

Completed suicide during pregnancy and postpartum

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Abstract

Both pregnancy and the postpartum are typical periods for the onset or relapse of psychiatric symptoms and disorders, with depression and anxiety being the most common. The prevalence of suicide spectrum behaviour is significantly higher among women with a diagnosis of depressive or bipolar disorder. Suicide during pregnancy and postpartum is a multifactorial phenomenon and a history of psychiatric illness is only one of the possible risk factors involved in suicide spectrum behaviour. The present paper highlights the importance of a complete screening for both depression and suicide risk during peripartum.

Key words

- suicide
- pregnancy
- postpartum
- peripartum

INTRODUCTION

Pregnancy and the postpartum are generally characterized by positive feelings and expectations but they may also disguise maternal stress and difficulties. Suicide is a major public health issue, with more than 800,000 people dying annually, and over recent years a growing number of reports have also identified pregnancy and postpartum as critical periods for suicide risk. Failure to complete pregnancy, the unavailability of elective termination methods and psychiatric disorders not adequately treated may actually lead to suicide during pregnancy. Unwanted pregnancies are, no doubt, a major risk factor for suicide and this is particularly true for female adolescents, whose discovery of a pregnancy may lead them to commit suicide [1]. The literature points to the early recognition of “baby blues” as opposed to peripartum depression [2, 3]. Furthermore, the postpartum period is often associated with the onset of mood and psychotic disorders that can cause post-traumatic stress, with lasting consequences for both mother and child. Postpartum psychosis is associated with an increased risk of both suicide and infanticide: up to 30% of mothers who commit filicide also commit suicide [4].

Gelaye *et al.* [5], in a review of 57 studies, found that suicidal ideation but not completed suicide was more frequent among pregnant woman compared to the general population, suggesting that pregnancy was a protective factor for suicide. However, Lysell *et al.* [6] found a weak association between pregnancy and suicide reduction, suggesting that previous studies may overestimate the protective effects of this life period in women.

Both pregnancy and the postpartum are typical periods for the onset or relapse of psychiatric symptoms

and disorders [7], with depression and anxiety being the most common [8]. Depressive symptoms occurring during pregnancy often persist postpartum, suggesting a strong relation between antenatal depressive symptoms and postpartum depression [9]. Furthermore, approximately half of postpartum depression cases have onset during pregnancy [10].

Data regarding the incidence of peripartum depression vary in relation to the assessment method used, the timing of the assessment and the population in epidemiological studies. In general, peripartum depression is present in 7-13% of pregnant women and in 7-15% of women 1 year postpartum [11, 12].

Due to the profound physiological changes during pregnancy and childbirth and the perturbations in mood, appetite, energy and sleep associated with childbirth and infant care, it has been proposed that postpartum depression differs from depression that occurs at other periods of life [13]. The American Psychiatric Association proposed the term “peripartum onset depression” to describe major depressive episodes developing during pregnancy and the postpartum period [14].

Peripartum depression is an important public health reality that affects not only the mother but also the infant and the entire family system, worsening the couple's relationship and parental care of the infant [5, 15]. The clinical presentation of peripartum depression is characterized by low mood, sadness, irritability, impaired concentration, feelings of guilt about childcare and feeling overwhelmed. However, even non-depressed postpartum women regularly experience many symptoms that commonly reflect depression in non-postpartum women, such as fatigue, appetite disturbances and sleep disturbances [16, 17].

Peripartum mood worsening and anxiety can progress rapidly and become an imminent risk to the patient and, in rare cases, the infant. Poor maternal–fetal attachment and adverse neonatal outcomes, including low birth weight, preterm birth, small for gestational age and early childhood developmental delays, are some of the most frequent aspects of peripartum depression [18] (Figure 1).

Peripartum depression is a multifactorial phenomenon and several psychological features are involved in its genesis, including a previous history of depression and anxiety, a negative attitude toward the recent pregnancy, stressful life events, a history of sexual abuse, reluctance to accept the baby and low self-esteem [19]. While the role of obstetric risk factors is still controversial, several studies have demonstrated that the number of deliveries, a high-risk pregnancy, postpartum complications and a mismatch between maternal expectations and pregnancy events are associated with an increased rate of depression, whereas breastfeeding is associated with a reduction in the rate of postpartum depression [20]. Glucose metabolic disorders during pregnancy are also involved in the genesis of postpartum depression [21]. Among the protective factors, evidence has demonstrated a key role for social support, including emotional support, financial support, intellectual support and empathetic relations [12]. Factors related to lifestyle, food intake patterns, sleep status, exercise and physical activity are also involved in the prevention of postpartum depression through direct and indirect effects on the level of serotonin in the brain [22].

During the first year after delivery, women with a psychiatric disorder are at the highest risk of psychiatric hospitalization [23]. Conversely, increased risk of severe postpartum psychiatric morbidity and substance use disorder was associated with severe maternal morbidity, with the highest period of risk extended to 4 months after hospital discharge [24].

Among women with a diagnosed mood disorder, the rate of relapse during the postpartum period is 30% for unipolar depression and 52% for bipolar depression or a

manic episode, whereas anxiety disorders are diagnosed in about 15% of women during pregnancy and about 10% of women postpartum [25]. Moreover, women who experience one episode of peripartum depression are at increased risk of recurrence with subsequent pregnancies, suggesting the need to assess and treat depressive symptoms early during pregnancy [26].

Alterations in many endocrine systems are present in pregnancy and the influence of endocrine changes on maternal mood and behaviour and fetal and child development has been widely investigated. Possible underlying mechanisms of maternal care alterations related to maternal depression include alterations in oestrogen and progesterone levels, central involvement of glucocorticoids in maternal care, altered hypothalamic–pituitary–adrenal axis function and the hypersecretion of cortisol [27–30].

A history of psychiatric disorders or onset in the peripartum period is one of the most important risk factors for suicidal behaviour. Depression in particular is a strong predictor of suicidality in the postpartum period [5, 6, 15, 31–37].

SUICIDE IN PREGNANCY AND POSTPARTUM

While being pregnant may actually protect against suicide, several subgroups of women may be at elevated risk before or after delivery [38, 39]. Even if suicide during pregnancy and postpartum is rare, it is among the leading causes of maternal perinatal mortality [39].

Suicidal behaviour encompasses a wide spectrum, from suicidal ideation (suicidal thoughts and plans) to self-harm, attempted suicide and completed suicide. Completed and attempted suicide are often preceded by suicidal ideation, which is therefore one of the main risk factors for completed suicide [40]. In addition, attempted suicide and self-harm are strong predictors for completed suicide [41]. During the peripartum period, the prevalence of suicidal ideation ranges from 5% to 14% [39, 42–43]. There is a strong association between suicidal ideation and depression. Most women with post-

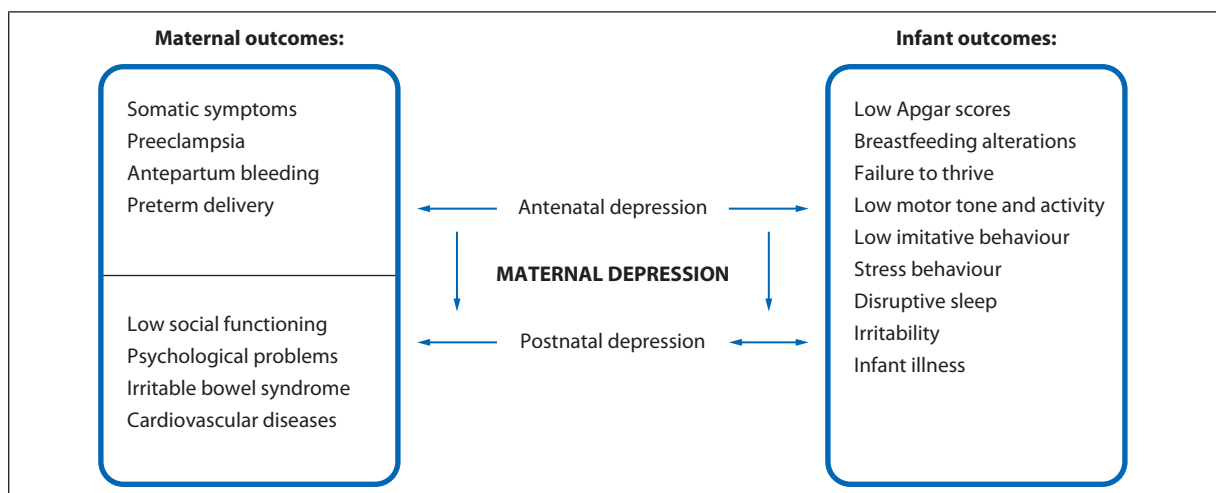


Figure 1
Most frequent aspects of peripartum depression.

partum suicidal ideation reported depressive symptoms and met the criteria for a major depressive episode [42-44]. Women who commit suicide during the peripartum period more frequently use violent and more lethal methods than suicidal women in other life periods, thus highlighting the greater intentionality of the act and the high level of psychopathology in these women [45-48].

Completed suicide as a cause of maternal mortality

According to the International Classification of Diseases (ICD) a “maternal death” is the death of a woman while pregnant or within 42 days of termination of pregnancy irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes. “Late maternal deaths” are the deaths that occur (from direct or indirect obstetric causes) more than 42 days, but less than 1 year after termination of pregnancy [49]. Comprehensive maternal death’ (introduced with ICD-11th revision) is a grouping that combines early maternal death (death of a woman while pregnant or within 42 days of termination of pregnancy) and late maternal death (death of a woman that occurs more than 42 days but less than 1 year after termination of pregnancy) [50].

The causes of maternal death are classified internationally according to the International Classification of Diseases for Maternal Mortality (ICD-MM) and are divided broadly into “direct” (pregnancy-related) and “indirect” (medical) causes. Antenatal and postpartum suicide are grouped according to the ICD-MM under “direct” causes of death (under the “other” category); this is recommended even if it may not be possible to definitively establish the diagnosis of puerperal psychosis and/or postpartum depression. Hence, maternal deaths due to suicide are identified when information about the pregnancy was indicated on the death certificate and are coded X60–X84 and Y97.0 according to the ICD [49-50]. One significant change with the introduction of the ICD-MM guidance in 2012 was the reclassification of maternal suicide from the indirect group to the direct group; however, this change seems to have had a minimal impact on the classification [51].

The fourth MBRRACE-UK annual report of the *Confidential Enquiry into Maternal Deaths and Morbidity* includes surveillance data on women who died during or up to 1 year after pregnancy between 2013 and 2015 in the UK and confidential enquiries into the care of women with severe postpartum mental illness and other physical or neurological conditions who died between 2013 and 2015 in the UK and Republic of Ireland; this report identifies suicide as the second largest cause of direct maternal deaths occurring during or within 42 days of the end of pregnancy and remains the leading cause of direct deaths occurring within 1 year after the end of pregnancy [52]. Suicide is reported as the second major cause of direct deaths occurring within 42 days of the end of pregnancy, after deaths by thrombosis and thromboembolism [52-53]. Furthermore, suicide represents about 18% of total deaths of women who died between 6 weeks and 1 year after the end of pregnancy in 2015-2017 [52, 53].

For the United States, Mangla *et al.* [54] report percentage suicides in the overall maternal mortality varying from 4% in Philadelphia, 5% in Texas and New York, 7% in Virginia and Illinois and a maximum of 13% in Colorado. In Ontario (Canada), suicide accounts for about 5% of the overall maternal mortality [55]. Lega *et al.* [48] found that for Italy, in the 7-year period 2006-2012, suicide deaths represent 12% of the deaths that occurred within 1 year from the pregnancy outcome. The Italian Obstetric Surveillance System (ItOSS) found that most suicides occurred between 43 and 365 days from the pregnancy outcome and suicide was the second cause of maternal death occurring 43-365 days following the end of pregnancy [48, 56].

Most maternal self-harm-related deaths occur in the late postpartum; a Canadian study found that the peak incidence period was between 9 and 12 months’ postpartum [55, 57].

Completed suicide during pregnancy and the 1-year postpartum period is estimated to be 3.7 per 100,000 live births in Sweden [58]. In the United States a peripartum suicide rate of 2.0 per 100,000 live births for 17 pooled states (South Carolina, Georgia, North Carolina, Virginia, New Jersey, Maryland, Alaska, Massachusetts, Oregon, Colorado, Oklahoma, Rhode Island, Wisconsin, California, Kentucky, New Mexico and Utah) was reported for the period 2003-2007 [59]. Another study that includes data for 50 states reports estimate suicide rates varying from 2.1 to 4.5 per 100,000 live births after adjusting for different hypothesized levels of misclassification (compared with 5.3/5.5 per 100,000 non-pregnant/non-postpartum women aged 10-54 years [60]. An even higher rate was reported for Colorado: 4.6 per 100,000 live births [57]. For Ontario (Canada), a perinatal suicide rate of about 2.6 per 100,000 live births was reported [55]. Knasmüller *et al.* [47] report, for Austria, a considerably lower rate of suicide amongst pregnant and postpartal women (0.89 per 100,000 birth events), probably attributable to a non-exhaustive identification of cases [47].

In Italy the peripartum suicide rate was 2.3 for 100,000 live births in 2006-2012 [48]; this is very close to the rate among the general Italian female population aged 15-49 years, which was 2.4 per 100,000 inhabitants in 2012 (our calculation using “Vital statistics on causes of death” data, collected by the Italian National Institute of Statistics and processed at the Italian National Institute of Health).

Risk factors for completed suicide during pregnancy and postpartum

Previous suicide attempts, self-harm, a history of psychiatric disorders before pregnancy, stressful life events during pregnancy and depression during the perinatal period have been identified as major predictors of suicidal ideation in multivariate analysis [42, 43]. Other factors involved in suicide risk in the peripartum period include previous abortion and unwanted pregnancy [1, 61, 62].

Completed suicide is characterized by impulsivity/aggression, depression, anxiety, hopelessness and self-consciousness/social disengagement [63], whereas low

self-directedness, low cooperativeness, higher anxiety and depression, lack of affection and anger and rejection towards the baby were found to be associated with suicidal thoughts [64].

Lysell *et al.* [6] found that mothers who died by suicide in the first year postpartum more often had affective disorders, psychotic disorders and a history of self-harm compared to living mothers.

Gold *et al.* [46] found that among the various risk factors, psychiatric symptoms, especially depression and substance abuse, were strongly involved in maternal suicide. Suicide risk was significantly elevated among depressed women during the entire peripartum period and it was found to be the second or leading cause of death in this depressed population [39]. In particular, it has been confirmed that a depressive status during the first 2 days' post-delivery predicted later suicidal ideation [65]. An important risk factor for completed suicide is the discontinuation of psychotropic medication during pregnancy [66, 67].

Suicidal ideation and suicide attempts are significantly higher among women with a diagnosis of depressive or bipolar disorder [39, 66, 68-70]. Furthermore, both suicidal ideation and suicide attempts are strong predictors of completed suicide. In women affected by minor depressive episodes, the prevalence of suicidality was reported to be about 34% during pregnancy and about 31% during the postpartum period [42].

Suicidal ideation and co-occurring postpartum depression share many of the same symptoms, although there are additional experiential aspects that can be detrimental to the mother and her relationship with the infant. Mothers who are suicidal can cognitively distort a small stressor into a lethal one. An overwhelming external stressor, such as pregnancy or the birth of a baby, can precipitate feelings of hopelessness and trigger thoughts of self-harm [71].

However, the association between depression and suicide is not deterministic. Zhong *et al.* [72] found that although the prevalence of suicidal behaviour was higher among those hospitalized with depression, more than 30% of hospitalizations were for suicidal behaviour without a diagnosis of depression.

It must be highlighted that suicide is a multifactorial phenomenon and a history of psychiatric illness is only one of the possible risk factors involved in suicide spectrum behaviour. Several psychological and social features contribute to increase the risk of suicidality during pregnancy and postpartum. These include, among others, sleep disturbance, stillbirth, undesired pregnancy, being abandoned by the partner, domestic violence, abortion or death of a previous child, lack of support, a history of psychiatric disorders, being unmarried and drug or alcohol abuse. In particular, women who committed suicide during the peripartum period were more frequently victims of domestic violence compared to suicidal women in the general population [46, 66, 73, 74]. Almost 50% of women died by suicide during pregnancy or within 1 year postpartum in Sweden from 1980 to 2007 had experienced adverse events during pregnancy [58].

On multivariate analysis, a history of suicide attempts remains strongly associated with suicidal behaviour

whereas social support and living with a partner remain protective factors [37].

The effect of maternal age on suicide in peripartum is not clear. Many studies report higher suicide rates after live birth and abortion in women younger than age 20 years compared with the same age group in the general population [5, 33, 37, 66, 72, 75-78]. Others studies found that women aged 40 years and over were more represented among suicide deaths during pregnancy, after delivery and after miscarriage [48, 59]. A list of the most important risk factors for suicide in the peripartum period is reported in *Table 1*.

Risk factors for fetus and newborn of mother's suicidality

Particular attention should be paid to the assessment of suicidal behaviour during pregnancy also for the consequences for the fetus and infant. Schiff and Grossman [79] demonstrated that fetal or infant death in the first year after delivery was strongly associated with hospitalization for attempted suicide in women.

Gandhi *et al.* [75] report that women who attempted suicide during pregnancy had increases in premature labour, caesarean delivery and need for blood transfusion, with analysis of neonatal outcomes revealing increases in respiratory distress syndrome and low birth weight; moreover, a sub-analysis that included women who delivered after hospitalization for attempted suicide demonstrated increased premature delivery, respiratory distress syndrome and neonatal and infant death. A list of the most frequent infant outcome of suicidal mother behavior in the peripartum period [80-84] is reported in *Table 2*.

In a clinical sample of mothers with postpartum depression, Paris *et al.* [84] found that mothers with high suicidality experienced lower maternal self-esteem, more negative perceptions of the mother-infant relationship and greater parenting stress. Women with high suicidality were less sensitive and responsive to their infants' cues and their infants demonstrated less positive affect and involvement with their mothers [84]. Moreover, postpartum suicidal ideation significantly correlated with thoughts of hurting the baby, which might lead to infanticide together with suicide [85]. Many mothers with postpartum depression experience shame and humiliation, viewing themselves as the worst mothers in the world and imagining that others also see them this way; such inner conflict can trigger suicidal thoughts for a woman who focuses on the idea that her baby would be better off without her or that she may hurt her baby if she lives.

It is well known that a family history of suicide is a risk factor for completed suicide. Moreover, in utero and perinatal conditions may contribute to increase suicide risk throughout the life span; thus, the effects of suicidal behaviour of the mother can also increase the suicide risk of children in adolescence or even older age [86].

Unrecognized and untreated postpartum mental illness can have tragic lethal consequences on the newborn. It has been reported that up to 30% of mothers who commit filicide also commit suicide [87]. Although

Table 1
Main risks factors for completed suicide in the peripartum period

Risk factors	References
Lifetime history or current diagnosis of depressive and anxiety disorders, major depression and other severe mental disorders (including psychosis)	Gelaye et al. 2016 [5]; Lysell et al. 2018 [6]; Oates 2003 [31]; Austin et al. 2007 [32]; Newport et al. 2007 [33]; Gavin et al. 2011 [34]; Coelho et al. 2014 [35]; Gressier et al. 2017 [36]; Martini et al. 2019 [37]; Gold et al. 2012 [46]
Psychiatric hospitalizations	Lysell et al. 2018 [6]; Gressier et al. 2017 [36]
Abrupt discontinuation of psychotropic drugs	Appleby et al. 1991 [66]; Orsolini et al. 2016 [67]
History of suicidal ideation and suicide attempts	Gelaye et al. 2016 [5]; Lysell et al. 2018 [6]; Martini et al. 2019 [37]; Lindahl et al. 2005 [39]; Beghi et al. 2013 [41]; Mauri et al. 2012 [42]
Lifetime or current history of substance use disorders, including alcohol and tobacco use	Oates 2003 [31]; Austin et al. 2007 [32]; Newport et al. 2007 [33]; Gressier et al. 2017 [36]
History of miscarriage and/or induced abortion	Coelho et al. 2014 [35]; Lega et al. 2019 [48]; Steinberg et al. 2019 [61]; Appleby 1991 [66]; Gissler et al. 1996 [78]; Mota et al. 2019 [96]
Stillbirth and infant death	Gissler et al. 1996 [78]; Schiff & Grossman et al. 2006 [79]
Unplanned/unwanted pregnancy	Gelaye et al. 2016 [5]; Newport et al. 2007 [33]; Frautschi et al. 1994 [62]; Appleby 1991 [66]; Kim et al. 2015 [77]
Low maternal education level	Gelaye et al. 2016 [5]; Newport et al. 2007 [33]; Gavin et al. 2011 [34]; Coelho et al. 2014 [35]; Gressier et al. 2017 [36]; Mauri et al. 2012 [42]; Alhusen et al. 2015 [74]; Gandhi et al. 2006 [75]; Pinheiro et al. 2012 [76]
Low household income and other adverse socioeconomic circumstances	Gelaye et al. 2016 [5]; Gavin, et al. 2011 [34]; Martini et al. 2019 [37]; Alhusen et al. 2015 [74]
History of abuse and intimate partner violence (including emotional abuse, physical and/or sexual violence) during pregnancy	Fisher et al. 2013 [25]; Coelho et al. 2014 [35]; Palladino et al. 2011 [59]; Halim et al. 2018 [73]; Alhusen et al. 2015 [74]
History of abuse/rape during childhood	Martini et al. 2019 [37].
Being unmarried/unpartnered	Gelaye et al. 2016 [5]; Newport et al. 2007 [33]; Martini et al. 2019 [37]; Gandhi et al. 2006 [75]; Kim et al. 2015 [77]
For pregnant teenagers: poor relation with parents (parental bonding: "affectionless control" and "neglectful parenting")	Coelho et al. 2014 [35]
Low social support	Gelaye et al. 2016 [5]; Palumbo et al. 2016 [12]; Coelho et al. 2014 [35]; Martini et al. 2019 [37]; Appleby 1991 [66]
Age 40 years and over	Lega et al. 2019 [48]; Palladino et al. 2011 [59]
Young maternal age (less than 20 years)	Gelaye et al. 2016 [5]; Newport et al. 2007 [33]; Martini et al. 2019 [37]; Appleby 1991 [66]; Zhong et al. 2016 [72]; Gandhi et al. 2006 [75]; Pinheiro et al. 2012 [76]; Kim et al. 2015 [77]; Gissler et al. 1996 [78]

Table 2
Main infant outcome of mother's suicidality

Infant outcome	References
Born early, preterm delivery, low infant birth weight; poor fetal growth, stillbirth, fetal death	Martini et al. 2019 [37]; Zhong et al. 2019 [72]; Gandhi et al. 2006 [75]; Czeizel 1992 [81]
Lower score for neuropsychological development	Martini et al. 2019 [37]
Long-term effect on child: increased risk of suicidality (transgenerational transmission of psychopathology and suicidality)	Sorenson and Rutter 1991 [82]; Orri et al. 2019 [86]
Depressive symptoms associated with suicidality can lead to lower maternal responsiveness, non-beneficial parenting behaviours, inadequate mother–infant interaction	Martini et al. 2019 [37]; Paris et al. 2009 [84]
Homicide death	Lysell et al. 2014 [83]; Naviaux et al. 2020 [88]

maternal infanticide is a rare event, a high proportion of cases occur in the context of postpartum mental illness. In particular, depression and psychosis represent very high risk factors for committing infanticide and neonaticide (when the neonate is killed within 24 hours after birth). It should be noted that fathers and mothers do not act the same way or for the same reasons when

they kill their offspring and neonaticide and infanticide are almost always committed by women [88]. Acute psychosis after childbirth is an important risk factor for infanticide [87] and severe anxiety and depression in pregnancy and postpartum can evolve into psychotic symptomatology [89, 90]. Psychiatrists have a vital role to play in recognizing the signs and symptoms of peri-

partum psychiatric disorders and in early identification and intervention with at-risk mothers [4, 91].

DISCUSSION

This broad overview sought to characterize completed suicide during pregnancy and in the peripartum period. We found that suicide during peripartum represents a leading cause of maternal mortality in the late postpartum. Overall suicide rates during the peripartum period do not seem to exceed the suicide rate among the general female population of reproductive age but for some susceptible groups of women pregnancy and postpartum can increase the suicide risk. Suicide remains a multifactorial phenomenon even in the peripartum. Depression and other severe psychiatric disorders are important, but not unique, risks factors for suicide; several demographic and social conditions combine to increase the risk of suicidal behaviour during the peripartum period.

Suicide prevention requires early screening, assessment, monitoring, and intervention for all women during the peripartum period, regardless of emotional affect and appearance. It is fundamental to investigate suicide risk, including suicidal ideation, thoughts, and intent, during pregnancy and the postpartum period, especially (but not only) in women affected by mental pathology.

Effects of maternal depression and suicide behaviour on infants range from physical and physiological to psychological and behavioural. Fetal growth has been found to be at risk when mothers suffer from depressive symptoms. Preterm deliveries and shorter gestations have also been associated with depressive symptoms. Furthermore, depressed mothers utilize preventative care for their children less often than non-depressed mothers and visit urgent care settings at a higher rate.

Systematic screening has been demonstrated to increase the identification of depression and to be more effective in identifying depression than clinical assessment alone [92]. Current guidelines from the United States Preventive Services Task Force and the Council on Patient Safety in Women's Health Care recommend screening women for depression at least once during pregnancy and/or after delivery [93, 94]. The American College of Obstetricians and Gynecologists (ACOG) recommends screening at least once during the peripartum period and recommends a postpartum screening even if screening took place during pregnancy [95]. All of these guidelines emphasize that screening alone is necessary but insufficient to address maternal depression, and providers must be prepared to initiate treatment or refer patients to mental health professionals when indicated.

It is important to implement and manage protocols for women at risk of serious psychiatric symptoms after childbirth in all maternal and neonatal wards. Information regarding psychiatric history should be collected routinely in order to investigate the presence of any familial psychiatric disorders. The term "postpartum depression" should not be used to indicate all possible mental disorders in the postpartum period because this may underestimate the gravity of the situation, as well as the consequent management. Psychosis and suicidal ideation in the peripartum period are relevant medical

emergencies that require immediate intervention.

Women who have a history of psychiatric disorders should be seen by a psychiatrist during pregnancy due to the high risk of relapse after childbirth, and women who have suffered from serious psychiatric conditions either after childbirth or in other phases of life should be informed about the possibility of relapse after subsequent pregnancies. In particular, women who have a history of bipolar disorder or postpartum psychosis have a very high risk of relapse after childbirth, thus presenting a higher risk of suicide.

Moreover, it has been reported that, compared with a non-perinatal period, the rate of a diagnosed mental disorder is lower during pregnancy but it rises in the postpartum period, highlighting the importance of early identification of women at risk [96]. Considering the high risk of infanticide, specific screening for severe psychiatric disorders should be performed routinely in obstetric and primary care [97, 98].

Available screening instruments for the peripartum period, such as the Edinburgh Postnatal Depression Scale (EPDS), are primarily designed to identify perinatal depression or psychiatric disorders [72]. Item 10 in the EPDS is used to identify women with suicidal thoughts or behaviour and the EPDS is a useful tool for this purpose. Nevertheless, considering the burden of suicide in this life period, an effort to develop a specific screening instrument would be of vital importance [15, 37].

The high prevalence of suicidal ideation among women without a psychiatric history of mental disorders highlights the importance of screening all women and carrying out a psychosocial assessment: psychiatric history, social support, domestic violence, etc. [43].

General practitioners, gynaecologists, midwives, paediatricians and psychiatrists need management training courses and knowledge of peripartum risk factors. Screening through validated tools on previous psychiatric disorders, history of domestic violence and the other risk factors listed above should be carried out routinely, as is done, for example, for diabetes and hypertension. It is therefore essential to invest in the training of health professionals (general practitioners, gynaecologists, paediatricians, nurses, midwives, psychiatrists) for the early recognition of risk factors in the field of perinatal mental health and for the identification of suicidal risk.

Suicidality should be assessed repeatedly by health professionals asking the woman at risk if she feels that life is not worth living or she wants to die or make suicide plans [37, 42]. Furthermore, specific care must be provided when suicide risk is detected, also in order to prevent infant harm [37, 42].

Providing long-term support of women at particular risk may reduce self-harm and suicide mortality and also improve the well-being of the newborn, the father and the whole family network.

Conflict of interest statement

The authors declare that they have no conflict of interest.

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REFERENCES

- Pompili M, Ruberto A, Girardi P, Tatarelli R. Suicide risk during pregnancy. Comment on "The obstetrician and depression during pregnancy" by Campagne DM [Eur J Obstet Gynecol Reprod Biol 2004;116:125-30]. Eur J Obstet Gynecol Reprod Biol. 2005;120(1):121-3; author reply 124. doi: 10.1016/j.ejogrb.2004.11.043
- Hirst KP, Moutier CY. Postpartum major depression. Am Fam Physician. 2010;82(8):926-33.
- Bergink V, Rasgon N, Wisner KL. Postpartum psychosis: Madness, mania, and melancholia in motherhood. Am J Psychiatry. 2016;173(12):1179-88. doi: 10.1176/appi.ajp.2016.16040454.
- Luyckx JJ, Di Florio A, Bergink V. Prevention of infanticide and suicide in the postpartum period: The importance of emergency care. V. JAMA Psychiatry. 2019. doi: 10.1001/jamapsychiatry.2019.1929.
- Gelaye B, Kajeepeta S, Williams MA. Suicidal ideation in pregnancy: An epidemiologic review. Arch Wom Ment Health. 2016;19(5):741-51. doi: 10.1007/s00737-016-0646-0.
- Lysell H, Dahlin M, Viktorin A, Ljungberg E, D'Onofrio BM, Dickman P, Runeson B. Maternal suicide: Register based study of all suicides occurring after delivery in Sweden 1974-2009. PLoS One. 2018;13(1):e0190133. doi: 10.1371/journal.pone.0190133
- Bennett HA, Einarson A, Taddio A, Koren G, Einarson TR. Prevalence of depression during pregnancy: Systematic review. Obstet Gynecol. 2004;103(4):698-709. doi: 10.1097/01.AOG.0000116689.75396.5f
- Klier CM, Rosenblum KL, Zeller M, Steinhardt K, Bergemann N, Muzik M. A multirisk approach to predicting chronicity of postpartum depression symptoms. Depress Anx. 2008;25(8):718-24. doi: 10.1002/da.20419
- Boekhorst MGBM, Beerthuizen A, Endendijk JJ, van Broekhoven KEM, van Baar A, Bergink V, Pop VJM. Different trajectories of depressive symptoms during pregnancy. J Affect Disord. 2019;248:139-46. doi: 10.1016/j.jad.2019.01.021
- Gaynes BN, Gavin N, Meltzer-Brody S, et al. Perinatal depression: Prevalence, screening accuracy, and screening outcomes. Evid Rep Technol Assess (Summ). 2005;119:1-8.
- Halbreich U, Karkun S. Cross-cultural and social diversity of prevalence of postpartum depression and depressive symptoms. J Affect Disord. 2006;91(2-3):97-111. doi: 10.1016/j.jad.2005.12.051
- Palumbo G, Mirabella F, Gigantesco A. Positive screening and risk factors for postpartum depression. Eur Psychiatry. 2017;42:77-85. doi: 10.1016/j.eurpsy.2016.11.009
- Bloch M, Schmidt PJ, Danaceau M, Murphy J, Nieman L, Rubinow DR. Effects of gonadal steroids in women with a history of postpartum depression. Am J Psychiatry 2000;157(6):924-30. doi: 10.1176/appi.ajp.157.6.924.
- Fairbrother N, Young AH, Janssen P, Antony MM, Tucker E. Depression and anxiety during the perinatal period. BMC Psychiatry. 2015;15:206.
- Gelaye B, Rondon MB, Araya R, Williams MA. Epidemiology of maternal depression, risk factors, and child outcomes in low-income and middle-income countries. Lancet Psychiatry. 2016;3:973-82.
- Cox JL, Holden JM, Sagovsky R. Detection of postnatal depression. Development of the 10-item Edinburgh Postnatal Depression Scale. Br J Psychiatry. 1987;150:782-6. doi: 10.1192/bjp.150.6.782
- O'Hara MW, Zekoski EM, Philipps LH, Wright EJ. Controlled prospective study of postpartum mood disorders: comparison of childbearing and nonchildbearing women. J Abnorm Psychol. 1990;99(1):3-15. doi: 10.1037//0021-843x.99.1.3
- Herba CM, Glover V, Ramchandani PG, Rondon MB. Maternal depression and mental health in early childhood: An examination of underlying mechanisms in low-income and middle-income countries. Lancet Psychiatry. 2016;3:983-92.
- Leigh B, Milgrom J. Risk factors for antenatal depression, postnatal depression and parenting stress. BMC Psychiatry. 2008;8:24.
- Dennis CL, Falah-Hassani K, Shiri R. Prevalence of antenatal and postnatal anxiety: Systematic review and meta-analysis. Br J Psychiatry. 2017;210(5):315-23.
- Silverman ME, Reichenberg A, Savitz DA, Cnattingius S, Lichtenstein P, Hultman CM, Larsson H, Sandin S. The risk factors for postpartum depression: A population-based study. Depress Anx. 2017;34(2):178-187. doi: 10.1002/da.22597.
- Milgrom J, Hirshler Y, Reece J, Holt C, Gemmill AW. Social support: A protective factor for depressed perinatal women?. Int J Environ Res Publ Health 2019;16(8):1426. doi: 10.3390/ijerph16081426
- Harlow BL, Vitonis AF, Sparen P, Cnattingius S, Joffe H, Hultman CM. Incidence of hospitalization for postpartum psychotic and bipolar episodes in women with and without prior prepregnancy or prenatal psychiatric hospitalizations. Arch. Gen. Psychiatry. 2007;64(1):42-8. doi: 10.1001/archpsyc.64.1.42
- Lewkowitz AK, Rosenbloom JI, Keller M, López JD, Macones GA, Olsen MA, Cahill AG. Association between severe maternal morbidity and psychiatric illness within 1 year of hospital discharge after delivery. Obstet Gynecol. 2019;134(4):695-707. doi: 10.1097/AOG.00000000000003434
- Fisher J, Cabral de Mello M, Patel V, Rahman A, Tran T, Holton S, et al. Prevalence and determinants of common perinatal mental disorders in women in low- and lower-middle-income countries: A systematic review. Bull World Health Organ. 2012;90:139G-49G.
- Stuart-Parrigon K, Stuart S. Perinatal depression: An update and overview. Curr Psychiatry Rep. 2014;16(9):468. doi: 10.1007/s11920-014-0468-6
- Lightman SL, Windle RJ, Wood SA, Kershaw YM, Shanks N, Ingram CD. Peripartum plasticity within the hypothalamo-pituitary-adrenal axis. Prog Brain Res. 2001;133:111-29. doi: 10.1016/s0079-6123(01)33009-1
- Glynn LM, Davis EP, Sandman CA. New insights into the role of perinatal HPA-axis dysregulation in postpartum depression. Neuropeptides. 2013;47(6):363-70. doi: 10.1016/j.npep.2013.10.007
- Glynn LM, Sandman CA. Evaluation of the association between placental corticotrophin-releasing hormone and postpartum depressive symptoms. Psychosom. Med. 2014;76(5):355-62. doi: 10.1097/PSY.0000000000000066
- Bridges RS. Long-term alterations in neural and endocrine processes induced by motherhood in mammals. Horm Behav. 2016;77:193-203. doi: 10.1016/j.yhbeh.2015.09.001
- Oates M. Suicide: The leading cause of maternal death. Br J Psychiatry. 2003;183:279-81. doi: 10.1192/bjp.183.4.279
- Austin MP, Kildea S, Sullivan E. Maternal mortality and psychiatric morbidity in the perinatal period: challenges and opportunities for prevention in the Australian set-

- ting. *Med J Aust.* 2007;186(7):364-7.
33. Newport DJ, Levey LC, Pennell PB, Ragan K, Stowe ZN. Suicidal ideation in pregnancy: assessment and clinical implications. *Arch Womens Ment Health.* 2007;10(5):181-7. doi: 10.1007/s00737-007-0192-x.
 34. Gavin AR, Lindhorst T, Lohr MJ. The prevalence and correlates of depressive symptoms among adolescent mothers: Results from a 17-year longitudinal study. *Women Health.* 2011;51(6):525-45. doi: 10.1080/03630242.2011.606355
 35. Coelho FM, Pinheiro RT, Silva RA, de Ávila Quevedo L, de Mattos Souza LD, de Matos MB, Castelli RD, Pinheiro KA. Parental bonding and suicidality in pregnant teenagers: A population-based study in southern Brazil. *Soc Psychiatry Psychiatr Epidemiol.* 2014;49(8):1241-8. doi: 10.1007/s00127-014-0832-1
 36. Gressier F, Guillard V, Cazas O, Falissard B, Glangeaud-Freudenthal NM, Sutter-Dallay AL. Risk factors for suicide attempt in pregnancy and the post-partum period in women with serious mental illnesses. *J Psychiatr Res.* 2017;84:284-291. doi: 10.1016/j.jpsychires.2016.10.009.
 37. Martini J, Bauer M, Lewitzka U, Voss C, Pfennig A, Ritter D, Wittchen HU. Predictors and outcomes of suicidal ideation during peripartum period. *J Affect Disord.* 2019;257:518-26. doi: 10.1016/j.jad.2019.07.040
 38. Marzuk PM, Tardiff K, Leon AC, Hirsch CS, Portera L, Hartwell N, Iqbal MI. Lower risk of suicide during pregnancy. *Am J Psychiatry.* 1997;154(1):122-3. doi: 10.1176/ajp.154.1.122.
 39. Lindahl V, Pearson JL, Colpe L. Prevalence of suicidality during pregnancy and the postpartum. *Arch. Women's Ment Health.* 2005;8:77-87.
 40. Appleby L, Mortensen PB, Faragher EB. Suicide and other causes of mortality after post-partum psychiatric admission. *Br J Psychiatry.* 1998;173:209-11. doi: 10.1192/bjp.173.3.209
 41. Beghi M, Rosenbaum JF, Cerri C, Cornaggia CM. Risk factors for fatal and nonfatal repetition of suicide attempts: A literature review. *Neuropsychiatr Dis Treat.* 2013;9:1725-36. doi: 10.2147/NDT.S40213
 42. Mauri M, Oppo A, Borri C, Banti S; PND-ReScU Group. Suicidality in the perinatal period: Comparison of two self-report instruments. Results from PND-ReScU. *Arch. Women's Ment. Health.* 2012;15(1):39-47. doi: 10.1007/s00737-011-0246-y
 43. Gelabert E, Gutierrez-Zotes A, Navines R, Labad J, Puyané M, Donadon MF, Guillamat R, Mayoral F, Jover M, Canellas F, Gratacós M, Guitart M, Gornemann I, Roca M, Costas J, Ivorra JL, Subirà S, de Diego Y, Osorio FL, Garcia-Estevé L, Sanjuan J, Vilella E, Martin-Santos R. The role of personality dimensions, depressive symptoms and other psychosocial variables in predicting postpartum suicidal ideation: A cohort study. *Arch. Women's Ment Health.* 2020;23(4):585-93. doi: 10.1007/s00737-019-01007-w.
 44. Guillard V, Gressier F. [Suicidality during the perinatal period]. *Presse Med.* 2017;46(6 Pt 1):565-71. doi: 10.1016/j.lpm.2017.05.018
 45. Cantwell R, Clutton-Brock T, Cooper G, Dawson A, Drife J, Garrod D, Harper A, Hulbert D, Lucas S, McClure J, Millward-Sadler H, Neilson J, Nelson-Piercy C, Norman J, O'Herlihy C, Oates M, Shakespeare J, de Swiet M, Williamson C, Beale V, Knight M, Lennox C, Miller A, Parmar D, Rogers J, Springett A. Saving mothers' lives: Reviewing maternal deaths to make motherhood safer: 2006-2008. Eighth Report of Confidential Enquiries into Maternal Deaths in the United Kingdom. *BJOG.* 2011;118(1):1-203. doi: 10.1111/j.1471-0528.2010.02847.x
 46. Gold KJ, Singh V, Marcus SM, Palladino CL. Mental health, substance use and intimate partner problems among pregnant and postpartum suicide victims in the National Violent Death Reporting System. *Gen Hosp Psychiatry.* 2012;34(2):139-45. doi: 10.1016/j.genhosp-psych.2011.09.017
 47. Knasmüller P, Kotal A, König D, Vyssoki B, Kapusta N, Blüml V. Maternal suicide during pregnancy and the first postpartum year in Austria: Findings from 2004 to 2017. *Psychiatry Res.* 2019;281:112530. doi: 10.1016/j.psychres.2019.112530
 48. Lega I, Maraschini A, D'Aloja P, Andreozzi S, Spettoli D, Giangreco M, Vichi M, Loghi M, Donati S, Regional Maternal Mortality Working Group. Maternal suicide in Italy. *Arch Women's Ment Health.* 2020;23(2):199-206. doi: 10.1007/s00737-019-00977-1
 49. World Health Organization. The WHO Application of ICD-10 to Deaths during Pregnancy, Childbirth and the Puerperium: ICD-MM. Geneva: WHO; 2012. Available from: http://apps.who.int/iris/bitstream/10665/70929/1/9789241548458_eng.pdf?ua=1.
 50. World Health Organization. International Classification of Diseases for Mortality and Morbidity Statistics. Eleventh Revision. Reference Guide. Available from: <https://icd.who.int/icd11refguide/en/index.html>.
 51. Knight M, Nair M, Brocklehurst P, Kenyon S, Neilson J, Shakespeare J, Tuffnell D, Kurinczuk JJ, on behalf of the MBRACE-UK collaboration. Examining the impact of introducing ICD-MM on observed trends in maternal mortality rates in the UK 2003-13. *BMC Pregnancy Childbirth.* 2016;16:178. doi: 10.1186/s12884-016-0959-z
 52. Knight M, Tuffnell D. A view from the UK: The UK and Ireland confidential enquiry into maternal deaths and morbidity. *Clin Obstet Gynecol.* 2018;61(2):347-58. doi: 10.1097/GRF.0000000000000352
 53. Knight M, Bunch K, Tuffnell D, Shakespeare J, Kotnis R, Kenyon S, Kurinczuk JJ (Eds) on behalf of MBRACE-UK. Saving lives, improving mothers' care: Lessons learned to inform maternity care from the UK and Ireland confidential enquiries into maternal deaths and morbidity 2015-17. Oxford: National Perinatal Epidemiology Unit, University of Oxford; 2019.
 54. Mangla K, Hoffman MC, Trumpff C, O'Grady S, Monk C. Maternal self-harm deaths: An unrecognized and preventable outcome. *Am J Obstet Gynecol.* 2019;221(4):295-303. doi: 10.1016/j.ajog.2019.02.056
 55. Grigoriadis S, Wilton AS, Kurdyak PA, Rhodes AE, VonderPorten EH, Levitt A, Cheung A, Vigod SN. Perinatal suicide in Ontario, Canada: A 15-year population-based study. *Can Med Assoc J.* 2017;189(34):E1085-92. doi: 10.1503/cmaj.170088
 56. Donati S, Maraschini A, Lega I, D'aloja P, Buoncristiano M, Manno V, Regional Maternal Mortality Working Group. Maternal mortality in Italy: Results and perspectives of record-linkage analysis. *Acta Obstet Gynecol Scand.* 2018; 97:1317-24.
 57. Goldman-Mellor S, Margerison CE. Maternal drug-related death and suicide are leading causes of postpartum death in California. *Am J Obstet Gynecol.* 2019;221(5):489e1-e9. doi: 10.1016/j.ajog.2019.05.045.
 58. Esscher A, Essén B, Innala E, Papadopoulos FC, Skalkidou A, Sundström-Poromaa I, Högberg U. Suicides during pregnancy and 1 year postpartum in Sweden, 1980-2007. *Br J Psychiatry.* 2016;208(5):462-9. doi: 10.1192/bjp.bp.114.161711
 59. Palladino CL, Singh V, Campbell J, Flynn H, Gold K. Homicide and suicide during the perinatal period: find-

- ings from the National Violent Death Reporting System. *Obstet Gynecol.* 2011;118(5):1056-63. doi: 10.1097/AOG.0b013e31823294da
60. Wallace ME, Hoyert D, Williams C, Mendola P. Pregnancy-associated homicide and suicide in 37 US states with enhanced pregnancy surveillance. *Am J Obstet Gynecol.* 2016; 215(3):364.e1-e10. doi: 10.1016/j.ajog.2016.03.040
 61. Steinberg JR, Laursen TM, Adler NE, Gasse C, Agerbo E, Munk-Olsen T. The association between first abortion and first-time non-fatal suicide attempt: A longitudinal cohort study of Danish population registries. *Lancet Psychiatry.* 2019;6(12):1031-8. doi: 10.1016/S2215-0366(19)30400-6. Erratum in: *Lancet Psychiatry.* 2020;7(2):e6.
 62. Frautschi S, Cerulli A, Maine D. Suicide during pregnancy and its neglect as a component of maternal mortality. *Int J Gynaecol Obstet.* 1994;47(3):275-84. doi: 10.1016/0020-7292(94)90574-6
 63. Conner KR, Duberstein PR, Conwell Y, Seidlitz L, Caine ED. Psychological vulnerability to completed suicide: A review of empirical studies. *Suicide Life Threat Behav.* 2001;31(4):367-85. doi: 10.1521/suli.31.4.367.22048
 64. Takegata M, Takeda S, Sakanashi K, Tanaka T, Kitamura T. Perinatal self-report of thoughts of self-harm, depressive symptoms, and personality traits: Prospective study of Japanese community women. *Psychiatry Clin Neurosci.* 2019;73(11):707-12. doi: 10.1111/pcn.12917
 65. Bodnar-Deren S, Klipstein K, Fersh M, Shemesh E, Howell EA. Suicidal ideation during the postpartum period. *J Women's Health (Larchmt.)* 2016;25(12):1219-24. doi: 10.1089/jwh.2015.5346.
 66. Appleby L. Suicide after pregnancy and the first postnatal year. *BMJ* 1991;302:137-40.
 67. Orsolini L, Valchera A, Vecchiotti R, Tomasetti C, Iasevoli F, Fornaro M, De Berardis D, Perna G, Pompili M, Bellantuono C. Suicide during perinatal period: Epidemiology, risk factors, and clinical correlates. *Front Psychiatry.* 2016;7:138. doi: 10.3389/fpsy.2016.00138
 68. Freeman MP, Smith KW, Freeman SA, McElroy SL, Kmetz GE, Wright R, Keck PE Jr. The impact of reproductive events on the course of bipolar disorder in women. *J. Clin. Psychiatry* 2002;63(4):284-7. doi: 10.4088/jcp.v63n0403
 69. Munk-Olsen T, Laursen TM, Meltzer-Brody S, Mortensen PB, Jones I. Psychiatric disorders with postpartum onset: possible early manifestations of bipolar affective disorders. *Arch Gen Psychiatry.* 2012;69(4):428-34. doi: 10.1001/archgenpsychiatry.2011.157
 70. Jones I, Chandra PS, Dazzan P, Howard LM. Bipolar disorder, affective psychosis, and schizophrenia in pregnancy and the post-partum period. *Lancet.* 2014;384(9956):1789-99. doi: 10.1016/S0140-6736(14)61278-2
 71. Pollock LR, Williams JM. Problem solving and suicidal behavior. *Suicide Life Threat Behav.* 1998;28(4):375-87.
 72. Zhong QY, Gelaye B, Miller M, Fricchione GL, Cai T, Johnson PA, Henderson DC, Williams MA. Suicidal behavior-related hospitalizations among pregnant women in the USA, 2006-2012. *Arch Women's Ment Health.* 2016;19(3):463-72. doi: 10.1007/s00737-015-0597-x
 73. Halim N, Beard J, Mesic A, Patel A, Henderson D, Hibberd P. Intimate partner violence during pregnancy and perinatal mental disorders in low and lower middle income countries: A systematic review of literature, 1990-2017. *Clin Psychol Rev.* 2018;66:117-135. doi: 10.1016/j.cpr.2017.11.004
 74. Alhusen JL, Frohman N, Purcell G. Intimate partner violence and suicidal ideation in pregnant women. *Arch Womens Ment Health.* 2015;18(4):573-8. doi: 10.1007/s00737-015-0515-2
 75. Gandhi SG, Gilbert WM, McElvy SS, El Kady D, Danielson B, Xing G, Smith LH, et al. Maternal and neonatal outcomes after attempted suicide. *Obstet Gynecol.* 2006;107(5):984-90. doi: 10.1097/01.AOG.0000216000.50202.f6
 76. Pinheiro RT, da Cunha Coelho FM, da Silva RA, de Ávila Quevedo L, de Mattos Souza LD, Castelli RD, de Matos MB, Pinheiro KA. Suicidal behavior in pregnant teenagers in southern Brazil: social, obstetric and psychiatric correlates. *J Affect Disord.* 2012;136(3):520-5. doi: 10.1016/j.jad.2011.10.037
 77. Kim JJ, La Porte LM, Saleh MP, Allweiss S, Adams MG, Zhou Y, Silver RK. Suicide risk among perinatal women who report thoughts of self-harm on depression screens. *Obstet Gynecol.* 2015;125(4):885-93. doi: 10.1097/AOG.0000000000000718
 78. Gissler M, Hemminki E, Lönnqvist J. Suicides after pregnancy in Finland, 1987-94: Register linkage study. *BMJ* 1996;313(7070):1431-4. doi: 10.1136/bmj.313.7070.1431
 79. Schiff MA, Grossman DC. Adverse perinatal outcomes and risk for postpartum suicide attempt in Washington state, 1987-2001. *Pediatrics.* 2006;118(3):e669-75. doi: 10.1542/peds.2006-0116
 80. Zhong QY, Gelaye B, Karlson EW, Avillach P, Smoller JW, Cai T, Williams MA. Associations of antepartum suicidal behaviour with adverse infant and obstetric outcomes. *Paediatr Perinat Epidemiol.* 2019;33(2):137-44. doi: 10.1111/ppe.12535
 81. Czeizel AE, Szabados A, Susánszky E. Lower birth weight of offspring born after self-poisoning of parent. *Mutat Res.* 1992;269(1):35-9. doi: 10.1016/0027-5107(92)90158-x
 82. Sorenson SB, Rutter CM. Transgenerational patterns of suicide attempt. *J Consult Clin Psychol.* 1991;59(6):861-73.
 83. Lysell H, Runeson B, Lichtenstein P, Långström N. Risk factors for filicide and homicide: 36-year national matched cohort study. *J Clin Psychiatry.* 2014;75(2):127-32. doi: 10.4088/JCP.13m08372
 84. Paris R, Bolton RE, Weinberg MK. Postpartum depression, suicidality, and mother-infant interactions. *Arch Women's Ment Health.* 2009;12(5):309-21. doi: 10.1007/s00737-009-0105-2
 85. Babu GN, Subbakrishna DK, Chandra PS. Prevalence and correlates of suicidality among Indian women with post-partum psychosis in an inpatient setting. *Aust NZJ Psychiatry* 2008;42(11):976-80. doi: 10.1080/00048670802415384
 86. Orri M, Gunnell D, Richard-Devantoy S, Bolanis D, Boruff J, Turecki G, Geoffroy MC. In-utero and perinatal influences on suicide risk: A systematic review and meta-analysis. *Lancet Psychiatry.* 2019;6(6):477-92. doi: 10.1016/S2215-0366(19)30077-X.
 87. Friedman SH, Horwitz SM, Resnick PJ. Child murder by mothers: A critical analysis of the current state of knowledge and a research agenda. *Am J Psychiatry.* 2005;162(9):1578-87. doi: 10.1176/appi.ajp.162.9.1578
 88. Naviaux AF, Janne P, Gourdin M. Psychiatric considerations on infanticide: Throwing the baby out with the bathwater. *Psychiatr Danub.* 2020;32(1):24-8.
 89. Shea AK, Wolfman W. The role of hormone therapy in the management of severe postpartum depression in patients with Turner syndrome. *Menopause.* 2017;24(11):1309-12. doi: 10.1097/GME.0000000000000915

90. Pirec V. What can happen when postpartum anxiety progresses to psychosis? A case study. *Case Rep Psychiatry*. 2018;2018:8262043. doi: 10.1155/2018/8262043
91. Spinelli MG. Maternal infanticide associated with mental illness: Prevention and the promise of saved lives. *Am J Psychiatry*. 2004;161(9):1548-57. doi: 10.1176/appi.ajp.161.9.1548
92. Wisner KL, Sit DK, McShea MC, et al. Onset timing, thoughts of self-harm, and diagnoses in postpartum women with screen-positive depression findings. *JAMA Psychiatry*. 2013;70(5):490-98.
93. Kendig S, Keats JP, Hoffman MC, Kay LB, Miller ES, Moore Simas TA, Frieder A, Hackley B, Indman P, Raines C, Semenuk K, Wisner KL, Lemieux LA. Consensus bundle on maternal mental health: Perinatal depression and anxiety. *Obstet Gynecol*. 2017;129(3):422-430. doi: 10.1097/AOG.0000000000001902
94. Siu AL; US Preventive Services Task Force (USPSTF), Bibbins-Domingo K, Grossman DC, Baumann LC, Davidson KW, Ebell M, Garcia FA, Gillman M, Herzstein J, Kemper AR, Krist AH, Kurth AE, Owens DK, Phillips WR, Phipps MG, Pignone MP. Screening for depression in adults: US preventive services task force recommendation statement. *JAMA*. 2016;315(4):380-7. doi: 10.1001/jama.2015.18392
95. Committee on Obstetric Practice. ACOG Committee Opinion No. 757. Screening for Perinatal Depression. American College of Obstetricians and Gynecologist. 2018;132(5) Available from: www.acog.org/-/media/project/acog/acogorg/clinical/files/committee-opinion/articles/2018/11/screening-for-perinatal-depression.pdf.
96. Mota NP, Chartier M, Ekuma O, Nie Y, Hensel JM, MacWilliam L, McDougall C, Vigod S, Bolton JM, Mota NP, et al. Mental disorders and suicide attempts in the pregnancy and postpartum periods compared with non-pregnancy: A population-based study. *Can J Psychiatry*. 2019;64(7):482-91. doi: 10.1177/0706743719838784
97. Kim JH, Choi SS, Ha K. J. A closer look at depression in mothers who kill their children: Is it unipolar or bipolar depression? *Clin Psychiatry*. 2008;69(10):1625-31. doi: 10.4088/jcp.v69n1013.
98. Sharma V, Thomson M. Peripartum suicide: Additional considerations. *Can Med Assoc J*. 2018;190(2):E57. doi: 10.1503/cmaj.733569