Postpartum depression: Adverse consequences in mothers and their children

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Literature review current through: **Oct 2023.**
This topic last updated: **Jun 12, 2023.**

INTRODUCTION

Maternal postpartum depression impairs functioning, and can interfere with breastfeeding, maternal-infant bonding, care of the infant and other children, and the mother's relationship with her partner. In addition, postpartum depression is associated with adverse consequences for the offspring, including poor nutrition and health, as well as abnormal infant and child development [1-6].

Postpartum depression may also be related to cognitive impairment and psychopathology in the offspring [1-4,7,8]. It appears that general cognitive performance is impaired, including specifically executive functioning, intelligence, and language development. Moreover, postpartum depression may be associated with anxiety, depression, and hyperactivity/impulsivity in the offspring.

This topic reviews the adverse consequences of postpartum depression in mothers and their children. The clinical features, assessment, diagnosis, and treatment of postpartum depression are discussed separately:

- (See "Postpartum unipolar major depression: Epidemiology, clinical features, assessment, and diagnosis".)
- (See "Mild to moderate postpartum unipolar major depression: Treatment".)
- (See "Severe postpartum unipolar major depression: Choosing treatment".)

DEFINITION OF POSTPARTUM PERIOD

Consistent with many reviews and studies, we define the postpartum period as the first 12 months after birth. (See "Postpartum unipolar major depression: Epidemiology, clinical features, assessment, and diagnosis", section on 'Definition of postpartum period'.)

ADVERSE CONSEQUENCES FOR MOTHERS

Postpartum depression impairs maternal functioning, and can interfere with breastfeeding, bonding with the infant, care of the infant and other children, and the mother's relationship with her partner.

Bonding with infant — Multiple studies suggest that postpartum depression can interfere with the mother's ability to bond with her infant [1,7,9,10]. As an example, depressed mothers are less likely to tell stories or read to their children, or play peekaboo [11,12].

Although some studies suggest that bonding is not impaired in postpartum depression, this appears to be the case primarily for patients with relatively mild symptoms of depression. In one prospective study of 346 new mothers, bonding impairment was comparable for those with probable mild depression and nondepressed controls [13]. By contrast, impairment was nearly six times more likely in those with probable moderate or severe depression, compared with controls.

Risk factors for impaired maternal-infant bonding may include negative thoughts about the pregnancy during the antenatal period and primiparity [10].

Marital discord — Postpartum depression may strain the marital relationship [1,7,14,15]. In turn, marital strain may partially explain the adverse effects of maternal postpartum depression upon child health. Additional information about depression and marital dysfunction, and how they can exacerbate each other, is discussed separately. (See "Unipolar depression in adults: Family and couples therapy", section on 'Theoretical foundation'.)

Suicidality — Suicidality, which includes suicidal ideation (thoughts) and behavior (attempts and deaths), can occur in postpartum depression. Postpartum suicidal behavior is relatively rare; thus, most studies of postpartum suicidal behavior include females with one or more psychiatric diagnosis, including unipolar depression, bipolar depression, substance-related and addictive disorders, and personality disorders.

- **Suicidal ideation** – Among females with postpartum depression, suicidal ideation occurs in approximately 3 percent, based upon two studies that used the self-report Edinburgh Postnatal Depression Scale (figure 1A-B), which includes one item that asks about self-harm [16,17]. However, clinical assessments suggest that very few mothers are at high risk, as manifested by active suicidal ideation with plans, intent, and access to means [17].

  Among all postpartum females, regardless of diagnosis, it is estimated that suicidal ideation occurs in approximately 7 percent, based upon meta-analysis of 36 studies [18].

- **Suicide attempts** – Suicide attempts are rare events during the puerperium [19,20]. A study of hospitalizations for suicide attempts in postpartum females found a rate of approximately 44 attempts for every 100,000 live births; by comparison, the rate in the general female population was 64 per 100,000 [21]. One risk factor for postpartum suicide attempts is younger age (eg, <20 years) [20-22]. In addition, pregnancy loss (miscarriage) and fetal or infant death may be associated with attempted suicide [20,21].

- **Suicide deaths** – Although suicide is a leading cause of death in females during the postpartum period, the absolute rate is very low [23-27]. In Australia, Europe, and the United States, suicide occurs in approximately 1 to 5 per 100,000 live births [21,23,25,27-30].

  A study of postpartum females who committed suicide (n = 80) in the United Kingdom between 1997 and 2012 found that most of them appeared to be married and living with a partner, most were receiving mental health treatment but did not manifest suicidal ideas or endorse recent self-harm at the time of the last clinical contact, and most had a primary diagnosis of depression (51 percent) [28].

  The incidence of suicide in new mothers appears to be even lower than the low rate in the general population of females [24,28,31]. As an example, one study found that the rate of suicide in postpartum females was approximately half of the rate seen in the general population of females [32].

Additional information about suicidal ideation and behavior, including the evaluation and management of suicidality, is described separately. (See "Suicidal ideation and behavior in adults".)

Harming the baby — Postpartum depression may lead to thoughts of harming the baby, but is rarely associated with infanticide.

- **Thoughts of harming the baby** – Rumination about harming the baby can occur in postpartum depression [23,33]. Patients may describe these thoughts as "scary" or frightening, and typically express no intent of wanting to harm their infant [34]. Thoughts of harming the baby are generally experienced as unwanted, unacceptable (ego dystonic), and intrusive, and are usually not revealed unless patients are questioned directly [34-36].

  Rumination about harming the baby may be due to postpartum psychosis and should prompt an evaluation for psychotic symptoms such as delusions or hallucinations. As part of the assessment, clinicians need to distinguish rumination about harming the baby without intent (an unwanted intrusive thought), from rumination with intent, which is often seen in postpartum psychosis. (See "Postpartum psychosis: Epidemiology, clinical features, and diagnosis".)

- **Infanticide** – Infanticide is a rare event. A review of seven studies found that the incidence ranged from approximately 2 to 7 per 100,000 infants [37].

  Infanticide during postpartum depression may be more likely to occur in depression with psychotic features, or in females who were previously admitted to a psychiatric hospital (ie, more severely ill) [33,38-40]. Mothers who kill their infants often try to kill themselves [40], and one study found that among 80 postpartum women who committed suicide over a 15-year period, two killed their infant before killing themselves [28]. A case series of 10 mothers with postpartum depression who killed their infants found that the pregnancy was wanted and the baby was healthy, but that the mothers felt overwhelmed and were reluctant to be left alone with the baby [40].

Recurrent depression — Patients who recover from an episode of postpartum depression are at risk for recurrences of depression [41,42]. Reviews estimate that among females with postpartum depression who recover, subsequent depressive episodes (either postpartum and/or nonpostpartum) occur in approximately 40 to 50 percent [43,44].

However, the risk of recurrence in females with an episode of postpartum major depression and females with an episode of nonpuerperal major depression appears to be comparable [45]. Recurrence of unipolar major depression in the general population of patients who have suffered one or more episodes is discussed separately. (See "Unipolar depression in adults: Course of illness", section on 'Recurrence'.)

ADVERSE CONSEQUENCES FOR THE OFFSPRING

Maternal postpartum depression is associated with adverse consequences for the offspring, including poor nutrition and health [2].

Quality of evidence — Information about the association between postpartum depression and adverse outcomes in the offspring comes from low to moderate quality studies. The evidence consists of observational reports that can yield associations confounded by measured and residual (unmeasured) factors. These studies include retrospective case-control studies that carry the risk of recall bias, as well as population-based registry studies that may misclassify exposure. Other methodologic problems include incomplete assessment of maternal mental health, identifying depressed patients with screening questionnaires rather than structured clinical interviews, not assessing depression severity, not precisely defining outcomes, and grouping together different types of outcomes across a range of severity from mild to severe. Many studies use the mother's report for both the independent variable (postpartum depression) and dependent variable (child outcome), and depressed mothers may perceive their children in a more negative light than other informants (reporting bias). In addition, some studies fail to use appropriate control (comparison) groups, and some observed associations between exposure and outcome are based upon a small number of exposed and affected infants.

Associations between infant/child exposure to postpartum depression and adverse outcomes in the offspring that are found in observational studies may be confounded by many maternal factors [4,5,46-48]:

- Duration of depressive syndrome (eg, the postpartum depressive episode may have started prior to delivery).
- Poor adherence with postpartum care.
- Comorbid general medical illnesses.
- Comorbid psychopathology (eg, anxiety disorders, personality disorders, and substance use disorders).
- Prescribed medications (eg, antidepressants, antipsychotics, and/or benzodiazepines) in mothers who are breastfeeding.
- Demographic and environmental factors such as age, poor education, suboptimal parenting, financial difficulties, social isolation, preexisting marital conflict, and intimate partner violence.
- Factors (eg, depressive episodes) that arise after the postpartum period.

Other confounding factors include chronic health problems and stressful life events experienced by the child. In addition, shared genetic factors may underlie maternal depression and abnormal child development, including behavioral and emotional problems [49]. Paternal depression, either during the postpartum period or afterwards, may also increase the risk of adverse child outcomes [50]. (See "Postpartum paternal depression".)

Breastfeeding — Postpartum depression is associated with lower rates [5,7,8,51-53], and decreased duration of breastfeeding (eg, three months less) [54,55]. However, some depressed mothers may be amenable to support for initiation of breastfeeding. (See "Breastfeeding: Parental education and support".)

Abnormal development — Postpartum depression is associated with developmental disturbances in infants and children [3,56]; most of the effects appear to be small to moderate [1]. Some of these disturbances may be due at least partially to potentially modifiable factors, including quality of parenting and duration of the depressive episode.

Physical health — Physical health problems and general medical illnesses occur more frequently in children of mothers with postpartum depression than children of mothers without postpartum depression [7]. In mother-child dyads followed for up to five years after birth, postpartum depression is associated with an increased risk of problems, including colic, diarrhea, poisonings, and burns, as well as chronic illnesses such as asthma and diabetes [57,58].

Growth — The relationship between postpartum depression and growth of the offspring may depend upon economic factors. Multiple prospective observational studies in low-income countries suggest that postpartum depression is associated with stunted growth and poor weight gain in infancy, and that the effects persist into early childhood [1,59-61]. In high-income countries, some prospective studies have found that maternal postpartum depression was not associated with anthropometric indices of growth in the children [1,62,63], whereas other studies found that postpartum depression may predict relatively short stature at age six years and adiposity at age three years [64,65].

Brain structure — Based upon magnetic resonance imaging, maternal postpartum depression is associated with smaller total gray matter volumes in infants, including thinner cortices in the frontal and temporal lobes [66-68]. In addition, diffusion tensor imaging suggests that microstructural changes occur, with increased diffusivity [66].

Temperament — Based upon a meta-analysis of 19 studies, postpartum depression is moderately correlated with difficult infant and childhood temperament [56]. As an example,

postpartum depression is associated with inconsolability, irritability, fussiness, demanding behavior, problems regulating negative affect, and unusual sensory sensitivities [69-72].

Sleep — Mothers with postpartum depression may be less likely to properly position their infants for sleep (babies should be placed on their backs) [7,11,52,73]. In addition, postpartum depressive symptoms may be associated with problematic sleeping patterns in the infant, such as night-time awakenings and disorganized sleep, but the observed effect appears to be small [71,74].

Emotional and behavioral functioning — Postpartum maternal depression is associated with a small to moderately increased risk of problems with emotional regulation and social behavior/competence in the offspring [1,7,56,75]. Interpersonal and social skills that are delayed during the first two years of life in the children of mothers with postpartum depression include reacting to voices, smiling with eye contact, and pointing to selecting objects [76].

Bonding with mother — Infant bonding with the mother is also referred to as attachment. Based upon a meta-analysis of six studies, infants have difficulty bonding with mothers who suffer from postpartum depression, and the clinical effect is moderate [56]. As an example, postpartum depression is correlated with insecure or disorganized attachment [77,78].

Motor functioning — Due to conflicting results across studies, it is not clear whether maternal postpartum depression is associated with developmental delays in motor functioning [7]. Some prospective studies suggest that postpartum depression is associated with developmental delays in fine and gross motor skills in the offspring [76], and that delays may be more likely in children of mothers with high levels of depressive symptoms and depressive episodes that persist for at 12 months [79,80]. However, a pooled analysis of nine other studies found no relationship between postpartum depression and deficits in motor functioning [56].

Vaccinations — It is not known whether children of depressed mothers are less likely to receive vaccinations, due to conflicting results across studies [81,82].

Maternal safety practices — Postpartum depression may be associated with decreased use of infant car seats and electrical outlet covers, and thus compromise infant safety [51,52,73].

Cognitive impairment — Postpartum maternal depression is associated with cognitive impairment in the offspring, including general cognitive performance, as well as executive functioning, intelligence, and language development [1,56].

General performance — Multiple studies have found that postpartum depression is associated with adverse effects upon childhood and adolescent cognitive development

[1,7,8,83,84]. As an example, a meta-analysis of 16 studies found that postpartum depression was moderately correlated with delayed cognitive development [56].

Longer episodes of maternal postpartum depression appear to be associated with greater cognitive deficits in children, compared with shorter postpartum episodes [51,80,85,86].

Executive functioning — Postpartum depression may be associated with deficits in executive functioning (eg, attention and processing speed) during childhood [84].

Intelligence — Multiple studies suggest that postpartum depression is associated with adverse effects upon intelligence in the offspring [51,87]. However, the effect varies across the two major components of intelligence. Meta-analyses indicate that postpartum depression is correlated with substantially lower performance intelligence quotients, but do not show any relationship between postpartum depression and verbal intelligence quotients [56].

Language development — Multiple studies have found that postpartum depression is associated with poorer language skills in the offspring during early childhood [7,8,51]. In a meta-analysis of 10 studies in infants and children aged less than five years, postpartum depression was correlated with poorer expressive and receptive language skills, and the clinical effect was small to moderate [56]. As an example, expressive language that is delayed during the first two years of life includes making sounds, speaking two or three words, and engaging in dialogue [76].

Academic achievement — A meta-analysis of three studies found that postpartum depression was weakly correlated with poorer academic achievement [56]. As an example, failing to achieve a passing grade in mathematics was 1.5 times more likely in the adolescent offspring of mothers with postpartum depression than the offspring of nondepressed mothers [84].

Psychopathology — Prospective observational studies indicate that postpartum maternal depression is often associated with psychopathology in children [1].

Childhood psychopathology is often conceptualized as problems that consist of an amalgam of symptoms found in different psychiatric disorders, rather than the specific disorders per se. As an example, one model divides childhood psychopathology into two categories [88]:

- Externalizing problems – Symptoms of oppositional defiant disorder, conduct disorder, and/or attention deficit hyperactivity disorder
- Internalizing problems – Symptoms of anxiety disorders and depressive disorders

Multiple studies have found that postpartum maternal depression is associated with externalizing and internalizing psychopathology in early childhood [89]. As an example, a study of a representative sample of families (n >2500) in Australia included children who were assessed at age four to five years [90]. Psychopathology in the children, including problems with peers, conduct problems, and hyperactivity, was two times more likely in children exposed to postpartum maternal depressive symptoms than children who were not.

Postpartum maternal depression is also associated with externalizing and internalizing psychopathology in later childhood. Two studies of mother-offspring pairs (n >3000) found that postpartum maternal depression was associated with small increases in psychopathology in the children at age seven to eight years [91,92]. Psychopathology included symptoms of oppositional defiant disorder, conduct disorder, and/or attention deficit hyperactivity disorder, as well as symptoms of anxiety disorders and depressive disorders. In addition, one study found that postpartum depression was associated with internalizing symptoms in the offspring from age 14 to 28 years [93].

However, the effect of postpartum maternal depression upon children may be less detrimental than the effect of maternal depression that occurs after the postpartum period. In multiple studies, the association between depression and childhood psychopathology was weaker in children exposed to postpartum depression, compared with children exposed to maternal depressive episodes occurring after the postpartum period [42,94]. In addition, chronic maternal depression, rather than postpartum depression per se, may have larger adverse effects on child outcomes [51].

Child care provided by individuals other than the parents may ameliorate the association between postpartum maternal depressive symptoms and symptoms of anxiety and depression in the offspring, based upon a prospective study of a representative sample in Canada [95]. The benefit may be greater for regulated group-based care than care provided by a relative or babysitter.

The following subsections review the association between maternal postpartum depression and specific psychiatric disorders in the offspring.

Oppositional defiant disorder — Oppositional defiant disorder is marked by angry and irritable mood, along with argumentative behavior [96]. A prospective study of nearly 8000 mothers and their children found that oppositional defiant disorder was two times more likely in the offspring of mothers with postpartum depression, than mothers without postpartum depression [97].

Conduct disorder — Children of mothers with postpartum maternal depression may be at increased risk of rule-breaking and aggressive behavior, which are the core symptoms of conduct disorder. A prospective study of 645 postpartum mothers with or without depressive symptoms found that high levels of rule-breaking and aggressive behavior were twice as likely to occur in the 10-year-old children of mothers with postpartum depressive symptoms [49].

Anxiety — Prospective studies indicate that postpartum maternal depression is associated with anxiety disorders in the children, starting at age 18 months and extending to age 16 years [69,77,98-100]. The rate of pediatric anxiety disorders, including specific phobia and generalized anxiety disorder, is two to three times greater in the offspring of mothers with postpartum depression, than mothers without postpartum depression [77,99].

Depression — Postpartum depression is associated with depression in the offspring, starting in early childhood (eg, age 18 months), and persisting into adolescence; approximately 45 percent of the offspring will suffer at least one depressive episode by age 16 years [1,69,77,101]. By age 18 years, the risk of depression in the offspring of mothers with postpartum depression is up to seven times greater than the risk in the offspring of mothers without postpartum depression [89,102]. In addition, the increased risk in the children may extend to age 25 years [57].

Hyperactivity/impulsivity and inattention — Multiple studies suggest that postpartum depression is related to attention deficit hyperactivity disorder in the offspring [1,103]. As an example, a meta-analysis of eight studies with more than 33,000 mothers found that the risk of ADHD in the children was 70 percent greater in the children of mothers with postpartum depression [104].

SUMMARY

- **Adverse consequences for mothers** – Postpartum depression is associated with adverse consequences for mothers. The disorder can impair bonding with the infant and strain the marital relationship. (See 'Bonding with infant' above and 'Marital discord' above.)

  Among females with postpartum depression, suicidal ideation occurs in approximately 3 percent, whereas suicide attempts are rare events during the puerperium. Although suicide is a leading cause of death in postpartum females, the absolute rate of suicide during the postpartum period is very low. (See 'Suicidality' above.)

  Rumination about harming the baby can occur in postpartum depression, but infanticide is a rare event that may be more likely to occur in women who are psychotic. (See

'Harming the baby' above.)

- **Adverse consequences for the offspring** – Postpartum depression is also associated with adverse consequences for the offspring, including an increased risk of:

  - **Abnormal development** – Postpartum maternal depression is associated with an increased risk of physical health problems (eg, asthma, colic, diabetes, and/or diarrhea) in the offspring. In low-income countries, stunted growth occurs more often in the children of women with postpartum depression, compared with the children of nondepressed mothers. Postpartum depression may also be associated with structural brain abnormalities. (See 'Physical health' above.)

    Postpartum depression appears to be associated with difficult temperament and sleep problems in the infant. (See 'Temperament' above and 'Sleep' above.)

    Postpartum depression is also associated with an increased risk of emotional and behavioral problems. In addition, infants have difficulty bonding with mothers who suffer from postpartum depression (See 'Emotional and behavioral functioning' above and 'Bonding with mother' above.)

  - **Cognitive impairment** – Postpartum maternal depression appears to be associated with cognitive impairment in the offspring, including general cognitive performance as well as executive functioning, intelligence, and language development. Longer episodes of maternal postpartum depression appear to be associated with poorer cognitive performance in children, compared with shorter postpartum episodes. In addition, the association between postpartum depression and poorer cognitive functioning in the offspring may extend into adolescence. (See 'Cognitive impairment' above.)

  - **Psychopathology** – Postpartum depression is often associated with psychopathology in children. Psychiatric problems can include symptoms of oppositional defiant disorder, conduct disorder, and/or attention deficit hyperactivity disorder, as well as symptoms of anxiety disorders and depressive disorders. However, the effect of postpartum depression upon the children may be less detrimental than the effect of maternal depression that occurs after the postpartum period. (See 'Psychopathology' above.)

Topic 107664 Version 5.0