

The Effect of Postpartum Depression on an Infant's Language and Cognitive Development

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Introduction

For many women, when they find out that they are pregnant and are going to have a baby, it is one of the most exciting times of their life. There is always a lot of joy surrounding the news, especially from friends and family members. A cultural and societal norm of gender reveal parties and baby showers adds even greater expectations on the mother-to-be. However, what if she did not feel joyous? Has it ever crossed your mind how terrifying and scary it would be for a mother-to-be to feel like a failure and constantly experience sadness and guilt? What if she felt as if she could not take care of her own child after birth? And what would the effect of these depressive thoughts be on the fetus/infant? One impact of postpartum depression is that there is a decline in their child's language and cognitive development. Research suggests that language acquisition and development in the babies of mothers with postpartum depression poses a problem both in the child's early years and as they grow. From a speech and language standpoint, it is imperative for speech language pathologists (abbreviated in this paper as SLPs) to identify infants who may be at risk and implement interventions as soon as possible to avoid long-term consequences.

In this paper, I will look at postpartum depression (abbreviated in this paper as PPD) as a medical illness that refers to a type of depression occurring after childbirth (American Psychiatric Association, 2020). Sudden changes in the female hormones estrogen and progesterone are thought to lead to PPD, which can carry many risks for the mother and the child, especially if the depression goes untreated. PPD involves feelings of extreme sadness, indifference, and/or anxiety, along with changes in energy, sleep, and appetite. Bonding issues, as well as sleeping and feeding concerns, can occur. An estimated one in seven women can be affected by postpartum depression. That means that about 14% of new moms experience a severe

form of depression. In 2019, there were 3.75 million births in the United States (US Department of Health and Human Services, 2021). This statistic demonstrates that 525,000 mothers would be diagnosed with postpartum depression. Their children would all be at a greater risk for cognitive, emotional, developmental, and verbal deficits.

Maternal Depression and Development in Children

It is a well-known fact that an infant's early relationship with their mother is the basis for later intellectual and personality development. As a mother cares for her child and gives them appropriate attention, she is promoting healthy development and growth. Any kind of parental psychiatric disturbance, especially after childbirth for mothers, can be a factor as to why she is not properly caring for and neglecting her child. However, there is little known about possible long-term cognitive effects in the children of mothers who experience depression. What would happen to the growth and development of infants whose mothers are too depressed to calm them down? What happens to the infants if they do not have a secure attachment to their mothers? What may happen to the child's academic and intellectual abilities as they start preschool? These questions cannot be answered because there is not enough research conducted or because previous reports have suggested that long-term effects are small or not established. However, we do know something about cognitive effects and age-specific milestones.

As children grow, they start to reach age-specific milestones while they interact with the world and people around them. For example, by 6 months, most babies will reach out for a toy if they want to play with it. If they do not reach specific milestones, they may be at risk for a developmental delay. While the exact cause of a developmental delay is unknown, it can be caused by many factors, such as genetics, premature birth, or even pregnancy/postpartum complications. In a study that was done in Israel, researchers investigated the association of

postpartum depression with developmental delays in infants. A mother's depressive symptoms were measured using the Edinburgh Postnatal Depression Scale (EPDS) at 6-9 months postpartum. This scale describes depression as "cognitive and affective features that last for at least one week including the inability to laugh, the inability to look forward to things with enjoyment, blaming oneself unnecessarily, feelings of anxiety or worry, being scared or panicky, the inability to cope, difficulties in sleeping, feeling sad or miserable, crying, and thoughts of harming oneself" (Lubotzky-Gete, 2021). If a mother had at least one score equal or higher than 10, or scored higher than 0 in the question about suicidal ideation, she was considered to have postpartum depression. For the infants, all outcome measures were based on developmental assessments that were routinely performed at the Mother and Child Health Clinics at the ages of 1, 2, 4, 6, 9, 12, 18 and 24 months. The information was collected through maternal reporting or through the observation of nurses.

The Israeli study examined three categories of milestones: gross motor skills, fine motor and adaptive skills, and personal-social skills. If the child could not perform the skill within a month of the upper limit, it was defined as a developmental delay. For gross motor skills, they studied if the infant could raise their head when lying on their stomach (4 months), ground crawl on legs or belly (10 months), roll from the back to the abdomen (10 months), stand when pulling themselves up (13 months) and walk without support (25 months). For fine motor and adaptive skills, researchers studied the child playing with hands and combining fingers (7 months), pinching (13 months), and building a cube tower (25 months). For personal-social skills, following a moving object (4 months), social smile with eye contact (4 months), reacting to voices (7 months), and pointing to selected objects (19 months) were studied (Lubotzky-Gete, 2021). The results found that compared to children whose mothers did not have PPD, children

with depressed mothers were more likely to experience delays in all domains. There were greater setbacks in walking, rolling, and ground crawling for gross-motor skills. Additionally, for personal-social skills, these children experienced significant delays when reacting to voices and pointing to selected objects (Lubotzky-Gete, 2021). These outcomes suggest that these children may be at a greater risk for a language impairment because they are not experiencing as much interaction from their mothers as typically developing children.

Similarly, the National Institute of Health investigated an association between maternal mental health and social circumstances during and after pregnancy and children's cognitive functioning at the age of four. For the mother's assessments, their information was presented in a survey that they completed about their personal and family psychiatric history, social class, and educational achievements. They were also clinically assessed at three different intervals (3 months postpartum, up to 12 months postpartum, and four years after birth) by a psychiatrist using a standardized semi structured interview (Cogill et al., 1986). Then, at four years old, these children were administered the McCarthy scales of children's abilities by a psychologist at their home. It measured their verbal, quantitative, perceptual, motor, and memory skills and were combined into a general cognitive index score.

The results show that the children's performance on the McCarthy scales was significantly reduced by about ten points in association with maternal depression only in the first year of their lives (Cogill et al., 1986). When the researchers tested for interactions between other variables and postpartum depression, the results indicated that children's cognitive performance declined. For example, children of mothers with postpartum depression developed more slowly because they also come from socioeconomically disadvantaged homes. Furthermore, boys, children from working class families, and children of mothers who

themselves had been poor achievers educationally had lower overall cognitive performance (Cogill et al., 1986). These results indicate that SLPs and other healthcare providers may want to consider targeting specific at-risk groups in order to reduce the possibility of long-term effects on children's cognitive abilities. They may also want to take into consideration gender and cultural stereotypes in both their diagnoses and their treatment as well.

One outcome of a developmental delay is that an infant may not obtain as many words as a typically developing child. A typically responding mother may greet her infant after a nap showing excitement that her child is awake and ask them questions. At night before she puts the child to bed, she may sing a song or read a book. However, a mother with PPD may not show this type of interaction with her infant resulting in less stimuli to the infant. A longitudinal study was conducted to investigate the possible relationship between maternal depression and infant's lexical development (Brookman et al., 2020). The recruitment process was conducted by contacting a community sample of mothers who were involved in a large-scale longitudinal study, while the remaining were recruited from an infant laboratory database or from volunteers who responded to a flyer in the community (Brookman et al., 2020). The participants included thirty-six mother-infant pairs with seventeen female and nineteen male infants. Depending on the mother's diagnosis or symptoms, infants were placed in a risk group or a non-risk control group. The Center for Epidemiologic Studies Depression Scale-Revised (CESD-R) was used to measure depression at 6, 9, 12, 18 months during the postpartum period.

The study assessed the infants' vocabulary size and lexical processing abilities at 18 months. The MacArthur-Bates Communicative Inventory (OZI) was a parent report that measures infant's vocabulary size and the Look-While-Listening (LWL) procedure was used to evaluate the infant's lexical abilities. This method involved infants being placed on their

mother's lap with a monitor sixty centimeters away from them while a speaker played audio recordings. There were twenty-four test trials that consisted of six pictures of the target words (ball, shoe, book, car, cup, hat) presented in pairs (target and distractor word). The audio recordings were of an Australian-American female asking "where is the _____" or "look at the _____" which prompted the infant to look in one direction or the other so that their eye movements could be tracked. The results showed that infants in the control group were significantly more likely to fixate on the target than infants in the risk group after hearing its label (Brookman et al., 2020). The infants in the risk group were marginally slower in directing their gaze to the target and demonstrated deficits in their lexical processing abilities which revealed that these processing abilities were correlated with their mothers' depression scores since infants of mothers with higher mean scores were less likely to fixate on the targets (Brookman et al., 2020). This result suggests that infants whose mothers were more severely depressed had a more difficult time looking at the target word because they may not have known the classification of the objects pictured.

Long-Term Verbal Abilities and Expressive Language in Early Childhood

For an infant's long-term verbal abilities, there is little known about whether timing and/or chronicity of PPD is associated with their long-term verbal abilities. Again, however, since infants are largely dependent on maternal care, early exposure to PPD may have a larger developmental impact on a child's development than an exposure later in childhood. Also, it is known that the persistence of symptoms over time is often associated with negative behavior and smaller achievements in elementary school. Children who have been exposed to chronic PPD

may also have a greater risk of experiencing developmental delays, and, therefore, are more likely to experience lifelong negative effects.

A Canadian study tested the associations between the timing and chronicity of postpartum depression symptoms and children's long-term verbal abilities. The mother's depression symptoms were assessed when their child was 5 months, 1.5, 3.5, and 5 years old while the child's verbal abilities were measured at 5, 6, and 10 years old (Ahun et al., 2017). In order to test the mother's depression symptoms, a shortened version of the CES-D scale was used. The researchers created four categories of interest for mothers who never met criteria for elevated symptoms (no exposure), met criteria for early exposure at either 5 months and/or 1.5 years, met criteria for late exposure at either 3.5 and/or 5 years, and met criteria for chronic exposure at 5 months, 1.5, 3.5, and 5 years. They also created five categories of mothers who never had elevated symptoms, had elevated symptoms once, twice, three times, and four times (Ahun et al., 2017). In order to test the verbal abilities of the child, the Peabody Picture Vocabulary Test-Revised (PPVT-R) was performed at ages 5, 6, and 10 years old. During the test, the child was presented with pictures and had to identify the picture that matched the word that was read aloud.

The results concluded that children in the chronic exposure group had significantly lower PPVT-R scores than children in the no exposure, early exposure, and late exposure groups (Ahun et al., 2017). Also, it confirmed that children in the late exposure group had lower PPVT-R scores than children in the no exposure group (Ahun et al., 2017). With the number of times children were exposed to elevated symptoms, their level of verbal abilities differed, especially children that were exposed at all four times (the chronic exposure group). They had significantly lower scores than children never exposed, and those exposed once, twice, and three times to

elevated symptoms (Ahun et al., 2017). This study demonstrated how exposure to chronic maternal depression during the first five years of life is a potential risk factor for lower levels of receptive language skills and may extend past middle childhood (Ahun et al., 2017). However, the implication is that the child may not be fully understanding the language that is being spoken to them since they are not exposed to it. For example, they may not even be engaging in eye contact during conversations. Such a skill deficit could cause language problems to extend through childhood, since maintaining eye contact is a vital skill in school and public settings.

The other subset of a child's verbal abilities is expressive language which is how they use words, gestures, vocalizations, and/or facial expressions to express themselves. For a typically-developing child, infants less than a month old can express their wants and needs using undifferentiated crying. This is when infants' cries sound the same, but do not vary by the specific need. It is not until around 6 months of age that they begin to vary these vocalizations. As early as 10 months, infants are expected to comprehend at least one recognizable word such as "mama" or "dada." At 14 months of age, they are expected to use single words and combine sounds with gestures to communicate. For instance, the infant may point to an object and say "dog" signaling that they want it. At 18 months, infants are expected to use two or three-word phrases reflecting grammatical conventions such as "want ball." At 24–40 months of age, they are expected to have an increasingly broad knowledge and command of words that can be composed into short sentences to respond formally (Aoyagi et al., 2019). If a child does not meet these specific milestones, there may be external factors such as late-onset PPD that are affecting their language development.

The longitudinal study as part of the Hamamatsu Birth Cohort for Mothers and Children examined whether children with mothers with early- or late-onset postpartum depression have

reduced expressive language scores during infancy and early childhood (10, 14, 18, 24, 32, and 40 months). After the mothers gave birth, they were assessed for depression at least twice during the first three months. To test the mothers, a Japanese version of the Edinburgh Postnatal Depression Scale (EPDS) was used at 2, 4, and 5-12 months postpartum. Based on their scores, three PPD categories were defined: early-onset PPD, late-onset PPD, and no PPD. The infant's expressive language abilities were measured using the Mullen Scales of Early Learning (MSEL) assessment which obtained non-verbal and verbal skills separately. The results showed that late-onset PPD (occurring at 5–12 weeks postpartum) was associated with reduced expressive language scores at 18 months or later (Aoyagi et al., 2019). This association was even confirmed on a growth curve analysis, which revealed a significant, monotonic decline of expressive language development between 10 and 40 months among children of mothers with late-onset PPD, but not among children of mothers with early-onset PPD (Aoyagi et al., 2019). This study was the first to demonstrate that exposure to late-onset maternal PPD is associated with a delay in neurodevelopment, reflected by reduced expressive language scores at multiple time points through infancy and early childhood (Aoyagi et al., 2019). Hence, it is important to monitor not only for early-onset postpartum, but also for late-onset postpartum, to facilitate early detection and intervention.

The Value of Interventions by Speech Language Pathologists

During early infancy, certain experiences can have significant effects on a child's brain development which is why it is so important to have quality interactions between the mother and child in order to foster proper language acquisition and development. Mothers with PPD typically display either an intrusive, controlling, and over-stimulating interaction or a withdrawn, passive, and under-stimulating interaction with their child. In both situations, the mother may not

be interacting appropriately with her child. These mothers may exhibit atypical verbal communication styles which include a flatter tone in voice, flat or more negative affect (not showing emotions), and less animation (not as lively) (Hall, 2016). Mothers will tend to use shorter utterances, less repetition, fewer explanations, suggestions, and questions, fewer references to infant's behaviors, and use less infant-directed speech (IDS) (Hall, 2016). IDS has higher and more variable pitch, reduced vocabulary, short utterances, and change in vowels when compared to adult-directed speech. IDS encourages learning by holding an infant's attention and allowing for social interactions between the infant and mother; insufficient IDS can be detrimental to an infant's language development. In terms of research, this may be why infants may not be able to identify picture cues or target words when assessed for a language delay or impairment.

Speech language pathologists are often involved in the treatment of children with language delays. SLP's two major concerns lie in identifying the harmful interactive patterns and providing guidance on healthy interactions that support proper development of communication and language (Hall, 2016). It has been argued that there should be appropriate treatment for these mother-infant pairs that include communication interaction goals such as the use of IDS and social communication along with treatment for the primary concern of the infant. However, it should be noted that little is known about the status of SLP services with this population because there are no studies, besides one, that examine mothers with PPD and their involvement with SLPs (Hall, 2016). The study aimed to determine the frequency with which SLPs help mothers with PPD and their infants.

In an American Speech-Language-Hearing Association (ASHA) study, researchers surveyed SLPs regarding their involvement in treating infants whose mothers experience

postpartum depression. An invitation with the description of the project and instructions on how to participate was emailed to the individuals in March and April of 2015 (Hall, 2016). The survey consisted of eight questions that were centered around working as an SLP with infants and if they ever had any experience working with infant-mother pairs and postpartum depression. There was a total of one-hundred eight individuals from ASHA's Special Interest Group 1 that completed the survey. It was only a starter project to find out whether or not there was an awareness of the presence of PPD by SLPs.

The results showed that 43 of the respondents reported that they worked with infant-mother pairs (Hall, 2016). Out of those 43, there were 25 individuals who worked with 20 or fewer pairs. When asked about how many of the pairs included a mother with PPD, the majority of respondents reported working with 1-5 mothers, while the others reported working with a range from 6-20 (Hall, 2016). The referral sources for the infant-mother pairs in which the mother was diagnosed with PPD were a pediatrician, family practitioner, obstetrician/gynecologist, and other. With this information, the results suggest the SLPs are involved with infants whose mothers experience depression, but the reason for their involvement is because of other factors (Hall, 2016). While the SLPs may be addressing the infant's primary concern, they could also be addressing the mother if they knew about the PPD diagnosis which would create an opportunity for the mother and the infant to work together on communication and interaction during treatment sessions (Hall, 2016). This study can help bring attention to the role of SLPs and how working with mother-infant pairs can be beneficial to both the child and mother in the long run.

Conclusion

While SLPs have the opportunity to work with infants that may exhibit delays in any kind of speech or language area, they may also have the opportunity to not only treat infants, but the mothers with postpartum depression too. If the SLP knew about the mother's postpartum depression, they could structure a treatment and goals plan that includes the mothers. This plan may involve the SLP explaining strategies for how the mother can communicate with her infant. It can be as simple as finding a time where she has the most energy to interact and pick an activity that supports the child's language development. For example, the mother could take the infant on a walk and as they pass objects, she can point them out and say the object's label. This activity can help the infant's development, while also benefiting the mother so she is not feeling distressed or depressed. Early intervention with an SLP is necessary for these infants so that they can get the intervention they need before it is too late. It is extremely important that since development is affected, there should be an integrated approach with PTs, OTs, and even pediatricians when it comes to the diagnosis and treatment of these mothers and infant pairs. There needs to be communication between each and every healthcare provider to provide the best care and plan of action in order to rectify the problems.

In our society, we should raise awareness about postpartum depression and address any stigmas regarding an individual's mental health. The healthcare providers should work to destigmatize mental health concerns so that mothers can feel comfortable seeking help for both themselves and their babies. Once they feel comfortable enough for treatment, they should make appointments with the necessary providers for further help. If healthcare providers know that mothers are experiencing postpartum depression, they should monitor the infant in all aspects of

development in case they ever need any sort of treatment or intervention. This intervention will save the infant from long-term developmental issues and will help the mother support her child.

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