

An analysis of key factors related to adaptation during pregnancy that contribute to the risk of perinatal depression

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Abstract

Background: The third trimester of pregnancy involves multiple changes to which women need to adapt. When such adaptation to pregnancy is unsuccessful, this can increase the risk to suffer perinatal depression. Yet, an integrative analysis of different forms of adaptation to pregnancy and their specific contributions to perinatal depression is still missing.

Objectives: This study thus aimed to advance knowledge on the role of specific indicators of adaptation to pregnancy as predictors of risk for or protection against perinatal depression.

Design and Methods: A randomized non-discriminatory exponential chain methodology was used to recruit a sample of 594 women in their third trimester of pregnancy. The participants completed online assessments, including sociodemographic data and psychological measures. A backward binary logistic regression was conducted to determine which dimensions of problems of adaptation to pregnancy accounted for higher risk to categorize women with clinically significant levels of depressive symptoms.

Results: The proposed model accounted for 17% of the variability in the occurrence of perinatal depression symptoms. Specific indicators of adjustment to pregnancy, such as a having lower positive views of the future with the baby, acceptance of the news of pregnancy, talking with the partner about the future baby, and acceptance of physical discomfort, emerged as protective factors.

Conclusion: Our study identifies key protective factors against perinatal depression in the third trimester, including imagining a positive future with the baby, a positive reaction to pregnancy confirmation, discussing the baby with a partner, and positively experiencing physical discomfort during pregnancy. This study provides a deeper understanding of key aspects of pregnancy adaptation that should be strengthened in clinical practice to reduce the development of depressive symptoms in late pregnancy.

Keywords

perinatal depression, adaptation to pregnancy, mother, indicator, pregnancy

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Introduction

Pregnancy is a pivotal time that involves numerous changes for women, encompassing physical, psychological, and social aspects, particularly during the third trimester, potentially impacting pregnant women's mood.¹ Changes and discomfort that normally occur during pregnancy are influenced by changes in hormone secretion.² Alterations such hormonal fluctuations can contribute to psychological changes that affect sleep quality.³ Moreover, the imbalance in estrogen and progesterone levels during pregnancy not

only causes physical changes but also leads to psychological adjustments, influencing emotions, thought patterns,

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and behavior.² Increased progesterone levels are linked to heightened anxiety and stress in pregnant women, as this hormonal surge not only induces feelings of unease and emotional instability but also contributes to fatigue and a general sense of discomfort.⁴ These challenges may contribute to increase depressive symptoms, potentially leading to the occurrence of perinatal depression.⁵

Perinatal depression refers to major depressive episodes whose onset occurs during pregnancy.⁶ The estimated global prevalence of this problem is 20.7%,⁷ with a higher incidence occurring during the third trimester of gestation, consistently with the occurrence of significant physical and emotional changes preceding childbirth.⁸

The presence of perinatal depression is crucial, as it has several influences both for the mother and the baby, as well as the establishment of the relationship between them throughout pregnancy and postpartum.^{8–12} First, in relation to the mother, those women who present this type of depressive symptomatology during pregnancy have lower adherence to medical check-ups and prescriptions, perform less self-care, and show higher levels of alcohol, tobacco, and other substance abuse.¹³ Moreover, experiencing a depressive episode during pregnancy increases the likelihood of developing postpartum depression by 50%.^{14,15} As for the baby, children of mothers suffering from perinatal depression are more prone to premature birth, and to being born smaller than expected for their gestational age,⁹ factors that increase neonatal and infant morbidity and mortality.⁸ Problems in socio-emotional, cognitive, and motor development has also been found in newborns of mothers with depression during pregnancy.^{16,17} Finally, at the relational level, mothers with perinatal depression establish a poorer maternal–fetal bonding during pregnancy.¹⁸ Subsequently, several studies have found a relationship between the occurrence of this symptomatology during pregnancy and subsequent poorer mother–child interactions in the postpartum.^{19,20}

These different consequences demonstrate the important impact of perinatal depressive symptoms during pregnancy and justify the need to deepen the knowledge on their predictors and their efficient detection, thus improving its prevention of perinatal depression. Numerous studies have been conducted to establish risk factors for depression during pregnancy, with the majority focusing on individual psychological and/or sociodemographic variables.^{21–23} However, the psychological process of adaptation to pregnancy itself has not been fully considered as a potential predictor of these symptoms, with some recent expectations that highlight its clear relevance.²⁴

Adaptation to pregnancy

Psychological adaptation has been described as the process by which a person adjusts to changes in their environment and daily difficulties.²⁵ The adaptation of women to pregnancy and motherhood is a process during which

numerous changes occur in how a woman perceives herself, accepts the pregnancy and her role as a mother, perceives her baby, and bonds with it.²⁶

The definition of adaptation to pregnancy varies, but it typically includes managing the physical and psychological changes experienced throughout gestation and adapting to the tasks that accompany pregnancy.²⁷ Lederman²⁸ proposed a definition focused on the woman's adaptive responses to the changes produced by prenatal growth and development, the woman's degree of satisfaction with the pregnancy, and her acceptance responses to the changes produced by the pregnancy. Women who experience difficulties in adapting to pregnancy demonstrate lower levels of tolerance to changes or physical discomfort, feelings of fear and distress, and a tendency toward low mood, which may lead to the occurrence of perinatal depression.²⁸

Recently, Vega-Sanz et al.²⁴ showed that the relationship between higher difficulties in adapting to pregnancy and higher levels of perinatal depressive symptomatology could be explained through two alternative pathways. One was the use of maladaptive emotion regulation strategies by women (focused on repetitive negative thinking) as a response to difficulties in adapting to pregnancy, and the other one was the presence of higher maternal–fetal bonding difficulties because of difficulties of adaptation to pregnancy. These two factors emerged as two independent mediating factors on the contribution of difficulties of adaptation to perinatal depression during the third trimester of gestation.

Results as the ones from the above-mentioned study allow to conclude that low adjustment to pregnancy, understood as a general construct, can be a risk factor for the development of perinatal depression.

Nevertheless, further results also show that a positive acceptance of pregnancy can be disseminated into different separate dimensions such as a conscious desire and planning for the pregnancy, better mood states during pregnancy, a balanced approach to physical discomfort, acceptance of bodily changes, and no conflicts with the pregnancy.²⁸ Thus, rather than analyzing adaptation to pregnancy as a unique whole dimension, knowing which separate components of (mal) adaptation to pregnancy contribute to the early detection of the risk of depression can be a more adequate approach, with potential to inform more precise models of early risk detection and their prevention. Based on this proposal, it would be important to establish whether there are elements of adaptation to pregnancy that in themselves can act as predictors of depressive symptomatology, acting either as risk factors for this symptomatology or as protective factors toward the development of the same, and thus adapt clinical strategies for their prevention and intervention.

The objective of this study thus was to deepen the identification and understanding of specific indicators of adaptation to pregnancy that can act as predictors for the risk of development of perinatal depressive symptomatology

during the third trimester of pregnancy. Despite their noted relevance, the predictive roles of various of these elements of adaptation to pregnancy have remained understudied in previous literature.

This study aims to address the existing gap in research by providing an integrative analysis of the various components involved in adaptation to pregnancy and their contribution to perinatal depression risk. Given the novelty of this approach, the research is exploratory in nature and does not propose specific hypotheses for each adaptation factor. Instead, its primary objective is to identify key indicators of pregnancy adaptation that should be considered in future studies to improve the prevention of perinatal depression.

A better understanding of these adaptation factors is essential for advancing clinical practice. By identifying which aspects of pregnancy adaptation function as risk or protective factors for perinatal depressive symptoms, this research seeks to enhance the early identification of women at higher risk. This, in turn, can inform more targeted prevention and intervention strategies during pregnancy.

Materials and methods

Procedure

A non-discriminatory exponential chain demonstration was performed to recruit the sample between November 2021 and February 2022. The study was disseminated through the distribution of the survey across various social media networks (LinkedIn and Instagram). The inclusion criteria for the study were being a woman over 18 years of age and in the third trimester of pregnancy. All participating women signed an informed consent before starting to complete the study. The Ethics Review Committee at Universidad Pontificia Comillas approved our interviews (ref. no. 2022/41) on May 22, 2022. Respondents gave written consent for review for their participation and subsequent publication of the results obtained.

Participants

The inclusion criteria for participant selection were being a woman over 18 years old, primiparous, in the third trimester of pregnancy, and having Spanish as their primary language. Women with multiple pregnancies, those who did not specify their gestational week, or those who did not provide authorization for study follow-up were excluded.

Instruments

Data was collected through an online evaluation survey using commercial survey services. The survey included questions about sociodemographic data. The following

Table 1. Means and standard deviations of dimensional psychological measures, and descriptive data for sociodemographic and dichotomous psychological measures.

Variable	Total sample (N = 594)	
	%	M (SD)
Perinatal depression		8.54 (4.99)
Adaptation to pregnancy		37.17 (4.58)
University educational level	77.4	
Primary studies	3.4	
Secondary studies	19.1	
University studies	77.5	
Marital status	96.8	
Single woman	3.2	
Married or living together	96.8	
Type of medical care		
Public healthcare	64.8	
Health insurance	20.7	
Private	14.5	
Previous abortions	1.7	
Pregnancy medical complications	23.1	

M: mean; SD: standard deviation.

questionnaires presented below were included to establish the occurrence of perinatal depression during the third trimester of pregnancy and to assess the proposed predictive factors, referring to separate elements of difficulties of adaptation to pregnancy. Means and standard deviations (SD) of dimensional psychological measures are provided in Table 1 too.

Difficulties of adaptation to pregnancy

Following the primary definition of adjustment to pregnancy proposed by Lederman et al.,²⁹ we used the Prenatal Adjustment Subscale (12 items) of the Affective Attachment and Prenatal Adjustment Scale (EVAP³⁰) to derive and test multiple indicators of adaptation to pregnancy. This subscale assesses aspects of the mother's past, present, and future perspectives regarding pregnancy and has been validated for use with women from the second trimester onward.³⁰ For the purposes of this study, we did not use the total score of the subscale or its theoretical dimensions. Instead, we focused on the individual items to examine their specific contributions to the prediction of perinatal depression. Each item was recoded into a dichotomous variable ("Yes"/"No") based on the median of the responses and a theoretical framework. This allowed us to analyze whether the presence or absence of a given indicator of adaptation was associated with depressive outcomes. Supplemental Table 1S contains the coding used in the dichotomization of the items as well as the renaming of the items (see Supplemental Material for more details). Table 2 depicts the percentage of responses to each dichotomous value of these newly coded items.

Table 2. Items of the adaptation to pregnancy subscale of the EVAP.³⁰

Items	Categories, no/yes (%)
Positive expectations about future	28.3/71.7
Absence of concern for bodily changes	20.3/79.7
Avoiding risky activities	4.2/95.8
Going to childbirth class	30.8/69.2
Good relationship with father	44.3/55.7
Good relationship with mother	32.5/67.5
Ease of acceptance of pregnancy	11.2/88.8
Pregnancy as pleasure	11.7/88.3
Imagining caring of the baby	17.1/82.9
Regular partner communication about the baby	12.7/87.3
I like children	12.4/87.6
No pregnancy discomfort	21.3/78.7

EVAP: Affective Attachment and Prenatal Adjustment Scale.

Perinatal depression

The Edinburgh Postnatal Depression Scale (i.e., 31) has been validated for its use to assess depression levels in the perinatal stage. It is a 10-item scale, and items are rated on a 4-point Likert scale. The internal consistency of the Spanish adaptation of the instrument was 0.91,³¹ and in the current study was $\alpha = 0.86$. A cutoff score of ≥ 13 indicates a high risk of depression during pregnancy.³² This criterion was used in the present study to define a categorical outcome variable of participants experiencing perinatal depression during the third trimester of pregnancy. Thus, women who obtained a score lower than the cut-off point were assigned to group 0 (i.e., no perinatal depression symptomatology), and those who obtained a score equal to or greater than the cutoff point to group 1 (i.e., presence of perinatal depression symptomatology) in the current study. Based on such cut-off criterion, 25.5% of the sample scored above the cutoff point.

Statistics

To assess the statistical power of the analyses, a post-hoc power analysis was conducted using GPower.³³ Given the sample size ($n = 594$), an alpha level of 0.05, two tails, Nagelkerke R^2 of 0.168, and two tails, the achieved power ($1 - \beta$) ranged from 0.99 to 1 across the different variables. The odds ratios of the predictor variables used in this calculation are reported in Table 3. These results indicate that the study has an extremely high statistical power (between 0.99 and 1) to detect effects with the variables included in the analysis. Statistical analyses were conducted using IBM SPSS Statistics version 22 software. Initially, descriptive analyses of participants' psychological measures were performed. Additionally, chi-square tests were performed to explore the relationship between categorical factors

(adaptation to pregnancy elements) and the presence or absence of perinatal depression symptoms, according to the cut-off criterion.

To determine the percentage of variance explained in the dependent variable (i.e., occurrence of perinatal depression during the third trimester of gestation) by the dichotomous predictor variables, namely for each pregnancy adaptation elements, a logistic regression analysis was conducted using the backward stepwise method (likelihood ratio).

Results

The final sample in this study consisted of 594 randomly selected women in the third trimester of pregnancy (see full details of the recruitment procedure below). However, this sample may not fully represent the entire society. The mean age was 32.40 years old ($SD = 4.19$). The average weeks of pregnancy at the moment of the evaluation were 33.26 weeks ($SD = 3.88$), and 75% of women were primiparous. It is important to highlight that 77.4% of the women in the sample had a university-level education, and 96.8% were in a relationship or married. Additionally, 64.8% primarily received public prenatal care. There was no significant percentage of women with previous miscarriages, but 32.1% experienced medical complications during pregnancy. Descriptive data of sociodemographic and dichotomous psychological measures are reported in Table 1.

Chi-square

The results of the chi-square test showed a significant association (all chi-square tests > 4.56 , all p -values < 0.001) between the occurrence of perinatal depression symptomatology and the binary elements of adaptation to pregnancy scale, except for items 2, 4, 5, 9, and 11 (see Supplemental Table 2S for more details).

Logistic regression model

A logistic regression model was used to analyze the capacity of the binary items assessing separate elements of adaptation to pregnancy extracted from the subscale of the EVAP scale³⁰ to predict the likelihood of occurrence of a perinatal depression condition during the third trimester of pregnancy.

The selection method of the variables in the regression model was backward stepwise selection (based on likelihood ratio). Thus, removal testing was based on the probability of the likelihood-ratio statistic based on conditional parameter estimates. This method has been used in previous studies^{34,35} to develop more simplified prediction models in which multicollinearity and overfitting are reduced.

Table 3. Logistic regression model of the dependent variable symptomatology of perinatal depression.

Predictors	B	Step 1, OR (95% CI)	B	Step 9, OR (95% CI)
Item 1. Positive expectations about future	-0.63	0.52* (0.32–0.87)	-0.71	0.49** (0.30–0.80)
Item 2. Absence of concern for bodily changes	-0.84	0.42 (0.05–3.33)		
Item 3. Avoiding risky activities	-0.32	0.72 (0.44–1.17)		
Item 4. Going to childbirth class	-0.32	0.72 (0.40–1.28)		
Item 5. Good relationship with father	0.19.19	0.00 (0.00–0.00)		
Item 6. Good relationship with mother	-0.24	0.78 (0.51–1.19)		
Item 7. Ease of acceptance of pregnancy	-1.12	0.32** (0.17–0.59)	-1.19	0.30** (0.16–0.53)
Item 8. Pregnancy as pleasure	-0.29	0.74 (0.41–1.36)		
Item 9. Imagining caring of the baby	0.32	1.38 (0.73–2.59)		
Item 10. Regular partner communication about the baby	-0.60	0.54* (0.31–0.95)	-0.67	0.50* (0.29–0.86)
Item 11. I like children	0.09	1.09 (0.59–2.01)		
Item 12. No pregnancy discomfort	-1.20	0.30** (0.18–0.48)	-1.22	0.29** (0.19–0.45)

OR: odds ratio; CI: confidence interval.

*Regression coefficient significant at $p < 0.05$.

**Regression coefficient significant at $p < 0.01$.

The initial model is shown in Supplemental Material. All variables were entered into the model initially, with the least significant variables removed one at a time until only significant variables associated with values of $p \leq 0.05$ remained. Table 3 shows the results of the initial model with all predictors included (step 1), and the subsequent final model with the variables that remained as significant predictors in the last step (step 9).

The inclusion of the independent variables in the final predictive model contributed significantly to improve the fit of the null model ($\chi^2(9)=71.701$; $p < 0.001$), correctly classifying 94%–96% of those women without perinatal depression and 17%–24% of those women with perinatal depression. The overall correct classification percentage remained around 76% in all steps. The final model had high specificity but low sensitivity. This suggests that the model was good at identifying individuals without perinatal depression, but it was not as much effective at identifying those women with clinical levels of depressive symptoms. Furthermore, the Hosmer and Lemeshow test showed that the obtained fit was satisfactory ($\chi^2(9)=3.13$; $p=0.67$). This model accounted for 17% of the variance in the presence of perinatal depression, according to Nagelkerke's pseudo- R^2 (Nagelkerke $R^2=0.168$).

As for the specific contributions of items from the adaptation to pregnancy questionnaire³⁰ that remained as significant predictors in the final model, women who think positively about the future with their baby were 51% less likely to experience perinatal depression than those ones who felt anxious about her future ($1 - 0.49 = 0.51$). Mothers who readily accepted the news of their pregnancy were 70% less likely to suffer from perinatal depression than those ones who did not accept the confirmation of pregnancy ($1 - 0.30 = 0.70$). Women who discussed with their partner what their future baby would be like were 50% less likely to suffer from perinatal depression than those ones

who did not discuss it with their partner ($1 - 0.50 = 0.50$). Finally, women who had considered physical discomfort as part of pregnancy and had not been concerned about it were 71% less likely to experience perinatal depression than those ones who had perceived physical discomfort very negatively and have been greatly concerned about it ($1 - 0.29 = 0.71$).

Discussion

The present study aimed to assess the role of separate elements of adaptation to pregnancy in predicting the occurrence of perinatal depression symptoms in the third trimester of pregnancy. A comprehensive evaluation of these variables was conducted with a large sample of women in the third trimester of gestation ($n=594$), employing a backward stepwise method to determine the best predictive model of significant factors explaining the likelihood of perinatal depression symptomatology occurrence.

In summary, considering the pregnancy adjustment items included in the EVAP questionnaire,³⁰ our study provides evidence that imagining a positive future with the baby, demonstrating a positive attitude toward confirming the pregnancy news, discussing the future baby with the partner, and positively experiencing physical discomfort during pregnancy are all protective factors against perinatal depression in the third trimester.

The tested model allowed to identify four separate elements of adaptation to pregnancy that emerged as protective factors against the development of perinatal depression symptoms, providing significant and novel results. Beyond recent studies like the one from Vega-Sanz et al.,²⁴ which support an impact of difficulties in adaptation to pregnancy on perinatal depressive symptoms, thus understanding pregnancy adaptation as a general construct, the current results show that not all its aspects may act as predictors of risk for

perinatal depression symptom occurrence. Specifically, only items 1, 7, 10, and 12 of the EVAP scale³⁰ showed a protective nature against the occurrence of perinatal depression symptoms in the third trimester of gestation.

The ability to imagine the future easily and positively with the baby (item 1, *positive expectations about future*) was established in the final model as a protective factor against the occurrence of perinatal depression symptoms. Moreover, maintaining conversations with the partner about the future baby (item 10, *regular partner communication about the baby*) was also identified as a protective factor against this symptomatology. Other studies suggest that during pregnancy, future mothers develop representations of imaginary scenarios that they will share with their unborn babies, regarding the physical appearance and emotional characteristics with which they envision them.^{36,37} The creation of these representations is considered a fundamental part of the adaptation process to motherhood.³⁸ This adaptation is especially enhanced when the future mother has the support of her partner, which helps her in preventing the onset of depressive symptoms.³⁹

Based on our results, positive acceptance of the news of pregnancy, with a desire for pregnancy (item 7, *ease of acceptance of pregnancy*), even if it was not planned for a specific time, can be considered another protective factor against the development of perinatal depression. These results are in line with previous studies which argue that positive attitudes toward pregnancy and motherhood are an important protective factor for perinatal depression symptomatology.^{40,41}

Lastly, the mother's positive and normalized experience of physical discomforts that may arise during pregnancy (item 12, *no pregnancy discomfort*), acted as an additional protective factor against the occurrence of perinatal depression symptoms in the third trimester of gestation. Various studies have shown that discomfort generated by somatic symptoms of pregnancy, rather than their frequency, in the second trimester predicts depressive symptoms in the third trimester.⁴²

The identification of these four elements of adaptation to pregnancy as protective factors against the development of perinatal depression could lead to a redefinition of the dimensions of pregnancy adaptation proposed by Lafuente.³⁰ The regression model tested in this study was a model with high specificity but low sensitivity. This would indicate that it was good at identifying women without perinatal depression but would not be that much effective at identifying women with depressive symptomatology. Thus, the regression model proposed in this article is a rule-out model as it determines those four indicators of adjustment to pregnancy that a woman should be asked about during her medical visits during the third trimester of pregnancy to rule out that she is not at risk for perinatal depression. Although the positive presence of these indicators of adjustment would seem to indicate the absence of

depressive symptomatology, the absence of such indicators would make it safe to advance closer monitoring and early screening for possible depression.

The remaining items of the EVAP,³⁰ 2, 3, 4, 5, 6, 8, 9, and 11, which pertain to other aspects that may indicate difficulties in adapting to pregnancy, did not demonstrate significant predictive power by their own, as they were excluded from the final model predicting the occurrence of perinatal depression symptoms.

Furthermore, the items 2 (*absence of concern for bodily changes*), 4 (*going to childbirth class*), 8 (*pregnancy as pleasure*), 9 (*imagining caring of the baby*), and 11 (*I like children*) did neither show predictive value for perinatal depression occurrence in the third trimester of gestation. These items did neither show a significant association with perinatal depression symptomatology in the chi-square test results. Previous research suggests that positive attitudes toward motherhood and pregnancy can act as protective factors for psychological well-being.^{29,41} However, previous research has also shown that some ambivalence in women regarding their pregnancy is common, with total and complete adaptation being rare.²⁸

The results of the study did not support a predictive nature of perinatal depression occurrence, for example, for items 3 (*avoiding risky activities*). This could be attributed to the lack of representation in the response option "No." Only 4.2% stated that they were not avoiding risky activities. Other items, such as 5 (*good relationship with father*) and 6 (*good relationship with mother*), not support a predictive nature of perinatal depression occurrence. It could be because in pregnancy adaptation, the woman's own mental representation of her child would carry more weight than that of her own parents.

Limitations and strengths

Despite its contributions, this study has several limitations that should be acknowledged. One of the primary constraints is that both key variables—adjustment to pregnancy and perinatal depression—were assessed through self-report measures using short scales, which inherently limits the depth of the assessment. Future research should incorporate more comprehensive diagnostic methods, such as structured clinical interviews, to enhance the precision and reliability of these measurements. Additionally, concerning the measurement of adjustment to pregnancy, the construction of the EVAP subscale³⁰ suggests the need for theoretical revision, as several items appear to reflect maternal-fetal bonding rather than the broader dimension of pregnancy adaptation. This discrepancy may prevent a full capture of the complexity of adaptation processes, highlighting the necessity for further refinement in future studies.

Another notable limitation is the use of online assessments, which, while facilitating data collection, excludes

certain populations such as women from low-income regions, those with low socioeconomic status,⁴³ and individuals with lower educational levels.⁴⁴ Additionally, the absence of an interviewer in online evaluations presents a major drawback, as it limits the ability to clarify ambiguous terms or probe responses with follow-up questions.⁴⁵ Although online methods provide valuable insights, they may be less effective than face-to-face assessments, making this an important factor to consider in future replications.

Methodologically, the low sensitivity of the regression model indicates that, although it is effective as a rule-out tool, it is not sufficient on its own to comprehensively identify all women at risk of perinatal depression. This underscores the need to complement this approach with additional risk factors beyond adaptation to pregnancy to improve the model's predictive sensitivity. Moreover, the dichotomization of the adaptation subscale items in this study was based on theoretical rather than statistical criteria, which could have influenced the results. Future research should explore alternative methods for categorization and scoring to optimize the model's accuracy. Lastly, although the study presents novel findings on adaptation to pregnancy and perinatal depression prevention, these results should be replicated using more refined and diverse measures to ensure their robustness across different populations and contexts. Further research should also consider additional risk factors for perinatal depression in the third trimester, integrating a more holistic perspective to improve screening and early intervention strategies. This includes acknowledging that a considerable number of participants presented unspecified pregnancy-related problems, which could potentially increase the risk of developing perinatal depression.

One of the key strengths of this study lies in its community-based sample, which is particularly valuable given that pregnant women tend to be less likely to participate in research due to their gestational state. Furthermore, the study provides significant and novel insights into the role of pregnancy adaptation as a protective factor against perinatal depression. Specifically, four distinct elements of pregnancy adaptation were identified as protective factors, refining the traditional understanding of pregnancy adaptation as a general construct. Although previous studies, such as Vega-Sanz et al.,²⁴ have highlighted the impact of difficulties in pregnancy adaptation on perinatal depressive symptoms, our findings suggest that not all aspects of adaptation serve as risk predictors. This distinction opens the possibility of redefining the dimensions of pregnancy adaptation previously proposed by Lafuente,³⁰ allowing for a more targeted approach to identifying adjustment indicators that could be effectively utilized in prevention and early detection strategies for perinatal depression. Methodologically, the regression model developed in this study exhibited high specificity but low sensitivity,

meaning it was effective in identifying women without perinatal depressive symptoms but less effective in detecting those who did develop them. As such, the proposed model primarily functions as a rule-out model, enabling the exclusion of perinatal depression risk in women who exhibit the four identified adaptation indicators. Its clinical utility lies in the potential for early screening based on these protective factors during medical visits in the third trimester of pregnancy. The presence of these indicators suggests a lower likelihood of developing depressive symptoms, whereas their absence would justify closer monitoring and early detection interventions.

Conclusion


These findings contribute to a deeper understanding of various specific aspects of adaptation to pregnancy and their significance to protect against the development of depression in this period. Consequently, the present results support the advancement of programs aimed at detecting and preventing depression during pregnancy via de-evaluation of different elements of adaptation to pregnancy, which can enhance the precise identification of protective factors that are crucial for the prevention and early identification of perinatal depression.

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Ethical considerations

The Ethics Review Committee at Universidad Pontificia Comillas approved our research (ref. no. 2022/41) on May 22, 2022.

Consent to participate and publication

Respondents gave written consent for the review of their participation and subsequent publication of the results obtained. This consent was also reviewed and approved by the ethics committee.

Author contributions

Maria Vega-Sanz: Conceptualization; Methodology; Investigation; Writing – original draft; Formal analysis; Data curation.

Sofía Goñi-Dengra: Writing – original draft.

Amaia Halty: Writing – review & editing.

Ana Berástegui: Conceptualization; Methodology; Writing – review & editing; Funding acquisition.

Alvaro Sanchez-Lopez: Conceptualization; Methodology; Writing – review & editing.

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Declaration of conflicting interests

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Data availability statement

The dataset analyzed during the current study is available from the corresponding author on reasonable request.

Supplemental material

Supplemental material for this article is available online.

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