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THE EFFECT OF POSTPARTUM DEPRESSION ON CHILD COGNITIVE DEVELOPMENT

By

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Thesis Chair: John Klanderman, Ph.D.

Dedication

I would like to dedicate this manuscript to my grandparents and my parents; without your love and support, none of this would have been possible.

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I would like to express my appreciation to my Professors and Advisors for their guidance and understanding throughout this educational escapade. Your patience and assistance is responsible for the successful culmination to this chapter in my continuing academic career.

Abstract

Joshua Lees

The Effect of Postpartum Depression on Child Cognitive Development

2011

John Klanderman, Ph.D.

Master of Arts in School Psychology

The incidence of postpartum depression (PPD) in Western societies is approximately 10-15% and its cause is multi-faceted. Because mothers largely constitute infants' social environment and mediate their experience of the external world, it is imperative to investigate the effects of PPD on child growth and development. Within this paper, the author explores previously conducted Post-Partum Depression research, in regards to its effects on child cognitive development. Following this literature review, a brief experimental study is conducted and explained on a sample population of mothers' of special needs children, serviced by an Early Intervention provider. During this experimental analysis, the researcher is hypothesizing that mothers of children with more severe disabilities (as measured by percent of cognitive delay) will report more symptoms associated with Post-Partum Depression than mothers of children with less severe disabilities. The researcher will also be looking for further correlations between specific questions in the survey and other demographic information recorded. The researcher chose to explore this population, rather than more mainstream samples explored in the research articles because of the lack of research with the special needs/developmentally delayed population in reference to Postpartum Depression.

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Chapter 1

Introduction to the Study

Postpartum depression can be defined as an episode of non-psychotic depression according to standardized diagnostic criteria with an onset within 1 year of childbirth.

1.1 Statement of Problem

Postpartum depression is the most common complication of childbearing, affecting approximately 10 to 15% of women and as such represents a considerable public health problem affecting women and their families. Because mothers largely constitute infants' social environment and mediate their experience of the external world, it is imperative to investigate the effects of PPD on child growth and development. Young infants are appreciably affected and highly sensitive to the quality of care they receive. Recent work has begun to elucidate the course of infant and child development associated with Post-Partum Depression.

1.2 Significance of the Study

Past research has presented us with a wealth of information documenting effects of PPD on the development of mainstream or typically developing children; however, there have been no known research studies completed on the mother’s of special needs children, and the role that postpartum depression can play in these family’s lives. In addition, the researcher has focused only on the biological mothers of these children, rather than the testing and scoring of developmental examinations on the child due to time limitations, available populations, and issues with confidentiality.

1.3 Hypothesis

Within this paper, the author explores previously conducted Post-Partum Depression research, in regards to its effects on child cognitive development. Following this literature review, a brief experimental study is conducted and explained on a sample population of mothers’ of special needs children, serviced by an Early Intervention provider. During this experimental analysis, the researcher is hypothesizing that mothers of children with more severe disabilities (as measured by percent of cognitive delay) will report more symptoms associated with Post-Partum Depression than mothers of children with less severe disabilities. This population was chosen for exploration by the researcher, rather than more mainstream samples explored in the research articles due to the lack of research with the special needs/developmentally delayed population in reference to Postpartum Depression.

1.4 Operational Definitions

For the purpose of this research, developmental delays refer to a child's delay in meeting expected milestones in their early years. These delays may relate to motor, social/emotional, language or cognition skills and abilities. Some delays may be temporary, such as hearing loss due to chronic ear infections. Other delays may be life long, such as Down syndrome or autism.

Early intervention is defined as a collection of services for families with children with a delay or other disability, age’s birth to three years; with services designed to aid in the development of the child, and assist the family with the knowledge and support necessary for them to meet their goals.

1.5 Purpose of Study

The researcher’s hope in documenting this data is to provide a glimpse into the perception of a population of mothers of special needs children as it pertains to the development and general well-being of their offspring. The gathered data will be used to present correlations of collected data, in general terms, and participants’ basic demographics will also be recorded and used in these correlation studies. Each question included on the measure will be documented and scored. This data will then be utilized to draw correlations to other questions included on the measure. In scientific data, it appears that two variables are connected in such a way that when one variable changes, the other variable changes also. This connection is called a correlation. The researcher will attempt to measure the strength of a relationship between two variables by calculating a correlation coefficient. The value of the correlation coefficient indicates to what extent the change found in one variable relates to change in another. There are several types of correlation coefficients; however for the purpose of this study the researcher will be utilizing the Pearson Product-Moment Correlation Coefficient, or simply, the Pearson r.

1.6 Limitations of Study

The main limitations of this study will certainly involve the validity and reliability of the data collected in this study. Because the questionnaire being used in this study was created by the author, the measure's reliability and validity will not be truly tested. In addition, the comparatively small population utilized by the researcher will not allow information obtained in this study to be generalized outside of this specific population of mothers of developmentally delayed children involved with Shirley Eves. A further limitation to this study involves the rather homogenous sample being utilized in this study, with regard to participants' socioeconomic status. An additional limitation would be the homogeneity of the sample.

The sample used is a pool of mothers from only 2 counties in the state of New Jersey. Moreover, these counties exist in a more or less rural setting, with the population, in general, being predominantly Caucasian and not as ethnically diverse as other more urban areas. The lack of diversity will impact results, as well as conclusions in that they will be less generalizable to other populations.

1.7 Overview of Upcoming Chapters

Within this thesis, the next chapter details previously conducted Post-Partum Depression research, in regards to its effects on child cognitive development. Following this literature review, a brief experimental study surveys a small, sample population of mothers' of special needs children, serviced by an Early Intervention provider. During this experimental analysis, the researcher is hypothesizing that mothers of children with more severe disabilities (as measured by percent of cognitive delay) will report more symptoms associated with Post-Partum Depression than mothers of children with less severe disabilities.

Chapter 2

Review of Literature

2.1 Introduction

This chapter reviews the literature on cognitive development, and child behavior (e.g., nap, weeping, and anger tantrums). There are a number of reasons why there may be an association between postpartum depression and adverse child development. There seems to be a direct pernicious impact on the child exposed to maternal depressive symptoms, with significant associations between the severity and duration of the maternal mood disorder and child outcome. A detailed analysis of Post-Partum depression and its effects on child development reveals many mitigating factors impacting the outcome of the child’s cognitive and behavioral development. Sharp et al., (1995) looked in detail at contextual factors and alternative explanations for any relationships between PPD and child cognitive development.

Results showed that boys of PPD mothers scored significantly more poorly on the perceptual, motor and verbal subscales of the McCarthy Scales of Children's Abilities than girls or children of non-PPD mothers. This effect was specific to boys whose mothers were depressed in the first year postpartum, and not in years two or three.

This difference in cognitive ability based on PPD remained significant after controlling for such confounding factors as behavioral problems (maternal and paternal report), birth weight, maternal and paternal IQ, family climate, home environment, mother-child interaction, and breastfeeding during infancy. Although some of these other factors did reliably predict boys' cognitive development, they did not mitigate the effect of PPD. In multivariate analyses entering maternal IQ, social class, home environment and mother-child attunement before PPD, PPD remained a reliable predictor of child cognitive development, as did the home environment and mother-child attunement. A re-analysis of this data provided support for the association between PPD and boys' cognitive delay; low birth weight infants and infants of less educated mothers are most at risk of cognitive developmental delay.

Another longitudinal study supports the findings outlined above (Kurstjens S and Wolke, 2001). A representative sample of 1329 mothers and their singleton offspring who were randomly selected with stratification based on sex, SES and neonatal risk were assessed with research diagnostic criteria. Ninety-two mothers had diagnosed PPD, and 721 mothers served as controls.

There was no effect of PPD on cognitive development at 20 months, 4 years 8 months, nor 6 years 3 months, nor were there significant interactions by gender, SES or, birth risk. In fact at the last measurement point, there was no effect of timing, recency, severity, duration, or number of depressive episodes. However, chronicity of depression did interact with sex of child and neonatal risk (3-way interaction), such that boys of chronically depressed mothers of low SES families showed the lowest cognitive scores compared to boys of chronically depressed mothers in upper SES families, or boys and girls of the control group of any SES status.

A large community study followed close to 5,000 children and mothers. Child cognitive functioning was operationalized with the Peabody Picture Vocabulary test (Dunn and Dunn, 1981). This test is a standardized measure of vocabulary development that does not rely on expressive language skills. Vocabulary development score did not significantly relate to timing of maternal depression, but was related to severity and chronicity. Thus PPD is not playing a role here, but likely maternal education and chronic and severe depression have a large influence.

2.2 Discussion

The strongest study on long-term effects of PPD on the infant looked at 18 month-olds’ performances on the Bayley Mental Development Index (Murray, 1992). This longitudinal study found that the children of PPD mothers performed significantly less well than did children of well mothers, especially boys. Murray’s work demonstrated that maternal PPD predicted a poorer 18 month old cognitive performance in interaction with infant sex (the performance of boys of PPD mothers was particularly poor). It is interesting that the quality of mother/infant communication had a mediating effect on these results. The fact that 18 month old cognitive outcomes were also significantly affected by the extent of the infant’s active communication with the mother further supports the importance of the mother’s contribution to the infant’s cognitive development. At 5 years, there was no evidence of an adverse effect of PPD on cognitive functioning, even amongst vulnerable subgroups of children. However, Sinclair and Murray found the 5 year old children of PPD mothers were significantly more likely than controls to be rated by their teachers as behaviorally disturbed (Sinclair et al., 1998).

The literature relating PPD to cognitive development is quite developed. Researchers have done a commendable job of scrutinizing the interplay of life adversity and contextual factors that may mediate the relationship between PPD and language and IQ development in children up to the age of 7.

The studies outlined above support a relationship between PPD and child behavior up to five years. In another significant study the meta-analysis reported a small effect size. The outcomes included depressed cognitive functioning as measured by tools such as the McCarthy Scales and Piaget's object concept tasks and were found to be significant. In particular, PPD may increase distractibility, antisocial or neurotic behavior, and affect choice of play. We do see significant effects of PPD on latency and intensity of crying. Thus, we may see that these infants are quicker to cry in response to stimuli, and the crying is louder and longer. However, we see no significant effects on infant motor behavior (assessed via actometer).

The many studies on more general child behavior do suggest a negative effect of PPD up to five years later (and perhaps beyond) on some outcomes but not all. It should be noted that the use of maternal report of child behavior is often clearly biased. The negative effects of PPD may occur in conjunction with parental conflict and low socioeconomic status.

The maturational advantage held by infant girls in the population as a whole might protect them from the impoverishment or disorganization of social experience associated with the mother's PPD. Thus perhaps boys' abilities to regulate their attention and emotion are particularly in need of facilitation from a sensitive and emotionally-healthy caregiver (Murray and Cooper, 1997). Additionally, it is possible that depressed mothers treat their sons and daughters differentially, or that the child's sex has an impact on the duration of the mother's depressed mood. Moreover, considering that boys are more likely to develop insecure attachments than girls, may impede social competence and foster behavioral problems.

2.3 Findings

The findings of this review appear to suggest that aggressive screening and therapy for depression during early motherhood is warranted. There is some evidence for the effectiveness of screening in combination with systematic treatment (Pignone et al., 2002; Hoffbrand et al., 2002). However, this evidence is equivocal at best. Currently there are clinical trials underway to examine the best clinical course for mothers identified with PPD.

The developmental progress of the infants of women with postpartum depression has, in the main, been assessed by observing these infants in interaction with their mothers. Two studies, however, have assessed these infants independently of such interactions. In a study of a sample of 55 unselected women recruited through antenatal classes, found an association between mothers' level of depressed mood--defined by scores on the Beck Depression Inventory or BDI (Beck et al., 1961)--and the presence of difficult behavior in the infants at three months, as assessed by maternal reports and crying records, and by direct observations of infant crying.

When assessed the two-month-old infants of 25 women experiencing depression--defined by the Research Diagnostic Criteria or RDC (Spitzer et al., 1978) with information collected using the Schedule for Affective Disorders and Schizophrenia or SADS (Warner, 1996)--and 25 well mothers recruited from a variety of obstetric and family physician practices, found that, compared to the infants of well women, the infants of depressed mothers were more tense, less content and deteriorated more quickly under the stress of developmental testing. In addition, maternal depression was associated with poorer infant performance on the Bayley Scales of Mental development (Bayley, 1969).

A number of studies have been conducted examining the behavior of infants of depressed mothers in the context of face-to-face interactions. In a series of investigations, Field and colleagues have found the behavior of infants of three-to-seven months to be less optimal when the mother is depressed. Thus, Field (1984) recruited 12 depressed mothers (identified as depressed on the postnatal wards by social workers and subsequently found to have a high score on the BDI (> 16)) and 12 matched non-depressed controls, and observed them in interaction with their infants at three months postpartum. The depressed mothers' infants showed fewer positive facial expressions and more negative expressions and protest behavior.

Similarly, Warner and colleagues, working with a low socio-economic sample, reported the four-month-old infants of 12 mothers with pregnancy problems (the great majority of whom had high BDI scores) to be more drowsy and fussy, and less relaxed and contented during a 10 minute interaction than the infants of 12 women without pregnancy problems. In a further study conducted by this group (Warner, 1996) 40 infants of depressed mothers (defined by a BDI score > 12), and 34 infants of controls (BDI score < 9), all drawn from a disadvantaged population of Black and Cuban women, were compared at three-to-six months postpartum in interaction both with their mothers and with non-depressed unfamiliar adults. In both conditions the infants of depressed women were rated lower on measures of state, physical activity, facial expressions, vocalizations and fussing.

The general finding of less optimal infant behavior in the infants of depressed mothers has been confirmed. A high risk sample of 13 depressed mothers--as assessed by the Center for Epidemiological Studies Depression Scale or CES-D(Warner, 1996)--who had been referred to a family intervention service were studied. They found that the behavior during face-to-face interactions of the six-to-seven-month old infants of these women was characterized by high levels of withdrawn behavior and an absence of positive affect.

A notable feature of this study was the identification of different profiles of disturbed infant behavior, some infants showing a predominance of avoidance, while others showed high rates of protest behavior. This latter finding was corroborated in a further study by Field and colleagues of a high-risk sample of 24 depressed mothers (scoring > 12 on the BDI) and an equal number of well controls (scoring < 9 on the BDI) drawn from a university clinic.

2.4 Postpartum Depression and Later Infancy

A number of studies have examined the 12 to 19 month-old children of mothers who have had a postnatal depression. There has been some degree of consistency in these studies', finding an association between early maternal depression and adverse cognitive and emotional infant outcome.

Two studies have reported on the cognitive outcome of 12 to 18-month-old infants of mothers who had been depressed postnatally. In a comparison of mothers and infants who had been referred to a clinical infant intervention service and matched community controls, found that increased levels of maternal depression were significantly related to poorer infant mental and motor development as assessed by the Bayley Scales at one year. This relationship was still obtained even when controlling for maternal IQ. Similarly, Murray (1992), in a comparison of the development of the community sample of children of mothers who had had a postnatal depression with the children of well mothers, found a significant difference between the two groups of children in terms of a number of indices of cognitive development. At follow-up at 18 months of age, compared to the infants of well mothers, infants of mothers who had had a postnatal depression (n = 56) were significantly more likely to fail on Stage V of Piaget's Object Concept Task. The findings in relation to the infants' overall cognitive performance, as measured by the Bayley Scales of mental development, were somewhat more complicated in that there was an interaction between maternal mental state history and infant gender. Boys whose mothers had had a postnatal depression had the lowest findings on the Bayley scores. Both of these findings were still obtained when the presence of any current depression (i.e. at 18 months) was related.

2.5 Postpartum Depression and Early Childhood

There have been few studies of the longer term outcome of children of mothers who have had a postpartum depression. The studies which have been reported have produced somewhat less consistent findings than those obtained in infancy.

Three British studies have examined the relationship between postpartum depression and the cognitive development of four to five-year-old children. They followed up 94 children of an original low risk sample of 119 primiparous North London women recruited in ante-natal clinics in early pregnancy. In 22 cases the mothers had been identified as depressed on the SPI at some point in the first postpartum year. The children were assessed on the McCarthy Scales of Children's Abilities (McCarthy, 1972) at four years. The average score on the General Cognitive Index (GCI) of the case group was found to be significantly lower than that of the children of women who had been well in the first postnatal year. Further examination of the data from this study (Hay & Kumar, 1995), in which children with suspected neurological problems or low birth weight were removed from the analysis, confirmed the initial finding, but also revealed that the relationship between the maternal mood disorder and compromised child cognitive development was confined to cases where the mother was less well educated. A second British sample, drawn from a high risk population in South London, was also followed up at four years and assessed in the same manner (Sharp et al., 1995).

Of an original 252 women recruited from a GP practice in pregnancy, comprehensive data were available for 60 children whose mothers had been depressed during the first postnatal year (as assessed on the CIS or SADS-L) and 75 children of women who had not been depressed during this period.(Warner, 1996) The mean score on the General Cognitive Index of the McCarthy Scales was significantly lower for the children of mothers who had been depressed postnatally than that for the control children. This relationship between maternal mood disorder and poor cognitive status was confined to the boys of post-natally depressed women whose scores were, on average, one standard deviation lower than those for the boys of control group mothers. In both London studies the relationship between post-partum depression and adverse child cognitive outcome was still apparent when depression occurring beyond the first postpartum year had been taken into account.

The findings of the two studies summarized above stand in contrast. In this prospective, longitudinal study of a low risk sample, 95% of the cohort of postnatally depressed and well women and their children recruited at two months postpartum and reassessed at 18 months were followed up at five years. No relationship was found between postnatal depression and the children's performance on the McCarthy Scales or performance on Piagetian conservation tasks, even when child gender and the social class of the families had been taken into account.

2.6 Factors associating PPD and adverse child outcome

The principal question arising from the findings outlined above is that of the mechanisms mediating the associations between the postpartum mood disorder and adverse infant and child development. A major conclusion to emerge from the studies conducted to date is that it is the impaired patterns of interaction occurring between mother and child in the context of depression, rather than the child's exposure to depressive symptoms per se, that is important to the child's functioning. (Hay & Kumar, 1995) In the studies of early mother-infant interactions reviewed above, there was considerable variation in the style of maternal engagement with the infant in the context of a diagnosis of depression, and these variations in the form of maternal responsiveness were associated with the different profiles of disturbance in the infants of depressed mothers.

The high levels of infant distress and protest observed in depressed mothers' infants during face-to-face interactions were found to occur in the context of maternal withdrawal and disengagement, whereas infant avoidance occurred where the mother was intrusive and aggressive. Similarly, although the communication of depressed mothers did not show the severely disturbed characteristics of depressed groups drawn from disadvantaged populations, the disruptions in infant behavior that distinguished the infants of depressed and well mothers were precipitated by the occurrence of insensitive or rejecting maternal behavior, a feature that was significantly more prevalent in the depressed group.

Impairments in the face-to-face engagements of depressed mothers have not only been found to be associated with immediate signs of behavioral disturbance in the infants, but they also appear to mediate some of the longer term adverse child outcomes associated with postpartum depression. Thus, in the longitudinal study of Murray and colleagues, the adverse impact of postpartum depression on infant cognitive outcome at 18 months was determined by the quality of mother-infant interactions at two months, maternal insensitivity to the infant's experience, and the failure to engage the infant in active communication predicting poor performance both on object permanence tasks and the more general assessment of cognitive functioning.

Furthermore, those infants whose mothers showed insensitive behavior in the postpartum period not only had adverse cognitive outcome at 18 months, but the trajectory of their cognitive development from this point onwards was markedly constrained by their 18 month functioning. (Brennan, 2000)

A critical issue arising from the association between early mother-infant interactions and the longer term functioning of the child is whether this indicates a sensitive period in infant development, with early infant exposure to the impairments in maternal interactions associated with depression being sufficient to explain later adverse outcome. An alternative to this explanation is that there are enduring features of maternal engagement with the child (possibly initiated by the affective disorder) that better account for the longer term child deficits. There is certainly evidence for some degree of continuity in the style of mothers' communication with their offspring, despite remission from depression. Nevertheless, data from the longitudinal study indicate that the infant's experience of impairments in maternal communication early on may be more important in determining outcome than later exposure. Thus, in the five-year-old children, although current maternal communication was indeed associated with cognitive performance, once the child's functioning at 18 months postpartum (itself predicted by the two month interactions) (Armstrong, 1998) was taken into account, the influence of the current style of maternal behavior on child cognitive functioning was no longer significant.

While the suggestion that there may be something of a sensitive period in early infant cognitive development gains some support from the evidence outlined above, the detailed nature of the processes that may be involved remains unclear. In particular, the duration of the infant's exposure to disturbance in maternal communication necessary for adverse cognitive outcome in early childhood, while apparently less than 18 months, is unknown. A related issue that remains to be resolved, concerns the extent to which any continuing impairments in maternal interactions are themselves maintained by infant behavior. It is evident from a great deal of research with normal populations that, whatever their initial input, infants rapidly contribute actively to interactions with others, making for a transactional process that is jointly sustained in the long term.(Brennan, 2000) The finding that the avoidance and unresponsiveness of the infants of depressed mothers caused non-depressed adults to behave in a depressed-like manner when interacting with them suggests that the infant may indeed make a significant contribution to the persistence of difficulties in maternal communication in the context of postpartum depression.

This latter finding raises the more general question of the possible contribution of infant variables to the developmental process. It may be the case, for example, that individual infant characteristics influence the occurrence of maternal depression itself, the quality of mother-infant interactions, and even subsequent child development. With regard to maternal depression, which found difficult infant behavior at two-to-three months, assessed independently of interactions with the mother, to be associated with the mood disorder, are certainly consistent with there being an impact on maternal mental state of infant characteristics; but, since these studies were not prospective, the direction of effects is unclear. However, a prospective study conducted by Murray and colleagues did reveal a significant impact of infant variables on the occurrence of maternal depression: the presence of either poor motor control or irritable behavior in a normal sample of healthy full-term neonates of well mothers was found to increase the risk of subsequent postpartum depression by a factor of around four. However, although difficult neonatal behavior did appear to precipitate the onset of maternal depression, there was no evidence that differences in infant functioning in the neonatal period influenced the quality of maternal face-to-face interactions with the infant at two months.

By this time, the mother's mental state, together with her social circumstances, were the over-riding influences on the quality of mother-infant engagements. In addition, with regard to the longer term development of the child, there was no evidence from the longitudinal study that child cognitive outcome could be explained by individual infant differences: thus, while the infant's behavior during interactions with the mother at two months was significantly predictive of later cognitive performance, infant behavior during an interaction with a researcher was not.

The balance of evidence regarding cognitive development suggests that the adverse outcomes of the children of women with postpartum depression arise by virtue of early infant exposure to the disturbed maternal interactions. The situation regarding the adverse infant emotional outcomes is less clear. Although Murray et al. (1996a) did find an association between postpartum depression and insecurity of infant attachment they found no relationship between such attachment and the quality of the early structured mother face-to-face interactions observed. One possible explanation that might be advanced for this finding is that the association between postpartum depression and adverse infant emotional outcome is non-environmentally transmitted. This account, however, is not consistent with the findings of a recent controlled treatment trial compared to the infants of women with postpartum depression who received no treatment. The infants of those who received a brief psychological intervention between two and four months post-partum were found to have a significantly lower rate of behavior problems at 18 months. In addition, early remission from postpartum depression in this trial, itself associated with the intervention, was found to be predictive of a lower rate of insecure infant attachment. It seems more likely, therefore, that the failure to detect a relationship between early mother-infant engagements and later attachment quality arose because the structured nature of the face-to-face interactions may have precluded the elucidation of attachment related behaviours.

The evidence outlined above regarding the mechanisms mediating child development in the context of postnatal depression concerns proximal influences; that is, interactions impinging directly on child experience. A wider issue arises, however, in relation to the more distal environmental factors influencing mother-infant interactions and child outcome. As will be evident from the summary of the research findings, variability in outcome was, in part, related to differences in the nature of the samples studied. Samples drawn from disadvantaged populations evidenced, in the context of maternal depression, both more severe disturbance in interactions (Field et al., 1988; Field et al., 1990) and more adverse child cognitive functioning (Sharp et al., 1995) than those from low risk groups, suggesting the synergistic influences of depression and social disadvantage.

2.7 Conclusion

In conclusion, the strongest effects of PPD appear to be on cognitive development such as language, intelligence (IQ), and Piaget's object concept tasks. But these effects are quite mixed, and relate to contextual factors and child sex. The literature on child behavior generally supports an effect of PPD on distractibility, antisocial and neurotic behavior in the home and at school up to 5 years postpartum.

However, teacher reports of child behavior are not supportive of effects of PPD, and over reliance on maternal report of child behavior warrants caution. Current research does suggest that postpartum depression may affect child development. However, it is likely chronic or recurrent maternal depression that is related to later effects on the child, rather than postpartum period depression per se. The adverse effects of PPD on child development seem to be mediated through maternal interpersonal behavior and sex of infant. The impact is likely to be worse where the depressive episode is severe and prolonged, and where it occurs in the context of adversity. There is a compelling body of evidence implicating postpartum depression in a range of adverse child cognitive and emotional outcomes.

Whilst infant factors do appear to contribute to the inception of the maternal depression, the balance of evidence strongly suggests that it is the maternal interactional style, secondary to the affective disorder and/or social adversity, which is the potent aetiological agent. Observational and experimental studies are needed to elucidate the process by which the maternal behaviors become disturbed. In addition, the role of the infant in the development and maintenance of the impaired interactions needs to be clarified. The idea of there being a sensitive developmental period has received some support, at least with respect to cognitive development. However, little is known of the precise parameters involved. These could in the future contribute much to elucidating the relative contributions of genetic and environmental factors to the association between postpartum depression and adverse child outcome.

Chapter 3

Methodology

Past research has presented us with a wealth of information documenting effects of PPD on the development of mainstream or typically developing children; however, there have been no known research studies completed on the mother’s of special needs children, and the role that postpartum depression can play in these familys’ lives. Due to time limitations, available populations, issues with confidentiality, as well as lack of previously documented research on the topic, the researcher has chosen to condense the experimental side of this thesis project and focus on the mothers of children with delayed developmental milestones. In addition, the researcher has focused only on the biological mothers of these children, rather than the testing and scoring of developmental examinations on the child due to some of the limitations and issues mentioned above.

3.1 Introduction

Because mothers largely constitute infants' social environment and mediate their experience of the external world, it is imperative to investigate the effects of Post-Partum adjustment and depression symptomology on child growth and development, especially within a population that has not previously received any attention or specific research. This research is designed to provide real-world data from mothers of developmentally delayed children. There is little to no risk in regard to human subjects, as the survey collecting the data is anonymous, and the questions asked by the survey are generic. In addition, the collection of this data will be occurring during a normally occurring scheduled appointment with a Shirley Eves in-home provider. These service providers will be on hand to assist these mothers if any problematic thoughts or feelings arise. The researcher also asked the Shirley Eve's Social Worker and Service Coordinator to create a list of counseling providers and support groups in the local area that participants may access if they so choose. This result may be beneficial to the parent, as they will have the ability to be linked to further services or supports through participation in this study. In addition, the Shirley Eves professional will have the opportunity to have open dialogue and communication with their clients about some of the thoughts, feelings, and experiences they have gone through in the past, surrounding the birth of their child. This may present in-sight and understanding to these professionals as they work to service their families and provide much needed services to these children.

In order to move forward with this project, the researcher made contact and was granted approval by Shirley Eves Developmental & Therapeutic Center, located in Millville, NJ, in order to survey the mother's of children serviced by Shirley Eve's. Children involved with Shirley Eves are between the ages of 0 to 3years old, and are eligible for the program based on a 33% delay in one area of development, or 25% delay in 2 or more areas of development as revealed by a normed assessment such as the Batelle. Shirley Eves' mission is to provide appropriate service for families with disabled children, and to assist families in maintaining their disabled child at home and in the community. For the purpose of this research, developmental delays refer to a child's delay in meeting expected milestones in their early years. These delays may relate to motor, social/emotional, language or cognition skills and abilities. Some delays may be temporary, such as hearing loss due to chronic ear infections. Other delays may be life long, such as Down syndrome or autism. In all cases, early diagnosis and intervention increases the chance to mitigate the effects.

Early intervention is defined as a collection of services for families with children with a delay or other disability, ages birth to three years; with services designed to aid in the development of the child, and assist the family with the knowledge and support necessary for them to meet their goals. According to the Centers for Disease Control and Prevention, less than half of all children with developmental challenges are identified before they begin school. Parents should be aware of the typical milestones children are expected to achieve and when to become concerned. Developmental milestones are usually divided into gross and fine motor skills, language, cognitive and social/emotional skills, as well as self-help.

With the assistance and approval of Shirley Eve's Board of Directors, the researcher created an anonymous survey tool that will be used by the in-home service providers with mothers of these special needs children. The researcher then worked with the Director of Shirley Eves, in order to produce a timeline and schedule for this research to occur. Prior to the survey being handed out to service providers and to parents, the researcher will have an in-service with the Shirley Eves in-home service providers, in order to give an explanation and instructions on handing out the material, as well as protocol for collecting the survey, as well as working on actively engaging their families in a discussion focused on postpartum adjustment and some of the feelings and emotions that the family may have dealt with following birth.

3.2 Participants

Subjects of this study are mothers of children receiving Early Intervention Services through Shirley Eves Developmental and Therapeutic Center, in Cape May and Cumberland Counties. Shirley Eves employs speech/language pathologists, social workers, occupational therapists, physical therapists, and special education teachers, as well as a variety or paraprofessionals. Families are seen with frequencies ranging from one or two times a week to once every 6 months, with specific treatment plans and goals being documented and recorded in Individual Family Service Plans that are revised every 6 months.

3.3 Research Design

The Shirley Eves professionals will be responsible for handing out and collecting the survey materials, and will also be completing a section of the material that provides demographic information of these children and their families. The in-home provider will begin a conversation with the mother about postpartum adjustment, and give a brief introduction to the project and survey materials. Mothers can voluntarily take part in the research and complete the anonymous survey either privately, following the session with the service provider, or with the assistance of the provider, while they are in the home. As this research is specifically focusing on mothers of developmentally delayed, the majority, if not all questionnaires, handed out and collected by the Shirley Eves professionals will be completed by women. Inclusion and exclusion criteria for this experiment will revolve solely around who is willing and able to participate in this study. Mothers willing to fill out the survey will have the choice to fill out the material with their service provider or privately following the appointment. The in-home service provider will then collect the survey from the parent during the family's next scheduled appointment.

As a large number of families serviced by Shirley Eves are Spanish speaking, the researcher will also be offering this document translated into the Spanish language. This addition to the project was suggested by the Shirley Eves Board of Directors, and will allow this survey to be handed out and completed by non-English speaking families. Shirley

Eves also employs translator services that assist in-home service providers with communication with these families.

3.4 Measure

The survey being utilized by the researcher is made up of questions designed to determine basic demographics of the group, interactive and parenting styles of each participant, as well as detail each mother’s own perception of her performance in social and behavioral domains, specifically items relevant to a mother’s care of her infant. The questionnaire also contains questions designed for the mother to indicate her perception of her infants’ health, basic development, awareness, and attachment to them as the child’s primary caregiver. The researcher is utilizing an anonymous survey, with permission granted by the board of director's of the Shirley Eves Developmental and Therapeutic Center. Informed consent for participants is included at the top of the measure, and will also be explained verbally by the Shirley Eves in-home service professionals at the time the survey will be handed out to participants. The measure created by the researcher will be modified to include questions pertaining to PPD symptoms or diagnosis in the demographics section of the survey. No formal advertising or fliers are being used to gather this group of women. The survey material can be filled out directly by mothers without assistance by the professional. This takes a little bit of stress off the service provider to ask tough questions, while allowing the parent to read right from the paper. The aim here is for the professional to engage the client about the materials, affording the service provider insight into what this parent has experienced. It also may open up the mother for possible access to other services or support groups that may be beneficial. The service provider will still be asked to fill in demographic information at the end of the survey.

During the researchers in-service with Shirley Eves staff, suggestions for opening communication and discussion between provider and client were focused upon, as well as explanations of the purpose of this research and what it may provide both to parent and providers. Warm-up conversation and genuine rapport building with the parent is also beneficial to the process. Service providers trying to have this conversation with families that have a long established relationship with the therapist may be difficult. The hope is that if provider and mother openly engage and communicate during the completion of this survey, the professional may get an even better view of what the parent has experienced or possibly connect them to other services. There are specific support groups that exist for families of special needs or developmentally delayed children. Participants of this study will have the ability to talk with their service providers and possibly access this modality of support.

3.5 Collection of Data and Analysis

The researcher’s hope in documenting this data is to provide a glimpse into the perception of a population of mothers of special needs children as it pertains to the development and general well-being of their offspring. The gathered data will be used to present correlations of collected data, in general terms, and participants’ basic demographics will also be recorded and used in these correlation studies. Each question included on the measure will be documented and scored. This data will then be utilized to draw correlations to other questions included on the measure. In scientific data, it appears that two variables are connected in such a way that when one variable changes, the other variable changes also. This connection is called a correlation. The researcher will attempt to measure the strength of a relationship between two variables by calculating a correlation coefficient. The value of the correlation coefficient indicates to what extent the change found in one variable relates to change in another. There are several types of correlation coefficients; however for the purpose of this study the researcher will be utilizing the Pearson Product-Moment Correlation Coefficient, or simply, the Pearson r.

Chapter 4

Discussion of Results

4.1 Introduction

Shirley Eve's Developmental & Therapeutic Center strives to enhance the capacity of families to meet the developmental and health-related needs of developmentally disabled children from birth to age three. As implementation and evaluation of the Early Intervention Program commences, it is often useful and necessary to identify any difficulties or emotional instability the child's mother may be experiencing during these traumatic early years. As a child is identified as special needs and evaluated for services, a mother experiences an incredible variety of emotions and apprehension. Children with severe disabilities may require more intense and direct caretaking from a parent, possibly perpetuating further feelings of depression or anxiety by the child's mother.

According to research, the incidence of post-partum depression in Western societies is approximately 10-15% and its cause is multi-faceted. For the purpose of this project, the researcher is hypothesizing that mothers of children with more severe disabilities will report more symptoms associated with Post-Partum Depression than mothers of children with less severe disabilities. The researcher will also be looking for further correlations between specific questions in the survey and other demographic information recorded.

4.2 Results

Following collection of the survey material from the Shirley Eve’s staff, the researcher then set about to analyze the data and determine specific demographics of the sample population. In addition, the examiner ran several correlational statistical analyses on the collected data. The researcher was able to compile a total of 33 surveys, completed by new mothers currently being serviced by Shirley Eve’s Developmental and Therapeutic Center, located in Millville, NJ.

For the purpose of this study, each questionnaire was divided up into three sections, allowing a correlational analysis to be run several different ways. The first bank of questions, labeled 1 10 on the survey, required the participant to reference their own physical and emotional well-being. Section 2 of the questionnaire, labeled 1 through 5 on the second page of the survey, asked the mother to measure their child’s overall health, including both physical and emotional well-being, as well as the child’s overall temperament. The last segment of this document completed by the mother, labeled 1 through 7 on the third page of the survey, scrutinizes the mother’s perceptions, thoughts, and feelings of her ability to care for her child, form permanent attachment bonds to her child, and possible feelings of blame for disabilities or delays seen in their child. Each question was then added together, in order to determine an overall score for each section of the document, labeled *Mother’s Well-Being*, *Child’s Well-Being*, and *Perception*. Utilizing these scores, the examiner was able to run the necessary correlational analyses in order to prove or disprove the hypothesis. As stated previously, the researcher is hypothesizing that mothers of children with more severe disabilities will report more symptoms associated with Post-Partum Depression than mothers of children with less severe disabilities. In order to measure this hypothesis and determine if it is statistically significant, the researcher took the score given to each survey’s *Child Well-Being* section and the *Perception* section, and ran the Pearson Product-Moment Correlation Coefficient, in order to determine if the stated hypothesis is statistically significant. ($p>.05$)

If the hypothesis is true, the p-value or probability value is the probability that the observed outcome would happen.

The p-value is a value obtained after calculating the Pearson r coefficient. The smaller the p-value, the less likely there is a null hypothesis. For the purpose of this study, alpha will be set at .05, meaning the p-value must be smaller than this to be considered statistically significant; the p-value tells us the probability expected in the results given the null hypothesis is true. If the p-value is less than alpha, the null hypothesis must be rejected, stating that there appears to be statistical significance between groups.

As seen in Table 1, there is no statistical significance between the mother's report of her child's overall well-being and the perceptions of that mother's ability to care for and bond with her child. Because the p value exceeds the alpha, set at .05, it is not statistically significant; thus the null hypothesis cannot be rejected, and it can be concluded that there is no reason to expect the mothers' of children with more severe disabilities to report more symptoms associated with Post-Partum Depression than mothers' of children with less severe disabilities. $r(33) = -.999$, $p > .05$, as p=0.583.

Table 1 Correlation

Child vs. Perception

		Child	Perception
Child	Pearson Correlation	1	-.099
	Sig. (2-tailed)		.583
	N	33	33
Perception	Pearson Correlation	-.099	1
	Sig. (2-tailed)	.583	
	N	33	33

Future researchers will want to look at the population and effect size, in order to determine the strength of the any of these relationships. A moderate to large effect will not be statistically significant if the sample size is low, as is the case in this study. In this case, we cannot reject the null hypothesis, as there is no statistical significance between a child’s overall well-being and the mother’s perception of her ability to bond and care for her infant.

A second important correlation analyzed by the examiner was the mother's report of her own physical and emotional well-being. Much in the same manner that the child's overall score was analyzed against the mother's perceptions, the mother's overall score was statistically measured in the same way.

In Table 2, we can see that there is statistical significance between the mother's overall well-being and her perceptions of her own abilities to care for her child and form a permanent bond. The p value has determined that the probability with which we can expect this result to occur. ($r(33) = .626$, $p < .05$)

Table 2 Correlation

Mother vs. Perception

		Perception	Mother
Perception	Pearson Correlation	1	.626**
	Sig. (2-tailed)		.000
	N	33	33
Mother	Pearson Correlation	.626**	1
	Sig. (2-tailed)	.000	
	N	33	33

With this data in hand, the null hypothesis can be rejected, as there is a statistical significance between a mother’s well being and her perception of care-taking abilities and bond to her child. It is important to remember that that statistical significance does not equal importance. In order to determine the strength of the relationship between these two variables, a measure of effect size must be calculated, as the effect size, and how important it is, is somewhat subjective and can vary depending on the study at hand. This study did not take this into account, and therefore the strength of the relationship between these two variables is unknown. Further research with a larger sample is necessary for any form of validity or reliability in these statements. The researcher is only able to state these results from this sample population, and is unable to generalize any findings.

4.3 Review of Results: Interpretation of Findings

Statistical analyses of the survey materials allowed the evaluator to draw several correlations. Within this data, the evaluator observed a correlation between a mothers' physical and emotional well-being and her own perception of herself as a mother. This suggests a relationship between well being and perception, highlighting the importance of a new mother taking care of herself, as well as her newborn baby, and the Early Intervention service provider showing increased sensitivity to the physical and emotional needs of the mother as well as the child. The evaluator was also able to reject the original hypothesis that mothers of infants with a more severe developmental delay will display a more negative viewpoint or perception. By calculating the percent of cognitive delay for each child and comparing this data to the mother's perception score, using the Pearson r, a statistical significance was not realized. This lack of correlation is evidenced in Table 3 Percent Delay vs. Perception.

Table 3 Correlation

Percent Delayed vs. Perception

		Percent Delayed	Perception
Percent Delayed	Pearson Correlation	1	.128
	Sig. (2-tailed)		.485
	N	32	32
Perception	Pearson Correlation	.128	1
	Sig. (2-tailed)	.485	
	N	32	33

This lack of statistical significance may show the degree of disability of a child has no effect on a mother's outlook and perception. This is actually a positive message to parents of special needs children, and may be welcome information to Shirley Eves and its staff members working with this population.

In addition to the correlational analyses, the researcher was able to utilize the survey data in order to document basic demographics of the surveyed population. The examiner was surprised to record that the majority of mothers surveyed by Shirley Eves’ service providers are Caucasian and 68.7% are above the age of 26, witnessed with Table 5 Race and Table 7 Parents Age. The average, or mean, age recorded in the survey data is 30.84 years old, and the average, or mean, child chronological age is 24.45 months old, with a mean cognitive age of 18.77, as reported in Table 4 Demographic Information. The most frequently used diagnosis within the survey data was developmentally delayed, second only to Speech and Language disorders. This information can be seen in the demographic chart labeled Table 8 Diagnosis.

Table 4 Demographic Information

		Race	Mother's Age In years	Chronological Age of Child (in months)	Cognitive Age in months	Diagnosis	% Delaye
N	Valid	33	32	33	32	30	32
	Missing	0	1	0	1	3	1
Mean		1.21	30.84	24.45	18.77	6.10	24.94
Median		1.00	30.00	26.00	21.50	5.00	28.00
Mode		1	26*	12*	22	5	0
Std. Deviation		.600	5.892	7.981	7.989	3.782	20.111
Range		3	20	26	28	12	62

*. Multiple modes exist. The smallest value is shown

Table 5
Race

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	White	28	84.8	84.8	84.8
	Hispanic	4	12.1	12.1	97.0
	Mixed: White/Black	1	3.0	3.0	100.0
	Total	33	100.0	100.0	

Table 7
Parents Age

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	22	1	3.0	3.1	3.1
	23	2	6.1	6.3	9.4
	24	2	6.1	6.3	15.6
	25	2	6.1	6.3	21.9
	26	3	9.1	9.4	31.3
	27	1	3.0	3.1	34.4
	28	1	3.0	3.1	37.5
	29	3	9.1	9.4	46.9
	30	2	6.1	6.3	53.1
	31	2	6.1	6.3	59.4
	32	1	3.0	3.1	62.5
	33	3	9.1	9.4	71.9
	35	1	3.0	3.1	75.0
	37	3	9.1	9.4	84.4
	39	1	3.0	3.1	87.5
	40	2	6.1	6.3	93.8
	41	1	3.0	3.1	96.9
	42	1	3.0	3.1	100.0
	Total	32	97.0	100.0	
Missing	System	1	3.0		
Total		33	100.0		

Furthermore, this study separated the last two questions participants were asked to complete prior to the Shirley Eves staff member completing the survey with basic demographic information. These two questions measured participants’ mood, prior to and preceding Early

Intervention Services. Analysis of the collected data showed marked improvement in mood following these services. This statistic can be seen in Table 6 Mood Before and After Early Intervention Services. Participants responded from 1 to 5 with what best applies to their own thoughts or perceptions, with 1 being the most positive and 5 being the most negative. The mean, or average, response within the 33 questionnaires shows an average response of 2.45 prior to services, with an average response of 1.24 after Shirley Eves Early Intervention Services. This response from participants in this study shows an improvement in mood with the addition of these services. Shirley Eves Developmental & Therapeutic Center focuses its services and assistance not only on the special needs child, but also on the family’s needs, goals, and knowledge base.

Table 6

Mood Before and After Early Intervention Services

		Mood Prior to Services	Mood After Services
N	Valid	33	33
	Missing	0	0
Mean		2.45	1.24
Median		3.00	1.00
Mode		3	1
Std. Deviation		1.148	.435

Scores above range from 1(positive) to 5(negative), indicating the lower the score the more positive the participants response.

Listed in Table 8 is the diagnosis of the child, as documented on each collected survey. The most frequently used diagnosis for children involved with this study is developmentally delayed; with the second most frequently used diagnosis being a speech language disorder. This demographic information is only relevant to those mothers' who chose to take part in this study, and in no way reflects the population demographic of families serviced by Shirley Eves.

Table 8
Diagnosis

		Frequency	Percent	Valid Percent	Cumulative Percent
	Failure to Thrive	1	3.0	3.3	3.3
	Speech and Language Disorder	7	21.2	23.3	26.7
	Autistic	1	3.0	3.3	30.0
	Down Syndrome	1	3.0	3.3	33.3
	Developmental Delay	8	24.2	26.7	60.0
	Hearing Loss	1	3.0	3.3	63.3
	Pervasive Developmental Disorder	1	3.0	3.3	66.7
	Seizure Disorder	1	3.0	3.3	70.0
	Primature Child Birth	2	6.1	6.7	76.7
	Motor/Speech Disorder	1	3.0	3.3	80.0
	Cerebral Palsy	1	3.0	3.3	83.3
	Language Delay	4	12.1	13.3	96.7
	Tuberous Sclerosis	1	3.0	3.3	100.0
	Total	30	90.9	100.0	
Missing	System	3	9.1		
Total		33	100.0		

Chapter 5

Review of Thesis

5.1 Review of Study and Results:

It is generally accepted that mothers largely constitute infants' social environment and mediate their experience of the external world; therefore it is imperative to investigate the effects Post-Partum Depression symptomology may have on a child with delayed growth or development. Young infants are appreciably affected and highly sensitive to the quality of care they receive, and mothers of special needs children must be sensitive to such needs. This research project is designed to look at a specific population of developmentally disabled children and their mothers, by making use of an anonymous, voluntary survey, created by the researcher. Shirley Eves in-home service providers were first instructed by the researcher, and then met with the parent during a normal appointment or session. These surveys are made up of questions designed to determine basic demographics of the mother and child, interactive and parenting styles of each participant, as well as detail each mothers’ own perception of her performance in social and behavioral domains, specifically items relevant to a mother’s care of her infant. Shirley Eves’ staff members included the chronological and cognitive age of the child, allowing the evaluator to compute the percentage of cognitive delay seen in the child. The staff members also included any known classification of the child’s disability. Prior to completing this survey, mothers were provided with a copy of the project’s Informed Consent Protocol, notifying the participant of their rights as they pertain to participation in this project. The Shirley Eves service provider, meeting with the parent, also provided a brief explanation of the project and the included survey materials, and was able to answer any questions. According to research, the incidence of post-partum depression in Western societies is approximately 10-15% and its cause is multi-faceted. For the purpose of this project, the researcher hypothesized that mothers of children with more severe disabilities will report more symptoms associated with Post-Partum Depression than mothers of children with less severe disabilities. Through this study, the evaluator was able to reject this hypothesis. The idea that a child’s overall well-being has some form of a relationship to the mother’s perception of her caretaking ability and bond or attachment was also rejected. This is very positive news, both for mothers of special needs children, as well as to the specialized staff servicing this population. If severity of delay or handicap does not diminish the caretakers’ positivity, then that mother and child may have a better chance to work together in a constructive relationship.

Shirley Eves Developmental & Therapeutic Center strives to enhance the capacity of families to meet the developmental and health-related needs of developmentally disabled children. As implementation and evaluation of the Early Intervention Program commences, it is often useful and necessary to identify any difficulties or emotional instability the child’s mother may be experiencing during these traumatic early years. As a child is identified as special needs and evaluated for services, a mother experiences an incredible variety of sentiment and apprehension. Children with severe disabilities may require more intense and direct caretaking from a parent, possibly initiating further feelings of depression or anxiety by the child’s mother. As the reliability and validity of this study are possibly compromised due to the small and specific population utilized, further research in this arena is apparently necessary for the benefit of families receiving such services, as well as the service providers working directly with these families. The study did indicate that the mother's overall well-being has a direct correlation to that mother's perception of her caretaking ability, as well as attachment or bond to her child. Early Intervention providers may find this statistically significant correlation very important to their work; as such services are focused not only on the child, but on the parent or caretaker's needs as well. This is a priority of early intervention services provided in the state of New Jersey. As stated above, this study is limited by the small and specific population surveyed by the evaluator. In addition, the tool developed by the evaluator has not been normed or compared to any other scientifically acceptable tool available. Further researchers may want to take this into account, and utilize a valid and reliable measure such as the Beck Depression scale. Furthermore, as the survey tool is anonymous and was administered by various Shirley Eves staff members, and not the evaluator, different methods of administration may have been used that would possibly skew results and conclusions of this study. In total, this study was able to survey 33 mothers of special needs children up to age 3. The majority of mothers' surveyed by Shirley Eve's are Caucasian, and 68.7% are above the age of 26. The average, or mean, age recorded of mothers participating in this study is 30.84 years old, and the average, or mean, child chronological age is 24.45 months old, with a mean cognitive age of 18.77. The most frequently used diagnosis within the survey data was developmentally delayed, second to speech and language disorders.

5.2 Conclusions

Following the collection and statistical analyses of the survey materials, the evaluator was able to draw several correlations. Within this data, the evaluator observed a correlation between a mothers' physical and emotional well-being and her own perception of herself as a mother. This suggests a relationship between well being and perception, highlighting the importance of a new mother taking care of herself, as well as her newborn baby, and the Early Intervention service provider showing increased sensitivity to the physical and emotional needs of the mother as well as the child. The evaluator was also able to reject the original hypothesis that mothers of infants with a more severe developmental delay will display a more negative viewpoint or perception. By calculating the percent of cognitive delay for each child and comparing this data to the mother's perception score, using the Pearson r, a statistical significance was not realized. This lack of statistical significance may show the degree of disability of a child has no effect on a mother’s outlook and perception. This is actually a positive message to parents of special needs children, and may be welcome information to Shirley Eves and its staff members working with this population.

Demographic information provided in this study describes an 84.8% Caucasian population participating in this study, with the majority of mothers over the age of 26. With only 33 surveys collected, the demographic information provided is not representative outside of the population serviced by Shirley Eves at the time this data was collected, thus making the correlations and descriptions highlighted in this study less than generalizable to other populations’ nation-wide.

The evaluator also looked at the last two questions participants were asked to complete prior to the Service provider including basic demographic information. These questions asked participants to compare their mood, prior to and following Shirley Eves early intervention services. According to the data collected, participants’ moods showed marked improvement in mood following the implementation of early intervention services. This statistic can be seen in Table 6 Mood Before and After Early Intervention Services. For this survey, participants were asked to choose a number from 1 to 5 that best applies to their own thoughts or perceptions, with 1 being the most positive and 5 being the most negative. The average, or mean, displayed in the chart shows an average response of 2.45 prior to services, with an average response of 1.24 after Shirley Eves Early Intervention Services. This response from participants in this survey shows a significant improvement in mood with the addition of these services. This finding coincides with a focal point of Shirley Eves services, as these service providers strive to not only service and assist the special needs child, but also support and educate the family as a whole.

5.3 Limitations

The main limitations of this study will certainly involve the validity and reliability of the data collected in this study. Because the questionnaire being used in this study was created by the author, the measure's reliability and validity will not be truly tested. In addition, the comparatively small population utilized by the researcher will not allow information obtained in this study to be generalized outside of this specific population of mothers of developmentally delayed children involved with Shirley Eves. A further limitation to this study involves the rather homogenous sample being utilized in this study, with regard to participants’ socioeconomic status. An additional limitation would be the homogeneity of the sample. The sample used is a pool of mothers from only 2 counties in the state of New Jersey. Moreover, these counties exist in a more or less rural setting, with the population, in general, being predominantly Caucasian and not as ethnically diverse as other more urban areas. The lack of diversity will impact results, as well as conclusions in that they will be less generalizable to other populations. Due to the region serviced by Shirley Eves and the socio-economic break-down in the Cape May and Cumberland Counties, this survey may not be representative of populations in and around New Jersey. Therefore, this data may not be valid and reliable in its current form. Further efforts to research and explore Post-Partum Depression symptomology and its effects in the special needs population of children are desperately needed.

5.4 Implications for Further Study

The study examining Post-Partum Depression symptomology occurrences in a developmentally delayed or special needs population has shed some light on an area that is previously lacking in research. The researcher was able to draw a correlation and show statistical significance, within a small population of mothers of special needs children, between the mother's overall well-being, including physical and emotional health, and her perception of her ability to bond and care for her child. ($r(33) = .626$, $p < .05$) This statistical significance highlights the importance of the mother's health and well being, in addition to the needs and healthy development of the child.

For the purpose of this study, the researcher was unable to show any relationship between the developmentally delayed child's physical and emotional well-being and the mother's perception of her capability to bond and care for her child. With the lack of statistical significance observed in this correlation, $r(33) = -.999$, $p > .05$, as p=0.583, the null hypothesis cannot be rejected. The null hypothesis in this case boils down to the severity of a child's disability having no effect or relationship to the perceptions of that child's mother in her ability to be an effective parent. In the opinion of the researcher, this is a very optimistic result for special needs families universally. However, due to the limitations described above, as well as the lack of previous research into Postpartum Adjustment difficulties present in mothers' of special needs children, further research and experimentation is needed.

This study into Post-Partum depression symptomology and its effects on a special needs population has provided the evaluator and the Shirley Eves service professionals with real-world data of a small population in Cape May and Cumberland Counties. In the opinion of the evaluator, it is extremely necessary to assess the population of mothers with special needs children, as there is little to no research specifically scrutinizing this specific.

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Assessment Questionnaire
"A Look at Post-Partum Adjustment symptomology in mothers with children with delayed developmental milestones"

Informed Consent for participants in the study:

You are being asked to participate in a survey research project entitled *"A Look at Post-Partum adjustment symptomology in mothers' of children with delayed developmental milestones,"* which is being conducted by Joshua Lees, a student at Rowan University. This survey is anonymous. No one, including the researcher, will be able to associate your responses with your identity. Your participation is voluntary. You may choose not to take the survey, to stop responding at any time, or to skip any questions that you do not want to answer. You must be at least 18 years of age to participate in this study. Your completion of the survey serves as your voluntary agreement to participate in this research project and your certification that you are 18 or older. Questions regarding the purpose or procedures of the research should be directed to Joshua Lees at (609)653-4932 or Leesj79@Rowan.edu. This study has been exempted from Institutional Review Board (IRB) review in accordance with Federal regulations. The IRB, a university committee established by Federal law, is responsible for protecting the rights and welfare of research participants. If you have any questions about your rights as a research subject, you may contact the Associate Provost for Research at:

Rowan University
Institutional Review Board for the Protection of Human Subjects
Office of Research
201 Mullica Hill Road
Glassboro, NJ 08028-1701
Tel: 856-256-5150

On a scale from 1 to 5 with 1 being the most positive and 5 being the most negative, please circle the number that pertains to you.

1.) In the first few months after your child was born, your overall emotional well-being during this time was:
1...................2...................3...................4...................5
Excellent emotional well-being…………extremely poor emotional well-being

2.) In the first few months after your child was born, your overall physical health during this time was:
1...................2...................3...................4...................5
Excellent physical health…………extremely poor physical health

3.) After your child's birth up until the present, how would you describe your own mood?
1...................2...................3...................4...................5
Rarely depressed…………………………………extremely depressed

4.) If you have a current partner, how would you describe your relationship during the first year following your child's birth?
1...................2...................3...................4...................5
Happy, close relationship……………………………troubled, poor relationship

5.) In your daily life, how often are you pleased about things?
1...................2...................3...................4...................5
Often pleased and satisfied about things daily…………….almost never pleased

6.) In your daily life, what best describes your mood.
1...................2...................3...................4...................5
Rarely angry, irritated or annoyed…………………Constantly angry and irritated

7.) How would you describe your overall life?
1...................2...................3...................4...................5
My life is largely what I want it to be…….........I am very dissatisfied with my life

8.) How do you feel about yourself?
1...................2...................3...................4...................5
I feel good about myself…………………………I feel completely useless

9.) How would you describe your feelings about the future?
1...................2...................3...................4...................5
Positive and optimistic………………………………..overwhelming feeling of dread

10.) How would you describe your ability to be calm and composed?
1...................2...................3...................4...................5
Almost always calm and serene………………………constantly tense and nervous

On a scale from 1 to 5 with 1 being the most positive and 5 being the most negative, please circle the number that best applies to your child.

1.) My child's ability to be calm:
1...................2...................3...................4...................5
Always calm and alert………………………constantly crying and hard to calm

2.) My child's need for attention:
1...................2...................3...................4...................5
Able to occupy self most of time………………..needs constant attention

3.) My child's ease of going to sleep:
1...................2...................3...................4...................5
Able to fall asleep easily……………….needs a great deal of help to go to sleep

4.) My child's ability to stay asleep:
1...................2...................3...................4...................5
Sleeps through the night…………………..constant waking/fitful sleeper

5.) My child's temperament:
1...................2...................3...................4...................5
Happy, content, smiles a lot……….............constantly fussy and often crying

On a scale from 1 to 5 with 1 being the most positive and 5 being the most negative, please circle the number that best applies to your own thoughts or perceptions.

1.) My perception of my own ability to physically care for my child:
1...................2...................3...................4...................5
Excellent care, all of child's needs met...........have a lot of trouble taking care of my child

2.) My perception of my child's attachment to me:
1...................2...................3...................4...................5
My child is strongly bonded to me…............My child seems not have bonded to me at all.

3.) My perception of how other's view the ability for me to care for my child:
1...................2...................3...................4...................5
People see me as a perfect mother……….............People think I am a bad mother

4.) My thoughts about being a mother and primary caregiver for my child:
1...................2...................3...................4...................5
Being a mother to my child is the greatest..........Caring for him/her is the worst

5.) My thoughts about the causes of my child's disability or delay:
1...................2...................3...................4...................5
I am OK with my child's disabilities...........I blame myself for my child's disability

6.) My mood prior to beginning early intervention services with my child and family:
1...................2...................3...................4...................5
Positive and focused..........Negative, anxious, and depressive

7.) My mood since my child and family has begun early intervention services:
1...................2...................3...................4...................5
Positive and focused..........Negative, anxious, and depressive

Thank you for taking part in this project. If this survey has produced any emotions, feelings, or thoughts that may result in feelings of depression and/or anxiety, please talk with your in-home service provider.

The in-home service provider will fill out the following basic demographic questions:

Race of mother: _______________

Age of parent: ____________

Chronological Age of child: _______________

Cognitive Age of child: _______________
**based on the H.E.L.P. (Hawaii Early Learning Profile Developmental Scale) or initial evaluation by TET

Diagnosis of child, if known: _____________