

Postpartum depression: Impact on pregnant women and the postnatal physical, emotional, and cognitive development of their children. An ecological perspective

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ABSTRACT

Maternal mental health problems during pregnancy, childbirth, and the postpartum period are a challenge for public health. Not recognizing them hinders a timely diagnosis and treatment and has an impact on the mother and the establishment of the fundamental bond of the mother-child dyad. We must recognize the risk factors (age, socioeconomic status, mental health history, family dysfunction, unfavorable environment), clinical manifestations, and screening tools. There is evidence that the effect of stress, anxiety, and depression during pregnancy negatively affect fetal neurodevelopment and condition child developmental outcomes. Here we describe the negative impact of postpartum depression during the first months of life, which affects mother-child bonding, postnatal development (emotional, behavioral, cognitive, language), and the maintenance of breastfeeding. We also recognize protective factors that mitigate its effects. It is essential to establish preventive strategies and interdisciplinary diagnostic and therapeutic approaches to minimize the risks to the mother and her children.

Keywords: *postpartum depression; child development disorders; newborn infant; child.*

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INTRODUCTION

In 2020, an editorial by Ceriani Cernadas, M.D., warned about the risks of postpartum depression and the need for early detection.¹ This new dimension in the perception of the mother-child dyad allowed us to broaden the contextual view of biopsychosocial health, prioritizing maternal mental health (MMH) due to the great relevance in relation to child neurodevelopment.²

Postpartum depression (PPD) is an often unrecognized and untreated mood disorder; it is estimated to affect 10–15% of pregnant women.^{3,4} It represents a significant public health problem that affects maternal physical and mental health, as well as the physical, cognitive, and emotional development of the child.^{5,6}

According to the International Classification of Diseases, 11th revision (ICD-11), PPD is described under the item “Mental or behavioral disorders associated with pregnancy, childbirth or the puerperium, without psychotic symptoms.”⁷ The Diagnostic and Statistical Manual of Mental Disorders, 5th edition, by the American Psychiatric Association, 2013 (DSM-5) does not include it as an independent diagnosis, but lists it as a specifier “Major depressive disorder, with postpartum onset”⁸ (Table 1).

PPD usually occurs within 4–6 weeks postpartum, although it may appear within the

first year postpartum. The etiopathogenesis of PPD is unclear; a greater sensitivity to hormonal fluctuations (sudden drop in estrogen, progesterone, and cortisol in the first 48 hours postpartum), changes in serum levels of cytokines, fatty acids, oxytocin, and arginine/vasopressin, as well as effects on the serotonergic pathway have been described.⁹

In contrast to PPD, the so-called postpartum blues have a prevalence of 15% to 85% and are observed in the first 10 days postpartum.¹⁰ They are associated with mood swings, irritability, fatigue, confusion, and a tendency to cry. The risk factors include prenatal depression or depression not associated with pregnancy and premenstrual dysphoric disorder. It is a common, self-limited, transient condition that does not require intervention. Recognizing the postpartum blues is important because it is a future risk factor for PPD.

RISK FACTORS FOR POSTPARTUM DEPRESSION

The main associated risk factor is a history of PPD or depression in a previous pregnancy; the risk of recurrence is 50–60% in future pregnancies. Other risk factors, although not specific, include maternal age less than 20 years, family or personal history of mental illness

TABLE 1. Diagnostic criteria as per the DSM-5

A- Five (or more) of the following symptoms during the same 2-week period that are a change from previous functioning; at least 1 of the symptoms is (1) depressed mood or (2) loss of interest or pleasure. 1. Depressed mood most of the day, nearly every day, based on subjective data or as observed by others. (Note: in children and adolescents, it may be irritable mood). 2. Markedly diminished interest/pleasure in all or almost all activities most of the day, nearly every day (based on subjective data or as observed by others). 3. Significant weight loss without dieting or gain, or decrease or increase in appetite nearly every day. (Note: in children, it may be failure to gain weight as expected). 4. Insomnia or hypersomnia nearly every day. 5. Psychomotor agitation or retardation nearly every day. 6. Fatigue or loss of energy nearly every day. 7. Feelings of worthlessness or excessive or inappropriate guilt (which may be delusional) nearly every day (not merely self-reproach or guilt about being sick). 8. Diminished ability to think or concentrate, or indecisiveness, nearly every day (either by their subjective account or as observed by others). 9. Recurrent thoughts of death (not just fear of dying), recurrent suicidal ideation without a specific plan, or a suicide attempt or a specific plan for committing suicide.

B- The symptoms cause clinically significant distress or impairment in social, occupational, or other important areas of functioning.

C- The episode is not attributable to the direct physiological effects of a substance or to another medical condition.

D- The occurrence of the major depressive episode is not better explained by schizoaffective disorder, schizophrenia, schizophreniform disorder, delusional disorder, or other specified and unspecified schizophrenia spectrum and other psychotic disorders.

E- There has never been a manic or hypomanic episode.

DSM-5: Diagnostic and Statistical Manual of Mental Disorders, 5th edition.

Source: DSM-5. Available at: <https://portal.guiasalud.es/egpc/depresion-infancia-diagnostico/>

(anxiety, depression, personality disorders, etc.), history of inadequately treated depression, substance abuse, stressful events during pregnancy or in the previous 12 months, marital conflict, unemployment, history of depression in the partner, having contemplated abortion, previous pregnancy loss, a bad relationship between the pregnant woman and her mother, C-section delivery, absence of breastfeeding, living without a partner, lack of emotional and economic support, obstetric complications, newborn infant (NBI) with congenital malformations or prematurity (especially with less than 34 weeks of gestation).^{3,5,11–13}

Therefore, PPD requires a holistic, ecological, preventive, interdisciplinary, and intersectorial approach, strongly oriented to mothers from vulnerable environments (both due to poverty-related factors and to personal or environmental risk factors), which should be identified and addressed in a timely manner.¹⁴

In addition, there are moderating or protective factors against the effects of PPD, such as a better family socioeconomic or educational level, greater family cohesion, positive parental behaviors, and favorable temperamental characteristics of the child.¹⁵

CLINICAL MANIFESTATIONS

Clinically, PPD includes depressive symptoms, anxiety, frequent and excessive crying, sadness, mood swings, irritability, difficulty concentrating, alterations in sleeping and eating patterns, feelings of not being able to cope and manage the situation, constant fatigue, loss of interest in usual activities, relational problems (partner, family, friends), lack of or excessive concern for the baby, or inability to approach and interact as expected.³ These symptoms are usually aggravated in the case of very demanding NBIs or those with a more challenging nature (inconsolable crying, frequent feedings, short periods of sleep, etc.).

It is important to consider the presence of suicidal ideation or recurrent thoughts about death or obsessive thoughts that focus aggression on the NBI (observed in more than 60% of mothers with PPD). These do not usually represent a desire to harm the baby, but may lead to avoidant behaviors toward them, striving to minimize negative and intrusive thoughts.^{3,4}

Sometimes, there is a conflict in the mother related to her previous ideas about motherhood, social and family mandates and, on the other

side, her actual feelings, which may be far from those ideas or mandates. These feelings often lead to embarrassment or fear of other people's reactions, so they are often concealed or not mentioned.¹⁰

IMPORTANCE OF SCREENING. THE ROLE OF THE HEALTH CARE TEAM

The presence of PPD, without an appropriate management, may affect the relationship in the mother and child dyad, which is under development; this increases the risk on socioemotional, cognitive, and psychomotor development, compromises the normal course of physiological mechanisms of self-regulation, and leads to the onset of behavioral problems.

In general, low levels of screening, diagnosis, and treatment of PPD are reported, which should alert us about the barriers that prevent it. Some causes include health care providers' lack of experience and discomfort to address psychiatric conditions, a short consultation time, and lack of awareness of the connection between PPD and potential effects on the child's development in postnatal life. In addition, the taboos that cause mental health disorders both in society and among the health care team members play a negative role.

Obstetric consultations for antenatal care and postpartum follow-up and neonatal/pediatric follow-up of NBIs are opportunities that we should take advantage of to assess the mother's clinical situation. For this reason, intervention before and after childbirth is critical to allow a timely and preventive diagnosis and to provide the necessary support for an empathetic and sensitive approach. Systematic screening protocols are necessary, especially in pregnant women with known risk factors, so that they can be approached for diagnosis and treatment.^{4,15}

One of the most common screening tools, whose Spanish version has been validated, is the Edinburgh Postnatal Depression Scale (EPDS)^{16,17} (*Supplementary material I*). Other scales are the Beck Postpartum Depression Screening Scale¹⁸ (*Supplementary material II*) and the Patient Health Questionnaire PHQ-9.

Postpartum blues, postpartum psychosis, bipolar disorder, endocrine (thyroid) disorders, iron deficiency anemia, obsessive-compulsive disorder, adverse drug reactions, problematic substance use, etc. have been mentioned as differential diagnoses of PPD.

IMPACT OF PREGNANT WOMEN'S MENTAL HEALTH ON THE FETUS

Maternal depression during pregnancy is associated with a higher prevalence of inadequate antenatal care, nutritional problems, increased risk of preterm delivery, low birth weight, preeclampsia, miscarriage, and problematic substance use. Early experiences and environmental influences leave a lasting imprint that affects the architecture of the developing brain and long-term health. Stress, anxiety, and depression are factors that cause epigenetic and developmental modifications and brain programming that can even cross generations.¹⁹⁻²¹ Several articles show changes in the central nervous system (CNS) of the fetus/NBI: thinning of the amygdala, prefrontal and orbitofrontal cortical thinning, etc.^{22,23} The fetus is also exposed to nutritional, immune, and endocrine effects (cortisol, corticotrophin-releasing hormone [CRH]) that cause changes in the fetal CNS.^{24,25} Many of these changes were associated with increased risk of neurodevelopmental or mental disorders (autism spectrum disorder, attention deficit/hyperactivity disorder, schizophrenia)²⁶ (Figure 1) as well as a higher impulsivity and a lower intelligence quotient (IQ) in adolescents.^{27,28}

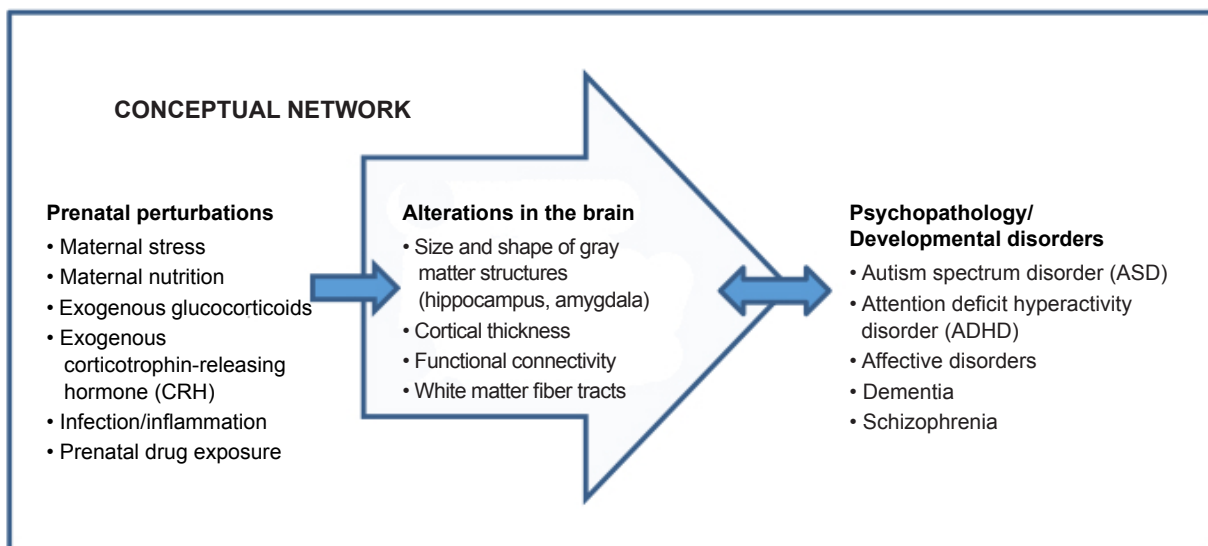
RISKS ON THE DEVELOPMENT OF CHILDREN BORN TO MOTHERS DIAGNOSED WITH POSTPARTUM DEPRESSION

In general, parental psychiatric conditions have a negative effect on neurodevelopment. Extreme dependence on daily care and interpersonal contact in early postnatal life are key in cognitive and emotional development and have an impact on the quality of bonding and interpersonal functioning.^{29,30}

Reported physical effects include an increased risk of postnatal growth retardation, more frequent and intense infant colic, and sleep disturbances. Incomplete immunizations, more frequent visits to the emergency department, and more frequent unscheduled visits to the pediatrician have also been reported.³¹

The effects on neurodevelopment depend on the severity, chronicity, timing, and therapeutic approach of PPD, as well as on the heterogeneity of the risk and protective factors present that potentiate or mitigate it. The levels of poverty and economic adversity play a key role in the future negative effects of PPD, worsening its prognosis in settings of low social support and severe parental difficulties.⁶ The chronicity and severity of exposure to prenatal and postnatal depression, beyond the

FIGURE 1. The role of stress in brain development. The gestational environment's long-term effects on the brain



Modified and translated from: Buss C, et al.²⁶ Original article available at: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3574809/>

first year of life of the NBI, is a very important risk factor for neurodevelopment and its consequences may extend to school age and adolescence.

During pregnancy, childbirth, the neonatal stage, and the first months of life, a fundamental bond is established in the mother-child dyad. This is influenced by multiple factors: contact and attachment, breastfeeding, nutrition, stimulation, general care, cultural and affective intergenerational transmission, etc.³² The sustained alteration of such bonding channels has a negative effect on this bond, modifying the biopsychosocial scaffolding on which neurodevelopment is established.

PPD may cause negative maternal perceptions of the infant's temperament, which may generate unfavorable behaviors, including impatience, hostility, poor responsiveness to cues, infrequent and negative interactions, ineffective communication, inappropriate feeding practices, and discontinuation of breastfeeding.

Studies conducted from more than 2 decades ago showed a worse performance in mental and motor areas on the Bayley scale in children from mothers who had PPD after 12 months.⁵ Recent studies show that, in some mild forms of PPD, mothers may be able to maintain a nurturing and enriching care environment that supports language, cognitive, socioemotional, and adaptive function development, although no statistically significant differences have been observed in the investigations. At the same time, there is emphasis on the relevance of the role of other caregivers as buffers against potential negative neurodevelopmental effects.³³

A study conducted in 2017 found significant differences in global, social, and language development (without affecting motor and coordination areas) in children whose mothers had PPD with respect to the control group, and language was the most affected area.³⁴

A meta-analysis conducted by Slomian (2019) on the consequences of PPD found evidence of a negative influence on cognitive development and language, both by direct action and the effect of the resulting adverse environment. Alterations in emotional and behavioral development (at 2 years of age) and bonding and breastfeeding failure at 1 month of life have also been described.^{1,31}

Maternal stress, depression, and anxiety have been associated with increased activity of the hypothalamic-pituitary-adrenal (HPA) axis of children at different ages: at 6 months, 5 years, and 10 years. The dyad interactions and the

mother's psychological status also affect the HPA axis activity. With onset in the first year of life, when the HPA axis is very labile, sensitive/nurturing parental care is associated with less increase in or less prolonged activations in response to daily life disturbances.³⁵

RISK FOR UNTREATED MOTHERS

Negative consequences on the physical and mental health of mothers without a therapeutic approach have been described: a poorer quality of life, problems in maintaining breastfeeding, persistent depression, risk behaviors (including problematic substance use), difficulties in social interaction, and suicidal ideation.

Suicide during the postpartum period is less frequent than in non-puerperal periods, except in adolescents. Suicide attempts are 3 times more frequent during the first year postpartum after fetal or infant death.¹⁰

Postpartum psychosis (PPP) is a psychiatric emergency and occurs in 1 out of 500 mothers in the first 2–4 weeks. It requires immediate intervention because of the risk of infanticide and suicide. It is more common in primiparous women older than 34 years. The clinical manifestations include mood changes, hallucinations, disorganized behavior, paranoia, impaired functioning and judgment, and confused thinking. The risk factors described include previous episodes or hospitalizations due to psychosis or manic episodes, withdrawal of treatment with mood stabilizers, obstetric complications, family history of bipolar disorder or PPP.¹

Infanticide is the most risky situation in PPP, and is associated with the presence of command hallucinations and the effects of unmanageable stress caused by infant care. The prevalence is unknown. Reports also indicate that PPP is associated with severe PPD in situations of abuse and rejection of the unwanted NBI or as revenge against the abuser. According to the bibliography, between 16% and 29% of mothers who murder their children later take their own lives. Neonaticide is defined as the killing of the NBI within the first 24 hours of life and is associated with denial of pregnancy, dissociation/depersonalization, lack of antenatal care, and intermittent birth amnesia.¹⁰

MANAGEMENT OF POSTPARTUM DEPRESSION

The impact of different actions by the health system on the mother was assessed, and both

negative and positive actions in relation to PPD were observed. The negative actions, especially on mothers at risk, included insecurity, lack of empathy, overmedicalization of pregnancy and childbirth, abuse of complementary tests, and inadequate support. On the contrary, a customized model of care—including a supportive, empathetic, and humanized attitude, tailored to the patient's needs—is a relevant protective factor that will contribute to a better course of MMH.^{2,31}

Different lines of treatment are implemented. Firstly, psychotherapy, which includes different approaches (interpersonal, psychodynamic). Secondly, pharmacotherapy, especially serotonin reuptake inhibitors (mainly sertraline due to its lower toxicity in pregnancy and lactation).^{36,37} Finally, other resources, such as family therapy, mother-baby units, and psychoeducational and social support interventions.^{3,4,10,38}

PREVENTIVE AND PROMOTIONAL PROPOSALS ON MATERNAL MENTAL HEALTH AND NEURODEVELOPMENT LOOKING AT THE PRESENT AND THE FUTURE

There are experiences that demonstrate the benefits of transdisciplinary and multifactorial interventions on parents and NBIs at risk in the prevention of stress and depression.³⁹

We propose some actions and general guidelines that may contribute to their care:

1. To establish active public policies for the prevention and treatment of mental health problems during pregnancy, childbirth, the postpartum period, and the first years of life of the child.
2. To study and note in the clinical history the elements that allow to suspect and detect MMH problems.
3. To strengthen the protective factors of children and adolescents in risk situations.
4. To establish parental leave policies that guarantee support for the needs of the mother-child dyad at this stage.
5. To inform and train both the healthcare team and the families during birthing classes, so that the symptoms of PPD can be detected in a timely manner and to provide guidance on the actions to be taken.
6. To establish primary prevention actions on the population with risk factors.
7. To establish specific policies or programs in hospitals with a large number of deliveries or that care for high-risk pregnancies

(regionalization model).⁴⁰

8. To establish clear strategies within the interdisciplinary/transdisciplinary framework, in collaboration with obstetricians, nurses, gynecologists/obstetricians, neonatologists, pediatricians, mental health specialists, social workers, etc.⁴¹

CONCLUSIONS

PPD is a prevalent problem in public health, with potential negative consequences on the mother and her NBI/baby. It requires a timely and preventive management oriented to the negative effects on the mother and the physical, cognitive, and emotional development of the NBI, and also considering its impact on the neurodevelopment (structural, functional, epigenetic) of children and adolescents.

Fears, taboos, or prejudices may inhibit patients from consulting and seeking help, which reduces the chances of detection and intervention. Information and training of the attending health care team, from the beginning of pregnancy until the first year of life of the child, are essential to reduce the harm that may arise from these situations.

Pediatricians and neonatologists play a fundamental role in this process; however, to do so, we must look beyond the patient, with a holistic and integrative approach. We must incorporate MMH as a relevant item in the process of children's development and pay attention to this issue whenever we encounter unexpected circumstances. ■

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