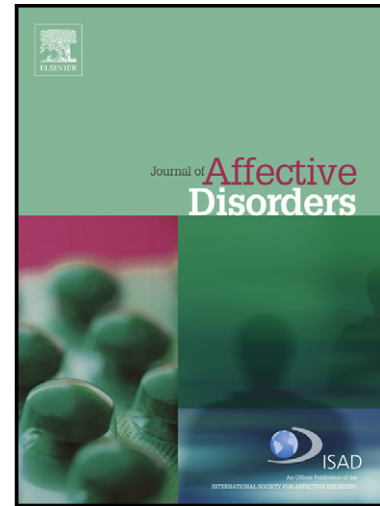


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Profile of depressive symptoms in women in the perinatal and outside the perinatal period: similar or not?

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ABSTRACT

Purposes: To analyze which Beck Depression Inventory-II (BDI-II) and Postpartum Depression Screening Scores (PDSS) total and dimensional scores, as well as symptomatic answers proportions significantly differ between women in the perinatal period (pregnant/postpartum) without major depression, with major depression and women outside the perinatal period. **Methods:** 572 pregnant women in the third trimester completed Beck Depression Inventory-II and Postpartum Depression Screening Scale and were assessed with the Diagnostic Interview for Genetic Studies. 417 of these were also assessed (with the same instruments) at three months postpartum. Ninety non-pregnant women or that did not have a child in the last year (mean age=29.42±7.159 years) also filled in the questionnaires. **Results:** Non-depressed pregnant women showed lower scores than depressed pregnant women and higher scores than women outside of the perinatal period in the BDI-II total score and in its Somatic-Anxiety dimension. Non-depressed postpartum women showed significantly higher scores than women outside of the perinatal period only at Sleep/Eating Disturbances. Compared to women outside the perinatal period, pregnant women without depression presented higher scores only in the somatic items. Women with *versus* without depression in the postpartum period did not significantly differ and both presented higher scores than women outside of the perinatal period in the proportions of loss of energy and sleep changes. **Limitations:** women outside the perinatal period were not diagnosed for the presence of a depressive disorder, but their BDI-II mean score was similar to the figures reported worldwide for

regarding women in the childbearing age. **Conclusion:** In the perinatal period, most particularly in at pregnancy, women experience significant somatic changes even if not clinically depressed. Cognitive-affective symptoms are more useful when assessing the presence of perinatal depression.

Key-words: perinatal women; non-perinatal women; depressive symptoms.

INTRODUCTION

Depression is common among women (Kessler, 2003), and the age range when they are most likely to have children is that with the highest life-span depression rates (Eaton et al., 2012). Although the majority of women adapt to motherhood with success (Lutz & May, 2007), some can experience psychological distress, such as depressive symptoms (O'Keane, 2006).

Excellent epidemiological studies conducted since the eighties have shown elevated rates of depressive symptoms during pregnancy. One of the most methodologically rigorous was from Gotlib et al. (1989), in which approximately 25% of the women had high depressive symptoms levels (Beck Depression Inventory/BDI-II; Beck & Steer, 1996 >10) both before and after delivery. Ten percent of the women were diagnosed with major or minor depression during pregnancy; in the postpartum, the prevalence was lower - 6.8%. Other prospective studies have reached similar prevalence of perinatal depression, ranging between 6.5% and 12.9% at different times during pregnancy and the first postpartum year (Gaynes et al., 2005).

In the influential paper by O'Hara et al. (1990), although there were no differences between childbearing and non-childbearing women with respect to rates of minor and major depression during pregnancy and postpartum, childbearing women experienced significantly higher levels of depressive symptoms during late pregnancy and early puerperium. Thus, depressive symptoms at the perinatal period are a significant clinical issue that require accurate assessment and treatment (O'Hara & Wisner, 2013), due to their potential negative consequences including familial, maternal, foetal, infantile, and child effects (Pereira et al., 2013). Furthermore, depressive symptoms during the transition into motherhood are a risk factor for major depression (Beck, 2001; O'Hara & Swain, 1996; Marques et al., 2011).

According to the UK National Institute for Clinical Excellence (NICE, 2007) the distinctive symptoms of perinatal depression are low mood and loss of enjoyment, anxiety, disturbed sleep and disturbed eating patterns, poor concentration, low self-esteem, low energy levels, and loss of libido. Other authorities add hopelessness, irritability, emotional lability, tearfulness, fatigue, psychomotor agitation, guilt and/or feelings of inadequacy (O'Hara & Swain 1996). Apparently, these indicators do not differ from depression clinical features that arise at any other life moment (NICE, 2007).

Several investigators have questioned whether perinatal depression is a special form of depression that reflects hormonal changes associated with pregnancy and the puerperium (Ahokas et al., 2000; Bloch et al., 2000) or a depressive illness that is simply temporally related to giving birth (Whiffen & Gotlib, 1993; Cooper & Murray, 1995). Proponents of this later view propose that the perinatal period may trigger or exacerbate emotional disorders not unlike any other stressful life event (Riecher-Rössler & Rohde, 2009). According to Riecher-Rössler (2009) and Cunningham, Brown, Brooks, and Page (2013) reviews, there is insufficient evidence to support a distinction between these two groups.

More specific to the perinatal period is the difficulty of distinguishing depressive symptoms and normal somatic symptoms that are part of the normal adjustment required by the profound physiological and psychosocial changes that characterize pregnancy and infant care (Stewart, 2005; O'Hara & Wisner, 2013). Examples include changes in appetite and weight, sleep and energy, loss of sexual interest, fatigue, and mood lability (Bernstein et al., 2006). This physiologic reality obscures the detection and screening of depression during the perinatal period (Buist, 2006), as the difficulty of distinguishing between normal and pathological symptoms exists both in perinatal women (Whiffen, 1988; Witton et al., 1996) and in health professionals (Olson et al., 2002). Given this, it has been questioned whether somatic symptoms are valid indicators of depression in the perinatal period. Many investigators suggest their exclusion when assessing depression in the perinatal period (Cox et al., 1987). Others contend that this option may well lead to the loss of important information (Bernstein et al., 2008); it is one of the most mentioned criticisms to the Edinburgh Postpartum Depression Scale (EPDS; Cox et al., 1987), which excludes somatic items (Barker, 2005; Beck & Gable, 2001a).

This debate focuses mainly around the BDI-II (Beck et al., 1996), which ability to accurately detect perinatal depression has been called into question. Critics have argued that BDI and BDI-II may overstate depressive symptoms severity in the perinatal period and, thus, increase the number of false positives (Gaynes et al., 2005; Gotlib et al., 1989; Harris et al., 1989; Holcomb et al., 1996; Hopkins et al., 1989; Huffman et al., 1990; Kammerer et al., 2009; O'Hara et al., 1984; O'Hara et al., 1990; Su et al., 2007; Troutman & Cutrona, 1990; Whiffen, 1988).

Unlike other instruments, as the EPDS and the BDI-I (Beck & Steer, 1961) and II (Beck & Steer, 1996), the Postpartum Depression Screening Scale (PDSS; Beck & Gable, 2002) dimensions and items were not based on other general measures of depressive symptoms, but created from qualitative studies on the subjective experience of postpartum depression (Beck, 1992, 1993, 1996).

The present study aimed to analyze which BDI-II and PDSS scores (total and dimensional) and items significantly differ between pregnant (3rd trimester) and postpartum (3 months) women without major depression, with major depression and women outside the perinatal period.

METHODS

The present work comes from a wider research project "Postpartum Depression and Sleep", approved by the Ethic Committee of the Faculty of Medicine, Coimbra.

Procedures

Women with uncomplicated pregnancies, 18 years old or more, in their last pregnancy trimester were approached while waiting for their medical appointment at local health medical centres and invited to participate in the study. Participants were asked to answer a booklet including questions about their demographic characteristics and questionnaires about their depressive symptomatology. Women were interviewed in person using a semi-structured diagnostic psychiatric interview, the Portuguese version of the *Diagnostic Interview for Genetic Studies* (DIGS; Azevedo et al., 1993; Nurnberger et al., 1994) adapted to pregnancy. After delivery, women who had given written consent to be followed up until a

posterior stage of the study (postpartum) were contacted by phone at 3 (T1) months after delivery to set up the appointments. They were asked to fill in a similar booklet and were again interviewed with the DIGS, now adapted to the postpartum period.

Childbearing age (19-44 years) women who were not pregnant or that did not have children in the last year were recruited at Coimbra University (students and staff).

Participants

Perinatal sample

At pregnancy, from the 648 women initially contacted, 572 women filled in the questionnaire and completed the interview (88.3%). From the 572 women, 398 (61.4%) filled in the questionnaire and answered the interview both at pregnancy and T1. Our pregnancy sample comprised women with a mean age of 29.85 years (SD=4.516; range=19-44) and a mean weeks of gestation of 32.6 (SD=3.61; range=26-40). The majority of women was married/was living with a partner (85.6%), 10.1% (n=58) were single/had never married and one woman (.2%) was a widow. 64.4% were nulliparae, 30.5% primiparae and 5.1% multiparae. The highest education achieved by the majority was high school (44.6%) and graduate school (26.4%), although other grades were represented. The majority (61.2%) was still working, 25.7% were on medical leave and 13.2% were unemployed. The mean weeks at postpartum assessment was of 13.1 (SD=1.84, range=8-21) and thus the mean age of the baby was of 3.1 months (SD=.57, range=2-5).

Regarding depressive disorders prevalence, 1.2% (n=7) of the women had major depression at pregnancy (last month) and 12.2% (n=51) at three months postpartum.

Non-perinatal sample

It was composed of 90 Portuguese women, with a mean age of 29.42 years (SD=7.159, Range=19-44). The majority was single/never married (58.9%), 36.7% was married/was living with a partner, two women were divorced and other two women were widows (1.8%). 59.6% were not mothers, 16.9% had a children and 23.3% had two or three children. The highest education level achieved was graduate school for 62.1% and high school for 25.3%. The great majority (91.9%) was working/studying (35.4% were graduate students) and 8.9% were unemployed.

This non-perinatal sample was not assessed in which concerns depressive disorders presence. The total BDI-II mean score was of 5.12 (SD=4.719; range=0-17.) Eight (8.88%) women had a BDI-II total score above 13, the cut-off score usually considered for major depression (Arnarson et al., 2008; Beck et al., 1996; Kapci et al., 2008; Pereira et al., 2011; Pereira et al., 2012; Wiebe et al., 2005).

Instruments

Diagnostic Tools

To collect relevant information for a depressive disorder diagnosis, women were interviewed face-to-face with the Portuguese version of the *Diagnostic Interview for Genetic Studies* (DIGS; Azevedo

et al., 1993; Nurnberger et al., 1994). The DIGS was designed to assess the presence of signs and symptoms of a broad range of psychiatric disorders, including mood disorders. The OPCRIT (Operational Criteria) was used to generate diagnoses (McGuffin et al., 1991; Williams et al., 1996). All interviews were reviewed by a blind experienced psychiatrist and a consensus OPCRIT diagnosis (Azevedo et al., 1999) was obtained.

Symptoms assessment

BDI-II. The BDI-II (Beck & Steer, 1996) is a self-report instrument that evaluates the presence and severity of depressive symptoms, according to the DSM-IV (APA, 1994) major depression criteria. The Portuguese version of the BDI-II possesses good psychometric characteristics (Coelho et al., 2002), in postpartum (Pereira et al., 2011) and pregnancy (Pereira et al., 2012) samples. These validation studies in the perinatal period were carried out on the same sample used in the present study. In the non-perinatal sample the internal consistency coefficient Cronbach alpha (α) was of .82. We used the BDI-II factorial structure obtained by Bos et al. (2009), with a sample of pregnant and postpartum women which participants also belonged to the present study. The 2-factor solution was identical in pregnancy and postpartum. Items loading on the Cognitive-Affective (CA) and on the Somatic-Anxiety (SA) factors were the same, except item 13 (Indecisiveness), which in pregnancy loaded on the CA factor and in the postpartum loaded on the SA factor. Given this, in the present study, this item was not included when computing the dimensions. Thus, the CA dimension was composed of items 1 (Sadness), 2 (Pessimism), 3 (Past failure), 4 (Loss of pleasure), 5 (Guilty feelings), 6 (Punishment feelings), 7 (Self-dislike), 8 (Self-criticalness), 9 (Suicidal), 12 (Loss of interest) and 14 (Worthlessness). Items included in the SA dimension were: 10 (Crying), 11 (Agitation), 15 (Loss of energy), 16 (Changes in sleep), 17 (Irritability), 18 (Appetite), 19 (Concentration difficulty), 20 (Fatigue) and 21 (Loss of interest in sex). In a recent psychometric study (Pereira et al., 2014) carried out with a sample of 120 women outside the perinatal period, aged 18-44 (90 of which also participated in the present study), the dimensions composition completely overlapped with the Bos et al. (2009) two-factor structure. Factor 1 (SA) explained 33.55% of the variance ($\alpha=.83$); factor 2 (CA) explained 10.26% of the variance ($\alpha=.80$).

PDSS. The PDSS is a 35 item self-report instrument that yields a separate score for each of the following seven symptom areas (5 items each): Sleeping/Eating Disturbances, Anxiety/Insecurity, Emotional Lability, Mental Confusion, Loss of Self, Guilt/Shame, and Suicidal Thoughts. Each item consists of statements about how a mother may be feeling after the birth of her baby. For each item the woman is asked to rate the feelings that she has experienced the last 2 weeks in a Likert scale from 1 (strongly disagree) to 5 (strongly agree). Higher scores on the PDSS indicate higher levels of postpartum depression symptoms (Beck & Gable, 2000). The Portuguese version possesses very good psychometric properties both at postpartum (Pereira et al., 2011) and at pregnancy (Pereira et al., 2012). Some items were slightly adapted for application at pregnancy (for example, expressions mentioning the baby were removed or transformed into “pregnancy” or “future baby”) (Pereira et al., 2012; Pereira et al., 2013) and in women who were not in the perinatal period (expressions mentioning the baby were removed, for example item 1 *Had trouble sleeping even when my baby was asleep* was replaced by *Had trouble*

sleeping). In the non-perinatal sample the internal consistency coefficient Cronbach alpha was of .92. At the present study, some of the analyses only included PDSS-7 short version items (Pereira et al., 2013).

RESULTS

Total and dimensional mean/median scores

Kruskal-Wallis test was used to compare continuous variables scores between pregnant women without major depression (group 1: $n=565$; 85.3%), pregnant women with major depression (group 2: $n=7$; 1.1%) and women outside the perinatal period (group 3: $n=90$; 13.6%). At least two groups significantly differed in Total PDSS and in all its dimensions (all $p \leq .001$), except Loss of Self. Also BDI total and dimensional scores significantly differed between groups (all $p < .001$). Given this, groups 1 vs. 2, 1 vs. 3 and 2 vs. 3 were compared using Mann Whitney U tests. To prevent Type I error, Bonferroni correction was applied, which consists in dividing alpha level by the number of paired comparisons (Green et al., 1999).

It was found that Total PDSS, Sleeping/Eating Disturbances and Emotional Lability scores were significantly lower in group 1 than in group 2 and higher in group 2 than in group 3. Groups 1 and 3 did not significantly differ. In Anxiety-Insecurity the pattern was similar but groups 2 and 3 also significantly differ. Guilt/Shame and Suicidal Thoughts were significantly lower in group 1 than in groups 2 and 3. Groups 1 and 3 did not significantly differ in these scores. Mental Confusion scores were not significantly different between groups 1 and 2; groups 1 and 2 both showed significantly higher scores than group 3. In Total BDI and in its dimension Somatic-Anxiety, group 1 had significantly lower scores than group 2 and higher scores than group 3; group 2 was higher than group 3. In relation to the BDI-II dimension Cognitive-Affective group 1 had significantly lower scores than groups 2 and 3 (Table 1).

Considering T1, Kruskal-Wallis test revealed that at least two of the three groups [group 1 - 3 months postpartum women without major depression ($n=362$; 72.0%); group 2 - 3 months postpartum women with major depression ($n=51$; 10.1%) and group 3 - women outside the perinatal period ($n=90$; 17.9 %)] significantly differed in Total PDSS and all its dimensions as well as in Total BDI-II and in its two dimensions (all $p < .001$). Table 2 shows the pairwise comparisons between groups (Mann Whitney U tests). Total PDSS score and its dimensional scores in Mental Confusion, Anxiety/Insecurity and Suicidal Thought were significantly lower in group 1 than in groups 2 and 3, which did not differ. Emotional Lability scores and BDI-II dimension Cognitive-Affective were significantly lower in group 1 than in groups 2 and 3 and in group 3 than in group 2. Loss of Self and Guilty/Shame scores were not significantly different between groups 1 and 2; group 3 had scores significantly higher than group 1 and significantly lower than group 2. Regarding Sleeping/Eating Disturbances group 1 had significantly lower scores than group 2 and higher than group 3; group 2 was also higher than group 3. In Total BDI and in its dimension Somatic-Anxiety scores, group 1 had significantly lower scores than group 2 and group 2 than group 3; groups 1 and 3 did not significantly differ (Table 2).

Proportion of symptomatic answers

To analyze the proportion of symptomatic answers by groups, BDI-II and PDSS items were collapsed. In BDI-II, options 1, 2 and 3 were collapsed and considered symptomatic answers. In PDSS,

options 1 ("strongly disagree") and 2 ("disagree") were recoded into 0 and options 3 ("neither agree nor disagree"), 4 ("agree") and 5 ("strongly agree") were recoded into 1 and considered symptomatic answers. Table 3 presents the results of the Chi-square test, used to compare the proportion of symptomatic answers in BDI-II items in the three groups, both at T0 and in T1. Considering T0, the items/symptoms in which group 1 had significantly lower proportion of symptomatic answers than group 2 and group 2 significantly higher proportions than group 3 (groups 1 and 3 did not differ) were: sadness, past failure, loss of pleasure, guilty feelings, self-criticalness, agitation and indecisiveness. The proportion of symptomatic answers in pessimism was lower in group 1 than in groups 2 and 3 (which did not differ). Groups 1 and 2 did not significantly differ in the proportion of punishment feelings, worthlessness, crying (in which group 2 was higher than group 3), loss of interest (in which group 1 was lower than group 3), self-dislike (in which group 1 was higher than group 3), loss of energy, appetite changes, fatigue and loss of interest in sex (in which groups 1 and 2 were higher than group 3). All the three groups differed in the items related to changes in sleep: group 1 had lower proportions than group 2; groups 1 and 2 had higher proportions than group 3. The 3 groups did not significantly differ in proportions of symptomatic answers in suicidal thoughts, irritability and concentration difficulties.

In relation to T1, the items/symptoms in which group 1 had significantly lower proportion of symptomatic answers than group 2 and group 2 had significantly higher proportions than group 3 (groups 1 and 3 did not differ) were: sadness, loss of pleasure, punishment feelings, self-dislike, self-criticalness, worthlessness, crying, loss of interest, indecisiveness, irritability, changes in appetite, concentration difficulty and fatigue. The proportion of symptomatic answers in pessimism and in guilty feelings was lower in group 1 than in groups 2 and 3 (which did not differ); in past failure was significantly lower in group 1 than in group 2. Groups 1 and 2 did not significantly differ in the proportions of loss of energy and of changes in sleep (in which groups 1 and 2 were higher than group 3). All the three groups differed in loss of interest in sex: group 1 had lower proportion than group 2; groups 1 and 2 had higher proportions than group 3. Agitation proportions also significantly differ in the three groups, but in a different pattern: lower in group 1 than in groups 2 and 3 and higher in group 2 than in group 3. The 3 groups did not significantly differ in proportions of symptomatic answers in suicidal ideation.

Table 4 presents the results of Chi-square tests, used to compare the proportion of symptomatic answers in PDSS-7 items in the three groups, both at T0 and at T1. When comparing groups at T0, items 25 (*Had a difficult time making even a simple decision*) and 34 (*I was not the mother I wanted to be*) showed significantly lower proportion of symptomatic answers in group 1 than in group 2 and significantly higher proportions in group 2 than group 3 (groups 1 and 3 did not differ). The same pattern was verified with these two items and also with items 24 (*Have been very irritable*) and 33 (*Did not feel real*) at T1. Proportions of symptomatic answers in items 14 (*Have thought that death seemed like the only way out*), 24 and 33 did not significantly differ at T0. The same was verified for items 14 and 22 (*Tossed and turned for a long time at night trying to fall asleep*) at T1. At T0, this last item (22) showed lower proportions in group 1 than in group 3. Proportions of symptomatic answers in item 9 (*Felt really overwhelmed*) were lower in group 1 than in groups 2 and 3 and higher in group 2 than in group 3.

DISCUSSION

The present study aimed to clarify which are the most useful and valid symptoms while assessing perinatal depression. Although this debate is not new, the issue is not settled because there are few rigorous studies on this topic, especially with samples of pregnant women.

In our study, the postpartum depression prevalence (9-12.2%) was very similar to the reported for the same period in the most rigorous meta-analysis published until now (Gaynes et al., 2005).

We have found that at PDSS total scores and at most of their symptomatic dimensions, pregnant women without major depression scores did not significantly differ from the scores of a community based sample of childbearing women who were not in the perinatal period. In some dimensions, as Guilty/Shame and Suicidal Thoughts, non-depressed pregnant women even presented lower scores than women outside the perinatal period, which led us to speculate that pregnancy may even be protective against these cognitive-affective experiences. On the other hand, in Mental Confusion scores, non-depressed pregnant women could not be distinguished from depressed pregnant women and both groups presented higher levels than women outside the perinatal period. These results suggest that a woman's perceived difficulty to concentrate, to make decisions, and to regulate her own thought processes can be normative in pregnancy, being a less useful symptom when assessing depression at pregnancy.

The fact that non-depressed pregnant women showed lower scores both at Total BDI and at its Somatic-Anxiety dimension than depressed pregnant women suggests that these measures are not completely invalid to assess perinatal depression. However, considering that non-depressed pregnant women showed higher scores than women outside the perinatal period at these variables, which was not found for the Cognitive-Affective dimension (their scores were significantly lower than those of pregnant depressed women and of women outside the perinatal period) confirms that somatic symptoms and the BDI-II should be used with caution when assessing depression at pregnancy. These results are in accordance with O'Hara et al. (1990) study, one of the few studies that have included a sample of pregnant women to analyze if the BDI scores were elevated in the perinatal period. Women in the perinatal period compared to women outside the perinatal period had significantly higher scores only at the somatic items. Also in a study developed to identify normative changes in general health and psychological symptoms status in the perinatal period, pregnant women in the third trimester had significantly higher levels of bodily pain and functional impairments resulting from physical health problems and lower levels of vitality than community controls (Otchet et al. 1999).

At the third month postpartum, women without depression presented significantly lower scores than women with depression and women outside the perinatal period both in BDI-II and PDSS total scores and in several dimensions, namely Cognitive-Affective (BDI-II), Mental Confusion, Anxiety/Insecurity, Suicidal Thoughts and Emotional Lability (PDSS). Although women outside the perinatal period were not evaluated for the presence of clinical depression, these results indicate that for the women who are not clinically depressed, the first months postpartum can actually be a period of psychological well-being.

On the contrary, non-depressed postpartum women showed significantly higher scores than women outside the perinatal period in the dimension related to Sleep/Eating Disturbances. This result was expected and can be explained by the fact that most of the three months babies need feeding and hygiene care more than once per night and also because breastfeeding women may have different appetite and

food intake patterns than their usual pattern. Therefore, when assessing sleep and appetite changes at the postpartum, health professionals and researchers should take into account these normative aspects. This is corroborated by a study developed with postpartum women assessed with the 9-Item Patient Health Questionnaire (PHQ-9; Kroenke et al., 2001) in which the items less discriminant of depressed and nondepressed women were abnormal sleep, abnormal appetite/eating and fatigue (Gjerdengen et al., 2011).

On the other hand, the lack of specificity of somatic symptoms that was verified in pregnancy, seems to be less relevant in the postpartum, because women without depression did not present different scores from the women outside the perinatal period both at the total BDI-II and in Somatic-Anxiety scores. This conclusion replicates the findings-from Whiffen and Gotlib (1993) study in which postpartum women showed lower somatic complaints than controls with and without major depression. On the other hand, the evidences that depressive symptoms at the postpartum significantly correlate with and predict poor health status (Haas et al., 2005; Hung, 2004; Setse et al., 2009) also demonstrate that somatic symptoms at the postpartum are less normative than at pregnancy.

The pattern of results obtained with the PDSS-7 and BDI-II items was very consistent. In non-depressed pregnant women, the most prevalent symptoms, with proportions of symptomatic answers higher than 70%, were those related to fatigue, changes in sleep, and loss of energy. Thus, these symptoms seem to be normative in pregnancy, which is problematic as these were also the most prevalent symptoms in depressed pregnant women. Loss of pleasure, sadness, guilty feelings, agitation, irritability were also among the most prevalent symptoms and appear to be more useful in distinguishing depressed and non-depressed pregnant women, as the proportions were significantly different between these two groups. In the third month postpartum the most prevalent symptoms were the same.

Compared to women outside the perinatal period, pregnant women without depression did not present different proportions of symptomatic answers in most of the BDI-II cognitive-affective items. They only presented higher scores in the somatic items (loss of energy, appetite changes, fatigue and loss of interest in sex). They also presented higher scores in self-dislike, probably due to the alterations on body-image that are typical in the first postpartum months (Sweeney & Fingerhut, 2013), loss of interest in sex and changes in sleep. Sleep difficulties in pregnancy are very well documented and have been considered a risk factor for postpartum depression (Marques et al., 2011). Those affect more than 70% of women and many complain about the fact that their sleep is worse during pregnancy than in any other time of their lives (Lee, 1998; Santiago et al., 2001).

The three groups did not significantly differ in suicidal thoughts, irritability, concentration difficulty and derealization which also suggest that these items may not also be valid indicators of depression in pregnant women.

Women not clinically depressed in the third month postpartum showed significantly lower symptomatic proportions than women outside the perinatal period in items related to pessimism, guilty feelings, agitation, feeling overwhelmed and loss of interest, which again confirms that, happily, for the majority of women, the postpartum is a positive period. This does not imply that this period does not include difficulties and challenges, which is evident in the fact that women with *versus* without depression in the postpartum did not significantly differ and both present higher scores than women

outside the perinatal period in the proportions of loss of energy and of changes in sleep. Similar results were found by Hopkins et al. (1989). When comparing symptoms of 25 women with and without postpartum (6 weeks) depression they also found that there were not significant differences in sleep disturbances, loss of energy and loss of interest in sex. Once again this could be attributed to the multiple tasks required by infant care. Note that the sleep item included in the PDSS-7 does not refer to the sleep difficulty cause, such as infant care (Item 22 *Tossed and turned for a long time at night trying to fall asleep*), which may explain the absence of a significant difference.

The main limitation of this study is that women outside the perinatal period were not assessed for the presence of a depressive disorder. However, their BDI-II total mean score is similar to the figures reported by the ODIN study (European Outcome in Depression International Network) (Veerman, Dowrick, Ayuso-Mateos, Dunn, & Barendregt, 2009), which examined females aged 18-40 from urban and rural areas in Finland, Ireland, Norway, Spain and the UK. Furthermore, the percentage of women presenting high scores (>13) in the BDI-II, which was of 9%, is also similar to the results found by studies carried out with community samples, ranging from 10 to 15% depending on the screening instruments, cut-offs and sample characteristics (Wang & Gorenstein, 2013). Given this, we consider that the depression levels of the sample of women outside the perinatal period are typical and representative. However, it is our intention to compare depressive symptoms levels of perinatal *versus* non-perinatal major depressed women in the near future.

All the results converge to the conclusion that at the perinatal period, most particularly at pregnancy, women experience significant somatic changes even if not clinically depressed, and that cognitive-affective symptoms are more useful when assessing perinatal depression.

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TABLES

Table 1: Pairwise comparisons of total and dimensional PDSS and BDI-II scores by groups – T0 (Mann Whitney U test)

	M (SD) Group 1 n=565; 85.3%	M (SD) Group 2 n=7; 1.1%	M (SD) Group 3 n=90; 13.6%	p δ
Total PDSS	51.48 (15.346)	0.00 (13.589)	55.14 (15.593)	1<2**, 2>3**
Sleeping/Eating Disturbances	10.88 (4.115)	15.00 (2.160)	7.62 (2.561)	1>3**, 2>3**
Anxiety/Insecurity	7.68 (3.189)	12.25 (4.193)	9.13 (3.359)	1<2**, 1<3**, 2>3**
Emotional Lability	8.43 (3.544)	15.25 (2.217)	8.97 (3.425)	1<2**, 2<3**
Mental Confusion	7.15 (2.66)	9.00 (2.708)	5.89 (1.946)	1>3**, 2>3**
Guilt/Shame	6.05 (2.197)	6.75 (2.362)	7.83 (2.548)	1<2**, 1<3**
Suicidal thoughts	5.38 (1.370)	5.50 (1.00)	6.56 (1.835)	1<2*, 1<3**
Total BDI	7.11 (5.242)	17.00 (3.91)	5.55 (4.608)	1<2**, 1>3**, 2>3**
BDI_Cognitive Affective	1.19 (2.514)	7.00 (4.690)	1.77 (2.425)	1<2**, 1<3**, 2>3**
BDI_Somatic Anxiety	5.78 (3.169)	9.50 (1.732)	3.57 (2.890)	1<2**, 1>3**, 2>3**

⁸ Bonferroni correction [$p=.05/3=.017$]; ** $p\leq.001$; * $p\leq.01$; M, Mean; SD, Standard Deviation; **Group 1** – Pregnant women without MjDep; **Group 2** – Pregnant women with MjDep; **Group 3** - Women outside the perinatal period

Table 2: Pairwise comparisons of total and dimensional PDSS, BDI-II scores by groups – T1 (Mann Whitney U test)

	M (SD) Group 1 n=362; 72.0%	M (SD) Group 2 n=51; 10.1%	M (SD) Group 3 n=90; 17.9%	p δ
Total PDSS	45.86 (12.917)	60.88 (18.972)	55.14 (15.593)	1<2**, 1<3**
Sleeping/Eating Disturbances	7.97(3.271)	10.66 (4.56)	7.62 (2.561)	1<2**, 1>3**, 2<3**
Anxiety/Insecurity	7.19 (2.592)	10.45 (4.056)	9.13 (3.359)	1<2**, 1<3**
Emotional Lability	7.52 (2.975)	11.45 (3.789)	8.97 (3.425)	1<2**, 1<3**, 2>3**
Mental Confusion	6.83 (2.58)	9.62 (3.76)	5.89 (1.946)	1<2**, 1<3**
Loss of Self	5.83 (1.957)	8.45 (3.187)	7.83 (2.548)	1<3**, 2>3**
Guilt/Shame	5.89 (1.935)	6.98 (3.089)	6.56 (1.835)	1<3**, 2>3**
Suicidal Thoughts	4.25 (.92)	5.38 (1.268)	5.20 (1.268)	1<2*, 1<3**
Total BDI	4.29 (4.443)	10.47 (6.48)	5.55 (4.608)	1<2**, 2>3**
BDI_Cognitive Affective	1.73 (1.840)	3.07 (3.023)	1.77 (2.425)	1<2**, 1<3**, 2>3**
BDI_Somatic Anxiety	3.39 (2.932)	7.02 (3.790)	3.57 (2.890)	1<2**, 2>3**

⁸ Bonferroni correction ($\alpha=.5/3=.002$); ** $p\leq.001$; * $p\leq.01$; M, Mean; SD, Standard Deviation; **Group 1** – Pregnant women without Major Depression; **Group 2** – Pregnant women with Major Depression; **Group 3** - Women outside the perinatal period.

Table 3: Pairwise comparisons in BDI-II proportions of symptomatic answers by groups (T0 and T1) – Chi Square Test

BDI Items		Group 1	Group 2	Group 3	p ^δ
		n=565; 82.2%	n=7; .0%	n=113; 6.5%	
	T0				
	T1	n=362; 72.0%	n=51; 10.1%	n=90; 17.9%	
1. Sadness	T0	11.2	85.7	16.7	T0: 1<2**, 2>3**
	T1	6.9	42.0		T1: 1<2**, 2>3**
2. Pessimism	T0	9.4	57.1	23.3	T0: 1<2*, 1<3**
	T1	7.7	26.0		T1: 1<2**, 1<3**
3. Past Failure	T0	9.9	71.4	11.1	T0: 1<2**, 2>3**
	T1	6.1	18.0		T1: 1<2**
4. Loss of Pleasure	T0	14.0	100.0	16.7	T0: 1<2**, 2>3**
	T1	9.9	46.0		T1: 1<2**, 2>3**
5. Guilty feelings	T0	12.0	85.7	17.8	T0: 1<2**, 2>3**
	T1	5.2	30.0		T1: 1<2**, 1<3**
6. Punish. feelings	T0	4.6	28.6	2.2	T0: 2>3*
	T1	1.4	12.0		T1: 1<2**, 2>3*
7. Self-Dislike	T0	2.7	14.3	7.8	T0: 1<3**, p<.001**
	T1	3.3	22.0		T1: 1<2**, 2>3**
8. Self-Criticalness	T0	9.8	57.1	17.8	T0: 1<2**, 2>3*
	T1	11.0	38.0		T1: 1<2**, 2>3**
9. Suicidal	T0	0.9	14.3	0.0	
	T1	0.0	2.0	0.0	
10. Crying	T0	31.6	71.4	21.1	T0: 2>3**
	T1	14.4	44.0		T1: 1<2**, 2>3*
11. Agitation	T0	34.2	85.7	31.1	T0: 1<2**, 2>3*
	T1	17.4	54.0		T1: 1<2**, 1<3*, 2>3**
12. Loss of Interest	T0	9.8	28.6	10.0	T0: 1<3*
	T1	9.1	40.0		T1: 1<2**, 2>3**
13. Indecisiveness	T0	12.0	71.4	15.6	T0: 1<2**, 2>3*
	T1	13.5	38.0		T1: 1<2, 2>3*
14. Worthlessness	T0	13.8	42.9	8.9	T0: 2>3**
	T1	4.4	18.0		T1: 1<2**
15. Loss of Energy	T0	72.0	100.0	36.9	T0: 1>3**, 2>3**
	T1	69.1	100.0		T1: 1>3**, 2>3*
16. Changes in Sleep	T0	81.9	85.7	47.8	T0: 1>3**
	T1	63.3	70.0		T1: 1<3**, 2>3*
17. Irritability	T0	37.9	71.4	26.7	
	T1	21.5	58.0		T1: 1<2**, 2>3**
18. Appetite	T0	58.9	100.0	30.0	T0: 1>3**, 2>3**
	T1	38.1	64.0		T1: 1<2**, 2>3**
19. Concen. difficulty	T0	31.7	71.4	35.6	
	T1	29.8	62.0		T1: 1<2**, 2>3**
20. Fatigue	T0	91.9	95.7	46.7	T0: 1>3**, 2>3**
	T1	45.3	76.0		T1: 1<2**, 2>3**
21. Loss interest sex	T0	49.0	71.4	18.9	T0: 1>3**, 2>3**
	T1	35.6	70.0		T1: 1<2**, 1>3**, 2>3**

^δ Bonferroni correction [p=.05/3=.017]; **p≤.001; * p≤.01; **Group 1** – Pregnant women without MjDep; **Group 2** – Pregnant women with MjDep; **Group 3** - Women outside the perinatal period.

Table 4: Pairwise comparisons in PDSS-7 proportions of symptomatic answers by groups (T0 and T1) – Chi Square Test

PDSS Items		Group 1	Group 2	Group 3	p ^δ
		n=565;82.2%	n=7; 1.0%	n=113; 6.5%	
9. Felt really overwhelmed	T0	22.6	85.7		T0: 1<2**; 1<3**; 2>3** T1: 1<2**; 1<3**; 2>3*
	T1	21.3	56.9	32.9	
14. death seemed like the only way out	T0	6.4	6.6	4.8	---
	T1	5.8	5.9		
22. Tossed and turned for a long time at night	T0	58.9	71.4	41.7	T0: 1>3* T1: ---
	T1	31.8	43.1		
24. Have been very irritable	T0	21.5	85.7	37.8	T0: --- T1: 1<2**; 2>3**
	T1	15.2	80.4		
25. Had a difficult time making a simple decision	T0	37.4	85.7	28.8	T0: 1<2**; 2>3** T1: 1<2**; 2>3*
	T1	31.2	54.9		
33. Did not feel real	T0	16.0	28.6	11.9	T1: 1<2*; 2>3**
	T1	13.3	31.4		
34. I was not the mother I wanted to be	T0	5.7	57.1	8.3	T0: 1<2**; 2>3**
	T1				

^δ Bonferroni correction [$p=.05/3=.017$]; ** $p\leq.001$; * $p\leq.01$; **Group 1** – Pregnant women without MjDep; **Group 2** – Pregnant women with MjDep; **Group 3** - Women outside the perinatal period.

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Contributors

Author Pereira AT designed the study, managed the literature searches and analyses, undertook the statistical analysis, wrote the first draft of the manuscript.

Authors Marques M, Soares MJ, Maia BR, Bos S, Valente J, Nogueira V, Roque C, Madeira N, Macedo A contributed to data collection and/or to the diagnostic interviews blind review and formulation of a consensus OPCRIT diagnosis. All authors contributed to and have approved the final manuscript.

Conflict of interest:

The authors declare that they have no conflict of interest.