 12 months postpartum. Of those 75 mothers, 46 had PPD risk factors and 26 were healthy, the control group. These women were asked to fill out a quantitative questionnaire of their maternal mental state, which included

the PANSS: Positive and Negative Syndrome Scale, HAM-D: Hamilton Depression Rating Scale, GAF: Global Assessment of Functioning, BDI: Beck Depression Inventory, and STAI-S: State-Trait Anxiety Inventory (State subscale). It was discovered that at risk mothers reported higher levels of parenting stress than the control group, while healthy mothers showed no evidence of PPD risk factors. The majority of the at-risk mothers reported having negative experiences towards their infants, such as lower-quality attachment than the control group. Mothers reporting a history of childhood maltreatment did not contain enough supporting evidence to conclude the effects it has on the quality of attachment. It was concluded the best way to prevent PPD is to intervene during the perinatal period by providing screenings and resources for pregnant mothers to manage their parenting stress and anxiety thus hopefully improving their infant bonding and having positive experiences.

Strengths	• Compared to a controlled group and experimental group (healthy mothers vs. at risk for PPD mothers). • All participants had a baseline of maternal mental state at 25 weeks gestation. • The study was approved by the local ethics community and all participants provided written consent.
Limitations	• Small sample size (not enough data was given to be significant). • Had an unequal number of participants in the groups compared. • Psychiatric relapse did not have a definite definition, which can be interpreted differently by each person.

A cross-sectional study, defined as a collection of data from many different individuals at one single point in time, was performed in *"The Relationship Between Disconfirmed Expectations of Motherhood, Depression, and Mother–Infant Attachment in the Postnatal Period"* (Rizzo & Watsford, 2020). The sample size was 238, ranging age from 19 to 44 from Australia. They were asked to complete an online survey of their postnatal experience from the

first 12 months after birth. The survey consisted of both quantitative and qualitative formatted-style questions. The examples of the questions asked were:

1. Does levels of support and maternal expectations have an impact on their postnatal period?
2. How does depression affect maternal attachment feelings/emotions in infant relationships postnatally?

Throughout the article, it addresses the importance for mothers to create realistic motherhood expectations, which is needed in prenatal education. In conclusion, mothers who had fewer positive experiences than expected postnatally reported having lower levels of attachment and higher levels of depression. Compared to mothers with more positive experiences than expected postnatally also reported higher levels of depression. With PPD it can affect a mother's psychosocial functioning, employment, and relationships with their infant and others. Infants are at risk for having unmet basic needs of food, water, and hygiene, thus possibly affecting their social and emotional development in further development.

Strengths	• The sample size was large. • The researcher took into consideration other factors affecting maternal-infant attachment (ex: age, income, birth method, previous mental illness, and breastfeeding duration). • The researcher was aware of their limitations and provided possible changes if the study were to be performed again.
Limitations	• The study was specially done on those in Australia (it cannot be generalized to mothers around the world). • There was no control group. • There may have been possible bias due to disconfirmed expectations reported by the mothers. • There is a possibility of inaccurate recall of experiences due to memory loss or choosing to not share certain details.

Category 2: Impact of Infant's Temperament and Maternal Postpartum Experience

Temperaments are influenced by sought, self-regulation, and how their situations affect one's reactivity. In some circumstances, infants may become inconsolable with any methods that mothers try, thus creating stress both in the mothers and infants. Infants with unmet needs or feeling unsatisfied will feel unsafe and lose a sense of trust in their caregivers. Mothers with this stress will feel anxious or unsuccessful, which creates an unexpected negative postpartum experience.

The article, "*Maternal Prenatal Stress and Infant Emotional Reactivity Six Months Postpartum"* (Bridgett, Huizink, Karlsson H., Karlsson L., Kataja, Korja, & Nolvi, 2016)*,* tested how infant's emotional reactivity affected the postpartum experiences at 6 months for mothers. It was a quantitative study. The research methods included a subscale questionnaire given to mothers to interpret their depression, anxiety, and stress experiences at 14-, 24-, and 34-weeks' gestation. The infant's behaviors were evaluated on a scale of 1 to 7, 1 being positive reactivity and 7 being negative reactivity. The higher the scores the more mothers viewed their infant's behavior as distressful. Positive reactivity included smiling, laughing, and other signs that showed pleasure. Negative reactivity included fearfulness, sadness, and other negative emotions. In the study, 172 mothers reported low stress during pregnancy, and 110 reported high stress. It was discovered that there was no relationship between prenatal stress and infant emotional reactivity, but anxiety during maternal pregnancy had some influence on negative emotional reactivity. Mothers reporting negative infant emotional reactivity had higher stress during the prenatal period which influenced their mood and expectations during the postnatal period. In conclusion, the researcher found that it would be best to provide depressive and anxiety screenings to prevent or lessen pregnancy-related worries.

Strengths	• It contained a big sample size of 282 mother participants. • Two groups were being compared: (1) mothers reporting high stress during pregnancy and (2) mothers reporting loss stress during pregnancy. • The research was conducted the research over different periods to see the mother's progression in depression, anxiety, and stress (14-, 24- and 34-weeks' gestation). • The researcher also acknowledged and took into consideration other factors that may have influenced certain behaviors, for example, maternal education, income, and civil status.
Limitations	• There may have been possible bias due to asking mothers' opinions of their maternal depressive symptoms (self-reported). • 67% of the participants gave informed consent. • There is limited information about the precipitating factors of prenatal stress and how it can influence negative emotional reactivity.

The quantitative and prospective longitudinal study named "*Maternal Postnatal Psychiatric Symptoms and Infant Temperament Affect Early Mother-Infant Bonding"* (Bridgett, Karlsson H., Karlsson L., Nolvi, Pajulo, & Tolvanen, 2016), compared parents' roles and infant temperament in early postpartum bonding phase. The goal of the study is to find ways to provide support and education to parents in understanding infant behaviors and how to manage them. Two hypotheses were made:

1. Maternal postnatal depression and anxiety, along with infant negative emotions are related to poor maternal-infant bonding quality.
2. Infants expressing positive emotions are related to higher maternal-infant bonding quality.

This study included 203 participants, some were married, and others were single parents. A questionnaire was used to evaluate maternal-infant bonding after the babies were born, 3 months, and 6 months after giving birth. Participants were asked using the Edinburgh Postnatal Depression Scale (EPDS) and the State and Trait Anxiety Inventory (STAI) for a 3-month questionnaire, and a Postpartum Bonding Questionnaire (PBQ and Infant Behavior

Questionnaire (IBQ) for a 6-month questionnaire. The findings were that high infant distress is related to lower bonding quality. Lower bonding quality is related to maternal depressive or anxiety symptoms. Infants who are frequently irritable and inconsolable have decreased opportunities to enjoy bonding activities and interactions in early bonding.

Strengths	• It included a large sample size of 203 participants. • The sample size consisted of different ages, economic backgrounds, and income statuses. • With the infant sample, the researcher had 51% male and 49% female. • The researcher took into consideration of age and educational level that may have influenced bonding experiences.
Limitations	• The study may have had reports of bias due to parents' views of infants' temperatures or not sharing certain details. • Some mothers dropped out of the study due to an increase in depressive symptoms. • At the beginning of the study, 147 fathers participated and after 6 months, only 62 fathers were left.

Category 3: Interventions to Improve Mother-Infant Dyad

Impaired maternal-infant bonding puts the infant at risk of building a healthy, trusting relationship with their mothers. If one does not feel safe in their environment, they will have trouble reaching their developmental stages. Infants are at risk for poor cognitive function, future psychopathology, and disorders if needs are constantly unmet. Maternal attachment begins with a mother's attitude toward the unborn infant. Infant bonding begins with how mothers react based on their attitudes toward their infants. Improvement can be started as soon as during the perinatal stages. The end goal of better maternal-infant bonding is to treat any symptoms related to postpartum depression, including stress and anxiety. A mother's emotional support and education on infant behaviors have an impact on mother-infant relationships, thus possibly predicting the child's future views and outcomes.

The qualitative study of "*PREPP: Postpartum Depression Prevention Through the Mother-Infant Dyad"* (Desai, Feng, Gustafsson, Jiang, Lee, Monk, & Werner, 2016) discusses the interventions used to prevent postpartum depression (PPD) to improve a mother-infant dyad. The treatment consisted of 54 mother-infant dyads, of which some received pharmacological and psychological interventions to reduce PPD symptoms. The goal of this study is to treat PPD by evaluating maternal behaviors and providing appropriate changes by incorporating mother-focused skills at 6 weeks postpartum and to decrease the infant's fuss or crying occurrences with the education of infant cues. The major findings of the study included that 30% of the 54 dyads reported increased reported of maternal PPD symptoms. There was a decrease in reports of anxiety and depressive symptoms at 6 weeks postpartum in mothers that received interventions of psychoeducation and mindfulness skills used in PREPP, subsequently, there was a decrease in fussing and crying in infants. Interventions included in the maternal perinatal phase were first identifying risk factors, such as previous PPD or history of any psychological disorders. Mothers were educated on the benefits of breastfeeding, which can improve bonding experiences and the stigma of mental health and its care.

Strengths	• The PREPP study used evidenced-based caregiving techniques. • There was a wide range of mothers ages from 18 to 45 years. • The study methods were approved by the Review Board of the New York State Psychiatric Institute/CUMC.
Limitations	• The study included a small sample size, thus does not provide enough evidence to generalize findings to all mother-infant dyads. • Dyads unable to participate included tobacco use, use of recreational drugs, non-English speaking, receiving psychological/psychiatric treatments not related to PREPP, having a complicated pregnancy, or non-singleton pregnancy).

To observe and study the relationship between mothers and infants, "*Nurse Home Visits Improve Maternal/Infant Interaction and Decrease Severity of Postpartum Depression"*

(Gregory, Horozitz, Murphy, Pulcini, & Wojicik, 2013), used a behavioral coaching intervention during the first 9 months postpartum by having nurse-led home visits. The study was a prospective longitudinal and qualitative study, including 134 mothers. The study had 3 phases:

- Phase 1: Women were screened for maternal postpartum depressive symptoms at 6 weeks after giving birth.
- Phase 2: Randomly women were assigned to treatment or controlled environments including video recordings of maternal-infant interaction at 6 weeks, 3, and 9 months.
- Phase 3: Mothers were in the group and individual interviews to add their opinions of the study.

A few hypotheses made by the researchers included:

1. After participating in the nurse-led home visits and behavioral interventions, the treatment group will have a more improved maternal-infant relationship than the control group.
2. After participating in the nurse-led home visits and behavioral interventions, mothers will have a better understanding of infant cues and increase responsiveness as a parent.

The major findings of the study were that nurse-led home visits have more positive effects than the control group that only had video recordings of maternal-infant interactions. Since there were positive effects to nurse-led visits, it has encouraged further ideas of emphasizing maternal postpartum screening to all mothers. Mothers from the treatment group reported feeling the study was a source of support and benefitted from the nurse home visits. While providing care to any mother, the most important is to use one's active listening skills and show empathy, which this study provided to their participants ensuring that they were heard and cared for in a safe environment.

Strengths	• The study was reviewed and approved by the Human Research Subjects Committees. • The participants were given the option to leave at any point in the study.
Limitations	• The study had a small sample size. • Mothers who were unable to participate included non-English speakers, diagnosis with major psychiatric disorders of bipolar, schizophrenia, or active postpartum psychosis, and severe medical conditions. • The same nurses were involved in control and treatment visits and interviews, which may have led to cross-contamination of information.

Summary of Findings

Overall, the studies included in this literature review offered insight into risk factors that influence maternal-infant bonding and ways to improve their attachment. Sample sizes ranged from 54 and 282. Studies with smaller sample sizes cannot be generalized to the greater population of all mothers and babies. Some of the results of survey questions may have been inaccurate due to reliance on mothers' memories to recall certain events. There is a risk of mothers possibly not remembering or choosing not to disclose. In addition, a number of the studies took place in a single location, which limited the generalizability of the findings. It needs to be kept in mind that mothers and infants do not have the same environmental influences and stressors in different locations. With each study, there is a need to take into consideration the participants' backgrounds and cultures.

It appears that nurse-led home visits and behavioral education and changes can improve postpartum depression and infant emotional reactivity. When infants' needs are met, such as diaper changes, feedings, and a sense of security, they can become easily consolable and decrease fuss and crying occurrences. Mothers who can control their depressive symptoms, including stress and anxiety, had an impact on the decrease of their infant's fusses and cries. With awareness and willingness to seek help, despite the stigma related to mental health

disorders, mothers can seek out support for themselves and their infants. It is important for mothers to set realistic expectations for themselves and their infants in the perinatal and postnatal periods. Setting high expectations and not meeting them can lead to feeling a sense of failure and becoming discouraged. Mothers and healthcare providers should be aware that those at risk for postpartum depression (PPD) are single parents, young maternal age, minority groups, unplanned pregnancies, unemployed, marital issues, and history of depression, anxiety, or stress. The most important takeaway of the literature review is to provide frequent screenings of PPD universally and provide support to mothers and infants during and post-pregnancy to ensure the best outcomes.

Proposal for Further Study

Further research is needed for the topic of maternal-infant attachment and bonding due to limited information shared and stigma about postpartum depression. Studies of motherhood and infant behaviors have been studied in various places, but the results cannot be generalized to all mothers and infants. Due to stigma of postpartum depression, not many mothers seek professional help. The proposed research is to provide more information and decrease stigma, as well as showing that preventive measures, including screenings, and interventions, such as home visits, can help. The goal is to identify those at risk, help manage postpartum depression, increase mother-infant bonding, and better motherhood experiences.

Theoretical Framework

To continue the research, the structure that will be used is the Mercer's Maternal Role Attainment Theory. This theory was created by Ramona Mercer, a mother-baby nurse. The framework was created to provide health care interventions for all mothers and their relationship with their infants. For mothers to create a trusting environment for their infant they need

education on caretaking tasks and learn how to control their emotional well-being. Mercer's framework includes four stages: anticipatory, formal, informal, and personal. Anticipatory focuses on the social and psychological remodeling of maternal roles, including education on setting realistic expectations (Nursing Theory, 2019). The formal stage aims to reduce assumptions of maternal role at birth by providing a social support system to assist in making decisions. Informal focuses on the mother's needs and wants of providing an environment that works for both her and her infant. The final stage, personal, is about the motherhood experience, including feeding confidence and feeling a sense of control and happiness (Nursing Theory, 2019). The Maternal Role Attainment Theory provides an educational and supportive system for mothers at different stages of pregnancy to feel comfortable in entering motherhood.

Hypotheses

The following hypotheses will be tested:

1. The experimental group compared to the control group will have better understanding of how to manage depressive symptoms, including stress and anxiety.
2. The experimental group compared to the control group will more positive maternal-infant bonding experiences and improved understanding of infant's cues.

Research Design & Sample

A new research proposal will include a prospective longitudinal, mixed-methods study design that will include collection of qualitative and quantitative data. The study will include a sample of 200 pregnant women and their unborn infants in the United States. The dyads will be followed throughout the pregnancy to gain perspective on any stressors.

Inclusion criteria will be: mothers of any age, primigravida, English-speaking, and any social-economic background. Exclusion criteria will be mothers with high-risk pregnancy, such

as preeclampsia, those who use substances, and/or those who are receiving treatment for psychological diagnoses, and/or needing other pharmacological interventions.

Methods

Quantitative data will include the surveys in which mothers can rate their anxiety and stress on a scale. Qualitative data will include open-ended questions that ask mothers about the types of emotional reactivity their infants exhibit when stressed and interventions they used to console their infants. There will be an intervention that includes home visits by nurses that provide education for the mothers. A focus group at the end of six months postpartum will assess mothers' perceptions of the effectiveness of the home visit and education intervention.

At 2nd and 3rd trimester, all participating mothers will be asked to score their emotional status by filling out the Perinatal Anxiety Screening Scale (PASS). The questions cover acute anxiety and adjustment, general worry and specific fears, and control of trauma. At three and six months, mothers will be asked to answer the PASS and Edinburgh Postnatal Depression Scale (EPDS), which will identify mothers who are risk for postpartum depression. All participating mothers in the control and experimental group will complete the surveys. The questions focus on emotional status. To evaluate infant's behaviors, at three months and six months postpartum, mothers will complete the Infant Behavior Questionnaire-Revised (IBQ-R). To obtain more information about maternal-infant relationships, mothers will complete the Postpartum Bonding Questionnaire (PBQ) at three and six months postpartum. With these screenings during pregnancy and post-pregnancy, mothers can become aware of their emotional well-being and how it affects their infant's emotional reactivity.

After mothers are evaluated on their depressive symptoms, including stress and anxiety, in the perinatal 2nd and 3rd trimesters, interventions will be introduced after the baby is born,

during the postnatal phase. In the postpartum period, the 200-dyads will be randomly placed into two groups. The experimental group will include 100 mother-infant dyads who participate in home visits and are provided education on ways to manage maternal depressive symptoms and infant emotional reactivity. The control group of 100 mother-infant dyads will participant in home visits but no additional education will be provided.

During home visits, assessments will cover neurological and emotional status. Mothers will be asked questions regarding their transition to motherhood and ensure they are understanding the infant's cues. Education will include how to answer infant's needs, for example, when the child wants food, warmth, or a diaper change, and ways for the mother to practice self-care, such as bathing and having some time to self.

After the home visits, small groups of 10 women each will be asked to meet and discuss their perceptions of the home visits. Women from the control and experimental groups will be separately. The focus group will be facilitated by a nurse researcher. A semi-structured interview guide will be used and the sessions will be recorded with consent of participants.

Ethical Considerations

This study will include a vulnerable population of pregnant mothers and infants. All mothers who want to participant must sign a consent form. Prior to giving consent the study, the mothers will have they study explained thoroughly. The researchers will answer questions they may have. The mother will need to allow nurses researchers to enter their home for home visits. The goal is for all mothers and infants to feel safe during the experiment and voice any concerns. Participants will be allowed to drop out of the study at any time. Due to mothers completing surveys about their mental health and infant behaviors, we will ensure that they have the right to privacy and confidentiality will be strictly maintained. Each participant will be assigned a

numeric study identify rather and participants' names will not be used. No data will be collected until the Ethics (IRB) Committee at Dominican University of California and the healthcare system that participants use review the study for ethical considerations and approve it. It is important to ensure autonomy and respect for persons.

Analysis

Demographic data will be assessed using descriptive statistics. Quantitative data from surveys will also be assessed using descriptive statistics. Correlation statistics will be used to assess any relationship between mothers' symptoms of depression or anxiety and their infants' behaviors. In addition, there will be a comparative assessment using analysis of variance (ANOVA) to examine between the control and experimental group.

Qualitative data is assessed with content analysis. The researchers will meet to read all responses to open-ended questions and the discussion that took place in the focus will be examined. With a consensus among researchers, similar words and phrases will be grouped together in categories. Themes derived from the categories will then be explored.

Conclusion

This research paper has included a review of six primary studies that provided beneficial background information about maternal depressive symptoms and the negative effects it has on infant's temperament and mother-infant attachment and bonding. With emphasis on screening during perinatal and postnatal, early detection of mothers at risk is possible. With early diagnosis, postpartum depression can be well-managed and prevent worsen of symptoms.

To implement the study into the nursing practice, home visits should be encouraged to provide a support system to both mother and baby. It provides an outlet for mothers to share their concerns and seek help. Education on pregnancy and infant's behavior is important in supporting

motherhood expectations. Mothers who have a sense of control and understanding infant's cues have shown a more positive mother-infant relationship and an attachment improvement.

The proposal for further study is intended to encourage healthcare professionals to share information to support mothers in their journey of motherhood. With this study, mothers may gain a sense of which parenting style works for them and establish a safe and loving environment.

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Appendix

Authors/Citation	Purpose/Objective of Study	n	Study Design/Methods	Major Finding(s)	Strengths	Limitations

Biaggi, A., Conroy, S., Dazzan, P., Fuste, M., Hazelgrove, K., Howard, L. M., Mehta, M. A., Miele, M., Seneviratne, G., Pariante, C. M., Pawlby, S., & Waites, F. (2021). **Maternal perceived bonding towards the infant and parenting stress in women at risk of postpartum psychosis with and without a postpartum relapse.** ***Journal of affective disorders*****, *294*, 210–219.** https://doi.org/10.1016/j.jad.2021.05.076
 	
In-text citation: (Biaggi, Conroy, Dazzan, Fuste, Hazelgrove, Howard, Mehta, Miele, Seneviratne, Pariante, Pawlby, & Waites, 2021)
	• Investigating maternal bonding during pregnancy and postpartum
	• Does parenting stress, childhood maltreatment, and psychiatric symptoms affect maternal bonding?
	• Hypothesis: (1) women at risk for postpartum depressive symptoms would report unmet infant bonding expectations than health controls and increase parenting stress and childhood maltreatment and (2) maternal stress and childhood maltreatment would affect maternal bonding quality
		75	Prospective longitudinal study (a study that follows a group of individuals overtime)
			
			• Followed a group of women at risk for postpartum (PP) and a group of health control women from 25 weeks gestation to 12 months PP
			• Groups: health control (HC), at risk unwell (AR-unwell), at risk well (at risk well
			• Use of: PANSS: Positive and Negative Syndrome Scale; HAM-D: Hamilton Depression Rating Scale; YMRS: Young Mania Rating Scale; GAF: Global Assessment of Functioning; BDI: Beck Depression Inventory; STAI-S: State-Trait Anxiety In- ventory (State subscale)
				• Majority of the women at risk for postpartum reported having a negative experience towards their infants than women not at risk (HC = health controls)
				  ○ At risk women: single, people of color/ minority groups, unemployed, unplanned pregnancies, history of severe childhood maltreatment
				• At risk (AR) women for postpartum depressive symptoms = reported higher levels of parenting stress than HC
				  ○ AR-well and AR-unwell had not much of a significant parenting stress level
				• Parenting stress and psychiatric symptoms restricts mothers from reaching their expectations of postnatal bonding
				• Intervening during the perinatal period improves parenting stress and maternal symptoms and could have a positive effect on infant bonding
				• History of childhood maltreatment did not have significant effect on quality of attachment
				• AR-unwell reported lower quality of attachment compared to AR-well (experiences were negative during pregnancy)
					• Had different groups to compare: (1) 46 women at risk for postpartum and (2) 29 healthy controls
					  ○ At risk well = 19 developed a psychiatric relapse within 4 weeks' PP
					  ○ At risk unwell = 27 remained symptom-free
					  ○ Health controls = had no current or previous psychiatric disorders with no family history of PP
					• Defined postpartum depression by using DSM-IV (widely used and commonly known, reliable source of information)
					• All participants has a baseline at 25 weeks
					• Study approved by the local ethics community
					• Participants provided written consent
						• Small sample size (some results were not significant enough)
						• Groups compared were unequal (46 at risk vs 29 health controls)
						• Women at risk had much more different risk factors that could potentially result in negative outcomes than the health controls
						• Psychiatric relapse does not have a definite definition (it is defined broadly and depends on one's situation)

Authors/Citation	Purpose/Objective of Study	n	Study Design/Methods	Major Finding(s)	Strengths	Limitations
Bridgett, D. J., Huizink, A. C., Karlsson, H., Karlsson, L., Kataja, E. L., Korja, R., & Nolvi, S. (2016). **Maternal prenatal stress and infant emotional reactivity six months postpartum.** ***Journal of affective disorders*****, *199*, 163–170.** https://doi.org/10.1016/j.jad.2016.04.020 In-text citation: (Bridgett, Huizink, Karlsson H., Karlsson L., Kataja, Korja, & Nolvi, 2016)	• Tests the correlation between prenatal stress and infant emotional reactivity at 6 months after birth	282	Quantitative (includes numerical data to represent reality) • Used a questionnaire method to measure mothers' depression, general anxiety, and stress (asked at gestational week 14, 24, and 34) • Infant Behavior Questionnaire Revised (IBQ-R): used to measure infant's temperament ○ On a scale 1-7 • Negative reactivity = consists of signs of distress to limitations, fearfulness, sadness, or any other negative emotions • Positive reactivity = smiling, laughing, high intensity of pleasure • Other measures: Edinburgh Postnatal Depression Scale/Symptom, also the anxiety subscale	• 172 reported low stress during pregnancy • 110 mothers reported high stress during pregnancy • Screening should be focused to prevent and lessen pregnancy-related worries • Negative infant emotional reactivity had a positive association with prenatal and postnatal stress • Reports of high stress during pregnancy were higher in positive/negative emotional reactivity compared to infants of mothers with low stress • Maternal pregnancy anxiety predicts infant negative emotional reactivity (ex: fearfulness) • No relationship between prenatal stress and infant emotional reactivity	• Included a big sample • Groups to compare: mother's reporting high stress during pregnancy vs. low stress mothers during pregnancy • Tested at different times of pregnancy (to see progression) • Took into consideration other factors (ex: maternal education, income, and civil status)	• Possible bias due to asking opinions to compare variables (mothers reported stress and infant reactivity • 67% of those informed about the study gave consent • Not enough information about prenatal stress and negative emotional reactivity to include in conclusion

Authors/Citation	Purpose/Objective of Study	n	Study Design/Methods	Major Finding(s)	Strengths	Limitations

Bridgett, D. J., Karlsson, H., Karlsson, L., Nolvi, S., Pajulo, M., & Tolvanen, M. (2016). **Maternal postnatal psychiatric symptoms and infant temperament affect early mother-infant bonding.** ***Infant behavior & development*****, *43*, 13–23.** https://doi.org/10.1016/j.infbeh.2016.03.003
 	
In-text citation: (Bridgett, Karlsson H., Karlsson L., Nolvi, Pajulo, & Tolvanen, 2016)
	• Compare parents on their role of infant temperament in early bonding
	• Examine the effects of maternal postnatal depressive and anxiety symptoms that is has on mother-infant bonding
	• Finding ways to counsel parents in understanding and to care for infants with different temperaments
	• Hypothesis: (1) maternal postnatal depressive/anxiety symptoms, and infant negative emotions are related with lower maternal-infant bonding quality at 6 months postpartum and (2) infant positive emotions are related with higher maternal-infant bonding quality at 6 months postpartum
	  ○ Maternal psychiatric symptoms were also considered
		203	Qualitative (uses language, concepts, and words to represent evidence)
			
			• Use of questionnaire
			• Asked at 3 points of time: after the babies were born, 3 months postpartum, and 6 months postpartum
			• Used Edinburgh Postnatal Depression Scale (EPDS) and the State and Trait Anxiety Inventory (STAI) for 3-month questionnaire
			• Used Postpartum Bonding Questionnaire (PBQ and Infant Behavior Questionnaire (IBQ) for 6-month questionnaire
			
			Prospective longitudinal study (a study that follows a group of individuals overtime)
				• Bonding is related to children's secure attachment sense and mother-child interactions quality
				  ○ Ex: based on maternal parenting behaviors (response to infant cues such as crying)
				  ○ Attachment and bonding influences cognitive development, physical health, and social competence
				  ○ Anxious/depressed mothers is a predictor
				• Temperament is influenced by attention seeked, self-regulation, and affectivity of situations
				• Infant negative emotionality is due to parenting stress, irritability, and inconsolability (parenting behaviors)
				• Positive infant emotionality = smiling, laughing, consolability
				• Negative infant emotionality = distress, fear, decrease activity level
				  ○ High infant distress is related to lower bonding quality
				  ○ Maternal depressive/anxiety symptoms affect infant distress
				• Infant irritability, inconsolability, infrequent smiles reduce opportunity for enjoyable interactions affects early bonding
					• Good sample size
					• Collected both mothers' and fathers' emotionality and reports of infant's temperament
					• Took into consideration of age and educational level
					• Participants included those of different age, economic backgrounds, income status, weight of infants
					  ○ Infants sex investigated: 51% were male, 49% were female
					• Took into consideration of early bonding and other factors that influenced bonding and attachment
						• Possible reports of bias due to parents' views of infant's temperaments
						• 153 answered the first questionnaire
						  ○ 147 fathers agreed to participate
						  ○ After 6 months: 102 mothers and 62 fathers answered questionnaire
						• Some mothers dropped out due to depressive symptoms

Authors/Citation	Purpose/Objective of Study	n	Study Design/Methods	Major Finding(s)	Strengths	Limitations

Desai, P., Feng, T., Gustafsson, H. C., Jiang, N., Lee, S., Monk, C. & Werner, E. A. (2016). **PREPP: postpartum depression prevention through the mother-infant dyad.** ***Archives of women's mental health*****, *19*(2), 229–242.** https://doi.org/10.1007/s00737-015-0549-5
 	
In-text citation: (Desai, Feng, Gustafsson, Jiang, Lee, Monk, & Werner, 2016)
	• Focuses on interventions to prevent postpartum depression (PPD) between a mother-infant dyad
	• Use of Practical Resources for Effective Postpartum Parenting (PREPP) – focus to examine the effectiveness
	• Goal: to treat PPD by including maternal behavior changes in their infants
	  ○ Includes mother-focused skills
	• Find ways to reduce symptoms of anxiety/depression symptoms at 6-weeks postpartum (PP)
		54	Qualitative (uses language, concepts, and words to represent evidence)
			
			• Use of clinical treatments to prevent PPD
			• Included pharmacological and psychological interventions to reduce maternal PPD symptoms
			• Use of behavioral intervention and compare to infants (ex: increase sleep time, less fussing/crying behaviors)
			• Treatment includes: (1) ways to reduce depression/anxiety symptoms during early PP, (2) decrease infant fuss/cry, (3) meet with a psychologist
				• More than 4 million live births per year in the U.S
				  ○ 800,000 of mothers reported feeling minor/major depression within the first 3 months postpartum
				• Risk for postpartum depression (PPD) – prenatal depression/ anxiety, low social support, history of psychopathology
				• Mothers-infants that participate in PREPP had results of fewer fussing and crying incidences at 6-weeks PP
				• Maternal PP is associated with marital discord, impaired occupational/social function, and interactions with their infants
				• Possible outcomes for infants – poor cognitive function, future psychopathology, and disorders
				• 30% of the 54 dyads reported infant crying at 3 months increased reports of PPD symptoms
				• Infants sleeping problems and PPD affects women's sleep
				• Psychoeducation and mindfulness skills used in PREPP was well-tolerated and effective in decreasing reported symptoms of anxiety/depression at 6-weeks PP
				• Providing care to mothers at risk has a direct impact to mother-child relationship (their views and child outcomes)
					• PREPP uses evidence-based caregiving techniques and traditional psychotherapy
					  ○ Provides mindfulness meditation, psychoeducation
					  ○ Promotes maternal behaviors changes in their infants
					• Had blind, clinical-rated assessments
					• Provides prevention techniques:
					  ○ First identify, risk factors
					  ○ Emphasis breastfeeding
					  ○ Education on stigma of mental health care
					  ○ Encourage new baby and mother checks with providers
					• Wide range of mother's age: 18-45 years old in 2nd and 3rd trimester of pregnancy
					• Procedures of study was approved by the Review Board of the New York State Psychiatric Institute/CUMC
					• Ways to help infant sleep and cry:
					  ○ Swaddling techniques
					  ○ Increase nighttime sleeping in infants
					  ○ Provide higher stimulation during day
					  ○ Quiet environment
						• Small, randomized control trial
						  ○ Some mothers dropped from the study due to increased depression
						• Mothers-infants unable to participate in study include tobacco use, use of recreational drugs, not-English speaking, receiving psychological/psychiatric treatment, had/having a complicated pregnancy, non-singleton pregnancy
						• Bias of self-reported measures of maternal mood

Authors/Citation	Purpose/Objective of Study	n	Study Design/Methods	Major Finding(s)	Strengths	Limitations
Gregory, K., Horowitz, J. A., Murphy, C. A., Pulcini, J., Wojcik, J., (2013). **Nurse home visits improve maternal/infant interaction and decrease severity of postpartum depression.** ***Journal of obstetric, gynecologic, and neonatal nursing: JOGNN*, *42*(3), 287–300.** https://doi.org/10.1111/1552-6909.12038 In-text citation: (Gregory, Horozitz, Murphy, Pulcini, & Wojicik, 2013)	• To observe and study the relationship between mother and infant, consisted of relationship-focused behavioral coaching intervention • Maternal-infant relational effectiveness during the first 9 months after postpartum • To observe the effects on mother-infants during nurse-led home visits (6 weeks to 9 months after birth) • Hypothesis: (1) After participating in the CARE intervention, the treatment group compared to the control group will have significantly higher maternal-infant relational effectiveness and (2) after participating in the CARE intervention, the treatment group compared to the control group will have significantly higher infant clarity of cues and responsiveness to parent • Additional questions: how maternal depression will vary over time for the treatment group and control group?	134	Randomized clinical trial Prospective longitudinal study (a study that follows a group of individuals overtime) • Phase 1: women screen for postpartum depression (PPD) 6 weeks after giving birth • Phase 2: randomly assigned those women to treatment or controlled environments (included video-recordings of maternal-infant interaction at 6 weeks, 3 months, 9 months) • Phase 3: had focus groups and individual interviews about study • CARE intervention: targets behavioral coaching to maternal behaviors Qualitative (uses language, concepts, and words to represent evidence)	• Results suggested that nurse-led home visits have positive effects for the participants o Provided further ideas of making maternal PP screening universal • Risk factors: young maternal age, low education, low income, history of depression, minority races/ethnicity (ex: people of color) • PPD associated with less affectionate, withdrawn, avoidant, discontent to infant behavior • Negative interactions – missing or not meeting needs of infants' cues, using limited amounts of voice, limited touch, rapid vocalizing, decreased patience • Mothers reported CARE as a source of support (received support and benefit from the nurse home visits) • No differences in results between treatment and controlled groups	• Defined postpartum depression clearly o Characterized by loss of interest or pleasure, depressed mood, psychomotor agitation or retardation, fatigue/sleep disturbance, changes in appetite, feelings of inadequacy, worthlessness, or guilt, and decreased concentration, all of which can interfere with effective maternal functioning • Study was reviewed and approved by the Human Research Subjects Committees • Participants were able to leave the study at anytime • Possible further study of CARE – to include important safety net for vulnerable populations • Provided nurse active listening and showed empathy	• Small sample size (did not provide a national population of PP mothers • Mothers excluded: diagnosed with a major psychiatric disorder (bipolar, schizophrenia, active PP psychosis) or severe medical conditions that impaired participation ability • Only those proficient in English were able to participate • Same nurses were involved in control and treatment visits and interviews (possible cross-contamination)

Authors/Citation	Purpose/Objective of Study	n	Study Design/Methods	Major Finding(s)	Strengths	Limitations
Rizzo, I., & Watsford, C. (2020). The relationship between disconfirmed expectations of motherhood, depression, and mother–infant attachment in the postnatal period. Australian Psychologist, 55:6, 686-699. https://doi.org/10.1111/ap.12472 In-text citation: (Rizzo & Watsford, 2020)	• Investigates the effects of mother's expectations in mother-infant relationships • Does levels of support and expectations affect their actual experience post birth? • How does feelings of attachment and depression affect mother-infant relationships in the postnatal period? • To address the importance of creating realistic expectations of motherhood by providing prenatal education	238	Cross-sectional study (a type of research design in which you collect data from many different individuals at a single point in time) • Postnatal mothers (ages 19-44) asked to complete an online survey of their postnatal experiences in the last 12 months • 96% were married or in a relationship • 74% had a household income greater than $90,000 • 32% reported a previous diagnosis of a mental illness • 60% were first-time mothers • 53% had unassisted births, and 96% had breastfed their youngest child Quantitative (includes numerical data to represent reality) Qualitative (uses language, concepts, and words to represent evidence)	• Postnatal experiences with less positive than expected (including support and sense of self) in mothers = lower levels of attachment and higher levels of depression • Infant expectations that were more than expected = also had higher levels of depression • Postnatal/postpartum depression affects mother's psychosocial functioning, employment, relationships with infant and others (reduce responsiveness in infant's needs which also affects their social and emotional development in later years) • Motherhood includes emotional, physical, and social changes which means increase in workload can increase stress, fatigue, and negative emotions • Weak negative correlation – age vs. depression and household income vs. depression and infant disconfirmed expectations vs. depression • Weak positive correlation – age of youngest child vs. depression, assisted birth vs. depression, mental illness vs. depression • Moderate negative correlation – support disconfirmed expectations vs. depression • Strong negative correlation – self-disconfirmed expectations vs. depression	• Providing statistics: In Australia, postnatal depression affects 10% of mothers in the first 12 months after birth • Took into consideration of participant's age, income, birth method, previous mental illness, and breastfeeding duration in relationship to their depression and attachment • Included both qualitative and quantitative data • Researchers pointed out what should be changed for the possible next study (awareness of limitations)	• Only surveyed mothers in Australia (cannot be used to generalize mothers around the world) • Prenatal depression or attachment were not able to be controlled • Possible bias due to disconfirmed expectations according to mothers • Recalling and reporting expectations made be inaccurate due to possible memory loss or choosing to leave out certain details