

# Antenatal risk factors for postpartum depression: a synthesis of recent literature

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## Abstract

Postpartum nonpsychotic depression is the most common complication of childbearing, affecting approximately 10–15% of women and, as such, represents a considerable health problem affecting women and their families. This systematic review provides a synthesis of the recent literature pertaining to antenatal risk factors associated with developing this condition. Databases relating to the medical, psychological, and social science literature were searched using specific inclusion criteria and search terms, in order to identify studies examining antenatal risk factors for postpartum depression. Studies were identified and critically appraised in order to synthesize the current findings. The search resulted in the identification of two major meta-analyses conducted on over 14,000 subjects, as well as newer subsequent large-scale clinical studies. The results of these studies were then summarized in terms of effect sizes as defined by Cohen. The findings from the meta-analyses of over 14,000 subjects, and subsequent studies of nearly 10,000 additional subjects found that the following factors were the strongest predictors of postpartum depression: depression during pregnancy, anxiety during pregnancy, experiencing stressful life events during pregnancy or the early puerperium, low levels of social support, and a previous history of depression. Critical appraisal of the literature revealed a number of methodological and knowledge gaps that need to be addressed in future research. These include examining specific risk factors in women of lower socioeconomic status, risk factors pertaining to teenage mothers, and the use of appropriate instruments assessing postpartum depression for use within different cultural groups.

*Keywords:* Depression; Maternal mental health; Postpartum; Risk factors

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## 1. Introduction

Depression is common in women of childbearing age [1] and debate has long ensued over whether the postpartum period is a time of increased risk for mood disorders [2,3]. Although the overall prevalence of depression does not appear to be higher in women after delivery as compared to age-matched comparison women [3–6], serious depression requiring admission to hospital is clearly more prevalent [2,7]. The occurrence of depressive illness following childbirth can be detrimental to the mother, her marital relationship, and her children, and can have adverse long-term effects if untreated. For her children, a mother's ongoing depression can contribute to later emotional, behavioral, cognitive, and interpersonal problems. Because of these serious consequences, early diagnosis and treatment inter-

ventions of postpartum illnesses are imperative for the health and well-being of the mother and child. The literature on postpartum depression is somewhat problematic, with conflicting opinions about its uniqueness as a disorder, its etiology, and its risk factors. We undertook a systematic, evidence-based literature review for risk factors for postpartum depression to help guide public health policy and best practices, the results of which are presented and discussed.

## 2. Postpartum affective disorders

Postpartum affective disorders are typically divided into three categories: postpartum blues, postpartum depression, and puerperal (postpartum) psychosis. The prevalence, onset, and duration of the three types of postpartum affective disorders are shown in Table 1 (adapted from [8]).

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Table 1  
Postpartum affective disorders: summary of onset, duration, and treatment

Disorder	Prevalence (%)	Onset	Duration	Treatment
Baby or maternity blues	30–75	3 or 4 days after delivery	Hours to days, never more than 2 weeks	No treatment required other than reassurance
Postpartum depression	10–15	Within 6 months after delivery	Weeks to months	Treatment usually required by health professional
Puerperal psychosis	0.1–0.2	Within 2 weeks after delivery	Weeks to months	Hospitalization usually required

### 2.1. Postpartum blues

Postpartum or “baby blues” is the most common observed puerperal mood disturbance, with estimates of prevalence ranging from 30% to 75% [9]. Symptoms are mild and include mood lability, irritability, tearfulness, generalized anxiety, and sleep and appetite disturbance. Onset is within a few days of childbirth and symptoms remit within days. Treatment is not required [10,11].

### 2.2. Postpartum psychosis

Postpartum (or puerperal) psychosis is the most severe and uncommon form of postnatal affective illness, with rates of 1–2 episodes per 1000 deliveries. The clinical onset is rapid, with symptoms presenting as early as the first 48–72 h postpartum, with the majority of episodes developing within the first 2 weeks after parturition [2]. The presenting symptoms are typically depressed or elated mood (which can fluctuate rapidly), disorganized behavior, mood lability, and delusions and hallucinations [12]. Most cases require hospitalization and treatment by specialists. Evidence from clinical, genetic, and follow-up studies indicates that most cases of puerperal psychosis meet criteria for bipolar disorder [2,12–16]. Although the prognosis is generally favorable and women fully recover, they are at risk of developing further puerperal and nonpuerperal episodes of bipolar affective disorder [17].

### 2.3. Postpartum depression

Postpartum nonpsychotic depression is the most common complication of childbearing, affecting approximately 13% of women [18] of childbearing age. Estimates of prevalence in teenage mothers are much higher at 26% [19]. Postpartum depression usually begins within the first 6 weeks following delivery, and most cases require treatment by a health professional. In some women, baby blues simply continue and become more severe. In others, a period of well-being after delivery is followed by a gradual onset of depression. Recent evidence from epidemiological and clinical studies suggests that mood disturbances following childbirth are not significantly different from affective illnesses that occur in women at other times [4–6]. However, the content of symptoms may focus on the delivery or baby

and the impact of the illness affects the mother, infant, and the entire family.

Postpartum depression is characterized by tearfulness, despondency, emotional lability, feelings of guilt, loss of appetite, suicidal ideation, and sleep disturbances as well as feelings of inadequacy and inability to cope with the infant, poor concentration and memory, fatigue, and irritability [20]. Some women worry excessively about the baby’s health or feeding habits and see themselves as “bad,” inadequate, or unloving mothers [20]. To meet diagnostic criteria for depression, symptoms must be continuously present for at least 2 weeks and interfere with the individual’s everyday functioning [21,22].

Although the symptoms of postpartum depression are the same as episodes of depression occurring at other times [22], distinguishing between depressive symptoms and the supposed “normal” sequelae of childbirth, such as changes in weight, sleep, and energy may be a challenge that complicates clinical diagnosis [23]. While very severe postnatal depressions are easily detected, less severe presentations can be easily dismissed as normal or natural consequences of childbirth. Failure to recognize postpartum mood disturbance can sometimes lead to tragic consequences for the mother and child, notably maternal suicide and infanticide.

The majority of postnatal depressions are self-limiting, resolving within months of onset [5,24]. However, for many women childbirth is the stressor that triggers the start of recurrent or chronic episodes of depressive disorder. Women who have experienced postpartum depression are at risk of suffering further episodes of illness, both following subsequent deliveries and also unrelated to childbirth [5,25,26]. After one postpartum episode the risk of recurrence, defined as an episode of illness meeting criteria for major depression as defined in the *Diagnostic and Statistical Manual of Mental Disorders*, 4<sup>th</sup> ed. [21], is 25% [27].

## 3. Methods

Because the literature on postpartum depression is vast and extremely variable in quality, the following criteria were used in this systematic evidence-based review, in order to identify articles of good scientific quality.

The research studies were of human subjects, empirical, peer-reviewed, and published in English between 1990 and 2002 (excluding seminal studies prior to these dates). Stud-

ies had to state both the diagnostic and temporal criteria of postpartum depression used, only cases of nonpsychotic depression with an onset within 1 year of childbirth were included. The method of assessment (self-report or clinical interview) had to be clearly stated with proven reliability.

Diagnoses were made using standardized operational criteria, and assessment conducted more than 2 weeks postpartum to avoid reporting of postpartum blues. Risk factors had to be explicitly defined and measured, and the statistical relationship between the variable and postpartum depression clearly stated.

Nineteen databases containing medical, psychological, and social science literature were searched to identify studies examining risk factors for postpartum depression. Relevant studies meeting inclusion criteria were identified and critically appraised in order to synthesize the current findings. We included only studies that employed prospective data collection: that is the information was collected during pregnancy, thereby optimizing predictive power and avoiding retrospective bias.

The literature search identified two meta-analyses of risk factors for postpartum depression conducted by O'Hara and Swain [18] and Beck [28]. These studies incorporated results from over 70 studies, and 12,000 research subjects. Effect sizes were reported in terms of Cohen's *d*, with a *d* of 0.2 indicating a small relationship, 0.4 indicating a moderate relationship, and 0.8 indicating a strong relationship [29].

Our search and retrieval strategy allowed us to identify those studies that were and were not included in the meta-analyses, and also those studies that had been conducted or published subsequently. The results of the more recent studies of nearly 10,000 additional subjects were analyzed in relation to the findings of the meta-analyses. Due to the power of the meta-analyses to detect effects we could comment on whether the newer studies supported the findings of the meta-analyses or whether the interpretation of contributing factors needed to be changed in light of new evidence.

A summary of the clinical and social factors studied as potential risk factors for postpartum depression is presented in Table 2 in order of magnitude.

## 4. Results

### 4.1. Strong to moderate risk factors

#### 4.1.1. Depression or anxiety during pregnancy

The results of the studies consistently found that experiencing depressed mood or anxiety during pregnancy were significant predictors of postpartum depression [18,28,30–32]. Moreover, higher levels of anxiety during pregnancy predicted the level of postpartum depressive symptomatology [18,24,28,31–33].

Table 2  
Risk factors for postpartum depression

Antenatal predictor variable [study reference]	Total number of subjects	Cohen's effect size
Depression during pregnancy [18,28,30–32]	>3000	Strong/moderate Effect size = 0.75
Anxiety during pregnancy [18,24,28,31–33]	>1100	Strong/moderate Effect size = 0.68
Life events [18, 28, 38]	>2500	Strong/moderate Effect size = 0.61
Social support [18,28,43–45]	>3100	Strong/moderate Effect size = -0.64
Previous history of depression [18,28,30,31]	>3700	Strong/moderate Effect size = 0.58
Neuroticism [18,31,38]	>600	Moderate Effect size = 0.39
Marital relationship [5,18,28]	>1700	Moderate Effect size = 0.39
Socioeconomic status [18,26, 28,38,43,50]	>1700	Small Effect size = -0.14
Obstetric factors [18,26,28, 31,44,47,48]	>9500	Small Effect size = 0.26

Each of the factors was measured prospectively within the studies: the sample sizes for each study are given. Effect sizes are reported in terms of Cohen's *d*, with a *d* of 0.2 indicating a small relationship, 0.4 indicating a moderate relationship and 0.8 indicating a strong relationship [29].

#### 4.1.2. Past history of psychiatric illness

Similarly, there is little question that a past history of psychiatric illness puts women at risk for depression in the postpartum period. The average effect size is one of the largest for the risk factors of postpartum depression. Studies consistently show that having previously experienced depressive symptoms at any time, not just related to childbirth [18,28,30,31], leads to a significantly increased risk of postpartum depression.

The current evidence from large-scale studies suggests that having a positive family history of any psychiatric illness confers risk of postpartum depression, although the effect size is small [31]. One of the difficulties in establishing family history of mental illness is that the patient needs to be aware of relatives with psychiatric problems and be willing to disclose that information. The results from studies that have been able to report completed clinical interviews with women suffering from postpartum depression and members of their family have also shown a highly significant relationship between family history of depressive or psychiatric illness and postpartum depression [34,35].

#### 4.1.3. Life events

The relationship between life events and the onset of depression is well established [36]. Experiences such as the death of a loved one, relationship breakdown or divorce, losing a job, or moving home are known to cause stress and can trigger depressive episodes in individuals with no previous history of affective disturbance.

Pregnancy and birth are often regarded as stressful life events in their own right, and the stressfulness of these

events may lead to depression [37]. However, some researchers have studied the effects of additional stressful life events that women experience during pregnancy and the puerperium. One of the difficulties of assessing a possible relationship between life events and the onset of depression postpartum is the study design. Retrospective collection of data may lead to overreporting of life events as subjects (perhaps subconsciously) try to link a stressful event as a possible cause of the illness. The prospective collection of data eliminates this source of bias, as the outcome of postpartum depression is not known a priori.

In their meta-analyses, O'Hara and Swain [18] took values from 15 studies, comprising data on over 1000 subjects, that had prospectively recorded data on life events. They found a strong-moderate relationship between experiencing a life event and developing postpartum depression. However, there was heterogeneity between studies that related to where the study was conducted: studies undertaken in Britain and North America showed strong associations between postpartum depression and recent life events, while Asian studies showed a nonsignificant association [38]. It is not clear why this should occur.

#### 4.1.4. Social support

Receiving social support through friends and relatives during stressful times is thought to be a protective factor against developing depression [39] and several earlier studies have evaluated the role of social support in reducing postpartum depression. Social support is a multidimensional concept. Sources of support can be a spouse, relatives, friends, or associates. There are also different types of social support, e.g., *informational* support (where advice and guidance is given), *instrumental* support (practical help in terms of material aid or assistance with tasks), and *emotional* support (expressions of caring and esteem).

Studies have consistently shown a negative correlation between postpartum depression and emotional and instrumental support during pregnancy [18,40–43]. Two recent studies have found that perceived social isolation (or lack of social support) during pregnancy was a strong risk factor for depressive symptoms postpartum [43,44].

These findings suggest that women who do not receive good social support during pregnancy are more likely to develop postpartum depression. This concept was confirmed in a recent study that argued that receiving informational support from a large number of social network members was protective against postpartum depression [43].

It should be noted that researchers have consistently found differences between depressed women's perceptions of social support, and the amount of support they objectively received [45]. These differences may be accounted for, in part, by the fact that depressed individuals tend to view everything more negatively, including the level of support they perceive.

## 4.2. Moderate risk factors

### 4.2.1. Psychological factors: neuroticism

Maternal personality characteristics including neuroticism and cognitive attributional style have been measured as risk factors for postpartum depression. Neurotic disorders can be defined as psychological disorders that are usually distressing but allow one to think rationally and function socially. The neurotic disorders are usually viewed as ways of dealing with anxiety. The term *neurotic* is no longer used within psychiatric classification systems, although it is commonly included in personality questionnaires as a measure of psychological distress.

Neuroticism measured in women antenatally was found to be a weak-to-moderate predictor of postpartum depression [18,38]. Johnstone et al. [31] found that women who were defined as "being nervous," "shy, self-conscious," or a "worrier" through questionnaires were significantly more likely to develop postpartum depression. Similarly, women with negative cognitive attributional styles (e.g., pessimism, anger, ruminations), previously shown to be good indicators of depression [46], were more likely to develop postpartum depression [18].

### 4.2.2. Marital relationship

Closely linked with findings on social support, studies have reported an increased risk of postpartum depression in women who experienced marital problems during pregnancy [5,18,28]. This would be reflected in feelings of isolation and lack of support.

The effects of parenthood on all aspects of the mother's psychosocial functioning should not be underestimated. Robinson and Stewart [20] discuss how in many cases, the family system must be reorganized, and many couples adopt more traditional roles. The mother usually tends to do the greater share of parenting tasks, and the parents must decide how their new roles will affect their previous work patterns and implement the necessary changes. With the added burden of childcare, the relationship between the partners often suffers, and there is less time for socializing. A supportive relationship with the father can help mitigate the stresses of being a new mother. These stresses should be borne in mind when evaluating the role of factors in the development of postpartum depression.

## 4.3. Small risk factors

### 4.3.1. Obstetric factors

Obstetric factors including pregnancy-related complications such as preeclampsia, hyperemesis, premature labor, as well as delivery-related complications, such as caesarean section, instrumental delivery, premature delivery, and excessive bleeding intrapartum have been examined as potential risk factors for postpartum depression. The results from 16 large-scale studies of 9500 women indicate that pregnancy- and delivery-related complications have a small but

significant effect on the development of postpartum depression [18,26,31,44].

Although there is little evidence supporting an association between delivery by caesarean section and postpartum depression from large studies [26,31,44], it has been reported that women undergoing emergency caesarean sections were more likely to develop postpartum depression [47,48]. It is unclear, however, if delivery complications or long and painful labor leading to emergency procedures account for the association.

Equivocal findings have been reported for associations between unplanned or unwanted pregnancies [26,40] and breastfeeding and postpartum depression [26,44,48].

In summary, the evidence suggests that obstetric factors make only a small but significant contribution to the development of postpartum depression. However, one must be very cautious when interpreting the results. Some of the variables measured may not be truly independent but rather are influenced by extraneous variables. For example, the decision to perform caesarean sections may differ between physicians and hospitals, and certainly internationally. Similarly, rates of breastfeeding or attitudes toward breastfeeding may differ within cultures and countries. It should also be noted that an unplanned pregnancy merely reflects the circumstances in which the pregnancy occurred, and is not a measure of the woman's feelings toward the fetus. Therefore, the results may be reflecting trends within the sample rather than an etiological relationship between postpartum depression and obstetric variables.

#### 4.3.2. Socioeconomic status

Socioeconomic deprivation indicators such as unemployment, low income, and low education have been cited as risk factors in mental health disorders, and depression in particular [49–51]. The evidence suggests that these factors play a small but significant role in the development of postpartum depression. Indicators such as low income, financial strain, mother's occupation, and lower social status have a small but significant predictive relationship to postpartum depression [18,26,28,38,43,52]. These results are consistent across different cultures and countries.

#### 4.4. Factors not associated with postpartum depression

It is also worth establishing which factors have no relationship with postpartum depression. Here, nonsignificance is defined as the confidence interval containing 0.

Two meta-analyses of over 10,000 subjects found the following factors were not associated with postpartum depression [18,28]: maternal age (in samples of women aged over 18 years, as previously stated the risk is much higher in teenage mothers), level of education, parity, and length of relationship with partner.

Studies conducted within Western societies have found no association between the gender of the child and postpartum depression. However, recent studies provide evidence

from India [52] and China [38], which suggest that spousal disappointment with the gender of the baby, specifically if the baby is a girl, is significantly associated with developing postpartum depression. Therefore, the parent's reaction to the gender of the baby may be a potential risk factor for postpartum depression within certain cultural groups.

## 5. Discussion

All women are susceptible to developing depression following childbirth, however, women who have certain risk factors have a significantly increased risk of experiencing the illness.

Based on current research, the strongest predictors of postpartum depression are women who experience depression or anxiety during pregnancy or have a previous history of depressive illness. Women who have recently experienced a stressful life event, and those who perceive they have low levels of social support, even though this may not be true, are also at high risk of illness.

All of these potential risk factors can be ascertained during routine pregnancy care, therefore, it is important that antenatal healthcare providers (including obstetricians, prenatal nurses, and family doctors), and women themselves are educated about these risk factors. For clinicians, it is important to ensure a thorough clinical history is obtained, which specifically asks about previous episodes or feelings of depression. It is highly probable that many women may have experienced symptoms previously but never sought treatment. Eliciting information on antenatal depressive and anxiety symptoms is especially difficult, particularly if the woman may not view these feelings as being pathological, but rather a normal consequence of pregnancy. However, an increased awareness of mood during pregnancy and asking women how they feel could be helpful. For women with a past depression, or who currently report or appear to be depressed the Edinburgh Postnatal Depression Scale [53] is a self-report, user-friendly screening tool consisting of 10 easy to score questions.

Physicians should also be aware of potentially vulnerable groups, including women experiencing marital problems, those who have undergone stressful life events, those from lower socioeconomic groups, and those under financial strain. The experience of immigrant women should also be considered, as their interactions with, and access to, healthcare services, and opportunities for social networks and support may differ significantly from other groups.

Lack of social support is a well-established risk factor for postpartum depression, and immigrant women may be at higher risk of depression because they are culturally and physically separated from their support systems. Healthcare professionals should be aware that the gender of the child may be an additional risk factor within some cultures and may wish to ask about the woman's feelings about this.

The occurrence of illness during the puerperium has

consequences for the mother, her marital relationship, and her children. Adverse outcomes for the mother in terms of ongoing illness, the health and well-being of the mother and child and the effects on the family call for early diagnosis and treatment. Although all women are susceptible to developing postpartum depression, it is possible for physicians and healthcare professionals to identify women at higher risk antenatally for closer follow-up and intervention where necessary. Fortunately, treatments found to be effective for depression including interpersonal psychotherapy and antidepressant drugs are also safe and efficacious in postpartum women [27], including those who are breastfeeding.

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