

## Article

# Post-partum depression: a comprehensive approach to evaluation and treatment

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## ABSTRACT

Post-partum depression (PPD) presents a significant disruption to the mother–infant relationship. Such disruptions are associated with risks to the neurological, socio-emotional and cognitive functioning of the developing infant. A review of this literature supports the early detection of PPD and the application of comprehensive, psychotherapeutic interventions that target the functioning of the infant, the mother and the

mother–infant relationship. Ecological factors important to evaluation and avenues of intervention are emphasised. The need for further research to determine evidence-based methods of intervention is described.

**Keywords:** infant and mother mental health, post-partum depression

## Introduction

The infant–caregiver relationship has been described as a primary relational unit nested within a complex set of interacting individual, social and ecological factors that shape developmental outcome.<sup>1</sup> Quality infant–maternal emotional bonds, and the attachment security they provide, form the basis for infant mental representations of self and others,<sup>2</sup> predict cognitive, socio-emotional, self-regulatory and moral development,<sup>3</sup> and promote an optimal developmental trajectory in childhood and adolescence.<sup>2</sup> Infant needs and maternal attunement and responsiveness operate as a dyadic, co-regulated system in which affective states and biological rhythms are coordinated.<sup>3–5</sup>

The effects of post-partum depression on maternal attunement, infant–maternal attachment, and the development of infant–maternal synchrony are profound.<sup>3,6–8</sup> Intervention approaches have tended to address either maternal depression or infant–mother attachment and interaction with limited effective-

ness.<sup>9</sup> The need for a comprehensive intervention approach that simultaneously addresses both maternal and dyadic relational factors is clear. Further, such interventions must consider the ecological factors, such as socioeconomic status (SES), that may exacerbate the effects of maternal depression on infant development as well as impede access to effective psychosocial care.

## The impact of post-partum depression on infants

Post-partum depression (PPD) is a non-psychotic depressive illness that is moderately severe in symptomatology and similar to depression at other times in life.<sup>10</sup> Onset is often four to six weeks post-partum,<sup>10</sup> but can occur anytime within the first

year after childbirth. An estimated 10–15% of women experience PPD<sup>11</sup> and it has been found to be much higher in low-income populations, at between 23 and 52%.<sup>12</sup> Women at highest risk for PPD are those who have a history of depression, experience depression during pregnancy and have had one episode of major depression following childbirth. Women with a previous diagnosis of PPD have a risk of recurrence of about 25%.<sup>13</sup> Depression is often accompanied by a slower rate of speech and reduced eye contact, as well as decreased emotional expressiveness and responsiveness. Parent–infant synchrony is impacted in that depressed mothers tend to be slower to respond to infant stress or social signals, look at and vocalise less often to their children and engage in less rhythmic imitation and joint activity.<sup>3,8</sup> Further, mothers with depression demonstrate speech that is less focused on the actions and abilities of the infant, have more difficulty providing optimal levels of stimulation, provide less touch to their babies, and their touch is more functional and less affectionate. Interactions between depressed mothers and their infants become impaired with a longer course of depression, with depressed mothers being less positive in face-to-face interactions and in play with toys and less competent in feeding at six months post-partum.<sup>6</sup> The non-contingent and self-preoccupied nature of behaviour in depressed mothers appears to promote insecure attachment in infants, toddlers and preschoolers.<sup>7,14</sup> When a caregiver responds by being unavailable, unpredictable, insensitive or rejecting, the infant will learn to not seek out the caregiver when distressed or will do so in an ambivalent manner.<sup>2</sup> These infants learn to see others as untrustworthy and potentially rejecting, and view themselves as unworthy.<sup>2,15</sup>

Maternal depression is associated with a range of difficulties in infants and toddlers including emotional dysregulation, lower frustration tolerance, higher rates of non-compliant behaviour and emotional lability and decreased positive affect and ability to self-soothe.<sup>16,17</sup> Infants of depressed mothers have electroencephalograph (EEG) activity that demonstrates more negative affect and crying, more reactivity and decreased abilities to regulate arousal.<sup>18</sup> Difficulties regulating attention and emotion negatively impact perceptual learning.<sup>7</sup> Lower rates of infant-focused speech by mothers is related to infants performing lower on cognitive tasks,<sup>7</sup> even as early as two months post-partum.<sup>19</sup> Infant physical health is also impacted as depressed mothers are less likely to breastfeed and comply with immunisations and well-child visits.<sup>20</sup>

## Multiple factors contributing to PPD

### Infant factors

Mothers have a greater risk of developing depression when they have high-risk pregnancies<sup>21</sup> or infants with low birth weight,<sup>7</sup> poor motor functioning, neonatal irritability<sup>8</sup> and prematurity.<sup>3</sup> Maternal depression in pregnancy has a prevalence rate of 10–15%, and has been found to impair the psychological systems of infants due to the increased maternal cortisol levels that cross the placenta.<sup>1</sup> Infant stress-related physiological dysregulation is associated with higher cortisol levels, EEG asymmetries paired with negative emotions and the development of depression and stress-related psychopathology. The infants' poor abilities to self-regulate their physiological rhythms and attentional states disrupt parent–infant synchrony.<sup>3</sup>

### Caregiver factors

In addition to characteristics of depression that impact on maternal interactions with infants (as cited above), other caregiver factors are important to consider. A history of major depressive disorder puts women at a high risk of relapse during pregnancy. This risk increases when the use of antidepressants is discontinued due to being pregnant. Depression during pregnancy not only has adverse outcomes on the infant as described above, but research also demonstrates an increased risk for depression in the post-partum period.<sup>22</sup> The attitude a woman and her partner have towards pregnancy and having children impacts maternal mood and may predict PPD.<sup>23</sup> When a mother's own reaction to the pregnancy was negative, maternity blues tended to be stronger.<sup>14</sup> Women who adjust their personal goals to align with the demands of each stage of the transition into motherhood have a decrease in depressive symptoms.<sup>24</sup> An increase in self-focused goals is positively associated with depressive symptoms. The presence of a supportive partner is a protective factor for children in that infants of depressed mothers were found to have higher quality interactions with such fathers.<sup>25</sup> A father's positive reaction to a pregnancy predicts lower decreased symptoms of depression and higher levels of maternal attachment to the infant.<sup>14</sup>

## Ecological factors

Several ecological factors have been discussed in the literature as influencing the development or impact of PPD, with increased risk associated with high levels of stress, higher numbers of life events, low self-esteem, low family income and low satisfaction with social support systems.<sup>17</sup> Women with chronic symptoms of depression but with higher income-to-needs ratios show more sensitive caregiving.<sup>26</sup> Support in childrearing, such as closeness to mothers with children in the same age group, is associated with lower levels of maternity blues.<sup>14</sup> Working mothers demonstrate significantly higher interest in their babies, whereas non-working depressed mothers had a higher proportion of negative facial expressions, including irritation and disinterest, compared with working depressed mothers.<sup>27</sup>

Risk factors that impact child development include caregiver and ecological factors such as a history of maternal mental illness, maternal anxiety, rigidity in parental beliefs, attitudes and values mothers have with regard to child development, fewer positive interactions between mothers and infants, an unskilled occupation of the head of household, lower maternal education, racial/ethnic minority status, lower family support, higher number of stressful life events and larger family size.<sup>28</sup> The more risk factors, the higher probability for poorer academic achievement, lower scores on tests of intellectual functioning and poorer social outcomes. Poverty compounds risk in outcomes for children because the depression it causes in single parents leads to the worsening of parenting.

## Efficacy of treatment interventions

### Treatment targeting maternal depression

The standard medical treatment of depression is medication. However, there is often reluctance among mothers and providers to use a pharmacological intervention due to the fact that these medications cross the placental barrier and are passed into breast milk.<sup>25</sup> The use of medication and psychological treatment combined was not found to be superior to psychological treatment alone.<sup>29</sup> Large scale reviews indicate that psychotherapeutic approaches are successful in reducing the mother's symptoms of PPD.<sup>30</sup> Such approaches include cognitive-behavioural therapy, non-directive counselling and psychodynamic approaches.<sup>20</sup> Pharmacological strategies

are indicated for moderate to severe symptoms of depression or when non-pharmacological methods of intervention are unsuccessful.<sup>13</sup> A comprehensive risk-benefit assessment of the use of pharmacological intervention is necessary for mothers at risk of or who have developed depression.

Targeting maternal symptoms is not enough to improve the quality of the mother-infant relationship or to protect infants from the negative developmental outcomes of PPD.<sup>9</sup> While it reduces maternal stress related to parenting and improves maternal reporting of infant emotional and behavioural ratings, actual changes in mother-infant interaction and infant outcome have not been found.<sup>30,31</sup> Indeed, children of depressed mothers continue to demonstrate lower attachment security, higher negative affect, more internalising and externalising of problems and lower cognitive development.<sup>31</sup>

### Treatment targeting the mother-infant relationship

Mother-infant therapies directly include the infant in the intervention and attempt to restore disruptions in the mother-infant dyad.<sup>9</sup> Several approaches have similar theoretical foundations and have demonstrated improved infant functioning. Mother-infant psychodynamic psychotherapy (PPT),<sup>32</sup> Watch, Wait, Wonder (WWW)<sup>33</sup> and toddler-parent psychotherapy (TPP)<sup>34</sup> are based on psychodynamic principles, where the mother is encouraged to understand the influence of prior relationships on her current relationship with her infant. Therapy links the mother's present concerns in parenting to her own childhood conflicts, expecting that this insight will promote more competent maternal functioning in infant-mother interactions.<sup>9</sup> WWW and TPP additionally incorporate attachment theory, where mothers are provided with guidance through specific instructions focused on increasing their responsiveness and sensitivity, as well as decreasing their intrusiveness. Thus, the mother empowers the infant to work through core relational struggles directly with her, providing a sense of efficacy and mastery within their interactions.<sup>35</sup> These approaches result in improvement of maternal symptoms of depression, competence in the parenting role, greater reciprocity and decreased maternal intrusiveness in interactions.<sup>36</sup> Infants have significantly greater cognitive outcomes and emotional regulation, and demonstrate a greater shift toward secure attachment within the mother-infant dyad.<sup>35,36</sup> For depressed mothers who suffered subsequent depressive episodes, treatment appeared to have acted as a buffer for cognitive

functioning.<sup>34</sup> PPT demonstrated a significant decrease in maternal depression and improved infant cognitive functioning at the six-month follow up, suggesting a delayed effect of treatment.<sup>36</sup>

Mother–infant psychotherapy (M–ITG) groups have also been used as a treatment for PPD.<sup>37</sup> This short-term model integrates object relations, attachment, social learning, learned helplessness and interpersonal, psychodynamic and family systems approaches. Groups include a relationally focused mother–infant group, an infant developmental group and an interpersonal psychotherapy mothers’ group. This model results in a reduction in depressive symptoms, an improvement in mothers’ perceptions of their infants’ adaptability and an experience of their children as more reinforcing. Mothers exhibit significantly more positive affect involvement and communication with their infants.<sup>12</sup> This model has not been demonstrated to improve the cognitive outcomes for infants. Follow-up research might have found a delayed improvement, as in PPT, but has not been conducted. Another explanation may be that longer treatment is necessary.

### Home-based interventions

Several home-based approaches are similar to mother–infant psychotherapy in that they address PPD at individual and interactional levels, considering the mother, the infant and the relationship in treatment. These approaches additionally recognise the ecological risk factors associated with poverty, such as accessibility and cost. Home-based programmes that have provided a focus on increasing use of public resources, improving mother–infant interactions, decreasing social isolation of the mother and emphasising the mother’s role as a source of emotional security for the infant have resulted in improved cognitive and attachment functioning.<sup>38</sup> Infant massage interventions result in increased infant regulation, improved infant temperament and sociability, decreased infant stress hormone levels and increased serotonin levels, suggesting decreased infant stress and depression. Improvement in maternal–infant interactions over time<sup>31</sup> and enhancement in depressed mother’s sensitivity to their infants’ cues have also been found with infant massage.<sup>39</sup> Maternal variables that predict a more chronic course of depression include right frontal EEG activation, elevated serotonin, norepinephrine and cortisol levels, less positive interaction with infants and poor vagal tone.<sup>9</sup> Women identified to be at risk for more chronic depression who received a home-based, comprehensive approach to intervention look similar to non-depressed women at the end of treatment. Components of the approach

consisted of progressive relaxation therapy, visual imagery, music therapy, infant massage and interaction coaching for the mother and baby to increase maternal sensitivity and infant responsiveness, as well as educational and vocational skill development for mothers. Mothers have improved biochemical profiles, significantly lower levels of depression and improved interactions with their infants. Infants gain weight and score higher on cognitive and social functioning measures.

Teaching depressed mothers how to use the Neonatal Behavioral Assessment Scale (NBAS)<sup>40</sup> has been found to increase their sensitivity and positive affect toward their infants.<sup>9</sup> Infants have been found to be significantly heavier and taller than the controls<sup>9</sup> and to be performing significantly better on social interaction and state organisation.<sup>31</sup>

## Implications for a comprehensive primary care approach to PPD

The need for early detection, accessible and cost-effective treatment and attention to the multiple factors involved in successfully treating maternal PPD in ways that promote positive mother–infant relational and infant developmental outcomes is clear.

### Assessment and points of intervention

Treatment of PPD is unique in that there is a specific life-changing event that coincides with the condition of PPD; the transition to motherhood. It is also an event in which the population at risk already has contact with the healthcare system, making this an extremely important level of assessment and intervention. However, while this condition is estimated to affect 10–15% of the population and between 23 and 52% of low-income mothers, PPD goes largely undetected by the primary health team.<sup>41</sup> The American Academy of Pediatrics found that 57% of paediatrician respondents reported feeling a responsibility for recognising PPD.<sup>41</sup> However, 73% of paediatrician respondents reported having insufficient time for educating and counselling mothers, 70% reported insufficient time for getting the mother’s history, 64% indicated that they had insufficient training to diagnose or counsel mothers and 48% felt they did not have enough knowledge of treatment options. Early detection and intervention is vital in the treatment of PPD due to the exceptional sensitivity of infants in the early weeks of life.

There is an opportunity for obstetricians, gynaecologists, midwives, paediatricians and support staff to be aware of risk factors and symptoms of PPD and to assess for this condition at several points in time. Suggested assessments and points of intervention by primary care providers involve:

- maternal mental health status during prenatal visits
- infant developmental and maternal mental health status post-partum during their early days in the hospital
- maternal mental health status during regularly scheduled postnatal visits.

### Prenatal visits

These visits offer an opportunity for healthcare staff to screen for risk factors and symptoms of depression. Screening at this stage is likely to be low cost and should include the mother's personal and familial psychiatric history, assessment of the partner and attitudes about pregnancy and having the child, as well as environmental stressors and supports. The family's SES should be considered as a compounding stressor. Many of these factors can be discussed in an interview with soon-to-be mothers. Furthermore, there are several questionnaires designed to assess a mother's attitudes toward pregnancy and motherhood. For example, the Edinburgh Postnatal Depression Scale (EPDS) is a 10-item self-report measure for pregnant women and new mothers and has strong predictive validity for PPD.<sup>42</sup> Women that are depressed during pregnancy should begin to receive treatment to manage their symptoms of depression. Primary care intervention should involve considering pharmacological treatment and referral to community supports to treat PPD. Earlier intervention is associated with better prognosis.<sup>13</sup>

### The early days in the hospital

The period after the birth of the child also offers an opportunity to assess the mother for PPD and to intervene. Infant characteristics, such as low birth weight, poor motor functioning and neonatal irritability, including affect dysregulation and stress reactivity, are already an aspect of standardised infant screening in the NBAS. These data should be viewed as factors contributing to the strain on the infant-caregiver relationship and also an opportunity to intervene by promoting increased sensitivity in caregiving. A presumably more costly and therefore secondary level of screening for PPD is developing a biochemical profile of the mother at risk.

The maternal variables that predict a more chronic course of maternal depression are right frontal EEG activation, elevated serotonin, norepinephrine and cortisol levels, less positive interactions with their infants and poor vagal tone. For mothers identified at risk by other means, examining their biochemical profile at regularly scheduled postnatal visits provides another opportunity to assess for PPD, to consider intervention for psychopharmacological intervention and to refer the mother and infant for psychotherapeutic services and community supports.

### Postnatal visits

Since the onset of PPD is typically four to six weeks post-partum, women are likely to be symptomatic at the time of regularly scheduled postnatal visits. These visits provide a third opportunity to assess women while they are in contact with the healthcare system. Low cost questionnaires, such as the EPDS, would be useful in identifying mothers exhibiting signs of depression. These mothers could then be referred to a mental health professional for a standardised clinical interview. During postnatal visits, then, primary care intervention again involves detection, consideration of psychopharmacological intervention, referral to a mental health professional for further evaluation and treatment and referral to community supports.

## Psychotherapeutic interventions that address the mother, the infant and the dyad

### Treating the mother

One aspect of therapeutic intervention is the treatment of the mother, within which there are several components. One component is reduction in symptoms of depression. As discussed earlier, therapy and/or medication are important in order to address the biological and psychological factors that contribute to symptoms of depression. Other components in treating mothers with PPD address the issues unique to being a depressed mother caring for her infant. One approach to mother-infant psychotherapy follows a psychodynamic tradition of helping the mother to examine her own relationship history. The mother is helped to gain insight on how her previous relationships are impacting her current feelings and relationship with her child. These

intergenerational effects on parenting are explored to promote the mother's insight about her interactions with her child and increase her sensitivity. Other components include support, reassurance and psychoeducation related to child development and parenting. These additional components prepare the mother for improving her relationship with her child.

### Treating the mother–infant dyad

Other aspects of therapeutic intervention involve the infant and mother–infant relationship. Many of the mother–infant psychotherapy approaches reviewed strive to promote a secure attachment between the mother and infant. Some interventions put the focus on the mother's behaviour by pointing out attachment related behaviour as it occurs and focusing on maternal responsiveness, sensitivity and engagement. Those interventions that have more successful infant outcomes additionally make the infant a focus in therapy. The mother is guided towards actively sustaining attention to the infant's experience. The mother is helped to develop a more sensitive response to her infant, increase self-efficacy and increase acceptance of the infant. This sets the stage for a reciprocal, dyadic system where both infant and mother are engaged and empowered.

Home-based intervention models demonstrate that there are several interventions that fall outside the scope of traditional psychotherapy which are effective in decreasing maternal symptoms of depression and improving infants' cognitive and relational abilities. Approaches such as progressive relaxation, visual imagery, music therapy and education about infant development and community resources have been found to be helpful. Teaching a mother how to give massage to her infant and how to use the NBAS have been demonstrated to be beneficial to the infant and to promote maternal sensitivity. These methods of intervention can be provided from a variety of service providers, such as visiting nurses and mothers from the community, and are better suited to bridging the gap between some mothers and other environmental supports.

### Interventions that consider ecological factors

The mother–infant relationship is influenced by environmental factors that include family, community and culture which may be assessed through interview during primary care visits. There is also a range of environmental factors that contributes to the development of PPD, making it appropriate to

provide intervention that supports the ecological niche of the infant. Assessment of broader systemic issues will be necessary in order to intervene and determine additional services that will provide support to the mother–infant dyad. Developing interventions that consider ecological factors include considering the location of the therapeutic setting, assessment of other family members, community and cultural factors, vocational and educational assistance and community psycho-educational and/or support groups.

#### *Considering the location of services*

There is promising research for providing intervention in home-based as well as more traditional therapeutic settings. Several factors may make home-based models more appropriate. The nature of depression is likely to cause a lack of motivation and energy to attend a treatment facility. Lower SES populations are both more at risk for developing PPD and less likely to have the resources needed to attend treatment at a facility, such as child care and transportation. However, some of the empirically supported interventions, such as groups, are more easily done outside of the home. A comprehensive treatment model would need to plan service delivery in an individualised manner with these factors in mind.

#### *Assessing family members*

Goodman<sup>1</sup> asserts the need for the assessment of other family members. Partners can provide useful information in assessing for and treating PPD, but should also be viewed as potential targets for intervention. Other children should be screened for current symptoms of mental health issues and for vulnerabilities for developing them later, such as affect regulation, stress reactivity and social and cognitive skills. Patterns of interactions between family members may be contributing to or maintaining the mother's depression, and it may be appropriate to refer a mother and her family to a family therapist.

#### *Understanding community and cultural factors*

Community and cultural factors are important aspects of the infant's ecological niche and culturally competent services are important in designing any therapeutic intervention. This is particularly important when considering the higher risk of PPD in low-income populations and simultaneous overrepresentation of minority groups within low-income populations.

### *Providing vocational and educational assistance*

Developing vocational and educational opportunities may be useful to some mothers with PPD. Lower income is associated with a variety of factors that compound, putting mothers and infants at risk. Assisting mothers to develop the skills needed to gain employment and increase their income is likely to reduce some of their stressors. Research has also demonstrated that women with PPD who work have more positive interactions with their infants.<sup>25</sup>

### *Developing psycho-educational and/or support groups*

Developing psycho-educational and/or support groups in community settings provides a sense of belonging to mothers and reduces social isolation. The presence of nearby mothers with similar-aged children and discussion promoting family and birth-related goals can provide an outlet for mothers and is associated with decreased symptoms of depression. Groups also offer information about other community resources and may promote utilisation of these resources.

## Conclusion

PPD is an environmental factor that influences the mother, infant and the mother–infant dyad. When PPD is chronic, less than optimal patterns of mother–infant interactions develop. Secure attachment is hindered, negatively effecting neurological, social, emotional and cognitive developmental outcomes. Empirical findings and the nature of infant development call for a comprehensive treatment approach to PPD. Early assessment by primary care medical providers is vital to providing intervention in a timely manner. Primary care providers need to be familiar with the supports available in their community for the treatment of PPD. The mother, the infant and their relationship are each important aspects of intervention in order to optimise the emotional and cognitive outcomes of mothers and infants. Addressing these factors comprehensively is supported by the literature. Factors relevant to the ecological niche of the family require careful examination and intervention. Intervention that incorporates family, community and cultural contributions further supports the family's ecological niche.

There are insights gained from the expanding field of PPD research and infant mental health. Further research is necessary in order to propel these

insights into approaches that are evidence-based and incorporate the factors that influence maternal functioning and infant development. While a wide array of treatments for mothers with PPD, their infants and the mother–infant relationship are available, the heterogeneity of the research makes them difficult to compare. Examples of this include demographics, such as infant age and maternal diagnosis, and the multiple measures used to diagnose depression.

Furthermore, it is important that PPD be studied in other types of family constellations, such as adoption or same-sex parents. Interventions themselves have varied in the technique, setting, duration, intensity, focus on therapy and level of training of those providing the intervention. Often various techniques were employed and studied simultaneously, making it difficult to ascertain which variables were responsible for improvements. These variables will need to be tested separately in the future. Outcomes were measured in a variety of ways, including self-report by the mother. It is possible that the mother's perspectives on her symptoms and the infant's symptoms or the dyad's interactions are more a function of her perception or self-report rather than an objectively measured change in functioning. Future and long-term follow-up research in this area should use validated and reliable objective measures to fully understand the implications of these interventions. Overcoming these methodological challenges will be important in order for future researchers to develop effective interventions that address the needs of the mother, the infant and their relationship.

## REFERENCES

- 1 Goodman SH. Depression in mothers. *Annual Review of Clinical Psychology* 2007;3:107–35.
- 2 Egeland B, Weinfield NS, Bosquet M and Cheng VK. Remembering, repeating, and working through: lessons from attachment-based interventions. In: Osofsky JD and Fitzgerald HE (eds) *WAIMH Handbook of Infant Mental Health: infant mental health in groups at high risk* (4e). New York: John Wiley and Sons, 2000, pp. 35–89.
- 3 Feldman R. Parent–infant synchrony and the construction of shared timing: physiological precursors, developmental outcomes and risk conditions. *Journal of Child Psychology and Psychiatry* 2007; 48:329–54.
- 4 Beebe B and Lachmann FM. *Infant Research and Adult Treatment: co-constructing interactions*. New Jersey: Thee Analytic Press, 2002.
- 5 Stern D. *The Interpersonal World of the Infant: a view from psychoanalysis and developmental psychology*. New York: Basic Books, 1985.

- 6 Campbell SB, Cohn JF and Meyers T. Depression in first-time mothers: mother–infant interaction and depression chronicity. *Developmental Psychology* 1995;31:349–57.
- 7 Hay DF. The nature of postpartum depressive disorders. In: Murray L and Cooper PJ (eds) *Postpartum Depression and Child Development*. New York: Guilford Press, 1997, pp. 85–110.
- 8 Murray L and Cooper PJ (eds). The role of infant and maternal factors in postpartum depression, mother–infant interactions and infant outcomes. In: *Postpartum Depression and Child Development*. New York: Guilford Press, 1997, pp. 111–35.
- 9 Nylen KJ, Moran TE, Franklin CL and O’Hara MW. Maternal depression: a review of relevant treatment approaches for mothers and infants. *Infant Mental Health Journal* 2006;27:327–43.
- 10 Edhborg M, Matthiesen AS, Lundh W and Widstrom AM. Some early indicators for depressive symptoms and bonding two months postpartum: a study of new mothers and fathers. *Archives of Women’s Mental Health* 2005;8:221–31.
- 11 O’Hara MW. The nature of postpartum depressive disorders. In: Murray L and Cooper PJ (eds) *Postpartum Depression and Child Development*. New York: Guilford Press, 1997, pp. 3–31.
- 12 Clark R, Tluczek A and Brown R. A mother–infant therapy group model for postpartum depression. *Infant Mental Health Journal* 2008;29:514–36.
- 13 Joy S, Contag SA and Templeton HB. *Postpartum Depression*. *E-medicine from WebMD*. 2010. [emedicine.medscape.com/article/271662-overview](http://emedicine.medscape.com/article/271662-overview) (accessed 27 October 2010).
- 14 Nagata M, Nagai Y, Sobajima H, Ando T, Nishide Y and Honjo S. Maternity blues and attachment to children in mothers of full-term normal infants. *Acta Psychiatrica Scandinavica* 2000;101:209–17.
- 15 Ainsworth MDS, Blehar MC, Waters E and Wall S. *Patterns of Attachment: a psychological study of the strange situation*. Hillsdale, NJ: Erlbaum, 1978.
- 16 Bosquet M and Egeland B. Associations among maternal depressive symptomatology, state of mind and parent and child behaviors: implications for attachment-based interventions. *Attachment and Human Development* 2001;3:173–99.
- 17 Ritter C, Hobfoll SE, Lavin J, Cameron RP and Hulsizer MR. Stress, psychosocial resources, and depressive symptomatology during pregnancy in low-income, inner-city women. *Health Psychology* 2000;19:576–85.
- 18 Jones NA, Field T, Fox NA, Davalos M and Gomez C. EEG during different emotions in ten-month-old infants of depressed mothers. *Journal of Reproductive and Infant Psychology* 2001;19:295–312.
- 19 Whiffen VE and Gotlib IH. Infants of postpartum depressed mothers: temperament and cognitive status. *Journal of Abnormal Psychology* 1989;98:274–9.
- 20 Leis JA, Mendelson T, Tandon SD and Perry DF. A systematic review of home-based interventions to prevent and treat postpartum depression. *Archives of Women’s Health* 2009;12:3–13.
- 21 Besser A, Priel B and Wiznitzer A. Childbearing depressive symptomatology in high-risk pregnancies: the roles of working models and social support. *Personal Relationships* 2002;9:395–413.
- 22 Raudzus J and Misri S. Managing unipolar depression in pregnancy. *Current Opinion in Psychiatry* 2009;22:13–18. [www.ncbi.nlm.nih.gov/pubmed/19122529](http://www.ncbi.nlm.nih.gov/pubmed/19122529) (accessed 27 October 2010).
- 23 Field T, Sandberg D, Garcia R, Vega-Lahr N, Goldstein S and Guy L. Pregnancy problems, postpartum depression and early mother–infant interactions. *Developmental Psychology* 1985;21:1152–6.
- 24 Salmela-Aro K, Nurmi J, Saisto T and Halmesmaki E. Goal reconstruction and depressive symptoms during the transition to motherhood: evidence from two cross-lagged longitudinal studies. *Journal of Personality and Social Psychology* 2001;81:1144–59.
- 25 Canadian Paediatric Society. Maternal depression and child development. *Paediatric Child Health* 2004;9:575–83.
- 26 National Institute of Child Health and Human Development Early Child Care Research Network (NICHD). Chronicity of maternal depressive symptoms, maternal sensitivity, and child functioning at 36 months. *Developmental Psychology* 1999;35:1297–310.
- 27 Cohn JF, Campbell SB, Matias R and Hopkins J. Face-to-face interactions of postpartum depressed and nondepressed mother–infant pairs at two months. *Developmental Psychology* 1990;26:15–23.
- 28 Sameroff A and Fiese B. Models of development and developmental risk. In: Zeanah CH Jr (ed) *Handbook of Infant Mental Health* (2e). New York: Guilford Press, 2000, pp. 3–19.
- 29 Cooper PJ and Murray L. The impact of psychological treatments of postpartum depression on maternal mood and infant development. In: Murray L and Cooper PJ (eds) *Postpartum Depression and Child Development*. New York: Guilford Press, 1997, pp. 201–20.
- 30 Murray L, Cooper PJ, Wilson A and Romaniuk H. Controlled trial of the short- and long-term effect of psychological treatment of postpartum depression. *British Journal of Psychiatry* 2003;182:420–7.
- 31 Poobalan AS, Aucott LS, Ross L, Smith WCS, Helms PJ and Williams JHG. Effects of treating postnatal depression on mother–infant interaction and child development. *British Journal of Psychiatry* 2007;191:378–86.
- 32 Fraiberg S, Adelson E and Shapiro V. Ghosts in the nursery: a psychoanalytic approach to the problems of impaired infant–mother relationships. In: Fraiberg L (ed) *Selected Writings of Selma Fraiberg*. Columbus, OH: Ohio State University Press, 1987, pp. 100–36.
- 33 Johnson F, Dowling J and Wesner D. Notes on infant psychotherapy. *Infant Mental Health Journal* 1980;1:19–33.
- 34 Cicchetti D, Rogosch FA and Toth SL. The efficacy of toddler–parent psychotherapy for fostering cognitive development in offspring of depressed

- mothers. *Journal of Abnormal Child Psychology* 2000; 28:135–48.
- 35 Cohen NJ, Lojkasek M, Muir E, Muir R and Parker CJ. Six-month follow-up of two mother–infant psychotherapies: convergence of therapeutic outcomes. *Infant Mental Health Journal* 2002;23:361–80.
- 36 Cicchetti D, Toth SL and Rogosch FA. Toddler–parent psychotherapy as a preventative intervention to alter attachment organization in offspring of depressed mothers. *Attachment and Human Development* 1999;1:34–66.
- 37 Clark R, Tluczek A and Wenzel A. Psychotherapy for postpartum depression: a preliminary report. *American Journal of Orthopsychiatry* 2003;73:441–54.
- 38 Lyons-Ruth K, Connell DB and Grunebaum HU. Infants at social risk: maternal depression and family support services as mediators of infant development and security of attachment. *Child Development* 1990;61:85–98.
- 39 Field T. The treatment of depressed mothers and their infants. In: Murray L and Cooper PJ (eds) *Postpartum Depression and Child Development*. New York: Guilford Press, 1997, pp. 221–36.
- 40 Brazelton TB. *Neonatal Behavioral Assessment Scale*. London: Spastics International, 1973.
- 41 Illinois Academy of Family Physicians. *Maternal Depression and Child Development: strategies for primary care providers*. Proceedings of the Family Practice Education Network. Lisle, Illinois: Illinois Academy of Family Physicians, 2007.
- 42 Cox JL and Sagovsky R. Detection of postnatal depression: development of the ten-item Edinburgh Postnatal Depression Scale. *British Journal of Psychiatry* 1987;150:782–6.

#### CONFLICTS OF INTEREST

None.

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