

## Maternal depressive symptoms during immediate postpartum: associated factors

Sintomas depressivos maternos no puerpério imediato: fatores associados

Síntomas maternos de depresión en el puerperio inmediatamente posterior al parto: factores asociados

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### Keywords

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### Descritores

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### Descriptores

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### Abstract

**Objective:** Investigate the prevalence and risk factors for maternal depressive symptoms in the immediate postpartum period.

**Methods:** Cross-sectional study, involving 1099 postpartum women. The presence of maternal depressive symptoms was measured using the Edinburgh Postnatal Depression Scale, applied on the second day after birth, adopting  $\geq 10$  as a cut-off point. The data were collected in Botucatu-SP between January and June 2012. Factors associated with the depressive symptoms were initially investigated using multiple logistic regression, and those associated at the level of  $p < 0.20$  were included in the final regression model, significance being set as  $p < 0.05$ , with a 95% confidence level. This study received approval from a Research Ethics Committee and complied with the recommendations for research involving human beings.

**Results:** The prevalence of depressive symptoms amounted to 6.7%. Use of antidepressants during pregnancy, violence suffering during pregnancy and cesarean section were associated with the depressive symptoms in the immediate postpartum two, four and two times, respectively.

**Conclusion:** Women taking antidepressants, who were victims of violence during pregnancy and who gave birth through a cesarean section need particular attention, considering that these events were identified as risk factors for depressive symptoms.

### Resumo

**Objetivo:** Investigar a prevalência e fatores de risco para sintomas depressivos maternos no puerpério imediato.

**Métodos:** Estudo transversal, realizado com 1099 puérperas. A presença de sintomas depressivos maternos foi obtida com a escala de Depressão Pós-natal de Edimburgo, aplicada no segundo dia após o parto, adotando-se como ponto de corte escore  $\geq 10$ . Os dados foram coletados em Botucatu-SP, no período de janeiro a junho de 2012. Fatores associados aos sintomas depressivos foram inicialmente investigados por regressão logística múltipla e aqueles associados em nível de  $p < 0,20$  foram incluídos em modelo de regressão final, considerando-se nível crítico de significância  $p < 0,05$ , com intervalo de confiança de 95%. Este estudo foi aprovado por Comitê de Ética em Pesquisa e atendeu às recomendações para pesquisas com seres humanos.

**Resultados:** A prevalência de sintomas depressivos foi de 6,7%. Uso de medicação antidepressiva na gestação, violência sofrida na gestação e cesariana associaram-se a sintomas depressivos no puerpério imediato em duas, quatro e duas vezes, respectivamente.

**Conclusão:** Especial atenção deve ser dada às mulheres usuárias de medicação antidepressiva, àquelas que sofreram violência na gestação e às que evoluíram para cesariana, visto que esses eventos foram identificados como fatores de risco de sintomas depressivos.

### Resumen

**Objetivo:** Investigar la prevalencia y factores de riesgo para síntomas depresivos maternos en el período inmediatamente posterior al parto.

**Métodos:** Estudio transversal realizado con 1099 parturientas. La presencia de síntomas depresivos maternos se logró con la escala de Depresión Postnatal de Edimburgo, aplicada en el segundo día después del parto, adoptándose como punto de corte la puntuación de  $\geq 10$ . Se recogieron datos en Botucatu-SP, en el período de enero a junio de 2012. Los factores asociados a los síntomas depresivos fueron investigados inicialmente por regresión logística múltiple y los asociados a nivel de  $p < 0,20$  se incluyeron en el modelo de regresión final, teniendo en cuenta el nivel crítico de significancia  $p < 0,05$  con un intervalo de confianza del 95%. Este estudio fue aprobado por el Comité de Ética en Investigación y contempló las recomendaciones para investigaciones con seres humanos.

**Resultados:** La prevalencia de síntomas depresivos fue del 6,7%. El uso de medicación antidepressiva en la gestación, violencia sufrida en la gestación y cesárea, se asociaron a síntomas depresivos en el puerperio inmediato en dos, cuatro y dos veces, respectivamente.

**Conclusión:** Se debe prestar especial atención a las mujeres usuarias de medicamentos antidepressivos, a las que han sufrido violencia durante el embarazo y a las que han tenido una cesárea, ya que estos eventos fueron identificados como factores de riesgo para síntomas depresivos.

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## Introduction

The pre and postpartum periods have been particularly identified as part of the phase in the woman's life where the risk of presenting some mental disorder is greater. When she becomes a mother, the woman leaves her social activities (some forms of leisure or work, activities previously practiced and whose frequency can be reduced after the child's birth) to take care of the child and this fact, combined with the adaptation to the new roles required, can generate an individual psychological demand in the existing relationships and resources. Also, some emotional instability is natural to the transitions of life and adaptations to the changes, being the process of pregnancy, delivery and the birth of a child an important moment of transition.<sup>(1)</sup> It is noteworthy that one third of the women who develop depressive symptoms in the postpartum maintain the condition beyond the first year after giving birth.<sup>(2)</sup>

The main mental disorder that affects women in the pregnancy-postpartum cycle is depression: its prevalence amounts to 10% during pregnancy and 13% after delivery in women from high-income countries. In developing countries, rates are even higher: 15.6% during pregnancy and 19.8% postpartum.<sup>(3)</sup> Thus, depression in both underdeveloped and developing countries is a relevant problem.<sup>(4)</sup>

At present, there is an understanding that postpartum depression may be the continuation of prepartum depression and that, the earlier the condition is identified, the greater the chances of interventions that reduce its negative impact. Evidence shows that prepartum depression is the main risk factor for postpartum depression, which is often a continuation of the depression that started during pregnancy.<sup>(5)</sup> It is important to note that depression in the pregnancy-postpartum cycle can entail severe consequences for the woman, family and child, affecting the formation of the fetus as well as mother-infant bonding and consequent damage in its development, which evidences the importance of investigating the depressive symptoms in prenatal care.<sup>(6)</sup>

The risk factors for the occurrence of depressive disorders (pre and postpartum) already identified in

the literature include: background history of depression; absence of social, family or marital support; unwanted pregnancy; extreme stress and anxiety; addiction to alcohol, tobacco or other drugs; history of domestic violence and poverty. Much of the research admits that these factors act interrelated in the genesis of depression. Overall, the risk factors associated with depression in the pregnancy-postpartum cycle in developing countries were the same as those found in developed countries, except for some factors in economically unfavorable contexts, such as low education level, unemployment, financial difficulties and violence, which were predominant in studies in low-income countries.<sup>(3,5,7,8)</sup>

In view of the above, the objective of this study is to investigate the prevalence and risk factors for maternal depressive symptoms in the immediate postpartum. We believe that the answers can guide antenatal and birth care actions at the local level and will broaden the understanding of this important aspect of health today.

## Methods

Epidemiological and cross-sectional study. The data come from a larger study "The mother-child binomial in Botucatu: epidemiological study with emphasis on maternal and infant morbidity and mortality".

The study was carried out in Botucatu, a city located in the Central South of the State of São Paulo, with an estimated population of 138,590 inhabitants in 2018, which is part of the Regional Health Department VI (DRS VI), Bauru, together with 67 other cities. In 2016, 1735 children were born alive in this city. The municipal infant mortality rate was 12.6 per thousand live births, approximately half of the population (47.2%) had formal employment in the service area and the average monthly income in this area was R\$ 3,458.30. The city has a human development index (HDI) of 0.800, which is higher than that of the state (HDI = 0.783).<sup>(9)</sup>

Data were collected in the maternity wards of the two hospitals in the city, being one public and another belonging to the supplementary

health network, from January to June 2012. The population of interest consisted of the postpartum women (N = 1395) who had children in Botucatu during this period. A convenience sample was selected, without calculating the minimum number needed, as the intention was to capture, during the established period, all the postpartum women. The only inclusion criterion was to have given birth in one of the two maternity hospitals in the city. Due to the impossibility of contact before hospital discharge, out of 1395 postpartum women, 1317 were contacted, and 22 cases of twin pregnancy and 196 cases with incomplete data on variables related to the mother and/or baby were excluded, resulting in an intentional sample of 1099 puerperal women included in this study.

The data were collected during visits to the maternity hospitals in the immediate postpartum, on the second day after birth, using the histories, delivery room notes, antenatal cards and interviews with the postpartum women, after they had signed the Informed Consent Form. To collect the data, tools specifically constructed for the “mother” research were used.

The exposure variables included maternal sociodemographic data: age at birth (years), self-reported skin color (white, non-white), complete elementary education or higher (yes, no) and presence of partner (yes, no); obstetric history: number of pregnancies, births, abortions and previous live births; pre-pregnancy weight (kg); pre-pregnancy health problem (yes, no); data on the current pregnancy: gestational age at the first antenatal visit and at delivery (weeks), antenatal care (yes, no), number of antenatal consultations, planned pregnancy (yes, no) and pregnancy classified as risky (yes, no); smoking (yes, no), use of alcohol (yes, no), use of illicit drugs (yes, no) during pregnancy, violence suffered during pregnancy (yes, no), self-reported use of antidepressants (yes, no) and disease problems during pregnancy (yes, no); delivery route (vaginal delivery, cesarean section); problems during delivery (yes, no) and infant weight at birth (grams). The outcome variable was the presence of depressive symptoms (yes, no).

The assessment of depressive symptoms and their subsequent classification were performed using the Edinburgh Postnatal Depression Scale (EPDS). This scale can be applied by interview or self-reported, measuring the presence and intensity of depressive symptoms during the seven days prior to data collection. It was applied by means of an interview, together with the other questions in the instruments the interviewers used. The application result of the EPDS can range from zero (best situation) to 30 (worst-case scenario). Several studies appoint  $\geq 10$  as a positive predictive score in depression screening, and this value was adopted in this study.<sup>(10-12)</sup>

To evaluate the factors associated with maternal depressive symptoms, multiple logistic regression was performed, using all variables of interest. Then, the most strongly associated variables ( $p < 0.20$ ) were included in a second final multiple model, when  $p < 0.05$  was used to consider the association between exposure and outcome. Relationships were considered statistically significant if  $p < 0.05$ , adopting a 95% confidence interval (CI). The analysis was performed using the software SPSS version 21.0.

This study complied with the recommendations of Resolution 466/12 and received approval from the Research Ethics Committee at Botucatu Medical School, Universidade Estadual Paulista “Júlio de Mesquita Filho” (CAAE 65750817.0.0000.5411, Approval Opinion: 1.997.274). Women with a score  $\geq 10$  in the EPDS were treated in routine basic care, with the possibility of referral to a specialized service when necessary.

## Results

The prevalence of depressive symptoms among postpartum women was 6.7% (74 women), the maximum EPDS score was 26, with a single case. The median maternal age was 26 years (13-48 years); the median number of previous pregnancies, births and live births was 1 (0-9); the median number of antenatal consultations was 9 (1-20) and the median birth weight of the infant was 3190 grams (880-5210 grams), as shown in table 1.

**Table 1.** Characteristics of mothers and infants included in the study

Characteristics	Median (minimum-maximum)
Age at birth (years)	26(13 - 48)
Number of previous pregnancies	1(0 - 9)
Number of previous deliveries	1(0 - 9)
Number of previous abortions	0(0 - 5)
Number of previous live births	1(0 - 9)
Pre-pregnancy weight (kilograms)	62(40- 145)
Gestational age (weeks) at first antenatal consultation	9(5 - 40)
Number of antenatal consultations	9(1 - 20)
Gestational age (weeks) at birth	38(26 - 42)
Infant weight at birth (grams)	3190(880 - 5210)
Variables	n(%)
Self-referred skin color	
White	851(77.4)
Not white	248(22.6)
Finished elementary education or higher	
Yes	888(80.8)
No	211(19.2)
Presence of companion	
Yes	934(85.0)
No	165(15.0)
Planned pregnancy	
Yes	488(44.4)
No	611(55.6)
Participation in antenatal care	
Yes	1094(99.5)
No	5(0.5)
Health problem before pregnancy	
Yes	588(53.5)
No	511(46.5)
Pregnancy classified as risky	
Yes	392(35.7)
No	707(64.3)
Smoking during pregnancy	
Yes	137(12.5)
No	962(87.5)
Alcohol use during pregnancy	
Yes	41(3.7)
No	1058(96.3)
Illegal drug use during pregnancy	
Yes	5(0.5)
No	1094(99.5)
Violence suffered during pregnancy	
Yes	13(1.2)
No	1086(98.8)
Use of antidepressants during pregnancy	
Yes	30(2.7)
No	1069(97.3)
Disease interfering in pregnancy	
Yes	252(22.9)
No	847(77.1)
Birth route	
Vaginal birth	514(46.8)
Cesarean section	585(53.2)
Problems at birth	
Yes	206(18.7)
No	893(81.3)

Most postpartum women had finished primary education or higher and had a partner. Almost all women (99.5%) had participated in antenatal care and more than half mentioned some health problem during the pregnancy. In addition, 35.7% of the study participants were classified as pregnant women at risk. Smoking was present in 12.5% of the pregnant women and alcohol consumption in 3.7%. About one percent of the postpartum women had taken illegal drugs and had been victims of violence during the pregnancy. In 53.2% of the cases, the infant was born through a cesarean section (Table 1).

Factors associated with the presence of maternal depressive symptoms are displayed in table 2. Skin color, taking antidepressants during pregnancy, pre-pregnancy weight, participation in prenatal care, violence suffered during pregnancy, gestational age at birth and birth through cesarean section were the variables selected for inclusion in the final multiple logistic regression model (Table 3), as those were the variables most strongly associated with depressive symptoms in the immediate postpartum ( $p < 0.20$ ).

**Table 2.** Multiple logistic regression of sociodemographic, obstetric and clinical history variables, considering the outcome maternal depressive symptoms

Variables	OR	95%CI	p-value
Age at birth (years)	1.01	0.96 1.05	0.816
White skin color	1.52	0.87 2.65	0.139
Finished elementary education or higher	1.15	0.56 2.33	0.703
Presence of companion	0.87	0.42 1.80	0.710
Number of previous pregnancies	1.66	0.61 4.52	0.324
Number of previous deliveries	0.83	0.42 1.64	0.594
Number of previous abortions	1.03	0.38 2.76	0.958
Number of previous live births	0.85	0.32 2.30	0.753
Pre-pregnancy weight (kilograms)	1.01	1.00 1.03	0.097
Health problem before the pregnancy	1.00	0.56 1.79	1.000
Disease interfering in pregnancy	0.92	0.44 1.94	0.834
Use of antidepressants during pregnancy	3.68	1.45 9.30	0.003
Gestational age (weeks) at first antenatal consultation	1.03	0.98 1.08	0.244
Planned pregnancy	1.21	0.71 2.09	0.481
Participation in antenatal care	0.17	0.02 1.71	0.134
Number of antenatal consultations	0.94	0.84 1.05	0.277
Pregnancy classified as risky	0.71	0.37 1.38	0.310
Smoking during pregnancy	1.24	0.59 2.62	0.572
Alcohol use during pregnancy	0.88	0.27 2.89	0.839
Illegal drug use during pregnancy	2.92	0.21 41.49	0.429
Violence suffered during pregnancy	4.36	1.03 18.44	0.045
Gestational age (weeks) at birth	0.91	0.80 1.04	0.177
Cesarean section	2.58	1.43 4.65	0.002
Problems during birth	0.71	0.36 1.38	0.308

**Table 3.** Final multiple logistic regression model considering sociodemographic, clinical and obstetric variables and maternal depressive symptoms

Variables	OR	95%CI	p-value
White skin color	1.63	0.97-2.76	0.068
Use of antidepressants during pregnancy	2.07	1.12-3.61	0.010
Pre-pregnancy weight (kilograms)	1.01	0.99-1.02	0.206
Participation in antenatal care	0.19	0.02-1.81	0.149
Violence suffered during pregnancy	4.06	1.02-16.19	0.047
Gestational age (weeks) at birth	0.91	0.82-1.01	0.086
Cesarean section	2.07	1.22-3.53	0.007

Table 3 refers to the final multiple logistic regression model. Use of antidepressants during pregnancy, being a victim of violence during pregnancy and giving birth through a cesarean section were independently associated with the presence of maternal depressive symptoms. Taking antidepressants increased the chance of depressive symptoms in the immediate postpartum period twice (OR=2.07, 95% CI=1.12-3.61); being a victim of violence during pregnancy four times (OR=4.06, 95% CI=1.02-16.19) and giving birth through cesarean section twice (OR=2.07, 95% CI=1.22-3.53).

## Discussion

In this study, the occurrence of depressive symptoms in postpartum women was investigated, which were evaluated two days after birth, by means of a consistent, validated and widely used instrument in the literature. Adopting the cutoff point  $\geq 10$ , 6.7% of the postpartum women presented depressive symptoms. As, in the EPDS, the depressive symptoms refer to the seven days before the application and the scale was used during the hospitalization to give birth, with application on the second day postpartum, the prevalence of depressive symptoms was evaluated in the immediate postpartum. Eventually, such symptoms may be the continuity of other similar ones that occurred during the pregnancy or even in previous phases of life, as the research by Pereira et al., Ghaedrahmati et al. and Faisal-Cury et al. allows us to suppose.<sup>(5,13,14)</sup>

Three factors were identified that are independently associated with the increased chance of depressive symptoms: use of antidepressants during pregnancy, being a victim of violence

during pregnancy and cesarean birth of the child. Considering that the underdiagnosis of gestational depression is common and that there is reluctance to prescribe and use medication during this period,<sup>(15)</sup> it is possible that the postpartum women who took antidepressants in the prenatal period were those who presented depressive symptoms prior to pregnancy, since the start of pregnancy or with greater severity. Nevertheless, the use of antidepressants in pregnancy was investigated, without addressing the previous use, which is a limitation of this study.

The American College of Obstetricians and Gynecologists advocates that midwives systematically investigate psychosocial stressors and depression in each gestational trimester and in the postpartum, and act with the necessary care in positive cases.<sup>(16)</sup> In the main current public policy on maternal and child health, the Stork Network, the postpartum period is considered as fundamental to detect problems in situations that can lead to depression and that require clinical follow-up.<sup>(17)</sup>

In the scientific literature, an association has been found between mental health disorder during pregnancy and the occurrence of postpartum depression: Ghaedrahmati et al., in a review of the literature between 2000 and 2015, pointed out that the previous history of depression and anxiety figured among the factors most strongly associated with postpartum depression.<sup>(13)</sup> Faisal-Cury et al., in a study involving 831 women in the city of São Paulo, found a risk of postpartum depression 2.4 times higher among women who presented prepartum depression.<sup>(14)</sup> These studies reinforce the importance of the early evaluation of postpartum women to screen for symptoms of depressive disorders. Also in this context, in a study conducted in Rio Grande do Sul in 2013, EPDS was applied within two days after delivery and a cut-off point  $\geq 10$  was established. Postpartum depressive symptoms were significantly associated with depression at some point in pregnancy or sadness during the last trimester of pregnancy, which corroborates the findings of this research and supports systematic screening for depression in antenatal care and in maternity wards.<sup>(18,19)</sup>

The violence suffered during pregnancy figured as a negative determinant for depressive symptoms in the immediate postpartum, enhancing the recognition already present in the literature of the severe consequences of gestational violence for the woman and the baby. A Japanese research has pointed out that both physical violence and verbal violence are causal determinants for the development of depressive symptoms in mothers during pregnancy, emphasizing the importance of nurses to identify violence during their care of pregnant women and to refer timely for psychosocial support, as a way to prevent depressive symptoms before and after childbirth<sup>(19)</sup> and also to reduce its negative repercussions on the mother-child binomial.

A study conducted in Tanzania with 1013 women pointed out that one in three women were exposed to intimate partner violence during pregnancy, which contributed to the close association with the development of postpartum depression. Exposure to domestic violence at least once increased the risk of postpartum depression by more than three times.<sup>(20)</sup> A similar finding was obtained in Bangladesh, in a study in which more than half of women who experienced physical, sexual or psychological violence during pregnancy developed postpartum depression.<sup>(21)</sup> Also in an Indian research, a relationship was found between exposure to partner violence in the immediate postpartum, postpartum depression, and suicidal ideas.<sup>(22)</sup>

Another factor associated with depressive symptoms in this study was having given birth through a cesarean section, a situation that increased the chance of scoring  $\geq 10$  in the EPDS twofold. This result, although difficult to fully explain, also finds support in the literature: in a systematic review, cesarean section was appointed as a risk factor for postpartum depressive symptoms, the explanatory hypothesis being the surgical trauma or the problems that led to the indication of the surgery, such as pelvic pain, gastrointestinal problems, among others, all of which could affect the mother's psychological condition.<sup>(23)</sup> In a recent study in California, involving 223 women, the participants who gave birth by vaginal delivery had almost half the chance of postpartum depressive symptoms when com-

pared to women who gave birth through cesarean delivery.<sup>(24)</sup> The study closest to the present study was conducted in Italy, with 950 women being evaluated using EPDS on the second day after delivery and adopting the same cut-off point as in this study, and this also identified a positive association between cesarean section and depressive symptoms.<sup>(25)</sup>

The analysis performed and the result obtained are relevant, especially in view of the high cesarean rate in Brazil. It is difficult to evaluate the sense of the association, as depressive symptoms prior to delivery may favor the cesarean section and the opposite, that is, the cesarean section may trigger depressive symptoms in women.<sup>(23)</sup> Only prospective studies can better reveal the temporality of this relationship.

Comparing the prevalence of maternal depressive symptoms in Botucatu with the results reported by other authors is a difficult task, as measures and/or cutoff points can be used in the studies, besides variations in how long the symptoms are measured. In addition, it must be taken into account that sociocultural factors may be important and may influence the results of the studies. Nevertheless, some research results deserve to be presented.

In 2014, in a study carried out in Spain and France, a high rate was found, with 39.3% of postpartum depression but, despite adopting the same data collection instrument used in this study, the cut-off point was higher ( $\geq 12$ ), and the instrument was applied four weeks after delivery.<sup>(4)</sup> It is possible that differences in sample characteristics may be the main cause of the difference in prevalence between these results.

In a literature review that included studies developed in nine countries, including Brazil, the postpartum depression rate varied strongly: 4.9% in Nepal, EPDS being applied between five and ten weeks postpartum and cut-off point  $> 12$ ; and 59.4% in India, with EPDS application as from six months postpartum and cut-off point  $\geq 10$ .<sup>(26)</sup>

In a Brazilian study carried out in the state of Minas Gerais, the prevalence of postpartum depression was 26.9%, also using a cut-off point  $\geq 10$ .<sup>(12)</sup> In another study performed in Bauru, in the interior of São Paulo, the cutoff point was 12 and the

prevalence was 29.5%.<sup>(27)</sup> Faisal-Cury et al. found a prevalence of 15.9%, with data being collected on the tenth day postpartum and adopting the Beck Depression Inventory as a measure of depression.<sup>(28)</sup>

The two surveys closest to the present study found higher prevalence rates: in a public hospital in the city of São Paulo, applying EPDS on the second or third day postpartum and adopting the same cutoff point ( $\geq 10$ ), the prevalence was 18%.<sup>(29)</sup> In the city of Rio Grande/RS, using the same scale and cutoff point, the prevalence was 14%, and the measure was taken on the second day postpartum.<sup>(18)</sup>

In view of the above, the comparison of the prevalence rate obtained in Botucatu with others found in Brazil and abroad should be performed with caution, considering the differences related to the evaluation moment, the scale used and the cutoff point adopted.

Even with a lower prevalence than in other studies, 6.7% of postpartum women with depressive symptoms is a relevant finding, justifying the attention of maternity teams, due to the potential negative impact on the initial care for the child. The use of EPDS in the immediate postpartum refers to the depressive symptoms the women experience during a delicate period, which includes the final days of pregnancy and the first days of the baby's life. Thus, recognizing the presence of depressive symptoms and the associated factors while still in the maternity hospital can result in the health team taking actions to prevent depression in the postpartum period.

The time of onset of the depressive symptoms could not be identified and the use of antidepressants during or before the pregnancy could not be evaluated, as the women were not monitored during the pregnancy, a limitation inherent in the cross-sectional design. It is also worth noting that, despite the existence of a condition known as puerperal sadness or baby blues, with symptoms similar to those of depression, when evaluating the women on the second day postpartum, the chances of having identified this condition instead of the depressive symptoms that were the actual focus of this study are small, considering that baby blues start between the third and fourth day postpartum.<sup>(30)</sup>

## Conclusion

The prevalence of depressive symptoms in the immediate postpartum corresponded to 6.7%. Postpartum women who took antidepressants during pregnancy, were victims of some type of violence while pregnant or gave birth through a cesarean section present a greater chance of depressive symptoms. In view of these results, the maternity health teams should pay particular attention to women with these characteristics.

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## Collaborations

Poles MM contributed to the project design, writing of the article and final approval of the version for publication. Carvalheira APP, Carvalhaes MABL and Parada CMGL collaborated with the data analysis and interpretation, critical review of the intellectual content and final approval of the version for publication.

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3. Worldwide about 10% of pregnant women and 13% of women who have just given birth experience a mental disorder, primarily depression. In developing countries this is even higher, i.e. 15.6% during pregnancy and 19.8% after child birth. In severe cases mothers' suffering might be so severe that they may even commit suicide. In addition, the affected mothers cannot function properly. As a result, the children's growth and development may be negatively affected as well. Maternal mental disorders are treatable. Effective interventions can be delivered even by well-trained non-specialist health providers.

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