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Preliminary psychometric testing of the Postpartum Depression Predictors Inventory-Revised (PDPI-R) in Portuguese women

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Abstract

Introduction: Postpartum depression (PPD) is a prevalent condition with a serious impact. The early identification of women at risk for developing PPD allows for primary prevention and the delivery of timely appropriate referrals. This study investigated the validity and reliability of the postnatal version of the Postpartum Depression Predictors Inventory-Revised (PDPI-R), an instrument widely studied internationally, in Portuguese women.

Methods: The sample consisted of 204 women who participated in an online cross-sectional survey. Participants completed the European Portuguese versions of the PDPI-R, the Edinburgh Postnatal Depression Scale (EPDS), and the Postnatal Negative Thoughts Questionnaire at 1-2 months postpartum. Additionally, ROC analyses were performed to conduct an exploratory analysis of the instruments' predictive validity.

Results: The prevalence rates of clinical postpartum depressive symptoms were 27.5% and 14.2% using the cut-off scores of 9 and 12, respectively, on the EPDS. The European Portuguese postnatal version of the PDPI-R demonstrated acceptable reliability and satisfactory construct and convergent validity. When using the EPDS > 9 cut-off score, the exploratory analyses yielded a sensitivity of 76.8% and a specificity of 73.0% with a cut-off score of 5.5 (area under the curve [AUC] = .816).

Discussion: These preliminary findings encourage the use of the postnatal version of the PDPI-R as a screening tool to identify Portuguese women at high risk for developing PPD. Subsequent assessments are needed to support the routine application of the PDPI-R both in research and for clinical purposes.

Keywords: Postpartum depression, risk factors, screening, validity, reliability.

Significance

What is already known on this subject?

Based on the risk factors associated with postpartum depression (PPD), numerous instruments have been developed to predict women's risk of developing PPD. However, the majority of these instruments are not inclusive of specific postpartum risk factors, and some of them are not administered during both the prenatal and postnatal periods. One exception is the Postpartum Depression Predictors Inventory-Revised (PDPI-R), whose psychometric properties have been internationally studied.

What does this study add?

The present study supports the validity and reliability of the Portuguese PDPI-R postnatal version and encourages subsequent assessments of the predictive validity of the PDPI-R in more diverse cultural backgrounds and contexts.

Introduction

Postpartum depression (PPD) is a public health concern (O'Hara & McCabe, 2013) due to its high prevalence (Norhayati, Nik Hazlina, Asrenee, & Wan Emilin, 2015), persistent nature across the first year postpartum and beyond (Goodman, 2004) and well-documented adverse consequences on mother-child interactions, child development, and partnership and relationship well-being (O'Hara & McCabe, 2013; Westall & Liamputtong, 2011). In Portugal, between 8.6% and 26.7% of women develop PPD (or symptoms thereof) in the first three months postpartum (Norhayati et al., 2015), with recent prevalence estimates of clinical postpartum depressive symptoms reaching 19.6% at 6 weeks postpartum (Pereira et al., 2016). However, PPD symptoms are often undetected in health care settings mostly because of a lack of systematic screening for PPD (Wilkinson, Anderson, & Wheeler, 2016), and few women seek professional help to manage their depressive symptoms, including in Portugal (Fonseca, Gorayeb, & Canavarro, 2015).

In Portugal, primary health care and maternity care settings did not routinely screen for PPD or related risk factors, whereby women's access to treatment depends largely on their own request (Fonseca et al., 2015). However, the integration of screening procedures in Portuguese maternity care settings is supported by the timely opportunity (women are routinely followed to 6 weeks after childbirth), the availability of psychosocial services in major Public Maternity Hospitals and General Hospitals allowing appropriate referrals, and the favourable acceptability of screening tools for perinatal depression among women and health professionals (Pereira et al., 2016).

Recent international guidelines (Austin, 2014) recommend screening procedures that combine the assessment of current depressive symptoms and the assessment of past and current psychosocial risk factors, ideally conducted in both the antenatal and postnatal periods. Unlike PPD screening that aims to identify women with a possible diagnosis at the

time of assessment (e.g., by using the Edinburgh Postnatal Depression Scale [EPDS]), this complementary assessment allows us to early identify and address women's psychosocial vulnerabilities that may increase their risk of developing PPD (Beck, 2002; Beck, Records, & Rice, 2006). This is an important question because even if not clinically depressed at the time of assessment, women may develop clinical depressive symptoms across the first 12 months postpartum.

A variety of risk factors associated with the development of PPD has been studied (Beck, 2001; Norhayati et al., 2015), and research also underscores the important role of cognitive factors (Hall & Papageorgiou, 2005), namely, their interaction with other risk factors in predicting PPD (Church, Brechman-Toussaint, & Hine, 2005). Based on these, numerous screening tools have been developed to identify women who are at risk for PPD (Johnson et al., 2012), but present some important limitations: the majority do not cover the multiple PPD risk factors broadly investigated (e.g., specific postpartum predictors such as infant temperament; Beck, 2002; Beck et al., 2006), and some of them are only administered during pregnancy (e.g., Pereira et al., 2016). Recently, Pereira et al. (2016) developed an antenatal tool to predict perinatal depression among European Portuguese women. This tool comprised four self-report questionnaires that assessed current depressive symptoms and three risk factors (insomnia, negative affect, and lifetime history of depression). Notwithstanding this important contribution, some alternatives should be tested, which would be quicker to complete and interpret and that could also be administrated after childbirth, considering postpartum-related risk factors.

The Postpartum Depression Predictors Inventory (PDPI; Beck, 1998) represents a valid alternative option. The PDPI was revised based on an updated meta-analysis on PPD risk factors (Beck, 2001) to include 13 significant antenatal and postpartum risk factors associated with the development of PPD (PDPI-R; Beck, 2002; Beck et al., 2006). In clinical

settings as well as for research purposes, the PDPI-R can be used in two ways: (a) as a self-report measure, quickly and easily completed, without excessive time demands for both women and health professionals, and (b) as a mean to start the discussion of any problems women may be experiencing regarding each risk factor (as originally developed) (Beck et al., 2006; Oppo et al., 2009). A total score of the 13 risk factors can be computed and compared with the defined cut-off score, which allows quickly identifying women at higher risk of PPD.

The PDPI-R has been shown to be acceptable by Japanese mothers (Ikeda & Kamibeppu, 2013) and Australian nurses (Hanna, Jarman, Savage, & Layton, 2004). In comparison with the EPDS, the PDPI-R is not limited to a total scale score for depression, but enables a more comprehensive assessment of the woman's situation, as each of the risk factors is assessed (Beck et al., 2006), whereby its routine use in clinical practice has been recommended (Hanna et al., 2004; Oppo et al., 2009). Recently, the PDPI-R has also been adapted to estimate the risk of parental depression in the context of postadoption (Foli, South, Lim, & Hebdon, 2016).

Because PPD is a universal experience, translating the PDPI-R into different languages is required to make the inventory available to non-English-speaking women (Beck et al., 2006). Importantly, despite its relatively universality, the experience of PPD may differ across countries and cultures (Evagorou, Arvaniti, & Samakouri, 2016). Moreover, although the PDPI-R was based on risk factors globally established, culturally-specific beliefs and postpartum practices may impact the magnitude of each risk factor differently across cultures. Then, to avoid misclassification of risk, testing how the inventory fits to each specific context (i.e., to develop a culturally sensitive cut-off score) is deemed necessary.

The validation of the PDPI-R have been conducted in various countries (Ibarra-Yruegas, Lara, Navarrete, Nieto, & Valle, 2016; Ikeda & Kamibeppu, 2013; Oppo et al., 2009; Youn & Jeong, 2011), which in line with the results of the original version (Records,

Rice, & Beck, 2007) have revealed satisfactory psychometric properties, supporting its validity and reliability. However, because the instrument's psychometric properties have not yet been examined in Portugal, the aim of this study was to assess the validity and reliability of the postnatal version of the PDPI-R (self-report version) in Portuguese women.

Methods

Participants and procedures

This study was part of a larger project approved by the Research Ethics Committees of the Faculty of Blind for review of the University of Blind for review and one Blind for review university hospital (Blind for review) to understand the motherhood experience of women during the postpartum period (up to 12 months after childbirth). Postpartum women were invited to participate in the study through a variety of local and online advertisements between December 2015 and March 2016. All women were Portuguese-speaking and aged 18 years or older (inclusion criteria), participated voluntarily and were not compensated for their participation. The data were collected through an online survey, which included information about the study aims and the ethical considerations regarding confidentiality and anonymity on the introductory page. Participants provided their informed consent by answering a question about their agreement to participate in the study.

Although 480 participants completed the survey, for the present study, only women who completed the questionnaires during the first or second months postpartum ($N = 204$) were included for two reasons. First, because previous original and validation studies have administrated the postnatal version of the PDPI-R between 3 and 8 weeks postpartum. Second, since we were interested in providing valuable information for clinical practice, we opted to select women who have filled out the inventory at a time in which they simultaneously (a) are still in regular contact with the obstetric or primary health care services and (b) tend to present a high prevalence of clinical PPD symptoms (Pereira et al., 2016).

Measures

Postpartum Depression Predictors Inventory-Revised

The PDPI-R is an inventory of risk factors for PPD that comprises two versions: (1) a prenatal version with 10 risk factors (marital status [being single], low socioeconomic status, low self-esteem, prenatal depression, prenatal anxiety, pregnancy intention [unwanted/unplanned], history of previous depression, lack of social support [from partner, family and friends], marital dissatisfaction, and life stress), and (2) a postnatal/full version with the factors assessed in the prenatal version and three additional risk factors (child care stress, difficult infant temperament, and maternity blues). The number of items assessing each factor and the corresponding score range were specified in Table 1. The prenatal version contains 32 items and the postnatal version comprises 39 items. Except for the first two items (see Table 1), women were asked to answer "yes" or "no" to each item, which response is scored with a "0" (indicating the absence of risk) or "1" (indicating the presence of risk). A total score for each risk factor and version of the scale is obtained from the sum of all items, with higher scores indicating increased risk for PPD (Beck et al., 2006). The prenatal version (administered during pregnancy) total score ranged from 0 to 32, and the postnatal version (administered after childbirth) total score ranged from 0 to 39. In this study, we only used the postnatal version.

The authors translated the PDPI-R into European Portuguese after obtaining permission from the original author, and the translated version was then back-translated into English to establish semantic equivalence. Because the items of the PDPI-R are brief and simple, and were all relevant to the Portuguese context, the items were literally translated, with only minor alterations to clarify the meaning of each item.

Edinburgh Postnatal Depression Scale

The EPDS (Cox, Holden, & Sagovsky, 1987; Portuguese version: Areias, Kumar, Barros, & Figueiredo, 1996), a 10-item self-report inventory of antepartum and postpartum depressive symptoms, was used to determine probable depression (cut-off score above 9). Each item was rated using a 4-point response scale, with higher scores reflecting more depressive symptoms. In this study, Cronbach's α was 0.87. This scale was used to assess convergent and predictive validity.

Postnatal Negative Thoughts Questionnaire

The Postnatal Negative Thoughts Questionnaire (PNTQ; Hall & Papageorgiou, 2005), a 17-item self-report questionnaire that assesses negative postpartum thoughts, was used to assess convergent validity. It includes two dimensions: appraisal of cognition, emotion, and situation (Cronbach's $\alpha = 0.89$) and baby-related and motherhood-related negative thoughts (Cronbach's $\alpha = 0.74$). Each item was rated from 0 (*not at all*) to 3 (*almost always*), with higher scores indicating more negative postpartum thoughts.

Statistical analysis

Data were analysed using the Statistical Package for Social Sciences (IBM SPSS 23.0). Chi-square tests were conducted to assess differences in categorical variables, and a univariate analysis of variance (ANOVA) was performed to compare subgroups of women in the continuous variables. Internal consistency reliability was estimated using Cronbach's alpha and Kuder-Richardson-20 (KR-20) for dichotomous data. Pearson's correlations were performed to assess construct and convergent validity, and known-groups validity was assessed using an ANOVA to determine differences in PDPI-R according to EPDS cut-off points. Preliminary predictive validity (sensitivity, specificity, positive predictive value [PPV], and negative predictive value [NPV] for different cut-off points) was analyzed through Receiver Operating Characteristic (ROC) analyses. The accuracy of the instrument in predicting which women would or would not have PPD was obtained by the area under the

curve (AUC), which classified the accuracy as "low" (0.5-0.7), "moderate" (0.7-0.9), and "high" (0.9-1) (Swets, 1988). Scores higher than 9 and 12 on the EPDS were used as the gold standard. Statistical significance was set at $p < .05$.

Results

Participants' characteristics

The sample consisted of 204 women with a mean age of 32.75 years ($SD = 4.64$; range: 19-43). Most women had a university education ($n = 143$, 70.1%), were married/cohabitating ($n = 177$, 86.8%), were employed ($n = 165$, 80.9%) and were living in an urban area ($n = 123$, 60.3%). The majority of women had no other children ($n = 135$, 66.2%) and did not report current pregnancy complications ($n = 137$, 67.2%). The prevalence rates of clinical depressive symptoms were 27.5% and 14.2% according to the EPDS cut-off points used (EPDS > 9 and EPDS ≥12, respectively).

Prevalence of risk factors

The prevalence of the PDPI-R risk factors of the total sample and according to the EPDS cut-off points is summarized in Table 1. A high percentage of women, particularly those with an EPDS cut-off point above 9, reported being depressed in the past, being anxious and depressed during pregnancy and experiencing maternity blues. These women also scored significantly higher on the other risk factors, except for pregnancy intention and marital and economic status. When using a more conservative cut-off score (EPDS ≥12), the same pattern of results was observed.

[Insert_Table_1_about_here]

Construct validity

Significantly positive and small to moderate correlations between the factors of the PDPI-R were found, which ranged from 0.14 (between pregnancy intention and marital dissatisfaction; $p < .05$) to 0.41 (between prenatal depression and previous depression; $p <$

.001). The strength of the associations between each factor and the total score ranged from small ($r = 0.19, p < .01$ for pregnancy intention) to strong ($r = 0.80, p < .001$ for lack of social support). The exception was the factor marital status that was not significantly associated with any of the other factors or with the total score.

Demonstrating known-groups validity, the instrument also discriminated among depressed and non-depressed postpartum women (see Table 1).

Convergent validity

Small to moderate significant and positive correlations were found between the PDPI-R and the PNTQ factors (r range = 0.15-0.56) and between the PDPI-R and the EPDS (r range = 0.17-0.60) (see Table 2). The exceptions were the correlations with marital status and pregnancy intention.

[Insert_Table_2_about_here]

Exploratory analyses of predictive validity

Exploratory analyses were conducted to estimate the predictive validity of the PDPI-R separately for the two EPDS cut-off scores (see Table 3). The ROC analyses indicated an acceptable cut-off score of **5.5** when using EPDS > 9 as the gold standard (Sensitivity = 76.8; Specificity = 73.0; PPV = 51.8; NPV = 89.3; see Figure 1), and a cut-off score of **6.5** when considering EPDS ≥ 12 (Sensitivity = 75.9; Specificity = 76.6; PPV = 34.9; NPV = 95.0).

[Insert_Table_3_about_here]

[Insert_Figure_1 _about_here]

Reliability

The internal consistency reliability of the PDPI-R postnatal version was acceptable and that of the KR-20 was 0.80.

Discussion

The results of this study support the preliminary psychometric properties of the

European Portuguese postnatal version of the PDPI-R. Consistent with previous studies (Ikeda & Kamibeppu, 2013; Records et al., 2007), the findings supported the validity and reliability of the PDPI-R postnatal version as a screening instrument for predicting PPD based on past and current risk. Particularly, the results offered preliminary evidence about the predictive validity of the postnatal version using the EPDS as the gold standard. Similar to other validation studies (Ikeda & Kamibeppu, 2013; Oppo et al., 2009), the PDPI-R accurately predicted 82% of cases with probable depression, suggesting moderate diagnostic accuracy.

The high prevalence of clinical depressive symptoms during the first two months postpartum in this sample was consistent with that reported in recent studies (Norhayati et al., 2015; Pereira et al., 2016) and supported the relevance of routine psychosocial assessment to early identify women with a high risk of developing PPD early, thereby preventing the serious impact of pervasive PPD symptoms on women and their families. Taking advantage of timely opportunities during the postpartum routine obstetric appointment, the total score generated may provide an easier and quicker way to identify women who could benefit from additional psychological support.

Contrary to the original studies on the PDPI-R (Beck et al., 2006; Records et al., 2007) but consistent with recent validation studies, our preliminary analyses demonstrated acceptable cut-off points for the postnatal version of the instrument. When using a cut-off score above 9 on the EPDS, we suggest the same PDPI-R cut-off score of 5.5 that was observed in the postnatal Italian validation (Oppo et al., 2009) despite the fact that these authors used different criteria to diagnose PPD. Overall, our predictive values were similar to those found in the Italian validation, except for a higher PPV observed in our study (51.8% vs. 18.0%). The lower prevalence of depression observed among Italian women (6.7%) may explain this discrepancy, as PPV is sensitive to prevalence values (Kozinszky & Dudas,

2015). In our study, the PPV was not markedly different from that obtained in the Korean validation (59.2%; Youn & Jeong, 2011), which may be explained by the similarly high prevalence rates of clinical depressive symptoms using a comparable gold standard (EPDS ≥ 9.5; 22.5%). However, the recommended cut-off score of 5.5 observed was quite lower than the value of 9.5 obtained in the Korean validation. When using a more conservative gold standard (EPDS ≥ 12), the cut-off score observed in our study was slightly different from the value proposed in the Japanese validation (6.5 vs. 7.5 in Ikeda & Kamibeppu, 2013), and despite the different criteria used for a PPD diagnosis (self-report vs. diagnostic interview), the PPV was also very similar (34.9% vs. 33%).

Youn and Jeong (2011) suggested that the diverse criteria used for PPD diagnosis may account for the different PDPI-R cut-off scores observed across contexts. However, when we compare our results with those of previous studies, we observed similar cut-off scores despite the different criteria used for PPD diagnosis, as well as different cut-off scores when the criteria used to establish PPD was similar. Ikeda and Kamibeppu (2013) highlighted distinct cultural backgrounds as a possible reason for the observed differences. Consistently, the intercultural similarities between Portugal and Italy could explain the similar observed cut-off score between these two studies. Moreover, when an instrument is translated and adapted into another language and culture, subsequent cross-cultural comparisons require equivalence of measures (or lack of bias) to be valid (Van de Vijver & Tanzer, 2004). The comparisons draw herein may be therefore biased by methodological issues, such as variations in the PDPI-R adaptation process (e.g., the Korean and Japanese versions contain relevant modifications to accommodate culture-specific idiosyncrasies), and administration method (interview used in the Japanese validation, which may induce social desirability, vs. self-reported in the other versions). Future research with the PDPI-R should consider presenting more evidence about the psychometric properties of the adapted versions, as this would facilitate inferences about

the versions' equivalence.

Regarding the association between risk factors and PPD, our findings supported more similarities than differences between European Portuguese mothers and Italian and Japanese mothers. In line with existing literature (Evagorou et al., 2016; Norhayati et al., 2015), previous depression, prenatal depression and anxiety, and lack of social support were highly predictive risk factors across cultures. Interestingly, despite different postpartum traditional practices and cultural beliefs towards motherhood between European and Asian countries (Evagorou et al., 2016), the similar findings between the studies under comparison add evidence about cross-cultural similarities in the role of difficulties with emotional and practical aspects of baby care for unhappiness following delivery (Oates et al., 2004).

The inconsistency observed between studies regarding the influence of sociodemographic risk factors (i.e., low socioeconomic status was associated with PPD in Italian and Korean mothers but not in Portuguese and Japanese ones) is consistent with the mixed findings regarding the significance of such factors across countries (Norhayati et al., 2015). In Portugal, the birth of a child often leads to a strong connection with the family of origin (Social Issues Research Centre, 2012), which in a country characterized by unfavourable socioeconomic conditions could play an unquestionable role in helping raising a child. Additionally, despite the precarious circumstances, the experience of motherhood is still a defining component of womanhood in Portugal. It is therefore possible that for Portuguese women, sociodemographic factors are not the main risk factor for PPD. Different times of risk assessment may also account for the discrepancies observed across studies. Indeed, certain risk factors significantly predicted PPD only if present at certain times (Oppo et al., 2009). Consequently, some factors may increase women's risk for PPD depending of other circumstances.

Given its exploratory nature, this study has major limitations associated with its

methods (i.e., absence of a standardized psychiatric interview to determine a PPD diagnosis) and the timing (i.e., cross-sectional study, absence of follow-up) of the PPD assessment. In addition, the recruitment method was based on an online survey with voluntary participation (i.e., mental health concerns/awareness were likely to be higher among participating women) and possible selection bias (i.e., the study was limited to women with Internet access). Despite these limitations, our findings add wide-reaching contributions to this research field. First, they encourage subsequent assessments of the predictive validity of the PDPI-R not only in Portugal (i.e., as women are routinely followed during the course of pregnancy, the validation of the prenatal version is fundamental to allow risk assessment antenatally, which would improve PPD primary prevention), but also in more diverse cultural backgrounds and contexts. For instance, since Portuguese is spoken in many countries worldwide, being the official language of nine countries (Lewis, Simons, & Fennig, 2014), this study would encourage the development of research on PPD risk factors in Portuguese-speaking countries, and then expand the existing research, which has mainly been conducted among English-speaking women. Second, along with the versions available internationally, this study supports the cross-cultural validity of the PDPI-R. Its Portuguese version would be of value for non-Portuguese researchers interested in cross-cultural comparison studies, which then allows testing the hypotheses regarding cultural differences or similarities.

Conflict of Interest

The authors declare that they have no conflict of interest.

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Table 1. *Prevalence of risk factors for total sample and by EPDS cut-off score*

Risk factor$_{\text{(number of items; score range)}}$	**Total Sample (N = 204)**		**Women with EPDS > 9 (n = 56)**		**Women with EPDS ≤ 9 (n = 148)**			
	***n* (%)**	**Mean (SD)**	***n* (%)**	**Mean (SD)**	***n* (%)**	**Mean (SD)**	**χ^2/F**	**Cramer's V/η_p^2**
Being single$_{(1;\ 0\text{-}1)}$[a]	22 (10.8)		8 (14.3)		14 (9.5)		0.98	0.07
Low socioeconomic status$_{(1;\ 0\text{-}1)}$[b]	28 (13.7)		10 (17.9)		18 (12.2)		1.11	0.07
Low self-esteem$_{(3;\ 0\text{-}3)}$		0.19 (0.62)		0.61 (1.04)		0.03 (0.18)	42.03***	0.17
Prenatal depression$_{(1;\ 0\text{-}1)}$	34 (16.7)		18 (32.1)		16 (10.8)		13.31**	0.26
Prenatal anxiety$_{(1;\ 0\text{-}1)}$	130 (63.7)		44 (78.6)		86 (58.1)		7.36**	0.19
Pregnancy intention$_{(2;\ 0\text{-}2)}$		0.20 (0.41)		0.23 (0.43)		0.19 (0.41)	0.44	0.00
Previous depression$_{(1;\ 0\text{-}1)}$	72 (35.3)		30 (53.6)		42 (28.4)		11.29**	0.24
Lack of social support$_{(12;\ 0\text{-}12)}$[c]		1.54 (2.06)		2.80 (2.42)		1.06 (1.68)	33.90***	0.14
Marital dissatisfaction$_{(3;\ 0\text{-}3)}$		0.31 (0.72)		0.59 (0.89)		0.20 (0.62)	12.33**	0.06
Life stress$_{(7;\ 0\text{-}7)}$		0.75 (0.97)		1.14 (1.15)		0.59 (0.85)	13.82***	0.06
Child care stress$_{(3;\ 0\text{-}3)}$		0.48 (0.65)		0.71 (0.78)		0.39 (0.57)	11.05**	0.05
Infant temperament$_{(3;\ 0\text{-}3)}$		0.25 (0.70)		0.46 (0.89)		0.18 (0.59)	7.17**	0.03
Maternity blues$_{(1;\ 0\text{-}1)}$	116 (56.9)		45 (80.4)		71 (48.0)		17.37***	0.29
Total [range 0-39]		5.69 (4.32)		9.32 (4.98)		4.31 (3.08)	74.66***	0.27

Note. EPDS = Edinburgh Postnatal Depression Scale; EPDS > 9 = presence of clinical postpartum depressive symptoms; EPDS ≤ 9 = absence of clinical

postpartum depressive symptoms.

[a] Single status [single, separated, divorced, widowed = 1 point; married/cohabitating or in a relationship = 0 point];

[b] Low socioeconomic status = 1 point; middle and high = 0 point;

[c] Social support is assessed by asking women to answer the same four items for three types of relationships (i.e., with their partner, family and friends).

$^{**}p < .01$; $^{***}p < .001$

Table 2. *Descriptive statistics and correlations between PDPI-R, depressive symptoms, and cognitive risk factors*

	EPDS	**PNTQ**	
		Appraisal of cognition, emotion, and situation	**Baby-related and motherhood negative thoughts**
Mean (SD)	6.97 (4.73)	2.60 (3.81)	1.92 (2.22)
[Range]	[0-28]	[0-27]	[0-12]
Being single	-.04	-.04	-.08
Low socioeconomic status	.17*	.12	.04
Low self-esteem	.48***	.50***	.33***
Prenatal depression	.36***	.36***	.24***
Prenatal anxiety	.28***	.23**	.11
Pregnancy intention	.04	.04	.06
Previous depression	.35***	.23**	.22**
Lack of social support	.40***	.42***	.35***
Marital dissatisfaction	.30***	.22**	.13
Life stress	.26***	.28***	.15*
Child care stress	.30***	.28***	.30***
Infant temperament	.20**	.13	.20**
Maternity blues	.34***	.31***	.32***
Total [range 0-24]	.60***	.56***	.44***

Note. The first column presents the 13 risk factors of the Postpartum Depression Predictors Inventory-Revised and its total score; EPDS = Edinburgh Postnatal Depression Scale; PNTQ = Postnatal Negative Thoughts Questionnaire.

*$p < .05$; **$p < .01$; ***$p < .001$

Table 3. *Exploratory predictive validity of the PDPI-R: ROC analyses*

PDPI-R postnatal version	AUC (95% CI)	Cut-off points	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)	MR (%)
EPDS > 9	.816 (.747 – .885)	4.5	82.1	64.2	46.5	90.5	30.9
		5.5[a]	76.8	73.0	51.8	89.3	26.0
		6.5	64.3	81.8	57.1	85.8	23.0
EPDS ≥ 12	.823 (.733 – .913)	4.5	86.2	57.7	25.3	96.2	38.2
		5.5	79.3	65.7	27.7	95.0	32.4
		6.5[a]	75.9	76.6	34.9	95.0	23.5
		7.5	72.4	80.6	38.2	94.6	20.6
		8.5	65.5	85.1	42.2	93.7	17.6

Note. PDPI-R = Postpartum Depression Predictors Inventory-Revised; ROC = receiver operating characteristic; EPDS = Edinburgh Postnatal Depression Scale; AUC = area under the curve; CI = confidence interval; PPV = Positive predictive value; NPV = Negative predictive value; MR = Misclassification rate.

[a] Recommended cut-off.

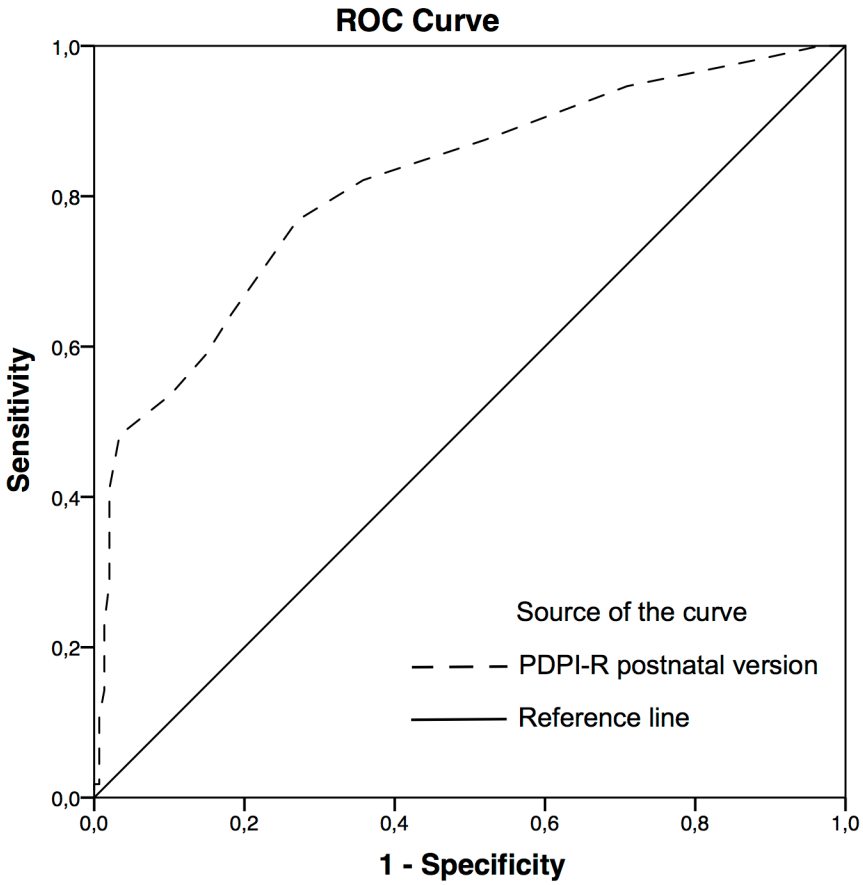

Fig. 1. ROC curve of the postnatal version of the PDPI-R for the detection of probable clinical depression (EPDS > 9).