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Perinatal depression and infant mental health

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ABSTRACT

A mother's mental health during pregnancy and the first year postpartum is of the utmost importance to the cognitive, social, and emotional development of her child. Perinatal depression is associated with increased risk for wide-ranging adverse child development effects that can affect infant and early childhood mental health. Although effective treatments for perinatal depression exist, it is currently unclear if treatment of maternal depression alone is sufficient to ameliorate the negative effects of maternal depression on child outcomes. Interventions focused on the mother-infant relationship and dyadic interaction may be required to address the potential effect of maternal depression on the child. This paper provides an overview of maternal perinatal depression, the risk it poses for infant/early-childhood mental health, strategies for intervention that include mitigating depression and decreasing risk to the child, and implications for psychiatric nurses who work with perinatal women. Early identification and treatment of perinatal depression are critical to ensure optimal infant development and the child's future mental health.

Maternal depression during pregnancy and the postpartum period is of concern not only because of the suffering and distress it causes for women, but also because of the risk of adverse effects on the developing fetus and child. The foundations of life-long mental health are laid during the critically sensitive developmental periods of gestation, infancy, and early childhood when rapid brain growth is occurring, and development is particularly open to and affected by the existing environment (Lyons-Ruth et al., 2017). A child's earliest environments - both in utero and in infancy – play a crucial role in the formation of the child's future mental health. Maternal depression may be one of the earliest adverse environmental exposures a child can experience because of the risks to fetal and infant development associated with it. Up to one in five infants is exposed to maternal depression either in utero and/or in the early months after birth (Gavin et al., 2005; O'Hara & Wisner, 2014). Infant and early-childhood mental health is inextricably intertwined with and affected by maternal mental health. Therefore, approaches to infant/early-childhood mental health necessitate attention to maternal mental health. This paper provides an overview of maternal perinatal depression, the risk it poses for infant/early-childhood mental health, strategies for intervention that include mitigating depression and decreasing risk to the child, and implications for psychiatric nurses who work with perinatal women.

1. Perinatal depression

Perinatal depression, defined as maternal major and minor depression during pregnancy and/or during the first year postpartum, is a common occurrence among childbearing women, affecting up to 20% of perinatal women in the general U.S. population (Gavin et al., 2005; O'Hara & Wisner, 2014), with higher rates for women with history of major depression (Payne et al., 2007), and for low socioeconomic status and/or immigrant women (Dolbier, Rush, Sahadeo, Shaffer, & Thorp, 2013; Goyal, Gay, & Lee, 2010; Liu & Tronick, 2013). Major features of perinatal depression include depressed mood, anxiety, compulsive thoughts, loss of control, feelings of inadequacy, inability to cope, irrational fears, fatigue, and despair (Sichel, 2000). In some cases, the mother may develop suicidal and/or infanticidal thoughts and plans: In fact, maternal suicide surpasses hemorrhage and hypertensive disorders as a cause of maternal mortality (Palladino, Singh, Campbell, Flynn, & Gold, 2011). Major risk factors for perinatal depression include history of depression and/or anxiety, bipolar disorder, unintended pregnancy, life stress, history of sexual abuse, domestic violence, low social support, and poor relationship quality (Howard et al., 2014; Norhayati, Hazlina, Asrenee, & Emilin, 2015; Verreault et al., 2014). A substantial proportion of women with depression in pregnancy will continue to experience depression after delivery, and prenatal depression is one of the greatest risk factors for postpartum depression (PPD) (Verreault et al., 2014), with an estimated 50% of women with PPD reporting that their depression started in pregnancy (Norhayati et al., 2015).

The timing of perinatal depression complicates matters as it occurs during a major family transition of adjusting to the addition of a newborn to the family and the demanding work of caring for an infant. Depression can seriously impair this adjustment. Women who are depressed during pregnancy are less likely to attend to their personal health and wellbeing, and are more likely to underutilize prenatal care, have increased substance use, poorer nutrition, excessive weight gain, and poorer maternal functioning (Andersson, Sundström-Poromaa, Wulff, Aström, & Bixo, 2004; Birndorf, Madden, Portera, & Leon, 2001; Cefalo, 2002), all which can negatively affect birth outcomes. Obstetric complication associated with depression in pregnancy include having a

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C-section delivery, a preterm birth, and low birth weight babies (Jarde et al., 2016; Huang et al., 2017). In the postpartum period, depression affects a mother's practical caregiving practices such that depressed mothers are less likely to breastfeed, less likely to follow infant safety recommendations (such as placing the infant in the back-to-sleep position or use home safety devices), take their child to fewer well-child healthcare visits, read and sing to their infants less, and use less healthy sleep practices with their infant (Dennis & McQueen, 2007; Field, 2010; Hiscock & Wake, 2001; McLearn, Minkovitz, Strobino, Marks, & Hou, 2006; Minkovitz et al., 2005; Paulson, Dauber, & Leiferman, 2006).

2. Infant/early childhood mental health and perinatal depression

Infant/early-childhood mental health is defined as “the developing capacity of the child from birth to 5 years of age to form close and secure adult and peer relationships; experience, manage, and express a full range of emotions; and explore the environment and learn—all in the context of family, community, and culture” (Zero to Three, 2012). Specific indices of infant/early-childhood mental health include temperament, socioemotional development, attachment, emotional regulation, and behavioral difficulties. Cognitive development is also included given the rapid neurodevelopment during the first years of life and the links between neurodevelopment and child mental health (Herba, Glover, Ramchandani, & Rondon, 2016). Infant mental health lays the foundation for mental health in childhood, adolescence, and adulthood and, as such, requires the utmost attention. Thus, one could argue that attention to infant/early-childhood mental health can greatly affect a child's lifelong trajectory and thus should be prioritized as a most crucial preventative and early intervention.

2.1. Effects of perinatal depression on infant/early childhood mental health

Perinatal depression has detrimental effects on child development. In particular, there is a robust body of research demonstrating that maternal prenatal and postpartum depression are associated with increased risk for wide-ranging adverse child development effects that can affect mental health. Such effects include attachment insecurity; impaired cognitive, social, and emotional development; and long-term behavioral problems (for reviews see Field, 2010, 2011; Gentile, 2017; Goodman et al., 2011; Sanger, Iles, Andrew, & Ramchandani, 2015; Stein et al., 2014; Tronick & Reck, 2009). Newborns exposed to maternal depression show more dysregulated behavior such as disturbed/disorganized sleep and difficult temperament (Netsi, Evans, Wulff, O'Mahen, & Ramchandani, 2015; O'Connor et al., 2007), which can reciprocally further increase maternal depression (Dix & Yan, 2014). Older children are at increased risk for attention deficit hyperactivity disorder, behavior problems, and conduct disorder (Glover, 2015; Stein et al., 2014; Van Batenburg-Eddes et al., 2013). More conclusively, perinatal depression has been associated with an increased risk for emotional problems, including depression and anxiety, starting in early childhood and persisting into young adulthood (Conroy et al., 2012; Murray et al., 2011; Pearson et al., 2013; Raposa, Hammen, Brennan, & Najman, 2014; Stein et al., 2014). The negative effects are seen not only among the children of clinically depressed mothers, but also among children of mothers who have subclinical levels of depressive symptoms (Behrendt et al., 2016; Meaney, 2018; Tronick & Reck, 2009).

2.2. Potential mechanisms linking perinatal depression and infant/early-childhood mental health

Mechanisms underlying the associations between maternal depression and adverse infant and child developmental outcomes have been hypothesized and continue to be explored (Goodman & Gotlib, 1999; Murray & Cooper, 1997; Stein et al., 2014). These potential mechanisms imply a complex interplay among genetics, epigenetics, other biological factors, and the prenatal and early childhood environment (Stein et al., 2014).

2.2.1. Genetics and gene-by-environment interactions

Shared genetic factors is one mechanism which likely accounts, in part, for the link between maternal depression and child mental health outcomes (Stein et al., 2014; Sullivan, Neale, & Kendler, 2000). Genetic factors, however, are not expressed in isolation, but rather the interaction between genes and environment, both nature and nurture, create the potential for each child. The influence of maternal depression varies across children (Meaney, 2018): Not all children of depressed mothers are affected or suffer adverse consequences; and those that are may be affected in different ways. Genetic factors contribute to differential vulnerability to the environmental conditions of early life, such that gene-by-environment interactions may largely account for variation in outcomes described (Glover, O'Donnell, O'Connor, Ramchandani, & Capron, 2015; Meaney, 2018).

2.2.2. Programming effects and epigenetics

Other mechanisms by which perinatal depression incurs risk to infant and child mental health are fetal programming and epigenetics. Considerable evidence indicates that a mother's emotional state during pregnancy can affect the development of her baby's brain (Lebel et al., 2016: Wen et al., 2017). This is largely thought to be due to the effects of fetal programming, whereby changes in the intra-uterine environment during sensitive periods can alter fetal development, initiating changes that can have life-long effects. Potential fetal programming mechanisms include hormonal priming effects such as elevated maternal glucocorticoids, alteration of placental function and perfusion, and epigenetic mechanisms (Lewis, Austin, Knapp, Vaiano, & Galbally, 2015). Postpartum depression has also been linked to physiological changes that affect the development of her baby's brain (Lebel et al., 2016: Wen et al., 2017).

Prenatal and postnatal programming of adverse child mental health as a consequence of maternal depression can occur through epigenetic mechanisms (Cao-Lei, Laplante, & King, 2016; Lester, Conradt, & Marsit, 2013; Lewis et al., 2015; Palma-Gudiel, Córdova-Palomera, Eixarch, Deuschle, & Fañanás, 2015; Shonkoff, Boyce, & McEwen, 2009). The prenatal period provides a critical window of time in development during which a maternal depression can potentially affect DNA methylation processes of the fetus, changing gene expression levels in utero (Palma-Gudiel et al., 2015; Kofink, Boks, Timmers, & Kas, 2013; Nemoda & Szyf, 2017). Epigenetic changes have also been shown to be associated with exposures to maternal depression via early postpartum maternal caregiving behavior (Lester et al., 2013). One of the most studied areas of fetal programming and epigenetics related to maternal depression is the effect of maternal depression on the development of the stress response system of the child. If a pregnant woman is depressed, the developing fetus is exposed to persistently heightened maternal secretion of the stress hormone cortisol and the neurotransmitter serotonin (Giesbrecht et al., 2011; Glover, 2015; Lester et al., 2013). This can lead to alterations of DNA methylation patterns in fetal genes involved in the function of the hypothalamic-pituitary-adrenal axis or other stress response systems (Non, Binder, Kubzansky, & Michels, 2014), resulting in a dysregulated stress response system in the child (stress reactivity), and vulnerability to future anxiety and depression (Lester et al., 2013; Wen et al., 2017). Postnatally, exposure to maternal depression in infancy further shapes the development of a child's stress biology. Infants exposed to maternal depression tend to themselves produce higher and more fluctuating levels of stress chemicals such as cortisol, which increases risk of child depression, anxiety, hyperactivity, behavior problems, anger, and inattentiveness (Center on the Developing Child at Harvard University, 2009; Waters, Hay, Simmonds, et al., 2014; Stein et al., 2014). Thus, early exposure to perinatal depression can alter the developing child's neurophysiology, resulting in life-long health consequences for the child, including altered stress biology and future mental health problems (Mitchell et al.,

2011).

2.2.3. Parenting and the mother-infant relationship

Compromised parenting, which includes mother-infant interaction, is considered the most critically important mechanism during the postpartum period by which maternal depression affects child mental health outcomes (Howard & Challacombe, 2018; Lovejoy, Graczyk, O'Hare, & Neuman, 2000). Infants and young children learn and develop in the context of relationships and are highly sensitive to the quality of care they receive from caregivers. The primary environment of infants and young children is, in the majority of cases, largely constituted by the mother. A key component of an optimal mother-infant relationship is maternal sensitivity, the ability to perceive and interpret accurately her infant's signals and communications and then respond contingently and appropriately, thus helping regulate the infant's stress (Leckman-Westin, Cohen, & Stueve, 2009; NICHD, 1999). Maternal sensitive responsiveness is widely construed to be one of the most crucial dimensions of mother-infant interaction and is known to predict positive outcomes in children, including attachment security (Bakermans-Kranenburg, van IJzendoorn, & Juffer, 2003; Shin, Park, Ryu, & Seomun, 2008; Van Doesum, Riksen-Walraven, Hosman, & Hoefnagels, 2008). Even in the first weeks and months of development, infants are highly attuned to their mother's responses to them. A mother's sensitive and responsive interaction with an infant is like a good game of tennis or ping-pong. The attuned mother responds to her infant's cues, babbles, and behavior with appropriate attention, gestures, or speech. This “serve and return” (Harvard) interaction builds and strengthens connections in the child's brain that support social, emotional, and cognitive development. Maternal depression, especially if chronic, can disrupt the “serve and return” interaction that is essential for healthy development. (Center on the Developing Child at Harvard University, 2009).

When a mother is depressed, she often lacks the emotional energy, motivation, and enjoyment needed to relate to, bond with, and build a positive relationship with her baby. Altered or negative cognitions associated with depression may further interfere with development of a healthy mother-infant relationship (Stein et al., 2012; Humphreys, King, Choi, & Gotlib, 2018). A depressed mother may misinterpret her infant's behavior or cues: For example, she may interpret the infant's crying as evidence that the infant does not like her or that she is a bad mother. Rumination makes it difficult a mother to focus attention on her infant and respond sensitively and contingently to the infant's cues (Stein et al., 2012; Tester-Jones, Karl, Watkins, & O'Mahen, 2017). Especially when other adversities such as poor support or low SES are present, it can be difficult for a postpartum woman to carry out the necessary tasks and responsibilities of parenting.

A large body of research has demonstrated detrimental effects of PPD on maternal sensitivity and on the quality of mother-child interactions (Shin et al., 2008; Kemppinen, Kumpulainen, Raita-Hasu, Moilanen, & Ebeling, 2006). In a meta-analysis of studies in this area (Lovejoy et al., 2000), depressed mothers of infants were found to be more irritable and hostile, to be more disengaged from their child, and to have lower rates of play and other positive social interactions with their child. Other studies have shown that depressed mothers tend to look at their infants less often, show fewer positive facial expressions, vocalize less, playfully and affectionately touch their babies less, and show overall less sensitivity to their infants than non-depressed mothers (Cohn, Campbell, Matias, & Hopkins, 1990; Field, 1984; Herrera, Reissland, & Shepherd, 2004; Mantis, Mercuri, Stack, & Field, 2018). Depressed mothers may be withdrawn and disengaged with flat affect, or they may be intrusive and over-stimulating (Field, Healy, Goldstein, & Guthertz, 1990; Cohn, Matias, Tronick, Connell, & Lyons-Ruth, 1986; Murray, Fiori-Cowley, Hooper, & Cooper, 1996). In response, infants may alter their interactive behavior with a depressed mother, leading to a broad range of infant deficits including poor emotional and behavioral state regulation, fewer positive and more negative facial expressions, avoidance, and greater fussiness (Field et al., 1988; Manian & Bornstein, 2009). An infants' altered behavior, in turn, may negatively affect the mother, with the resultant emergence of a negative pattern of mother-infant interaction (Tronick & Weinberg, 1997) which can further contribute to maternal depression and further child deficits.

Particular patterns of difficulties in parenting are linked to specific infant/early childhood mental health problems. Whereas maternal sensitivity facilitates secure attachment in infants, maternal insensitivity, particularly in relation to infant distress and emotional vulnerability, is related to child insecure attachment. Maternal sensitivity to the infant's emotions positively affects child behavioral and emotional regulation. A mother's difficulty in noticing infant's signs of interest and in supporting the infant's engagement with the environment, is related to poorer cognitive development. Hostile parenting behavior increases risk of child externalizing problems (Murray, Cooper, & Fearon, 2014; Murray, Fearon, & Cooper, 2015).

2.3. Important caveats: moderators

It is an important to make the point that the adverse effects of perinatal depression on the child are not inevitable. Not all children exposed to maternal depression will be negatively affected (Lester et al., 2013; Stein et al., 2018). The associations between maternal depression, maternal behavior, and child outcomes are complex and evidence suggests that the associations are moderated by various factors (Pearson et al., 2013). Two key moderating factors are the severity and persistence of depressive symptoms (Brennan et al., 2000; Campbell & Cohn, 1997; Comaskey et al., 2017; Netsi et al., 2018; O'Hara & McCabe, 2013; Stein et al., 2014). Higher levels of perinatal depressive symptoms (e.g., levels exceeding clinical thresholds) have been linked to greater risk for child psychiatric problems (Brennan et al., 2000; Lahti et al., 2017; Netsi et al., 2018; Stein et al., 2014). However, even milder, sub-clinical symptoms can affect parenting in negative ways and can impact child neurodevelopment (Goodman & Tully, 2009; Meaney, 2018; Lahti et al., 2017; Guyon-Harris, Huth-Bocks, Lauterbach, & Janisse, 2016). Even more so than severity, persistence of depressive symptoms plays a critical moderating role. In a prospective study of depressive symptoms across the three trimesters of pregnancy and the postpartum (Lahti et al., 2017), child psychiatric problems increased according to the number of pregnancy trimesters during which the mother reported clinically significant depressive symptoms and were greatest in children whose mothers had clinically significant depressive symptoms throughout the three trimesters of pregnancy and continuing after pregnancy. Similarly, Campbell and colleagues (1997) reported that mothers with PPD that persisted beyond six months postpartum showed significantly less positive interactions with their infants than mothers with no depression or whose PPD had remitted. Findings from a large observational study (Netsi et al., 2018) indicated an increased risk for adverse behavioral, cognitive, and emotional outcomes among children of women who had persistent PPD (defined as depressed at both 2 and 8 months postpartum) compared with women whose PPD did not persist. Although PPD, whether persistent or not, doubled the risk of child behavioral problems at age 3.5 years, regardless of the severity of the mother's depression, this association was substantially greater for children of mothers with persistent and severe PPD (OR, 4.84; 95%CI, 2.94–7.98). Additionally, persistent and severe PPD was associated with lower mathematics grades at age 16 years (OR, 2.65; 95%CI, 1.26–5.57), and with a substantially increased prevalence of depression at 16 years of age (OR, 7.44; 95%CI, 2.89–19.11).

Contextual factors also moderate the link between perinatal depression and child outcomes. Socio-economic status (SES) is an important contextual moderating factor: children whose mothers have the same degree of perinatal depression, but who are from a higher SES, are less likely to suffer adverse effects than children of lower SES mothers (Comaskey et al., 2017; Pearson et al., 2013; Meaney, 2018; Goodman

et al., 2011; Stein et al., 2014). Also to be considered is paternal mental health. About 8% of fathers experience postpartum depression (Cameron, Sedov, & Tomfohr-Madsen, 2016), and maternal and paternal depressive symptoms are positively correlated (Paulson & Bazelmore, 2010). Paternal PPD has also been linked to compromised child behavioral, social, and emotional development, and with later child psychiatric disorders, independently of maternal PPD (Gentile & Fusco, 2017; Gutierrez-Galve, Stein, Hanington, Heron, & Ramchandani, 2015; Ramchandani et al., 2008). The interactions between both parents and infant need to be considered, as non-depressed fathers may mitigate the risk of maternal PPD on infants (Paulson & Bazemoore 2010; Stein et al., 2014), whereas depressed fathers may contribute to risk.

3. Treatment

3.1. Maternal depression treatment

Given the negative consequences of perinatal depression on both mother and child, effective treatment is imperative in order to prevent or mitigate the negative effects for children. Fortunately, perinatal depression is highly treatable, and several interventions exist that effectively address maternal mood (O'Hara & McCabe, 2013). Antidepressants can effectively decrease depression symptoms in both pregnant and postpartum women (De Crescenzo, Perelli, Armando, & Vicari, 2014; Sockol, Epperson, & Barber, 2011); however the research regarding the safety of antidepressant use during pregnancy and breastfeeding has yielded mixed results, and many women are reluctant to take medication during pregnancy or postpartum due to concerns of potential adverse effects on the developing fetus and/or breastfeeding infant (Battle, Salisbury, Schofield, & Ortiz-Hernandez, 2013; Goodman, 2009). Women instead overwhelmingly prefer non-pharmacological treatment (Battle et al., 2013; Goodman, 2009). Various psychotherapies have been shown to be effective in treating perinatal depression including supportive/non-directive, psychodynamic, interpersonal, and cognitive behavioral therapies (for reviews see Leis, Mendelson, Tandon, & Perry, 2009; Cuijpers, Brännmark, & van Straten, 2008; Sockol et al., 2011; Sockol, 2015; Sockol, 2018). Current treatment guidelines recommend psychotherapy as first line treatment for mild to moderate perinatal depression, while antidepressant medication is the first choice for severe depression. Also to be considered for adjunctive treatment for perinatal depression are exercise (Daley et al., 2015), peer support (Dennis, 2003; Morrell et al., 2016), and mindfulness-based cognitive therapy (Dhillon, Sparkes, & Duarte, 2017; Dimidjian et al., 2016), although efficacy of these interventions have yet to be definitively elucidated.

3.2. Effects of maternal depression treatment on the mother-infant relationship and child outcomes

Despite the many known adverse effects of perinatal depression on the child, most perinatal depression treatment studies have focused exclusively on maternal depression as the outcome of interest, with very few examining the effect of maternal depression treatment on the mother-infant relationship and child outcomes (Jarde et al., 2016; Tsivos, Calam, Sanders, & Wittkowski, 2015a). This is a significant gap in knowledge. Although effective treatments for perinatal depression exist, it is currently unclear if treatment of maternal depression is sufficient to ameliorate the negative effects of maternal depression on dyadic interaction and on child outcomes (for reviews see Forman et al., 2007; Kersten-Alvarez, Hosman, Riksen-Walraven, Van Doesum, & Hoefnagels, 2011; Letourneau, Dennis, Cosic, & Linder, 2017; Poobalan et al., 2007; Tsivos et al., 2015a). Even when treatment reduces depressive symptoms, the mother-infant relationship may not be improved. Additional interventions focused on the mother-infant relationship and dyadic interaction may be required to address the potential effect of maternal depression on the child. This has led many researchers and clinicians to advocate for the further development and testing of PPD interventions to also target the parenting and the mother-infant relationship (Goodman & Garber, 2017; Tsivos et al., 2015a).

3.3. Treatment aimed at preventing and improving parenting and mother-infant relationship dysfunction

A separate body of research has investigated interventions directly aimed at preventing or improving compromised parenting and mother-infant relationship dysfunction associated with perinatal depression. Some of these interventions have been offered as stand-alone treatments focused solely on parenting or on mother-infant interaction (e.g., interaction guidance; infant massage). A few provide a dual-focused mother-infant intervention designed to address maternal depression and aspects of the mother-infant relationship concurrently (e.g., mother-infant psychotherapy; home-based interventions). Both single- and/or dual-focused approaches have focused on increasing maternal sensitivity, responsivity, and engagement with the infant (e.g., Goodman, Prager, Goldstein, & Freeman, 2015; Horowitz et al., 2013; Jung, Short, Letourneau, & Andrews, 2007; Kersten-Alvarez, Hosman, Riksen-Walraven, Van Doesum, & Hoefnagels, 2010; Letourneau et al., 2011; Puckering, McIntosh, Hickey, & Longford, 2010; Van Doesum et al., 2008); highlighting/enhancing attachment-promoting behaviors when they occur (Clark, Tluczek, & Wenzel, 2003; Clark, Tluczek, & Brown, 2008; Cicchetti, Rogosch, & Toth, 2000; Cohen et al., 2000; Gelfand, Teti, Seiner, & Jameson, 1996; Goodman et al., 2015); helping the mother develop insight in regards to her current feelings and relationship with her infant (Cicchetti et al., 2000; de Camps Meschino, Philipp, Israel, & Vigod, 2016; Lyons-Ruth, Connell, Grunebaum, & Botein, 1990); providing interaction coaching (Horowitz et al., 2013; Field 2000; Malphurs et al., 1998); promoting the frequency of touching via infant massage or other sensitive touching (e.g., O'Higgins, St James Roberts, & Glover, 2008; Onazawa, Glover, Adams, Modi, & Kumar, 2001; van Doesum et al., 2008); increasing social support (van Doesum et al., 2008); and providing support, reassurance and psychoeducation to the mother (e.g., Gelfand et al., 1996; Goodman et al., 2015; Lyons-Ruth et al., 1990; Tsivos, Calam, Sanders, & Wittkowski, 2015b). Overall, interventions aimed at improving the mother-infant relationship and interaction have shown promise or effectiveness in lessening the negative consequences of maternal depression on the developing child (Nylen, Moran, Franklin, & O'Hara, 2006). Given that both maternal depression and parenting present risks to the child, an integrated intervention which treats depression and the mother-infant relationship simultaneously is recommended (Goodman & Garber, 2017).

4. Implications for advanced practice psychiatric nurses

Given the adverse effects for both mother and child, effective treatment of perinatal depression is imperative. Fortunately, maternal depression is amenable to treatment and therefore is a risk factor that can be modified to decrease adverse child outcomes (Meaney, 2018). Interventions targeting the mother-infant relationship can also effectively mitigate the risk of maternal depression on the child. Intervening early in a child's life course (i.e., while in utero and in infancy and early childhood), not only may benefit the mother, but may also prevent future psychiatric problems in the child.

Prior to conception, advanced practice psychiatric nurses (APPNs) should work with each woman who is depressed or at high risk for depression to develop a plan to achieve the most optimal mental health possible, ideally before trying to conceive. APPNs can help women to prioritize their own health and well-being and to recognize the importance of such to their child (Goodman et al., 2015). When working with perinatal women, two patients must be considered: the woman and her fetus or infant. Advanced practice psychiatric nurses who work

with women of childbearing age need to be knowledgeable about perinatal mental health, it's potential effects on child development, and the special considerations regarding treatment, including available dyadic treatments for mothers and infants to augment psychotherapy and/or psychopharmacological treatment. APPNs should have a good understanding of infant development, parenting of infants, engaging depressed mothers in treatment, building and maintaining a therapeutic relationship, and screening and referral for associated problems (Goodman et al., 2015).

Routine depression screening for pregnant and postpartum women is recommended as part of primary care services, in particular at obstetrical and pediatric well-baby visits (Siu et al., 2016), and APPNs can help educate colleagues regarding screening and provide information about available resources and referrals for women who screen as positive for depression. Unfortunately, perinatal depression is often undiagnosed and/or untreated. The findings of a systematic review of the literature regarding rates of perinatal depression detection and treatment suggest that, for women with prenatal depression, about 50% are identified in clinical settings, 14% receive treatment, and only 8.6% receive adequate treatment (defined as at least 6 weeks of daily use of antidepressants or at least 6 weeks of psychotherapy). For women with PPD, about 31% are identified, 16% receive treatment, and only 6.3% receive adequate treatment (Cox, Sowa, Meltzer-Brody, & Gaynes, 2016). Clearly, ample opportunities exist for advanced practice psychiatric nurses to address this treatment deficiency, as they often serve as a source of mental health care for women during their reproductive years. Addressing barriers to treatment is a priority. Suggested ways to decrease barriers and make treatment more accessible include offering: co-located assessment and treatment services within primary care and in prenatal/postpartum obstetrical care settings (Goodman, 2009); flexible scheduling of appointments; telephone, tele-mental health, or home visit sessions; and cost-effective, affordable options, such as group interventions, peer-led interventions, and web-based depression treatment (Lee, Denison, Hor, & Reynolds, 2016).

Early identification of perinatal depression, followed by effective intervention can have a significant impact on maternal mental health and the prevention of child, adolescent and adult mental health difficulties. Treatment of maternal depression should begin early and be evidence-based, sustained, and available, especially to those most at risk, such as women with more severe or persistent depression, and those with socioeconomic and other adversities, as their children are at highest risk for adverse child development (Netsi et al., 2018; Weissman, 2017). Addressing maternal depression may represent one of the most modifiable and feasible strategies for reducing risk factors for compromised infant development (Kingston, Tough, & Whitfield, 2012). Parenting is another key mechanism through which maternal depression affects children and can be modified successfully and should be specifically targeted in interventions (Goodman et al., 2015; Stein et al., 2014). Efficiently addressing the two risk processes, depression in mothers and parenting, within an integrated intervention, mothers can simultaneously learn to manage their depressive symptoms and enhance their parenting ability (Goodman et al., 2015).

Advanced practice psychiatric nurses are in a key position to assess maternal adaptation to a newborn and mother-infant interaction and to promote optimal mother-infant relationships. Perinatal women are generally eager for information that will help them in their new roles as mothers and are thus receptive to new learning. Information and support during this time can have long-lasting effects on the parent-infant relationship and on developmental outcome. When treating women with perinatal mental health problems, it is important to also address the mother-infant relationship. Encourage mothers to bring their infant with them to appointments – at least some of the time. This allows the APPN the opportunity to directly observe the relationship. Look for attachment behaviors, such as noticing if the mother responds to the baby's distress by attempting to console or soothe the baby. Observe parenting and interaction: Did the mother come prepared to feed or change her baby if need be? For an older infant/child, did she bring toys, books, etc., to help occupy the child? Does the mother notice and respond to infant cues such as fussiness or smiling or attempts to engage? Does the mother engage in the reciprocal serve-and-return interaction with her baby? Does the mother gaze at and talk gently and lovingly to her baby? In a very non-judgmental way, ask if the mother feels connected to her baby, how she feels about being a mother, if the baby brings her pleasure or if she's still mostly in the hard work phase. Ask her what it's like being a mother and taking care of her baby? Validate the enormous change in life that having a new baby brings and normalize ambivalence. Listen for dysfunctional cognitions that can negatively affect the mother's mood and her relationship with her infant, such as believing that the baby does not like her, or that a baby should learn to cry it out.

APPNs play an important role in promoting maternal adjustment to a new baby. By continuously assessing maternal adaptation, parenting, and the developing mother-infant relationship, APPNs will be able to intervene early and appropriately to facilitate the best outcomes for both mother and child. APPNs can work to optimize the mother-infant relationship, not only by treating depression itself, but by also addressing the dyadic relationship as an adjunct to depression treatment or by referring to specialist care (e.g., parent-infant therapists) if needed. With early and effective intervention, fetal and/or infant exposure to maternal depression and potentially compromised parenting is limited, altering what otherwise might be a negative child development trajectory (Goodman & Garber, 2017; Netsi et al., 2015).

5. Conclusion

The research is clear: maternal mental health during pregnancy and the first year postpartum is of the utmost importance to the well-being of the mother and to the social, emotional, and cognitive development of her child. Early identification and treatment are critical to ensure optimal infant development and the child's future mental health. With appropriate intervention, the negative trajectory of maternal depression for both mother and child can be prevented or reversed.

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