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# Depression with postpartum onset: a prospective cohort study in women undergoing elective cesarean section in Brasilia, Brazil

*Depressão com início após o parto: estudo de corte prospectivo em mulheres submetidas à cesárea eletiva em Brasília, Brasil*

## Artigo Original

### Keywords

Depression, postpartum  
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### Palavras-chave

Depressão pós-parto  
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Assistência perinatal  
Complicações na gravidez

### Abstract

**PURPOSE:** It was to determine the prevalence of depressive symptoms in a sample of puerperal women from Brasília, Brazil, distinguishing cases with onset after delivery from those already present during pregnancy. **METHODS:** A prospective cohort study with convenience sampling of patients submitted to elective cesarean section at two private hospitals. As an instrument for assessing depressive symptoms, the Edinburgh Postnatal Depression Scale with cutoff  $\geq 13$  was applied shortly before delivery and four to eight weeks after childbirth. **RESULTS:** Among the 107 women who completed the study, 11 (10.3%) had significant depressive symptoms during pregnancy and 12 (11.2%) during the postpartum period. Among the 12 patients with postpartum symptoms, 6 had symptoms during pregnancy, so that 5.6% of the sample had postpartum onset of depression. The higher overall frequency of depression was significantly among single women than among married women ( $p=0.04$ ), a fact mainly due to a higher frequency of single women experiencing persistent depressive symptoms both before and after delivery ( $p=0.002$ ). The risk of depression was not influenced by age, parity or educational level. **CONCLUSION:** Women with depression identified during the postpartum period comprise a heterogeneous group, in which symptoms may have started before pregnancy, during pregnancy or after childbirth. In this sample, half of the postpartum depression cases already presented symptoms during late pregnancy. Since depression can arise before and after childbirth, it may have different etiologies and, therefore, a different response to treatment, a possibility that should be considered by clinicians and researchers.

### Resumo

**OBJETIVO:** Foi determinar a prevalência de sintomas depressivos em uma amostra de puérperas da cidade de Brasília, Brasil, discriminando os casos com surgimento após o parto daqueles já presentes durante a gestação. **MÉTODOS:** Estudo de corte prospectivo. Amostragem por conveniência de pacientes que seriam submetidas à cesariana eletiva em dois hospitais privados. Como instrumento para avaliar os sintomas depressivos, foi utilizada a Escala de Depressão Pós-natal de Edimburgo, com ponto de corte  $\geq 13$ , aplicada momentos antes do parto e quatro a oito semanas após o nascimento da criança. **RESULTADOS:** Das 107 mulheres que completaram o estudo, 11 (10,3%) apresentaram sintomas depressivos significativos na gestação e 12 (11,2%) no período pós-parto. Das 12 pacientes com sintomas no pós-parto, 6 já tinham os sintomas durante a gestação, de modo que 5,6% da amostra teve depressão com início após o parto. A frequência global de depressão foi significativamente maior entre as mulheres solteiras em comparação com mulheres casadas ( $p=0,04$ ) por causa principalmente da maior frequência de mulheres solteiras apresentando sintomas depressivos persistentes, antes e depois do parto ( $p=0,002$ ). O risco de depressão não foi influenciado pela idade, paridade e escolaridade. **CONCLUSÃO:** As mulheres com depressão reconhecida no período pós-parto compõem um grupo heterogêneo, no qual o quadro pode ter tido início antes da gestação, durante a gestação ou após o parto. Na amostra estudada, metade dos casos de depressão reconhecida após o parto já apresentava os sintomas no final da gestação. Uma vez que a depressão que surge antes e após o parto pode ter etiologia diferente e, portanto, apresentar resposta ao tratamento diferente, os clínicos e pesquisadores devem estar atentos a essa possibilidade.

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## Introduction

Depression affects one in every eight women in the postpartum period<sup>1</sup> and may have adverse consequences for mother, infant and their family. The possibility that the disorder with onset after childbirth has unique features was first suggested in the sixties. In a pioneering study by Pitt et al.<sup>2</sup>, three hundred women were evaluated at the seventh month of pregnancy and again in the second month postpartum. Among women whose disorder arose after delivery, the symptoms were different from those of classic depression, and the condition was so-called “atypical postpartum depression”<sup>2</sup>. In the following decade, the expression “postpartum depression” appeared in scientific publications, but with an important conceptual change. Rather than only referring to the condition that emerged after delivery, the term was used to describe any case of depression diagnosed in the postpartum period, regardless of when depressive symptoms actually appeared. As a consequence, the term “postpartum depression” lost its specificity and its exact meaning became confusing<sup>3</sup>.

The consequences of this change might be relevant to clinical practice since there are some peculiarities in depression with onset after delivery, such as the high probability of concomitant anxiety and obsessive-compulsive symptoms, lower incidence of suicide, delayed response to treatment and the need for pharmacological treatment<sup>4</sup>. In addition, the distinction of depression that arises after delivery from that which precedes it is important for the investigation of its etiology, pathophysiology and triggering factors. If depression with onset after childbirth is a specific entity, then analyzing these patients together with patients with antenatal depression would potentially lead to confusing results. This could be the case when evaluating the influence of hormonal changes in the occurrence of postnatal depression (PND). There is evidence that some women may be more sensitive to postpartum hormonal changes. In these women, the abrupt decline in the serum level of hormones that follows placental expulsion is associated with mood changes and depressive symptoms<sup>5-7</sup>. The hormones probably involved in these changes are estrogen<sup>5</sup>, progesterone<sup>5</sup>, corticotropin releasing hormone (CRH)<sup>6,8-10</sup>, and cortisol<sup>6,9</sup>. In our opinion, if the drop in the serum levels of placental hormones is considered to play a role in triggering postpartum depression, then the inclusion of women who were already depressed during pregnancy — and therefore before the drop in placental hormones — under this denomination would mean that distinct disorders would receive the same denomination.

In a recent review of Brazilian studies<sup>4</sup> addressing postpartum depression, there was a wide variation in its prevalence, ranging from 7.2<sup>11</sup> to 43%<sup>12</sup>. Only one of

these studies distinguished between depressive symptoms with onset before or after delivery<sup>12</sup>. Since in all other studies women were evaluated only in the postpartum period<sup>13-22</sup>, the proportion of women whose depressive symptoms in fact began in the postpartum period remains largely unknown.

The aim of this study was to determine the prevalence of depressive symptoms in a sample of puerperal women of Brasília – Brazil, distinguishing women whose symptoms were already present during pregnancy from those whose symptoms begun after delivery.

## Methods

This was a prospective cohort study carried out January and April 2011 in two large private hospitals, located in central Brasília, Distrito Federal, whose users consisted mainly of Supplementary Health System users (health insurance plans). The study was approved by the Catholic University of Brasilia Ethics Committee and all women who agreed to participate signed the informed consent form.

A convenience sample was composed of women submitted to elective cesarean section that were enrolled in a study to evaluate the correlation between hormonal concentrations in cerebrospinal fluid and the occurrence of postpartum depression, which is nearing completion. Women with singleton pregnancies terminated between 37 and 42 weeks by elective caesarean section that agreed to participate in the study were included. Exclusion criteria were labor pains, hypertensive disorders, diabetes, premature rupture of membranes, antidepressants use in the previous six months, glucocorticoid use during pregnancy and the diagnosis of fetal malformations or other disorders.

Depressive symptoms were assessed by the Edinburgh Postnatal Depression Scale (EPDS)<sup>23</sup>, which is a validated tool for use both during pregnancy and in the postpartum period<sup>24</sup>. The EPDS is a self-report questionnaire with ten items to which the patient assigns a score ranging from zero (no symptom) to three (severe symptoms), so that a final score from 0 to 30 points may be obtained. The cutoff score of 12 or greater is commonly used as an indication of the risk of depression, although higher or lower cutoffs may be used according to the desired level of specificity. We used a Portuguese version of the EPDS, which has been previously validated to Brazilian puerperal women<sup>13</sup>, and the cutoff score of 13 or higher was considered indicative of depression. Women were assessed at two time points: at the hospital, shortly before delivery, and again at home, four to eight weeks postpartum. At the hospital, the women completed the EPDS in the anteroom of the obstetric center, shortly

before cesarean section without any help from others. They were instructed about the importance of describing their feelings in the previous seven days and not only on the day they were completing the questionnaire. Four to eight weeks later, the EPDS was left in their homes and collected after confirmation that they had been completed. The assistant obstetrician of all patients with significant postpartum depressive symptoms was notified and referral to specialized treatment was recommended.

Data recording and analysis were performed using Excel for Mac software version 2011, and for statistical calculations we used SPSS software, version 19. Categorical variables were described using frequency analysis, and percentages and quantitative variables were reported as averages and standard deviations. Fisher's exact test,  $\chi^2$  and Student's *t*-tests were used to compare women with or without depressive symptoms, and statistical significance of differences were considered if  $p < 0.05$ .

## Results

A total of 113 women were considered eligible, but 2 refused to participate. Among the 111 women who completed the EPDS prior to delivery, 4 patients did not complete the EPDS in the postpartum period and were excluded from the study (three of them moved to another city and one wished to drop out). The characteristics of the final sample, consisting of 107 women, are shown in Table 1.

Depressive symptoms were observed in 17 (15.8%) of the 107 women evaluated. Eleven women (10.3%) had depressive symptoms during pregnancy, but five of them no longer showed these symptoms after childbirth. In contrast, 12 women (11.2%) had postpartum depressive symptoms. Six of the latter group had experienced these symptoms during pregnancy and the other six developed depressive symptoms only after childbirth. Thus, among all the 107 women included in the study,

5 (4.7%) of them showed depressive symptoms only before delivery, 6 (5.6%) experienced these symptoms before and after childbirth and in 6 (5.6%) depressive symptoms emerged after delivery.

The prevalence of depression and the influence of demographic variables were examined in the following patient subgroups: without depressive symptoms; with depression at some point before or after delivery; with depression only before delivery; with persistent depression before and after childbirth and with postpartum depression only (Table 2).

There was no difference in the mean age of women without depressive symptoms from those who showed these symptoms at any of the two time points in which they were assessed, before and after delivery. Most women

**Table 1.** Characteristics of the participants (n=107)

Parameter	n	%
<b>Age (years)</b>		
<25	9	8.4
25 to 35	73	68.2
>35	25	23.3
<b>Educational status</b>		
Elementary school	2	1.8
High school	23	21.4
College	57	53.2
Graduate	25	23.3
<b>Marital status</b>		
Single	14	13.1
Married/Stable relationship	93	86.9
<b>Parity (previous)</b>		
0	60	56
1 or more	47	44
<b>Gestational age at the moment of delivery (weeks)</b>		
37-38	8	7.5
38-40	90	84.1
>40	9	8.4

**Table 2.** Depression prevalence and characteristics of the sample

Variables	Total sample n=107	None depression symptoms n=90	Depression symptoms			
			At some point n=17	Only before childbirth n=5	Before and after childbirth n=6	Only after childbirth n=6
Prevalence of depression - %	15.8	-	15.8	4.7	5.6	5.6
Age (years; mean±SD)	31.6±5.1	31,6±5,3	31.6±5.3	32.2±4.1	31.8±3.4	31.3±5.1
<b>Educational level - n (%)</b>						
Less than college	25±23.3	22 (88)	3 (12)	0	2 (8)	1 (4)
College or post-graduation	82±76.7	68 (82.9)	14 (17.1)	5 (6.1)	4 (4.9)	5 (6.1)
<b>Parity - n (%)</b>						
Nulliparous	60 (56)	53 (88.3)	7 (11.6)	2 (3.3)	2 (3.3)	3 (5)
1 or more	47 (44)	37 (78.7)	10 (21.2)	3 (6.3)	4 (8.5)	3 (6.3)
<b>Marital status - n (%)</b>						
Married	93 (86.9)	81 (87.1)	12 (12.9)	4 (4.3)	2 (2.1)	6 (6.4)
Single	14 (13.1)	9 (64.3)	5 (35.7)*	1 (7.1)	4 (28.6)†	0

\* $p=0.04$  versus married; † $p=0.002$  versus married.

(76.7%) had high educational levels, as shown in Table 1, and there was no association between this parameter and the occurrence of depressive symptoms, either before or after delivery, or at both time points (Table 2).

A predominance of nulliparous women (56%) was seen in this study (Table 1), and there was no difference between those who were nulliparous or had one or more children with respect to the presence of depressive symptoms at any time, only before delivery, before and after delivery, and only after delivery, as indicated in Table 2. Most women included in this study were married (86.9%), as shown in Table 1. Overall, it was observed that depressive symptoms were significantly more frequent in single women ( $p=0.04$ ), and this difference was due to the higher frequency of single women in the group of patients who experienced these symptoms both before and after childbirth ( $p=0.002$ ) (Table 2). Marital status did not influence depression rate in women with symptoms only before delivery ( $p=0.43$ ). Similarly, although all women with depression symptoms arising after childbirth were married, there was no significant difference between these and single women ( $p=0.5$ ) (Table 2).

## Discussion

The concept of postpartum depression has significantly changed over the last decades<sup>3</sup>. It may be currently considered an imprecise term used to refer to any case of depression initially recognized after childbirth, irrespective to the precise onset of depressive symptoms.

In this study, the prevalence of depression with onset within four to eight weeks postpartum was 5.6%. It is noteworthy that studies carried out in different populations and using the EPDS and the same cutoff score used in our study and which similarly assessed the occurrence of depressive symptoms both before and after delivery have found similar results<sup>25,26</sup>. In a large study carried out in Australia, among 11,136 women who screened negative for depression during pregnancy, 584 (5.2%) had EPDS score of 13 or greater 6 weeks after delivery<sup>25</sup>. Similarly, when all pregnant women who lived in the city of Avon, England, were prospectively evaluated, Heron et al.<sup>26</sup> found that 7,233 women were free of depressive symptoms at the 32<sup>nd</sup> week of pregnancy, but in a second assessment, 8 weeks after childbirth, 380 (4.6%) had depressive symptoms indicated by EPDS score of 13 or greater.

To our knowledge, there are two Brazilian studies that assessed depressive symptoms both before and after childbirth by using the EPDS. The first one comprised a small sample of 29 pregnant women evaluated in the third trimester of pregnancy, and found that the prevalence of positive screening, also defined by EPDS

score of 13 or greater, was 38%<sup>12</sup>. Twenty-one of these patients remained in the study after delivery and were monthly assessed by the EPDS for six months. The cumulative depression rate after this period was 43%, but, when only cases with onset of depressive symptoms after delivery were considered, this rate dropped to 33%. The high prevalence of depression found in this study might be explained by the fact that the sample consisted exclusively of low-income women<sup>12</sup>.

In the second study, which was recently published<sup>27</sup>, the prevalence of depression was assessed early in the third trimester of pregnancy and four to six weeks after delivery in 600 Brazilian women. The depression rate during pregnancy was 24%, and the rate after delivery was 11%. However, in this study, women with depressive symptoms in the third trimester of pregnancy whose symptoms persisted in the postpartum were included in the calculation of the rate of postpartum depression. Interestingly, the authors emphasize that depression during pregnancy had high sensitivity (75%) and specificity (81%) for predicting the occurrence of postpartum depression<sup>27</sup>. One may ask whether some of these women had in fact persistent depressive symptoms, but were diagnosed with antenatal depression during pregnancy and postpartum depression after delivery. Accordingly, antenatal depression would not be a predictor of postpartum depression, but the same symptoms being recognized at two different time points. Since the prevalence of depression in the postpartum period found in this study comprising a large sample of women was similar to the one found in our study (11%), we believe that a *post-hoc* analysis of their results, with the exclusion of women who already experienced depressive symptoms during pregnancy, would add significantly to the knowledge of the prevalence of depression with postpartum onset in Brazil.

Other studies that used the EPDS to assess depression in Brazilian puerperal women did not include an evaluation during pregnancy and used cutoff scores equal to or greater than 11<sup>15,16,19,22</sup> or 12<sup>13,20</sup>. In these studies, the frequency of postpartum depression was higher than the one found in this study: 13<sup>13</sup>, 21<sup>16,20</sup>, 24.3<sup>22</sup>, 37<sup>15</sup> and 39%<sup>19</sup>. When the cutoff score used decreases, an increase in the frequency of results indicating depression by this scale is indeed expected<sup>4</sup>.

Other Brazilian studies have used different instruments to assess depressive symptoms, such as the Beck depression inventory<sup>14</sup>, Hamilton depression scale<sup>17</sup>, Postpartum Depression Screening Scale<sup>18</sup>, and the Structured Clinical Interview for DSM-IV Axis I Disorders<sup>21</sup>. The results from these studies indicated a consistently higher rate of depressive symptoms in

the postpartum period, ranging from 7.2<sup>21</sup> to 19%<sup>17</sup>. However, in these studies, women with depressive symptoms before delivery were not excluded from the calculation of postpartum depression rates, and this could explain, at least in part, the higher frequency of postpartum depression as compared to our results.

In the present study, it was found that depression with onset after childbirth accounted for half the cases of depression seen in the postpartum period. This finding is similar to that described by Gotlib et al.<sup>28</sup>, which drew attention to potentially misleading results of studies that did not distinguish between cases of depression arising after childbirth from those which they considered “simply a continuation of antenatal depression”<sup>29</sup>. Antenatal depression is associated with a number of socio-demographic factors, such as younger age, lower educational level and high number of children, which do not affect the occurrence of postpartum depression<sup>28</sup>. Accordingly, we could not find an association of age, educational level and number of children with postpartum depression. In another study that followed more than eight thousand women and used the EPDS with the same cutoff score as in this study, the prevalence of depression in the postpartum period was 9%. Among these cases, also half (4.6% of the sample) in fact appeared after childbirth<sup>26</sup>. In addition, this study showed that antenatal anxiety is frequent and may overlap with depression symptoms, increasing the possibility of postpartum depression<sup>26</sup>. The assumption that single women are more anxious would explain why single women had higher percentage of depression before and after deliver compared to married women. Josefsson et al.<sup>29</sup> followed a group of 1,500 Swedish women and found a prevalence of postpartum depressive symptoms of 12.7%, defined by EPDS score of 11 or greater. Again, about half of these women already had these symptoms by the end of pregnancy<sup>29</sup>. In a similar study involving 1,584 women evaluated by using the EPDS and a cutoff score of 12 or greater, the depression rate was 7.7% during pregnancy and 6.8% in the postpartum period<sup>30</sup>. In this study, 75% of patients with depression in the postpartum symptoms already had symptoms during pregnancy.

A study that assessed depressive symptoms using the Revised Clinical Interview Schedule found a prevalence of depression in the postpartum of 19.6%<sup>31</sup>. Although another diagnostic instrument was used, it was seen that in half of the cases (9.4%) depressive symptoms actually arose after delivery<sup>32</sup>, which is consistent with our findings. In a longitudinal study that followed more than one thousand women, depressive symptoms were found in 1.7% of women in the

eighth month of pregnancy and in 3.2% in the first month after childbirth<sup>31</sup>. When analyzing the group of 13 patients whose symptoms started after delivery, it was found that 4 of them (31%) had a history of depression outside the pregnancy-puerperal cycle and were in fact experiencing a recurrence of the condition. This possibility, largely not considered in other studies, makes the heterogeneity of women diagnosed with postpartum depression even more evident.

The fact that some women may have depressive symptoms during pregnancy and persisting after delivery and others symptoms arising specifically after childbirth supports the hypothesis that depressive symptoms arising at these different time points may have different etiologies<sup>29</sup>. Since disorders with different etiologies may have distinct therapeutic responses, we suggest that the term postpartum depression should be used exclusively to define the specific group of women who develop depression when challenged by biological and social changes that follow childbirth. When the exact onset of depressive symptoms cannot be defined, the term perinatal depression seems more adequate<sup>33</sup>.

The present study has some limitations. The small number of patients included and the fact that they were recruited from private hospitals may have favored the selection of a group with higher social and educational levels, which precludes generalization of the results. Another limitation was the use of the EPDS, which is a screening instrument and not a diagnostic tool. Despite the widespread use of the EPDS due to its simplicity, the gold standard for the diagnosis of depression is the structured interview<sup>4</sup>. Finally, the time point in which depressive symptoms were assessed during pregnancy, immediately before birth, may not have been the most appropriate. Despite the fact that the EPDS guides women about the importance of reporting their symptoms in the previous seven days and not only on the day of the response to the questionnaire, it is possible that the responses may have been influenced by the hospital environment and the fact that the EPDS was completed shortly before the cesarean section. A *post-hoc* analysis of a recently published Brazilian study<sup>27</sup> could confirm or refute the findings described here.

In conclusion, women with depression recognized in the postpartum period compose a heterogeneous group, in which the disorder may have arisen before pregnancy, during pregnancy or after childbirth. Once depression that arises before or after childbirth may have different etiologies and, therefore, different responses to treatment, researchers and clinicians should be aware of this possibility.

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