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Cognitive correlates of women's postpartum depression risk and symptoms: the contribution of dysfunctional beliefs and negative thoughts

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ABSTRACT

Background: Despite the extensive research on interpersonal and clinical risk factors for postpartum depression (PPD), there is a paucity of research on the potential role of cognitive variables (dysfunctional beliefs and negative thoughts) as correlates of PPD symptoms.

Aims: This exploratory study aimed to understand the cognitive processes of women at a higher risk (i.e. presenting well-established interpersonal and clinical risk factors) for PPD by: (a) comparing women's dysfunctional motherhood-related beliefs and frequency of automatic thoughts, as a function of their levels of PPD risk and symptoms; (b) examining the cognitive correlates of PPD symptoms, controlling for the presence of well-established risk factors.

Method: A cross-sectional internet survey comprising 441 postpartum women was conducted.

Results: Women presenting high-risk for PPD showed more dysfunctional motherhood-related attitudes ($p < 0.001$), more frequent negative thoughts ($p < 0.001$) and less frequent positive thoughts ($p < 0.001$) than low-risk women. More dysfunctional beliefs related to maternal responsibility, more frequent negative thoughts related with personal maladjustment and with the metacognitive appraisal of the thoughts' content, and less frequent positive thoughts were found to be significantly associated with PPD symptoms.

Conclusion: The inclusion of cognitive variables in risk assessment and preventive efforts for PPD may hold potential to increase its clinical efficacy.

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Dysfunctional beliefs towards motherhood; negative automatic thoughts; positive automatic thoughts; postpartum depression; risk factors

Postpartum depression (PPD) is a public health problem, considering its high prevalence (10–20%; Gavin et al., 2005; Pearlstein, Howard, Salisbury, & Zlotnick, 2009) and its well-established impact on the whole family system (Kingston, Tough, & Whitfield, 2012; Stein et al., 2014; Tronick & Reck, 2009). PPD is a feasible target for preventive efforts, as its beginning is preceded by a clear event (childbirth), it has a defined period of incidence and occurs during a period of increased contact with health professionals (Battle & Zlotnick, 2005). Therefore, efforts have been made to early identify women who might be at a higher-risk of developing PPD and to implement preventive approaches.

Existing research has identified a set of major risk factors for PPD, including prior history of anxiety/depression, prenatal anxiety and depression, personality characteristics (e.g. low self-esteem), occurrence of stress-inducing events (e.g. death, divorce or job loss), lack of social support and poor-quality marital relationship (Beck, 2002; Enatescu et al., 2017; Milgrom et al., 2008; Robertson, Grace, Wallington, & Stewart, 2004). Despite targeting modifiable risk factors for PPD (e.g. inadequate social support, poor marital relationship), existing preventive PPD interventions still present

modest efficacy results (Sockol, Epperson, & Barber, 2013), highlighting the need to identify other variables/mechanisms that could be a target of such interventions.

The Cognitive Theory of Depression (Beck, Rush, Shaw, & Emery, 1979) emphasizes the important role of cognitive variables in the development and maintenance of depression. These variables comprise not only the individual's most superficial level of thinking (their negative automatic thoughts), but also deeper level cognitions (their basic assumptions or dysfunctional beliefs) (Beck, 2009). A previous set of studies found some promising evidence of the role of cognitive variables in the severity of PPD symptoms, such as negative cognitive attributional style (Cutrona, 1983; O'Hara, Rehm, & Campbell, 1982). However, other studies found mixed evidence of such relationships (e.g. general dysfunctional beliefs; Gotlib, Whiffen, Wallace, & Mount, 1991; O'Hara, Neunaber, & Zekoski, 1984; depressive attributional style; Manly, McMahon, Bradley, & Davidson, 1982). Although these studies have raised attention to the explanatory role of cognitive variables, there was a paucity of more recent research on cognitive vulnerabilities as risk factors for the occurrence of PPD (O'Mahen, Flynn, & Nolen-Hoeksema, 2010), namely on their added value in

relation to other risk factors (e.g. demographic, interpersonal) previously identified in the literature. Moreover, existing studies relied on a set of measures to assess general cognitive vulnerabilities to depression, rather than focusing on the specific cognitive vulnerabilities of the postpartum period, such as motherhood-related dysfunctional beliefs and postpartum-specific negative automatic thoughts.

The individual's basic assumptions or dysfunctional beliefs are conceptualized by Beck (2009) as deeper level cognitions, and may be associated with PPD. Motherhood-related beliefs are characterized by themes of failure, responsibility and personal inadequacy in the maternal role, as well as maternal role idealization (Sockol, Epperson, & Barber, 2014). Recent studies have identified a significant association between dysfunctional motherhood-related beliefs and PPD symptoms (Fonseca & Canavarro, 2018; Phillips, Sharpe, Matthey, & Charles, 2010; Sockol et al., 2014; Wittkowski, Garrett, Cooper, & Wieck, 2017). Church, Brechman-Toussaint, and Hine (2005) found that women with prior risk factors for PPD (depression history, vulnerable personality and perceptions of infants as being more difficult) tend to report more dysfunctional motherhood-related beliefs and, in turn, higher levels of PPD symptoms. Grazioli and Terry (2000) also provided evidence that dysfunctional motherhood-related beliefs interact with high levels of postnatal stress to increase women's vulnerability to PPD symptoms.

Moreover, when considering the prenatal period, studies have found that self-devaluation (Hipwell, Reynolds, & Crick, 2004) and negative self-schemas (Evans, Heron, Lewis, Araya, & Wolke, 2005) during pregnancy may be cognitive markers of vulnerability for PPD. Finally, O'Mahen et al. (2010) suggested that cognitive factors (e.g. women's beliefs that they should sacrifice their needs for others') may interact with interpersonal vulnerability factors (low social functioning) to predict depressive symptoms during pregnancy. Taken together, these results suggest that women at a higher-risk of developing PPD (i.e. that present a set of the well-identified interpersonal and clinical risk factors; Beck, 2002; Robertson et al., 2004) may also present cognitive vulnerabilities that, in interaction with contextual risk factors and with the demands of caregiving, predispose them to the development of PPD symptoms.

On the other hand, some studies have identified that women with depressive symptoms present more frequent and intense negative automatic thoughts than non-depressed women (Hall & Papageorgiou, 2005; Hildebrandt, 2013; Jennings, Ross, Popper, & Elmore, 1999). However, there is also evidence that negative and intrusive automatic thoughts, namely concerning infant- and motherhood-related issues may occur to the majority of postpartum women, even in the absence of depressive symptoms (Hall & Wittkowski, 2006); although, further research is needed to understand if the high frequency of negative automatic thoughts may allow to identify women at higher risk for the development of PPD.

Most of the studies on this topic investigated the role of superficial and of deeper level cognitions separately, and

mainly without considering the presence of other risk factors for PPD. Therefore, a better understanding is needed concerning the similarities and differences between the cognitive processes of women at a higher-risk for PPD (with interpersonal and clinical risk factors for PPD), presenting or not presenting clinically relevant depressive symptoms, in comparison with women without such clinical and interpersonal risk factors (i.e. low-risk women). In addition, a clearer examination of the added value of cognitive variables in explaining the risk for PPD symptoms are essential for the development of a more effective risk assessment and for the implementation of preventive approaches that may include such cognitive variables, as they are modifiable through psychological interventions. Therefore, this exploratory study has two main goals: (1) to compare women's dysfunctional motherhood-related beliefs and frequency of general and postpartum-specific automatic thoughts as a function of their level of PPD risk based on well established risk-factors (low-risk vs. high-risk) and symptoms (absent vs. present); and (2) to examine the added explicative value of cognitive variables (dysfunctional beliefs, automatic thoughts) as correlates of PPD symptoms, controlling for the role of established risk factors for PPD (high-risk vs. low-risk women).

Methods

Procedure

A cross-sectional internet survey was conducted in Portugal, with the following eligibility criteria: (1) being a woman in the postnatal period (12 months after childbirth); and (2) being 18 years or older. The study was approved by the Ethics Committee of Faculty of Psychology and Education Sciences of University of Coimbra (Portugal), and data collection occurred between December 2015 and March 2016. The study was advertised online (e.g. social media websites) and in-person (participants were contacted by the research team during their postpartum hospitalization at the maternity ward). The internet survey was hosted by Limesurvey[®]. Before starting the survey, participants received information about the study's goals, their participation (e.g. voluntary nature) and the researchers' role (e.g. guarantee of anonymity/confidentiality), followed by the informed consent form (with the question "Do you agree to participate in this study?"). Only individuals who agreed to the study's conditions completed the survey.

Participants

The sample comprised 441 women in the postpartum period ($M = 4.01$ months, $SD = 3.26$) who completed the entire assessment protocol. The women's mean age was 32.30 years ($SD = 4.30$). Most women were married/living together ($n = 396$, 89.8%), were currently employed ($n = 351$, 81.1%) and had a monthly income of 1000€–2000€ ($n = 223$, 50.6%). The majority of women had completed higher education ($n = 307$, 69.6%).

Measures

Socio-demographic information

Sociodemographic (e.g. age, marital status, educational level, professional situation and socioeconomic status) and infant's data (infant's age) were collected through a self-report instrument.

Postpartum Depression Predictors Inventory-Revised (PDPI-R)

The Portuguese version of the PDPI-R (postnatal version; Alves, Fonseca, Canavarro, & Pereira, 2018) is an inventory used to assess PPD risk factors identified based on an updated meta-analysis (e.g. low socioeconomic status, low self-esteem, prenatal depression/anxiety, lack of social support, child care stress; Beck, 2001). Although originally developed as a clinical interview, the PDPI-R can also be used as a self-report measure, quickly and easily completed (Beck, Records, & Rice, 2006; Oppo et al., 2009). The questionnaire is composed of 39 items, answered on a dichotomous scale (yes vs. no, except for the first two items in which participants report their marital status and socioeconomic status). The PDPI-R total score ranges from 0 to 39. Higher scores indicate increased risk for PPD. The PDPI-R self-report form was translated in different languages and has globally revealed satisfactory psychometric properties (e.g. Ibarra-Yruegas, Lara, Navarrete, Nieto, & Valle, 2018; Ikeda & Kamibepu, 2013; Oppo et al., 2009). The Portuguese validation studies showed evidence of the good psychometric properties of PDPI-R as a screening instrument for predicting PPD. A cutoff score of 5.5 or higher was found to be indicative of higher PPD risk (Alves et al., 2018). Based on the PDPI-R scores, women were categorized as high-risk women (i.e. women presenting a score on PDPI-R ≥ 5.5) and low-risk women (i.e. women with a PDPI-R < 5.5).

Attitudes Towards Motherhood Scale (AToM)

The Portuguese version of the AToM (Costa, Rodrigues, Canavarro, & Fonseca, 2018) is a self-report measure to assess dysfunctional motherhood-related beliefs that comprises 12 items, answered on a six-point Likert scale (from 0 = *Always Disagree* to 5 = *Always Agree*). The AToM is organized into three dimensions: Beliefs related to Others' Judgements (4 items; e.g. *"If my baby is crying, people will think I cannot care for him/her properly"*; $\alpha = 0.87$), Beliefs related to Maternal Responsibility (five items; e.g. *"Good mothers always put their baby's needs first"*, $\alpha = 0.69$) and Beliefs related to Maternal Role Idealization (three items; e.g. *"It is wrong to have mixed feelings about my baby"*, $\alpha = 0.89$). Higher scores indicate more dysfunctional motherhood-related beliefs.

Postnatal Negative Thoughts Questionnaire (PNTQ)

The Portuguese version of the PNTQ (Rodrigues, Costa, Canavarro, & Fonseca, 2017) is a self-report questionnaire, composed of 17 items, answered on a four-point scale (from 0 = *Never* to 3 = *Almost Always*). The PNTQ evaluates the

frequency of specific postnatal negative thoughts in two dimensions: Pregnancy and Motherhood Negative Thoughts (the content of negative thoughts; 8 items, e.g. *"I do not want to be alone with my baby"*, $\alpha = 0.75$) and Appraisals of Cognition, Emotion, and Situation (the metacognitive appraisal of thoughts' content; nine items, e.g. *"There must be something wrong with me"*, $\alpha = 0.90$). Higher scores are indicative of higher frequency of postpartum negative thoughts.

Automatic Thoughts Questionnaire – Revised (ATQ-R)

The Portuguese version of the ATQ-R (Pereira, Matos, & Azevedo, 2014) is a self-report questionnaire that assesses the frequency of negative and nonnegative self-statements related to depression in the general population. The items of the ATQ-R are answered on a five-point frequency scale (from 0 = *Not at all* to 4 = *All the time*), and are organized into three dimensions: Low/Negative Self-Concept and Negative Expectations (12 items; e.g. *"I'm worthless"*, $\alpha = 0.94$); Personal Maladjustment and Desire for Change (15 items; e.g. *"No one understands me"*, $\alpha = 0.94$) and Positive Automatic Thoughts (9 items; *"No matter what happens, I know I'll make it"*; $\alpha = 0.93$).

Edinburgh Postnatal Depression Scale (EPDS)

The EPDS (Augusto, Kumar, Calheiros, Matos, & Figueiredo, 1996) is a 10-item screening scale used to assess the presence of clinically significant psychopathological symptoms. Women were asked to answer how they felt over the previous seven days (e.g. sadness, tearfulness) using a four-point Likert scale. A score of 12 or higher is indicative of probable depression (Cox, Holden, & Sagovsky, 1987). Based on their EPDS scores, women were classified as presenting clinically relevant symptoms (EPDS ≥ 12) and not presenting clinically relevant symptoms (No-Symptoms Group; EPDS < 12). In our sample, Cronbach's alpha was 0.89.

Statistical analysis

Data analyses were conducted using Statistical Package for the Social Sciences (SPSS Inc., Chicago, IL). Descriptive statistics were calculated for sociodemographic characterization of the sample. Comparison tests (MANCOVAs, followed by univariate analyses of variance when the multivariate effect was significant) were conducted to characterize the study variables as a function of group. The time since childbirth (in months) was introduced as covariate in the model. Effect size measures were presented for the comparison analyses (small: $\eta^2 \geq 0.01$; medium: $\eta^2 \geq 0.06$; large: $\eta^2 \geq 0.14$; Cohen, 1988).

A hierarchical linear regression model was performed to investigate the relationship between presence of risk factors for PPD [low-risk (PDPI-R < 5.5) vs. high-risk (PDPI-R ≥ 5.5)] and cognitive variables (dysfunctional beliefs, general automatic thoughts, postpartum-specific automatic thoughts), considered as independent variables, on

Table 1. Dysfunctional beliefs towards motherhood and negative automatic thoughts: comparison between low-risk, high-risk-no-symptoms and high-risk-symptoms women.

| | Low-risk group (n= 214) | High-risk-no-symptoms group (n= 139) | High-risk-symptoms group (n= 77) | F | η^2 | C1 | C2 | C3 |
|--|-------------------------|--------------------------------------|----------------------------------|-----------|----------|--------|--------|--------|
| | M (DP) | M (DP) | M (DP) | | | p | p | p |
| <i>Dysfunctional beliefs towards motherhood</i> | | | | | | | | |
| Beliefs about Others' Judgements | 1.05 (1.09) | 1.52 (1.22) | 2.31 (1.35) | 30.25*** | 0.12 | 0.001 | <0.001 | <0.001 |
| Beliefs about Maternal Responsibility | 1.69 (1.00) | 2.14 (1.02) | 2.73 (1.15) | 29.04*** | 0.12 | <0.001 | <0.001 | <0.001 |
| Beliefs about Maternal Role Idealization | 2.11 (1.85) | 2.18 (1.74) | 2.57 (1.67) | 2.00 | 0.01 | 0.999 | 0.363 | 0.176 |
| <i>General automatic thoughts</i> | | | | | | | | |
| Low/Negative Self-Concept and Negative Expectations | 13.57 (2.77) | 15.90 (5.04) | 25.30 (11.01) | 112.27*** | 0.35 | 0.001 | <0.001 | <0.001 |
| Personal Maladjustment and Desire for Change | 20.01 (4.51) | 25.55 (7.99) | 38.99 (12.28) | 167.79*** | 0.45 | <0.001 | <0.001 | <0.001 |
| Positive Automatic Thoughts | 32.74 (7.34) | 28.76 (6.86) | 21.24 (6.83) | 74.30*** | 0.26 | <0.001 | <0.001 | <0.001 |
| <i>Postpartum-specific negative automatic thoughts</i> | | | | | | | | |
| Pregnancy and Motherhood-Related Thoughts | 1.37 (1.80) | 2.18 (2.02) | 4.29 (3.33) | 46.44*** | 0.18 | 0.003 | <0.001 | <0.001 |
| Appraisals of Emotions, Cognitions and Situations | 1.57 (2.41) | 3.35 (3.20) | 8.79 (5.84) | 115.43*** | 0.35 | <0.001 | <0.001 | <0.001 |

Note. C1: comparison between the low-risk group and the high-risk-no-symptoms group; C2: comparison between the high-risk-no-symptoms group and the high-risk-symptoms group; C3: comparison between the low-risk group and the high-risk-symptoms group.

*** $p < 0.001$.

postpartum depression symptoms (EPDS scores, the dependent variable). Each set of variables was introduced in a different step of the model, in order to examine its incremental explicative value of the dependent variable (depressive symptoms). Time since childbirth (in months) was controlled for.

Finally, a logistic regression was performed, to investigate the relationship between the same set of independent variables and the presence of depressive symptoms indicative of PPD (EPDS ≥ 12 , with 1 meaning the presence of symptoms indicative of probable depression and 0 meaning the absence of symptoms indicative of probable depression). Odds ratios (ORs) and confidence intervals were displayed.

Results

Preliminary analyses

In our sample, 49.0% ($n = 216$) of women presented PDPI-R scores above the cutoff score (≥ 5.5), suggesting that they present a set of interpersonal/clinical risk factors that put them at higher-risk of developing PPD symptoms. Of these, 35.6% ($n = 77$) presented EPDS scores that indicated probable depression (EPDS ≥ 12). Only 11 women (4.89%) in the low-risk group presented EPDS scores indicative of probable depression. Due to their low number, they were excluded from comparison analyses.

Women presenting a low-risk for PPD (Low-Risk), women presenting a high-risk for PPD (but no current clinically relevant symptoms) (High-Risk-No-Symptoms) and women presenting a high-risk for PPD with clinically relevant symptoms (High-Risk-Symptoms) were compared in terms of cognitive variables.

A significant multivariate effect of group was found concerning dysfunctional beliefs towards motherhood (Pillai's Trace = 0.165, $F_{3,424} = 12.77$, $p < 0.001$, $\eta^2 = 0.08$), with univariate differences found in the dimensions Beliefs about Others' Judgements and Beliefs about Maternal

Responsibility, but not Beliefs about Maternal Role Idealization (cf. Table 1). Post hoc analyses suggested that differences were found between the three groups, with High-Risk-Symptoms women presenting more dysfunctional beliefs related with the others' judgements and maternal responsibility than the other groups, followed by the High-Risk-No-Symptoms and the Low-Risk women.

Moreover, a significant multivariate effect of group was found concerning general automatic thoughts (Pillai's Trace = 0.50, $F_{3,421} = 47.13$, $p < 0.001$, $\eta^2 = 0.25$), with univariate differences being found in the three dimensions. Post hoc analyses suggest that differences were found between the three groups, with High-Risk-Symptoms women presenting general negative thoughts more frequently and general positive thoughts less frequently than the other groups, followed by the High-Risk-No-Symptoms women and the Low-Risk women. Finally, a significant multivariate effect of group was found concerning postpartum-specific negative automatic thoughts (Pillai's Trace = 0.35, $F_{2,425} = 45.53$, $p < 0.001$, $\eta^2 = 0.18$), with univariate differences being found in both dimensions. Post hoc analyses suggest that differences were found between the three groups, with High-Risk-Symptoms women presenting the most frequent postpartum-specific negative thoughts, followed by the High-Risk-No-Symptoms women and the Low-Risk women.

Cognitive correlates of postpartum depressive symptoms

Table 2 presents the regression model examining the effects of risk factors (low-risk vs. high-risk) and of cognitive variables on depressive symptoms. The final model was statistically significant ($F_{10,427} = 89.60$, $p < 0.001$) and explained 67.7% of the variance in the dependent variable. In the second step of the model, and controlling for time since childbirth (in the first step), the presence of risk factors above the cutoff score significantly predicted the postpartum

Table 2. Multivariate regression model examining the effects of risk factors (low-risk vs. high-risk) and of cognitive variables on postpartum depressive symptoms.

| | Step 1: $\Delta R^2 = 0.011$, $F_{1,436} = 4.80^*$ | Step 2: $\Delta R^2 = 0.233$, $F_{1,435} = 134.18^{***}$ | Step 3: $\Delta R^2 = 0.120$, $F_{3,432} = 27.19^{***}$ | Step 4: $\Delta R^2 = 0.286$, $F_{3,429} = 116.67^{***}$ | Step 5: $\Delta R^2 = 0.027$, $F_{2,427} = 18.14$ |
|--|--|---|--|---|---|
| Months since childbirth | 0.17 (0.08)* | 0.10 (0.07) | 0.03 (0.06) | -0.02 (0.05) | -0.05 (0.05) |
| Risk factors (0: low-risk; 1: high-risk) | - | 0.44 (0.49)*** | 3.85 (0.43)*** | 1.22 (0.35)** | 1.04 (0.34)** |
| Dysfunctional Beliefs: Others' Judgments | - | - | 1.04 (0.19)*** | 0.28 (0.15) ⁺ | 0.14 (0.15) |
| Dysfunctional Beliefs: Maternal Responsibility | - | - | 0.82 (0.24)*** | 0.40 (0.18)* | 0.36 (0.17)* |
| Dysfunctional Beliefs: Maternal Role Idealization | - | - | -0.08 (0.12) | -0.02 (0.09) | -0.04 (0.09) |
| Automatic Thoughts: Negative Self-Concept | - | - | - | 0.09 (0.04)* | 0.07 (0.04) |
| Automatic Thoughts: Maladjustment | - | - | - | 0.19 (0.03)*** | 0.13 (0.03)*** |
| Automatic Thoughts: Positive Thoughts | - | - | - | -0.18 (0.02)*** | -0.17 (0.02)*** |
| Postpartum Thoughts: Pregnancy and Motherhood-Related | - | - | - | - | -0.01 (0.09) |
| Postpartum Thoughts: Appraisals of Emotions, Cognitions and Situations | - | - | - | - | 0.30 (0.06)*** |
| Overall model | $F_{1,436} = 4.80^*$ | $F_{2,435} = 70.22^{***}$ | $F_{5,432} = 49.48^{***}$ | $F_{8,429} = 99.51^{***}$ | $F_{10,427} = 89.60^{***}$ |

* $p < 0.05$.** $p < 0.01$.*** $p < 0.001$.

depressive symptoms and explained 23.3% of the variance of postpartum depressive symptoms. The addition of cognitive variables (dysfunctional beliefs, general automatic thoughts and postpartum-specific negative automatic thoughts) yielded a significant contribution to the model, by additionally explaining 12.0%, 28.6% and 2.7% of variance in the predicted variable, respectively (see Table 2).

As shown in Table 2 (final model), in addition to the presence of risk factors that put women at higher risk for depression ($\beta = 0.10$), more dysfunctional beliefs related to maternal responsibility ($\beta = 0.08$), more frequent general negative thoughts related to personal maladjustment and desire for change ($\beta = 0.25$), less frequent general positive automatic thoughts ($\beta = -0.27$), and more frequent postpartum-specific thoughts related with the appraisal of cognitions, emotions and situations ($\beta = 0.25$) were found to be significantly associated with higher levels of PPD symptoms.

A logistic regression model to predict the presence of levels of symptoms indicative of probable depression (EPDS ≥ 12) was also tested, and the results are presented in Figure 1. The logistic regression of the full model was statistically significant ($\chi^2_{10} = 195.21$, $p < 0.001$, $-2\text{Log-Likelihood} = 241.47$, Pseudo $R^2 = 0.36$ (Cox and Snell), 0.57 (Nagelkerke), Hosmer and Lemeshow = 8.42, $p = 0.393$), indicating that the predictors reliably distinguished between women presenting EPDS < 12 (non-clinical levels of depression) and EPDS ≥ 12 (symptoms indicative of probable depression). The presence of high-risk for depression ($F_{Wald} = 4.49$, $p = 0.034$), more frequent negative thoughts related with personal maladjustment and desire for change ($F_{Wald} = 8.72$, $p = 0.003$), less frequent general positive thoughts ($F_{Wald} = 17.93$, $p < 0.001$) and more frequent negative

postpartum-specific thoughts related with the appraisal of cognitions, emotions and situations ($F_{Wald} = 6.70$, $p = 0.010$) were significantly associated with the presence of depressive symptoms indicative of probable depression. This model allowed for 88.4% of the cases to be correctly classified.

Discussion

Despite being exploratory, the present study adds to the existing knowledge on the identification of risk for PPD and on its prevention, by highlighting that women at high-risk for PPD (presenting or not clinical symptoms) were found to present more dysfunctional beliefs towards motherhood, more frequent general and postpartum-specific negative thoughts, and less frequent positive automatic thoughts than low-risk women. Moreover, these cognitive correlates (dysfunctional beliefs and automatic thoughts) were found to be significantly associated with PPD symptoms, even after controlling for the effects of the well-established interpersonal and clinical risk factors for PPD.

To our knowledge, this is the first study examining the similarities and differences in the cognitive variables of women presenting low-risk and high-risk for PPD, as defined by the presence of past and current interpersonal (e.g. low social support, poor marital relationship quality) and clinical risk factors (e.g. history of depression, depression during pregnancy) for PPD (Beck et al., 2006). Our results showed that women's more dysfunctional motherhood-related beliefs and more frequent negative thoughts may differentiate not only women presenting clinically relevant depressive symptoms, which is congruent with prior studies (Hall & Papageorgiou, 2005; Sockol et al., 2014;

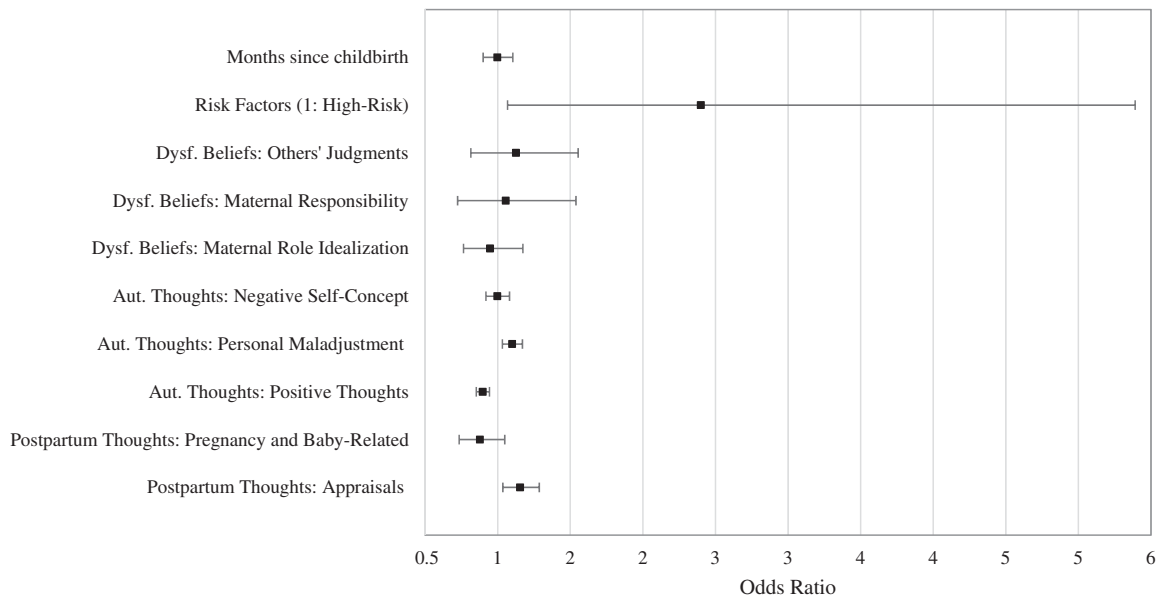


Figure 1. Odds ratio for the association of risk factors for postpartum depression, dysfunctional beliefs towards motherhood, general automatic thoughts, postpartum-specific thoughts and probable depression ($EPDS \geq 12$).

Wittkowski et al., 2017), but also women presenting a high-risk for PPD without clinically relevant depressive symptoms. Specifically, and in line with the findings by Church et al. (2005), it is possible that some of the pre-existing risk factors for PPD may predispose women to more dysfunctional beliefs, namely related with others' judgements (of their personal value as a mother) and maternal responsibility (high demands of the maternal role). For example, women with a prior history of psychopathology and/or low self-esteem (Milgrom et al., 2008; O'Hara & Swain, 1996) may already present more dysfunctional general beliefs about how they perceived themselves (e.g. "I am useless", "I am a failure") and about others' evaluations (e.g. "No one loves me", "No one believes in my worth"), which may not only be generalizable to the maternal role (i.e. leading to more dysfunctional motherhood-related beliefs), but also contribute to an already existent distorted pattern of interpretation of events (Kathree, Selohilwe, Bhana, & Petersen, 2014), even before depressive symptoms are present. Additionally, it is possible that when relational risk factors (e.g. lack of social support and marital dissatisfaction) are present (Afolabi, Bunce, Lusher, & Banbury, 2017; Milgrom et al., 2008), women may anticipate the parenting experience to be an isolated experience, which can also lead to the development of more dysfunctional attitudes about high maternal demands and responsibility.

Furthermore, our results support that these cognitive correlates (dysfunctional beliefs and negative automatic thoughts) explain additional variance in PPD symptoms, beyond the well-established risk factors for PPD, supporting their role as cognitive vulnerability factors. Specifically, in addition to the presence of high-risk for PPD (Beck, 2002; Milgrom et al., 2008; Robertson et al., 2004), more dysfunctional beliefs related to maternal responsibility, more frequent negative thoughts related to personal maladjustment and desire for change and with the metacognitive appraisal of the postpartum-specific thoughts' content, and less

frequently positive thoughts, were independently associated with PPD symptoms. On the one hand, these results highlight the prominent role of dysfunctional beliefs towards maternal responsibility in PPD symptoms and are in line with previous studies that found that PPD women were characterized by self-sacrifice beliefs (O'Mahen et al., 2010) and high performance standards, which were accompanied by overly critical evaluations of their maternal role (e.g. Gelabert et al., 2012). The failure to meet these high-performance standards appears to negatively influence women's evaluations of their own parenting experience, and this may translate into poorer adjustment to the maternal role (Bouchard, 2009; Delmore-Ko, Pancer, Hunsberger, & Pratt, 2000; Staneva & Wittkowski, 2013), leading to higher depressive symptoms.

On the other hand, our results reinforce the important role of the women's negative pattern of thinking as a predictor of higher depressive symptoms and, particularly, of clinically relevant depressive symptoms. It is possible that the activation of high-risk women's latent beliefs may predispose women to a biased pattern of interpretation of maternity-related events, translated into more frequent negative thoughts of personal maladjustment and inadequacy to the maternal role and generalized to their other roles (e.g. "There is something wrong with me"). Simultaneously, the self-imposed high-standards of maternal responsibility may prone women to critically evaluate the content of their existing motherhood-related negative thoughts as inappropriate and inadequate. Women who evaluate their thoughts as a sign of maternal inadequacy and who evaluate themselves as maladjusted to the maternal role may engage in cognitive coping strategies, such as self-blame or rumination about the occurrence of such thoughts, which can have the paradoxical effect of increasing the frequency of negative automatic thoughts (Bevan, Wittkowski, & Wells, 2013; Haga et al., 2012; Kathree et al., 2014), and of compromising the effectiveness of problem-solving

strategies to address stress-inducing situations (e.g. Donaldson & Lam, 2004). In fact, recent studies have acknowledged the important role of ruminative thinking in PPD, and in explaining the impact of PPD on parenting (Barnum, Woody, & Gibb, 2013; DeJong, Fox, & Stein, 2016; Schmidt, Seehagen, Vocks, Schneider, & Teismann, 2016). It seems that a continuous pattern of negative and perseverative thinking characterized by themes of personal inadequacy and maladjustment and by a critical evaluation of internal experiences (e.g. motherhood-related thoughts; Barnum et al., 2013; Egan, Kane, Winton, Eliot, & McEvoy, 2017) put women at risk of exacerbation of depressive symptoms and its maintenance over time (Kathree et al., 2014; Milgrom, Martin, & Negri, 1999). In fact, this is congruent with the results of this study, which show that although both dysfunctional beliefs and negative thoughts have a significant contribution in explaining the levels of depressive symptoms, it is only the frequency of general and postpartum-specific negative thoughts that proves to be associated with clinical depression levels.

Finally, our results highlight the importance of considering the role of positive automatic thoughts in this context, as women at higher-risk for PPD also present less frequent positive thoughts, and the lower frequency of positive thoughts is associated with higher depressive symptoms. Despite being innovative results in the context of PPD, these results are congruent with prior studies suggesting that deficits in positive cognitions may also play an important role in emotional disorders (e.g. Lightsey, 1994) and that positive cognitions may buffer the impact of stress-inducing events (Boyraz, & Lightsey, 2012). When transposed to the postpartum context, it is possible that the deficits in positive cognitions found in women who are at higher-risk for PPD may prone them to have more difficulties in give meaning to the stress-inducing nature of caregiving demands, which may heighten their negative thoughts of personal maladjustment and inadequacy.

Limitations

Several limitations of the present study are worth noting. First, the cross-sectional nature of the study does not allow for the establishment of causal relationships between study variables. Moreover, the definition of postpartum period consists of a period of great amplitude (0–12 months postpartum), which may influence the nature of the relationships found. In order to mitigate this limitation, the time since childbirth was controlled in statistical analyses. Second, to assess depressive symptoms, our study included only self-report measures, which preclude the establishment of a clinical diagnosis of depression. Further studies should include a sample of women with a clinical diagnosis of PPD, assessed from pregnancy (risk factors for PPD) and throughout the first postpartum year, in order to replicate these study's findings. Third, the self-selected sample comprised mainly highly educated and married women, which may compromise the full representativeness of our results.

Further studies should include a more sociodemographically diverse sample.

Implications for clinical practice

Our results emphasize the importance of including cognitive variables in the assessment of risk for PPD, as they were found to be important correlates of PPD symptoms. The existing risk assessment instruments (e.g. PDPI-R, Beck et al., 2006; Antenatal Risk Questionnaire, Austin, Colton, Priest, Reilly & Hadzi-Pavlovic, 2013) have only focused on contextual, clinical or interpersonal risk factors for PPD, but risk assessment should also include a comprehensive assessment of women's dysfunctional beliefs and automatic thoughts. The future development of risk indices that may include these variables should be considered.

Furthermore, given the added explicative value of dysfunctional beliefs and automatic thoughts on postpartum depressive symptoms, preventive efforts that address these cognitive variables hold potential for clinical efficacy. In fact, our results suggest that preventive approaches for PPD may target high-risk women in the early postpartum period, as this time may be a window of opportunity in which cognitive vulnerabilities are present but may not be completely activated (or activated during a continuous period of time) to systematically influence women's interpretation of events. Specifically, preventive approaches for PPD should integrate this specific thematic content by targeting the following: (1) helping women understand the origin of dysfunctional beliefs (prior experiences, perfectionism and the myths of perfect motherhood) and their consequences (unrealistic expectations about the maternal role, often leading to failure and to a poorer adjustment); (2) providing women with psychoeducation about cognitive processes (e.g. how cognitive coping strategies to address negative thoughts may have the paradoxical effect of increasing them); (3) promoting women's identification, non-evaluative acceptance and cognitive reappraisal of these beliefs, by encouraging them to challenge current beliefs and thoughts (through cognitive restructuring techniques) and to consequently adopt more realistic expectations of themselves as mothers; and (4) promoting women's positive cognitions.

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Ana Fonseca and Maria Cristina Canavarró declare that they have no conflict of interest.

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References

- Afolabi, O., Bunce, L., Lusher, J., & Banbury, S. (2017). Postnatal depression, maternal-infant bonding and social support: A cross-cultural comparison of Nigerian and British mothers. *Journal of Mental Health*. doi:10.1080/09638237.2017.1340595
- Alves, S., Fonseca, A., Canavarro, M. C., & Pereira, M. (2018). Preliminary psychometric testing of the Postpartum Depression Predictors Inventory-Revised (PDPI-R) in Portuguese women. *Maternal and Child Health Journal*, 22(4), 571–578. doi:10.1007/s10995-017-2426-5
- Augusto, A., Kumar, R., Calheiros, J., Matos, E., & Figueiredo, E. (1996). Post-natal depression in an urban area of Portugal: Comparison of childbearing women and matched controls. *Psychological Medicine*, 26(01), 135–141. doi:10.1017/S0033291700033778
- Austin, M. P., Colton, J., Priest, S., Reilly, N., & Hadzi-Pavlovic, D. (2013). The Antenatal Risk Questionnaire (ANRQ): Acceptability and use of psychosocial risk assessment in the maternity setting. *Women and Birth*, 26(1), 17–25. doi:10.1016/j.wombi.2011.06.002
- Barnum, S., Woody, M., & Gibb, B. (2013). Predicting changes in depressive symptoms from pregnancy to postpartum: The role of brooding rumination and negative inferential styles. *Cognitive Therapy and Research*, 37(1), 71–77. doi:10.1016/j.wombi.2011.06.002
- Battle, C., & Zlotnick, C. (2005). Prevention of postpartum depression. *Psychiatric Annals*, 35(7), 590–598. doi:10.3928/0048-5713-20050701-17
- Beck, A. T., Rush, A. J., Shaw, B. F., & Emery, G. (1979). *Cognitive therapy for depression*. New York, NY: The Guilford Press.
- Beck, C. T. (2001). Predictors of postpartum depression: An update. *Nursing Research*, 50(5), 275–285. doi:10.1097/00006199-200109000-00004
- Beck, C. T. (2002). Postpartum depression: A metasynthesis. *Qualitative Health Research*, 12(4), 453–472. doi:10.1177/104973202129120016
- Beck, C. T., Records, K., & Rice, M. (2006). Further development of the Postpartum Depression Predictors Inventory-Revised. *Journal of Obstetric, Gynecologic, and Neonatal Nursing*, 35(6), 735–745. doi:10.1111/j.1552-6909.2006.00094.x
- Beck, J. (2009). The Corsini encyclopedia of psychology. In I. Weiner & E. Craighead (Eds.), *Cognitive therapy* (pp. 353–354). New Jersey: John Wiley & Sons.
- Bevan, D., Wittkowski, A., & Wells, A. (2013). A multiple-baseline study of the effects associated with metacognitive therapy in postpartum depression. *Journal of Midwifery & Women's Health*, 58(1), 69–75. doi:10.1111/j.1542-2011.2012.00255.x
- Bouchard, G. (2009). Parents-to-be with overly optimistic expectations of parenthood: Who are they and what should counsellors do? *Canadian Journal of Counselling*, 43, 165–177.
- Boyras, G., & Lightsey, O. R. (2012). Can positive thinking help? Positive automatic thoughts as moderators of the stress–meaning relationship. *American Journal of Orthopsychiatry*, 82(2), 267–277. doi:10.1111/j.1939-0025.2012.01150.x
- Church, N. F., Brechman-Toussaint, M., & Hine, D. (2005). Do dysfunctional cognitions mediate the relationship between risk factors and postnatal depression symptomatology? *Journal of Affective Disorders*, 87(1), 65–72. doi:10.1016/j.jad.2005.03.009
- Cohen, J. (1988). *Statistical power analysis for the behavioral science*. Hillsdale, NJ: Erlbaum.
- Costa, A. C., Rodrigues, S., Canavarro, M. C., & Fonseca, A. (2018). Adaptação da Escala de Crenças Disfuncionais Face à Maternidade para a População Portuguesa: Estudos Psicométricos [Adaptation of the Attitudes Towards Motherhood Scale to the Portuguese population: Psychometric studies]. *Análise Psicológica*, 36(2), 247–260. doi:10.14417/ap.1387
- Cox, J., Holden, J. M., & Sagovsky, R. (1987). Detection of postnatal depression: Development of the 10-item Edinburgh Postnatal Depression Scale. *British Journal of Psychiatry*, 150(06), 782–786. doi:10.1192/bjp.150.6.782
- Cutrona, C. E. (1983). Causal attributions and perinatal depression. *Journal of Abnormal Psychology*, 92(2), 161–172. doi:10.1037/0021-843X.92.2.161
- DeJong, H., Fox, E., & Stein, A. (2016). Rumination and postnatal depression: A systematic review and cognitive model. *Behavior Research & Therapy*, 82, 38–49. doi:10.1016/j.brat.2016.05.003
- Delmore-Ko, P., Pancer, S., Hunsberger, B., & Pratt, M. (2000). Becoming a parent: The relation between prenatal expectations and postnatal experience. *Journal of Family Psychology*, 14(4), 625–640. doi:10.1037/0893-3200.14.4.625
- Donaldson, C., & Lam, D. (2004). Rumination, mood and social problem-solving in major depression. *Psychological Medicine*, 34(7), 1309–1318. doi:10.1017/S0033291704001904
- Egan, S., Kane, R., Winton, K., Eilat, C. & McEvoy, P. (2017). A longitudinal investigation of perfectionism and repetitive negative thinking in perinatal depression. *Behavior Research and Therapy*, 97, 26–32. doi:10.1016/k.brat.2017.06.006
- Enatescu, V.-R., Bernad, E., Gluhovschi, A., Papava, I., Romosan, R., Palicsak, A., ... Enatescu, I. (2017). Perinatal characteristics and mother's personality profile associated with increased likelihood of postpartum depression occurrence in a Romanian outpatient sample. *Journal of Mental Health*, 26(3), 212–219. doi:10.3109/09638237.2016.1149802
- Evans, J., Heron, J., Lewis, G., Araya, R., & Wolke, D. (2005). Negative self-schemas and the onset of depression in women: Longitudinal study. *British Journal of Psychiatry*, 186(04), 302–207. doi:10.1192/bjp.186.4.302
- Fonseca, A., & Canavarro, M. C. (2018). Exploring the paths between dysfunctional attitudes towards motherhood and postpartum depressive symptoms: The moderating role of self-compassion. *Clinical Psychology & Psychotherapy*, 25, e96-e106. doi:10.1002/cpp.2145
- Gavin, N. I., Gaynes, B., Lohr, K., Meltzer-Brody, S., Gartlehner, G., & Swinson, T. (2005). Perinatal depression: A systematic review of prevalence and incidence. *Obstetrics and Gynecology*, 106(5, Part 1), 1071–1083. doi:10.1097/01.AOG.0000183597.31630.db
- Gelabert, E., Subirà, S., García-Estève, L., Navarro, P., Plaza, A., Cuyàs, E., ... Martín-Santos, R. (2012). Perfectionism dimensions in major postpartum depression. *Journal of Affective Disorders*, 136(1–2), 17–25. doi:10.1016/j.jad.2011.08.030
- Gotlib, I., Whiffen, V., Wallace, P., & Mount, J. (1991). Prospective investigation of postpartum depression: Factors involved in onset and recovery. *Journal of Abnormal Psychology*, 100(2), 122–132. doi:10.1037/0021-843X.100.2.122
- Grazioli, R., & Terry, D. (2000). The role of cognitive vulnerability and stress in the prediction of postpartum depressive symptomatology. *British Journal of Clinical Psychology*, 39(4), 329–347. doi:10.1348/014466500163347
- Haga, S., Ulleberg, P., Slinning, K., Kraft, P., Steen, T., & Staff, A. (2012). A longitudinal study of postpartum depressive symptoms: Multilevel growth curve analyses of emotion regulation strategies, breastfeeding self-efficacy, and social support. *Archives of Women's Mental Health*, 15(3), 175–184. doi:10.1007/s00737-012-0274-2
- Hall, P. L., & Papageorgiou, C. (2005). Negative thoughts after childbirth: Development and preliminary validation of a self-report scale. *Depression and Anxiety*, 22, 121–129. doi:10.1002/da.20119

- Hall, P. L., & Wittkowski, A. (2006). An exploration of negative thoughts as a normal phenomenon after childbirth. *Journal of Midwifery and Women's Health, 51*, 321–330. doi:10.1016/j.jmwh.2006.03.007
- Hildebrandt, F. (2013). Depressão Pós-Parto: Aspectos epidemiológicos e proposta de tratamento cognitivo-comportamental [Postpartum depression: Epidemiological issues and proposal of a cognitive-behavioural treatment] (Unpublished dissertation). University Federal do Rio de Janeiro, Rio de Janeiro, Brazil.
- Hipwell, A., Reynolds, S., & Crick, E. (2004). Cognitive vulnerability to postnatal depressive symptomatology. *Journal of Reproductive and Infant Psychology, 22*, 221–227. doi:10.1080/02646830410001723797
- Ibarra-Yruegas, B., Lara, M., Navarrete, L., Nieto, L., & Valle, O. K. (2018). Psychometric properties of the Postpartum Depression Predictors Inventory-Revised for pregnant women in Mexico. *Journal of Health Psychology, 23*(11), 1415–1423. doi:10.1177/1359105316658969
- Ikedo, M., & Kamibeppu, K. (2013). Measuring the risk factors for postpartum depression: Development of the Japanese version of the Postpartum Depression Predictors Inventory-Revised (PDPPI-R). *BMC Pregnancy and Childbirth, 13*, 112. doi:10.1186/1471-2393-13-112
- Jennings, K., Ross, S., Popper, S., & Elmore, M. (1999). Thoughts of harming infants in depressed and nondepressed mothers. *Journal of Affective Disorders, 54*(1–2), 21–28. doi:10.1016/S0165-0327(98)00185-2
- Kathree, T., Selohilwe, O., Bhana, A., & Petersen, I. (2014). Perceptions of postnatal depression and health care needs in a South African sample: The "mental" in maternal health care. *BMC Women's Health, 14*, 140. doi:10.1186/s12905-014-0140-7
- Kingston, D., Tough, S., & Whitfield, H. (2012). Prenatal and postpartum maternal psychological distress and infant development: A systematic review. *Child Psychiatry & Human Development, 43*(5), 683–714. doi:10.1007/s10578-012-0291-4
- Lightsey, O. (1994). "Thinking positive" as a stress buffer: The role of positive automatic cognitions in depression and happiness. *Journal of Counseling Psychology, 41*(3), 325–334. doi:10.1037/0022-0167.41.3.325
- Manly, P., McMahon, R., Bradley, C., & Davidson, P. (1982). Depressive attributional style and depression following childbirth. *Journal of Abnormal Psychology, 91*(4), 245–254. doi:10.1037/0021-843X.91.4.245
- Milgrom, J., Gemmill, A. W., Bilszta, J. L., Hayes, B., Barnett, B., Brooks, J., ... Buist, A. (2008). Antenatal risk factors for postnatal depression: A large prospective study. *Journal of Affective Disorders, 108*(1–2), 147–157. doi:10.1016/j.jad.2007.10.014
- Milgrom, J., Martin, P. R., & Negri, L. M. (1999). *Treating postnatal depression: A psychological approach for health care practitioners*. West Sussex, UK: Wiley.
- O'Hara, M., Neunaber, D., & Zekoski, E. (1984). Prospective study of postpartum depression: Prevalence, course and predictive factors. *Journal of Abnormal Psychology, 93*, 158–171. doi:10.1037//0021-843X.93.2.158
- O'Hara, M., Rehm, L., & Campbell, S. (1982). Predicting depressive symptomatology: Cognitive-behavioral models and postpartum depression. *Journal of Abnormal Psychology, 91*, 457–461. doi:10.1037/0021-843X.91.6.457
- O'Mahen, H., Flynn, H., & Nolen-Hoeksema, (2010). Rumination and interpersonal functioning in perinatal depression. *Journal of Social and Clinical Psychology, 29*, 646–667. doi:10.1521/jscp.2010.29.6.646
- O'Hara, M. W., & Swain, A. (1996). Rates and risk of postpartum depression: A meta-analysis. *International Review of Psychiatry, 8*, 37–54. doi:10.3109/09540269609037816
- Oppo, A., Mauri, M., Ramacciotti, D., Camilleri, V., Banti, S., Borri, C., ... Cassano, G. B. (2009). Risk factors for postpartum depression: The role of Postpartum Depression Predictors Inventory-Revised (PDPPI-R). Results from the Perinatal Depression Research & Screening Unit (PNDReScU) study. *Archives of Women's Mental Health, 12*, 239–249. doi:10.1007/s00737-009-0071-8
- Pearlstein, T., Howard, M., Salisbury, A., & Zlotnick, C. (2009). Postpartum depression. *American Journal of Obstetrics & Gynecology, 200*, 357–364. doi:10.1016/j.ajog.2008.11.033
- Pereira, I., Matos, A. P., & Azevedo, A. (2014). Versão Portuguesa do Questionário de Pensamentos Automáticos - Revisto: Relação com sintomatologia depressiva em adolescentes [Portuguese version of the Automatic Thoughts Questionnaire - Revised: Relationship with depressive symptoms in adolescence]. *Psicologia, Saúde, & Doenças, 15*, 36–46. doi:10.15309/14psd150105
- Phillips, J., Sharpe, L., Matthey, S., & Charles, M. (2010). Subtypes of postnatal depression? A comparison of women with recurrent and de novo postnatal depression. *Journal of Affective Disorders, 120*(1–3), 67–75. doi:10.1016/j.jad.2009.04.011
- Robertson, E., Grace, S., Wallington, T., & Stewart, D. E. (2004). Antenatal risk factors for postpartum depression: A synthesis of recent literature. *General Hospital Psychiatry, 26*(4), 289–295. doi:10.1016/j.genhosppsy.2004.02.006
- Rodrigues, S., Costa, A. C., Canavarro, M. C., & Fonseca, A. (2017). Adaptação da Escala de Pensamentos Automáticos Negativos Pós-Parto para a população Portuguesa: Estudos psicométricos [The Portuguese version of the Postpartum Negative Thoughts Scale: Psychometric studies]. *Análise Psicológica, 35*, 395–407. doi:10.14417/ap.1334
- Schmidt, D., Seehagen, S., Vocks, S., Schneider, S., & Teismann, T. (2016). Predictive importance of antenatal depressive rumination and worrying for maternal-foetal attachment and maternal well-being. *Cognitive Therapy and Research, 40*(4), 565–576. doi:10.1007/s10608-016-9759-z
- Sockol, L., Epperson, C., & Barber, J. (2013). Preventing postpartum depression: A meta-analytic review. *Clinical Psychology Review, 33*(8), 1205–1217. doi:10.1016/j.cpr.2013.10.004
- Sockol, L., Epperson, C., & Barber, J. (2014). The relationship between maternal attitudes and symptoms of depression and anxiety among pregnant and postpartum first-time mothers. *Archives of Women's Mental Health, 17*(3), 199–212. doi:10.1007/s00737-014-0424-9
- Staneva, A., & Wittkowski, A. (2013). Exploring beliefs and expectations about motherhood in Bulgarian mothers: A qualitative study. *Midwifery, 29*(3), 260–267. doi:10.1016/j.midw.2012.01.008
- Stein, A., Pearson, R. M., Goodman, S. H., Rapa, E., Rahman, A., McCallum, M., ... Pariante, C. M. (2014). Effects of perinatal mental disorders on the fetus and child. *Lancet, 384*(9956), 1800–1819. doi:10.1016/S0140-6736(14)61277-0
- Tronick, E., & Reck, C. (2009). Infants of depressed mothers. *Harvard Review of Psychiatry, 17*(2), 147–156. doi:10.1080/10673220902899714
- Wittkowski, A., Garrett, C., Cooper, A., & Wieck, A. (2017). The relationship between postpartum depression and cognitions about motherhood during pregnancy. *Journal of Woman's Reproductive Health, 1*(4), 9–23. doi:10.14302/issn.2381-862X/jwrh-15-848