Perinatal Depression and Children: A Developmental Perspective

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Topic
Maternal depression

Introduction
Perinatal depression in mothers, defined as depression occurring during pregnancy or postpartum, is of concern for all who are involved with such families. These concerns derive from common understandings of the essential role both a healthy pregnancy and mothers' warm responsive care play in fetal and infant development and how depression might interfere. Emerging research reveals the effects of perinatal depression on the psychological development of infants and young children of depressed mothers, with a focus on vulnerabilities to the later development of psychopathology and likely mechanisms. Although many questions remain, some conclusions can be drawn about the effects of perinatal depression on child development and the implications for parents, service providers and policy makers.

Subject
Depression is common, especially in women. During pregnancy, rates of major depressive episodes, as defined by the *Diagnostic and Statistical Manual of Mental Disorders*, Fourth Edition (DSM-IV), range from 10-17%[1-3] with significant variability among estimates.[4] Additionally, one meta-analysis estimated that postpartum major or minor depression occurs in as many as 19.2% of women with the more narrowly defined major depression estimated to occur in 7.1% of new mothers.[4] Antenatal depression occurs in similar rates as in the postpartum period, rates which are not significantly different from rates in non-pregnant or postpartum women. Finally, given that antenatal depression is one of the strongest predictors of postnatal depression[5], many children are exposed both during fetal and infant development.

Problems
From a developmental perspective, timing of exposure to maternal depression is an important consideration, especially in terms of particular risks to development, resiliencies that the children would be able to bring to bear, and the mechanisms by which those risks are likely to be transmitted. Of particular concern is that early on, children of depressed mothers may develop vulnerabilities to later depression or other

problems. Antenatal depression may not only alter development of stress-related biological systems in the fetus, but may also increase risk of obstetrical complications.[6] Postnatal depression may also be an early life stressor given known associations with lower levels of sensitive, responsive care needed for infants' development of health attachment relationships, emotional regulation skills, interpersonal skills and stress response mechanisms.[7] Early life stressors, such as those that might be associated with maternal depression, can influence brain development, which continues at a rapid pace at least for several years after birth.[8] Problems in any of these aspects of development may disrupt the earliest stages of socio-emotional and cognitive development, predisposing to the later development of depression or other disorders.

Research Context

Research on the development of children exposed to perinatal depression emerges from the body of work which considers the broader context within which perinatal depression is embedded, including comorbidities (e.g., anxiety and/or substance use), correlates (e.g., marital distress), and the broader environment (e.g., economic stressors).

Key Research Questions

Researchers have focused their questions on the effects of antenatal or postnatal depression on infant and later development, with a few examining the combined effect of both. Essential questions that have been addressed include: (a) effects of antenatal, postnatal, or dual exposures on infant and later development (b) primary mechanisms or mediators that help explain those effects (c) moderators of those associations such that some children are at greater risk than others. Goodman and Gotlib's integrative model has served as an organizing framework for much of this work.[9]

Recent Research Results

Consistent with theorized mechanisms, antenatal depression has been found to be associated with newborns' neurobehavioural regulation, including their ability to attend to visual and auditory stimuli and overall alertness, as measured by the Neonatal Behavioral Assessment Scale.[10,11] Other adverse outcomes noted for these newborns are higher levels of fussing/crying and more sleep problems[12] (with sleep problems persisting through 18 and 30 months of age)[13] greater frontal electroencephalogram (EEG) asymmetry,[14] higher *cortisol* and lower *dopamine*,[15] and lower *vagal tone*,[15] although the latter association was no longer in 24 week-old infants.[16] Studies of infant temperament have found specific associations between prenatal depression earlier in pregnancy and negative affectivity.[17] Finally, antenatal depression is associated with elevations in both externalizing and internalizing problems in 30-month-old boys,[19] and increased externalizing but not internalizing problems in both sexes at 8 to 9 years of age.[18] Despite much theorizing and support from the animal literature for a role of cortisol as a mediator of the associations between antenatal depression and infant and child outcomes, support has been inconsistent and primarily indirect. First, associations between depression and cortisol in pregnancy were not found in one large population based cohort study[20] and may only be significant in the presence of antidepressant medication[21] or co-morbid anxiety.[22] Second, studies that tested either direct associations between antenatal maternal cortisol levels on infant or child outcomes or the mediational role of antenatal cortisol in

associations between antenatal depression and outcomes yield mixed findings and typically have relied on small samples.[23] Postpartum depression has been associated with a range of problems in infants' and young children's development. Associated outcomes include negative infant temperament,[24] insecure attachment,[25] cognitive and language development difficulties,[26] lower self-esteem and other cognitive vulnerabilities to depression in five year olds,[27] and poorer peer relations in early childhood.[28]

The primary mechanisms implicated in associations between postnatal depression and young children's development have been problems in parenting and high stress levels, both of which have strong associations with depression in women.[7,29] Depression interferes with the qualities of parenting known to be associated with infants' and young children's healthy development, as it is associated with parenting likely experienced as stressful by children (e.g., unresponsive/disengaged, hostile/critical or unpredictable). Support has been accumulating for parenting and stress/adversity as mediators of associations between postnatal depression and problems in child development.[30]

Given that antenatal depression for many women is followed by postnatal depression, many children are dually exposed. The few studies designed to test the potential added burden of postnatal depression on infants already showing vulnerabilities in association with antenatal depression have found that antenatal depression was uniquely predictive of outcomes described here, even after accounting for postnatal depression.[16,17]

Research Gaps

Although research now supports a broad range of outcomes associated with perinatal depression, many unanswered questions remain. Longitudinal studies are needed to test the specific mechanisms that may explain these associations, such as prenatal health behaviours (smoking, alcohol, drug use, poor weight gain), *constricted uterine placental blood flow*, fetal neurobehavioural profile (e.g., heart rate), and obstetrical outcomes (e.g., low birth weight). Similarly, more studies are needed to reveal which children of perinatally depressed parents are more or less likely to develop problems, whether explained by parent characteristics, such as the severity of depression or comorbid conditions, child characteristics such as gender, or contextual factors such as poverty. Also important to study as potential moderators are genetic *polymorphisms* implicated in depression. Overall, more studies are needed from a developmental perspective that include multiple time points of measures of perinatal depression, and that test transactional processes such as how child factors can contribute to the development and maintenance of depression in mothers.

Conclusions

Perinatal depression is associated with infants' and young children's problems in multiple aspects of functioning, increasing their vulnerability for the later development of depression and other disorders. Problems range from affective and interpersonal functioning to EEG and *neuroendocrine* abnormalities. Although most of the perinatal literature has focused on postnatal depression, studies that also measured antenatal depression suggest that antenatal depression may partially explain some effects previously attributed to postnatal depression. Both parenting qualities and stressful

environments are at least partial mechanisms in pathways from postnatal depression to young children's problems in development. Conclusions cannot yet be drawn about mechanisms to explain associations between antenatal depression and young children's problems. Transactional processes help to explain negative cascades such as an antenatally depressed mother who gives birth to a fussy baby, who then challenges an already vulnerable mother, who then might be more likely to experience a postnatal depression. Although not reviewed here, depression, including perinatal depression, is often preventable and treatable.

Implications for Parents, Services and Policy

The findings have implications for parents in helping them to understand that perinatal depression must be taken seriously, recognized and treated. Women with histories of depression might benefit from preventive interventions when they become or consider becoming pregnant, to prevent the likelihood of a perinatal depression. Family members can be helpful in identifying early signs of perinatal depression and helping minimize barriers to care, including practical and belief-related barriers. Service providers who work with pregnant and postpartum women play key roles in being able to not only identify perinatal depression, but, equally importantly, to facilitate prompt and effective treatment. A range of pharmacological[31] and nonpharmacological treatment options are available.[32] A recent report issued from the National Research Council and Institute of Medicine of the National Academies has multiple recommendations for policy makers.[33]

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