

# Impact of Postpartum Mental Illness Upon Infant Development

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## Abstract

**Purpose of Review** This review evaluates the state of the research regarding the effects of postpartum mental illness on the developing infant. It defines the scope of these disorders in the literature, and includes the impact of disorders referred to as perinatal mood and anxiety disorders (PMADs) on infants. **Recent Findings** New research reveals that PMADs apply to not only mothers, but that fathers can also experience perinatal depression and anxiety. When untreated in a primary caregiver, PMADs adversely affect parental cognitions and beliefs, attachment to the infant, and the growing caregiver-infant relationship. PMADs affect early developmental outcomes of infants

including neurosynaptic development, regulatory development, and developmental milestones.

**Summary** Early identification and treatment for PMADs are critical to ensure optimal infant development. Standardized and routine screening for PMADs, especially in the first 6 months postpartum, and cross-disciplinary communication among medical providers afford the best opportunity for early identification and treatment.

**Keywords** Postpartum · Infant development · PMAD · Mental health screening · Maternal depression · Paternal depression

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## Introduction

Research indicates the greatest risk to maternal mental health post-delivery is postpartum depression (PPD) [1], with percentages varying from 10 to 40% [2], depending on several mediating and moderating factors including socioeconomic status [3], partner support, antenatal mental health issues [4], and prenatal and postnatal complications [5]. Unidentified and untreated PPD complicates the postpartum period and can have significant deleterious effects on infant development [6, 7].

While PPD is most often cited, other mental health conditions may present in the postpartum period, including postpartum anxiety [8]. A recent meta-analysis indicated the incidence of postpartum anxiety disorders is around 8.5% [9]. Postpartum psychosis is much rarer, occurring in 0.1–0.2% of postpartum women [10]. Given the diverse mental health concerns that may occur in the postpartum period, the term perinatal mood and anxiety disorder (PMAD) has been used to better represent this range of disorders. This term also acknowledges that the distress may begin in pregnancy. Researchers investigating the impact of maternal

psychopathology, specifically anxiety and depression, have noted the impact of these maternal illnesses if untreated on various aspects of infant development [11, 12].

Although less well-studied, researchers now also recognize that postpartum mental illness also affects fathers [13]. A recent meta-analysis indicated the prevalence rates of paternal postpartum depression are estimated to be 10%, double the rate of depression for men in general, with the highest rates found 3–6 months postpartum [14]. The role of paternal mental health on the family system is a significant consideration given that a recent study indicated paternal postpartum depression was related to worsening maternal postpartum depression early in infancy [15]. Despite these findings, attention to fathers' psychological functioning in the postpartum period is not routinely assessed and therefore remains less systematically identified and treated.

Secondary to research indicating the prevalence of postpartum issues, professional organizations including the American College of Obstetrics and Gynecology (ACOG) recommend screening once in the perinatal period to identify mothers at risk for depression and anxiety [16]. Likewise, the American Academy of Pediatrics (AAP) created guidelines for pediatric providers, citing the impact of undiagnosed postpartum illness on child outcomes, including poor infant neurosynaptic development, early termination of breastfeeding, and impact on early childhood cognitive, behavioral, language, and motoric development [17]. The AAP recommends screening for maternal mental health concerns at the 1, 2, 4, and 6-month health supervision visits. With increased surveillance, there has been greater identification of mothers diagnosed with depression and anxiety [18].

## Impact on Infant Development

### The Dyadic Context

"There is no such thing as a baby ... if you set out to describe a baby, you will find you are describing a baby and someone." (Winnicott, 1947)

Infants exist and develop within the context of a growing relationship with their primary caregivers. In a well-functioning dyad, the infant develops expectations that the adult attachment figures will sensitively and consistently meet the infant's needs. These interactions strengthen the bond between the infant and caregiver, setting the stage for a secure attachment relationship. Within this relationship, the infant develops a set of behaviors characterized by exploration, regulation, and organization. The key mediator in healthy infant development is the infant's relationship with their primary caregiver [19]. In poorly functioning caregiver-infant dyads, which may occur in the context of PMADs, the infant's needs

are not reliably met or are even undermined, resulting in an insecure relationship.

In the first 5 years of life, significant growth occurs within multiple "sensitive" periods [20]. During these periods, the secure caregiver-infant relationship provides a strong foundation for the developing infant's developmental competencies. When the attachment relationship is jeopardized, the consequences are often disturbances of infant behavior and development, with longer term impact on later developmental stages [21]. For example, investigation of maternal behaviors has identified the impact of maternal depression on parenting styles, including deficits in attachment and bonding, atypical maternal facial expressions, and other impairments that directly impact infant development [12]. Over the past two decades with increasing attention on early brain development, there has been a corresponding focus on the impact of postpartum mental health issues on multiple aspects of infancy and early childhood development [22].

### The Role of Caregiver Expectations, Beliefs, and Attitudes

The vast majority of research focuses on the disruption of the mother-infant dyad in the context of PMAD, while attending less often to the father-infant dyad. Recent literature suggests that mothers view infant behavior as a reflection of their parenting skills. Anxiety or negative mood can skew a mother's perception of her infant's state, resulting in less accurate identification of positive emotions, and increased likelihood of identifying negative emotions in the infant [23]. When the mother misperceives an infant's cues (e.g., the crying infant dislikes her), this undermines opportunities for healthy relationship growth. Currently, researchers are investigating the connection between PMADs and cognitive factors affecting maternal mood, perception, and the specific characteristics of postpartum mental illness that relate to parenting quality [24–26]. They have found that rumination in particular—repetitive, prolonged, recurrent thoughts—is frequently associated with depressive mood and reduced maternal parenting quality during the postnatal period [27]. By definition, rumination dissipates once the source of anxiety is resolved. However, in the context of parenting, a newborn whose reason for crying is often ambiguous and difficult for a mother with a PMAD to interpret, rumination may persist. This misperception as a result of the repetitive, recurrent thoughts contributes to an ongoing cycle of stress in the mother-infant relationship.

### Impact on the Caregiver-Infant Relationship

PMADs negatively affect caregiver-infant attunement and bonding, with potential long-term negative effects on the caregiver-infant dyad. For mothers with PMADs, developmentally typical negative infant behaviors (e.g., fussiness, crying) affect a mother's responsiveness to her infant,

impacting the dyadic attachment relationship [28]. Mental health professionals may be keenly aware of this dynamic, but a recent study found that new mothers themselves reported that their symptoms of postpartum depression were closely related to the effectiveness of attachment between mother and baby [29]. This impairment in the attachment relationships poses a threat to the infant's typical developmental trajectory. For example, co-regulation and affective intensity, two critical components of the early mother-child relationship, have been found to impact motor development in a recent study of extremely low gestational age children [30].

Recent literature reflects a growing interest in the effects of parental depression on a broad range of developmental outcomes from language and motor development to early neurodevelopment and regulatory behaviors.

### **Infant Behavior and Development: Current State of the Science**

Over the past two decades, interest in the early uterine environment of the developing fetus and its relationship to brain development has led to multiple research programs investigating those linkages. A recent longitudinal study examined neurobiological connections between mothers with PMAD and the impact on infant development. The researchers were interested in the correlations of a variety of biomarkers (NGF, BDNF, and IL-6) in affected mothers on infant motor development. The authors explain that while they found only NGF to be associated with infant motor development, findings suggest a complex constellation of factors impact infant development. Importantly, the team highlighted the importance of a utilizing a biopsychosocial perspective of PMAD and early child development [31].

In another recent study, researchers found that maternal depressive symptoms in the prenatal period appeared to increase infant's vulnerability to abnormal brain development. Importantly, by preschool age, the children had altered gray matter, suggesting that those exposed to higher maternal perinatal depressive symptoms during pregnancy may show signs of premature brain development [32]. With the increased investigation of the importance of the early uterine environment, there has been increased discussion in the efficacy and potential impact of treating women who are high risk for PMAD while pregnant, to potentially lessen negative effects on in-utero development [26].

The effects of PMADs on early infant development, including regulatory behaviors like sleep and feeding, have been areas of interest for both clinicians and researchers. Critically, higher maternal stress and self-reported symptoms of anxiety have recently been associated with both dysregulated infant sleep and feeding up to 16 weeks postpartum [33]. Restorative, developmentally-appropriate sleep is critically important to infant brain development and affective

regulation. Poor infant sleep patterns contribute to poor maternal sleep, which is often already compromised in mothers with depression or anxiety. In the context of further disturbances in sleep, continued deterioration in maternal mood and heightened negative attributions for infant behavior can occur, perpetuating the cycle of conflicted mother-infant interactions. Infant regulatory behaviors are closely connected; thus, regulated sleep routines are often closely connected with positive feeding interactions. Given that feeding an infant is intrinsically relational in nature, attuned and responsive caregiving is required to optimize positive feeding interactions, which can be compromised when mothers are depressive or anxious. Responsive caregiving during early feeding routines in infancy (i.e., caregivers who accurately and appropriately read hunger and satiety cues) is associated with positive dietary habit formation in later childhood [34].

Current research also highlights the negative impact of PMADs on infant acquisition of developmental milestones. As early as 4 months of age, a relationship between postpartum depression and lower infant cognitive scores was observed [35]. By 14 months, children were found to be at higher risk for non-verbal communication delays (e.g., interpreting gestures) if their mothers showed symptoms of depression [36]. The impact of parental mood on infants' developing social-emotional milestones is also a key area of interest given the critical role of these competencies in not only positive mental health, but later school readiness and success. Another group examined maternal anxiety about the parental role at the infant age of 1 month and found a relationship between higher anxiety and less toddler social-emotional competence at 18–24 months. Interestingly, fathers' positive feelings about their role at the same early time point were associated with positive social-emotional competence at toddlerhood [37].

Another recent study found a negative relationship between postpartum maternal depression and anxiety and children's labeling emotions at preschool age [38]. Moreover, chronicity of depression is an important factor. Although parental mental health concerns may be identified in the postpartum period, its presence in this early period can serve as a foundation for continued symptoms. In one study, both maternal and paternal depression around 4 months postpartum were related to ongoing parental depression in toddlerhood, and both internalizing and externalizing problems by preschool age [39]. The role of mediators for the link between PMADs and the development of psychopathology has also been explored. In a meta-review of the impact of paternal depression and child outcomes, authors found that paternal depression was significantly associated with behavioral challenges from infancy through adolescence, and this association was mediated by paternal negative expressiveness, hostility, involvement, and marital conflict [40].

Taken together, these recent studies highlight the impact of both maternal and paternal postpartum mental health on a number of domains for the developing infant. They highlight a range of pathways from parent mental health symptoms to deficits for the infant and clearly point to the need for early identification of parent postpartum challenges, as well as treatment to prevent these challenges from setting a negative cascade of influences in motion.

### **Innovative Interventions to Promote Infant Development**

The deleterious impact of PMADs on the developing infant necessitates research that evaluates effective and accessible treatment. Although psychotropic medication can be an important part of treatment, postpartum mothers may be reluctant to take medication for a multitude of reasons. In addition, medication alone does not comprehensively address the impact of postpartum symptoms on parenting and the parent-infant dyad. One recent study utilized a dyadic therapy framework addressing the relational disturbance between parent and infant that can occur as the result of the postpartum disorder and evaluated treatment delivery in a group setting as a more efficient model than individual therapy [41]. The authors found significant reductions in depressive symptoms among mothers, as well as a trend towards reduction of anxiety symptoms and a near-significant reduction in parenting stress. They also found corresponding improvements in the mother-infant interactions. These results provide promise for an intervention that can be delivered to a greater number of people utilizing fewer resources. In addition, the group format is particularly beneficial for individuals who are prone to social isolation as a result of their symptoms. Importantly, recent work evaluating dyadic therapy designed to prevent postpartum depression and anxiety in high-risk women includes a randomized control trial that found not only fewer symptoms for women in the intervention group at 6 weeks postpartum, but also clear behavioral changes in infants. Infants of women in the intervention group exhibited less fussing and crying than infants of women in the enhanced treatment as usual group [42].

Interventions addressing groups at heightened risk for PMAD that evaluate the impact on both mothers and fathers are also needed. A recent study evaluated an intervention for mothers and fathers of infants in the Neonatal Intensive Care Unit (NICU) and provided a five-step guidance-based intervention targeting parental understanding of their infant and interactions with the infant at each stage of hospitalization [43]. They detected decreases in both short-term anxiety and depression scores at the time of discharge in the intervention group compared with the control group who received standard care. Well-controlled studies of interventions for parents of infants hospitalized in the NICU remain sparse, and there is an even greater paucity of those evaluating interventions for

parents after discharge, even though parent symptomology may rise after discharge, particularly for fathers [44].

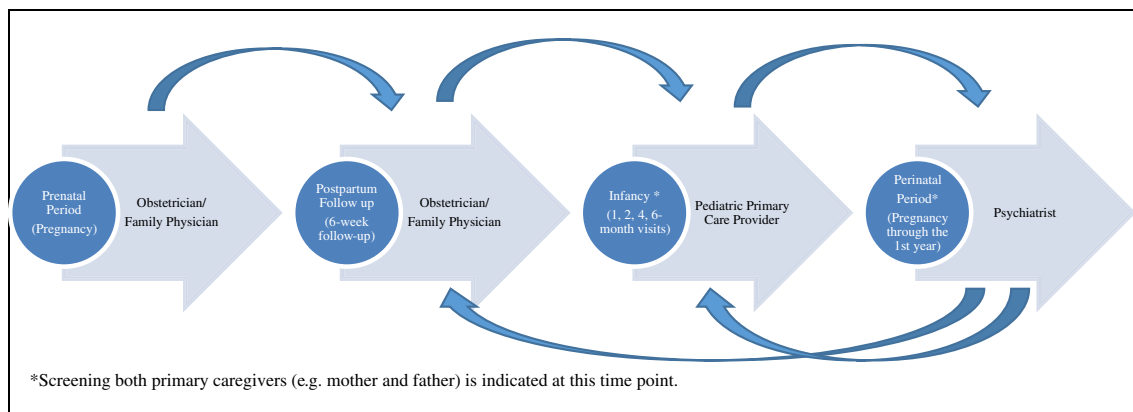
### **Conclusion**

A range of maternal mental health concerns presenting in the postpartum period can undermine optimal mother-infant interactions and the foundation for healthy infant development. Recommendations for screening mothers by obstetricians and pediatricians have been created to help identify women in distress. However, because these mental health concerns can begin in the prenatal period and up to several months postpartum, more than one screening time point is necessary to capture symptoms of perinatal mood and anxiety disorders (PMADs) (see Fig. 1 for a proposed screening protocol).

Starting in the prenatal period, obstetricians can provide screening and information to women that can identify early concerns and those at risk for postpartum difficulties, and provide education to help women self-identify distress after their baby is born. After delivery, women routinely see their obstetrician once in the first year for the 6-week postpartum visit. While mental health symptoms may be present for some women at that visit, for others they may not be fully present for several more weeks. At that point, new mothers are less likely to have contact with their own physician (e.g., obstetrician or primary care provider) and are more likely to come in contact with their infant's pediatric provider. Recommendations that pediatricians continue to screen women up to the infant's 6-month well child visit can be helpful in identifying concerns that may occur later. When maternal mental health concerns are identified by a pediatric provider, a hand-off to a psychiatrist with experience diagnosing and treating postpartum mood and anxiety disorders offers the best chance for effective treatment that will benefit the family system. Given the impact of PMADs on mother-infant interactions and infant development, psychiatrists should also have knowledge of available dyadic treatments for mothers and babies to augment psychopharmacological treatment.

A significant recent research development is the recognition that postpartum anxiety and depression are not unique to mothers. New research highlights the impact of postpartum stress on fathers and the parenting relationship both directly and indirectly, through mechanisms such as increased marital conflict, and exacerbation of maternal depressive symptoms. However, outside of the recommendations for screening both parents of high-risk infants [45], no general recommendations currently exist for screening fathers in the postpartum period. Therefore, practitioners who come in contact with fathers within the first several months after their infant's birth should strongly consider screening for postpartum depression and anxiety and referring for treatment as indicated. Screening should include primary caregivers in all types of family





**Fig. 1** Optimal early detection and screening protocol for perinatal mood and anxiety disorders

compositions (e.g., single parents with a grandparent serving as a secondary primary caregiver, same-sex parents, and gender fluid families).

The research is clear: during the postpartum period, parental mental health is of utmost importance to the well-being of the caregiver, the developing infant, and the family system. The overwhelming data indicate that early identification and treatment for PMADs are critical to ensure optimal infant development. Given that rates of postpartum depression or anxiety are estimated to be 1 in 5 women and 1 in 10 men, clinicians working with any caregiver in the postpartum period must ensure routine screening occurs, particularly in the first 6 months of the infant's life. Communication across adult and pediatric providers who come in contact with the family affords the best opportunity for early identification and treatment. With appropriate treatment, recovery is possible, which contributes positively to the functioning of the parent, infant, and family.

### Compliance with Ethical Standards

**Conflict of Interest** The authors declare that they have no conflicts of interest.

**Human and Animal Rights and Informed Consent** This article does not contain any studies with human or animal subjects performed by any of the authors.

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