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Postnatal Depression: Identification of risk factors in the short-stay maternity program in Belgium

TITLE PAGE

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ABSTRACT

Background

Postnatal depression (PND) is one of the most frequent complications in women of childbearing age in the developed world. The onset of PND is influenced by several risk factors. In an attempt to avoid unnecessary long maternity stays, a 'Short Stay in Maternity Program' was installed, shifting care from the hospital environment to the outpatient setting.

Aims

In order to develop an efficient program to trace vulnerable women after childbirth and to provide support within primary care, we aimed to inventory the risk factors for PND within the population of women participating in the short stay program.

Design and setting

This study is a cross sectional study without follow-up and women, included in the 'Short Stay in Maternity Program', were invited by e-mail to participate within three months after delivery.

Methods

The questionnaire addressed background features and feelings during the maternity period supplemented with the validated Dutch version of the Edinburgh Postnatal Depression Scale (EDPS).

The primary outcome measure of the questionnaire was the score on the EDPS.

Results

138 (27.3%) of the invited women participated. 16 participants (12.4%) presented with a positive score on the EPDS. The odds ratio for a positive score on the EDPS when experiencing negative feelings was 13.5 (95% CI 4.14-44.01). If the only provided material support, the odds ratio for a positive EPDS-score was 11.2 (95%CI 2.72-55.5).

Conclusions

In this study, we identified two risk factors for PND: negative feelings during pregnancy and the provision of only material support by the partner.

Keywords

Postnatal depression, Risk Factors, Primary Health Care

How this fits in

- Time spent in hospital after delivery is decreasing and home care becomes more prominent
- Postnatal depression has a severe impact on both mother and child but often remains underdiagnosed
- An identification of risk factors predicting postnatal depression permits a proactive screening in primary care

Word count

2971

INTRODUCTION

Postnatal depression (PND), comprising major depressive disorder and subthreshold depression is one of the most frequent complications in women of childbearing age and occurs in about 10-15% of new mothers in the developed world (1-3). PND is not considered a diagnostic entity by the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V) (4). Major depression is defined as a depressed mood and/or anhedonia in the presence of three of the following symptoms: weight change, insomnia, energy deprivation, feeling of worthlessness, decreased concentration and suicidality. These symptoms must be present for at least 2 weeks (5). During the perinatal period, women have an increased vulnerability to depression because of unavoidable psychological, biological (hormonal and immunological) and social changes (6-8). PND not only affects the mother but also the child and the family context (9, 10). PND can have a negative impact on the physical and mental health of the infant, resulting in physical, cognitive and psychological delay (11-14). The onset of PND is influenced by the presence of several risk factors including exposure to partner violence, lack of social support, history of depression, unwanted or unplanned pregnancy, premature birth and low birth weight, maternal age at parturition (especially teenage mothers), breastfeeding and smoking (15-24). Identification of risk factors helps to prevent or to timely detect a potential PND and to organise support in a multidisciplinary context tailored to women's needs or preferences (25, 26).

Until recently, the average postpartum hospital stay in Belgium was five days, which is longer than in neighbouring countries (27). In an attempt to avoid unnecessary long hospital stays, the ministry of Social Affairs and Public Health proposed a general reduction of the postpartum hospital stay with a shift of postnatal and postpartum care from the hospital environment to the outpatient setting. In answer to this proposal, a consortium of hospitals and primary care organizations designed the 'Short Stay in Maternity' program. The maternity stay of women with a low risk pregnancy was reduced to 72 hours after delivery (27). This shift in care raised many additional questions about the physical and psychological wellbeing and support of mothers in the early postpartum period. Above, the early detection and follow up of patients at risk for PND deserves more attention in primary care as negative feelings in postpartal women often remain under the radar (28). On the other hand, guidelines disagree on the screening strategy and on the impact and efficacy of early detection (29). The purposeful screening of vulnerable women is seen as the most efficient way to detect and follow women with suspected PND.

In order to develop an efficient program to detect and screen vulnerable women after childbirth and to provide preventive support within primary care, we aimed to inventory the risk factors for PND within the population of women participating in the 'short stay in maternity program'.

METHODS

This study is a cross sectional cohort study without follow-up. The study ran from July to December 2018 and 477 women were invited to participate within three months after delivery.

Patients were recruited based on participation in the program of the shortened maternity stay. The inclusion criteria for participation in the project were: a planned vaginal delivery, a stay in maternity for a maximum of 72 hours after delivery, no medical indication for a longer maternity stay for mother and new-born, guaranteed follow-up at home and the availability of a postpartum care plan (provision of home care during 10-14 day after delivery). The exclusion criteria were mild to severe complications in the mother or new-born, planned caesarean and social vulnerability as estimated by the accompanying caregiver (midwife, gynecologist, general practitioner).

The mothers were contacted by e-mail within 12 weeks after the birth to complete an electronic questionnaire addressing the feelings they experienced during the postpartum period. This questionnaire included the validated Dutch version of the Edinburgh Postnatal Depression Scale (EDPS) supplemented with variables considered in the literature as possible risk factors for postnatal depression (30-32). The EPDS contains 10 questions and is considered a reliable and easy method for screening purposes. The scale was an effective screening tool for Major and Minor depression at a cut-off of 9/10, but its accuracy increased if the cut- off was raised to 12/13 (33). The following risk indicators were added: age at delivery, history of depression, history of PND, previous antidepressant treatment, presence of depressed feelings during pregnancy, marital status, experienced partner support, complications during pregnancy or after delivery, obstetric factors (natural vaginal delivery or assisted delivery: caesarean section), parity, breastfeeding, smoking, partner violence, prematurity, unwanted or unplanned pregnancy and socioeconomic status.

The primary outcome measure of the questionnaire was the score on the EDPS. The number of postnatal depressive symptoms was summed with a maximum total score of 30. This score was then transformed into a dichotomous variable with a cut-off at value 13 (score> =13) to propose a suggestive diagnosis of PND (30, 34).

To predict PND during or after pregnancy and to describe the prevalence of PND, the following independent variables were analysed: age at delivery, civil status, profession, parity, smoking, alcohol, history of depression or antidepressants, history of PND, negative feelings during pregnancy, planning of pregnancy, term of delivery, complications during pregnancy, in child or during postpartum, type of delivery, breast feeding, experienced support of partner, abuse or violence during pregnancy.

A multivariate regression analysis was performed with the dichotomous outcome on the EDPS (cut off set on 13) as dependent variable. Final significance of Chi^2 was fixed at $P < 0.05$ and odds ratios with a value within the 95% confidence interval were considered significant. All statistical operations (frequency and logistic procedure) were processed with SAS 9.4.

ETHICAL APPROVAL

All procedures were approved by the Medical Ethical Board of the University Hospitals of Leuven under the number MP006123. Written informed consent was obtained from all patients. Patient participants signed an informed consent for participation in the 'short stay in maternity program' after verbal briefing by a researcher. By a simple opting out button, patients could withdraw from further participation.

RESULTS

The online questionnaire was sent to 477 mothers and 138 (27.3%) of women participated. Sixteen participants (12.4%) presented with a score greater than or equal to 13 on the EPDS. Fifteen (11.45%) participants mentioned antecedents of a depression and four (3%) presented with a PND after an earlier pregnancy. Nineteen (14.50%) participants reported negative feelings during the last pregnancy. Only one participant reported abuse or violence during the pregnancy. Twenty-two (16.79%) participants underwent a caesarean and in two (1.53%) respectively three (2.29%) cases there was a mother or child complication after delivery. Twenty-three (17.56%) participants experienced a complication during the pregnancy. One hundred thirteen (86.26%) participants experienced enough support from their partner but seven (5.34%) experienced only material or insufficient support. (table 1)

A multivariate logistic regression analysis with the score on the EDPS returned to a dichotomous variable and all the indicated risk factors as the predictors seemed not reliable and valid (model warning due to quasi-complete separation of data points). After a process of introducing and excluding the risk indicators in the logistic model, only a model with partner support and negative feelings during the pregnancy appeared reliable and valid. The odds ratio for a positive score on the EDPS when experiencing negative feelings was 13.5 (95% CI 4.14-44.01). If the partner only provided to material support than the odds ratio for a positive EPDS-score was 11.2 (95%CI 2.72-55.5). (table 2)

DISCUSSION

SUMMARY

In this study we investigated the relationship between the development of a PND (defined as a test score higher than 13 on the EDPS) and predictive contextual factors for women participating in the 'short stay in maternity program'. More than one in ten of all participants presented with a PND. Women who experienced negative feelings during their pregnancy or women who experienced only material support from their partner were particularly at risk for presenting with a PND within three months after delivery.

STRENGHTS and LIMITATIONS

The major strength of our study is the sample size, which is larger than most studies in this field. We also recruited a representative population when considering the demographic features. Second, we inventoried common and less common conditions with a suspected impact on the mental wellbeing. These conditions were well documented since they also served as quality indicators for the project.
The major limitation of our study is that we recruited participants during a nationwide implementation project. This strategy probably affected the study results since all women were included in a care pathway. We observed that a care plan was missing for the most vulnerable women and in that case, the hospital stay was extended. In addition, the most vulnerable women were traced before delivery, based upon the common screening programs, and did not enter the short stay program.
On the other hand, the standard care plan only provided support the first 10-14 days after delivery. After that period, the onset of PND is still possible. The low response rate is a second limitation of the study. We might have missed women who felt ashamed about the negative feelings or who felt too distressed to participate in a study. On the other hand, the sociodemographic features of this sub-sample were in line with de characteristics of the total sample of participants. Third, we used a single measure point without follow up. We considered that follow up of symptoms adds to the exploration of an intervention effect in case of PND but not necessarily to profiling of women at risk.

COMPARAISON with EXISTING LITERATURE

The reported prevalence of PND in our study is in accordance with other studies (4, 28, 35). When the cut off score on the EDPS was set on 11, another 13 women (almost 10% of the total number of participants) entered the risk zone of PND. Screening for PND might improve outcome for mother and child but both routine screening programs and instruments are still subject of debate (5, 28, 30, 36). With an increase of 10% of PND risk by minimally lowering the cut off score on the EDPS, the sensitivity of this instrument should be further investigated. Other authors demonstrated that a cut off value of 10 yielded a sensitivity of 100% and a specificity of 87%, which results in many false positives (28). To screen in women presenting with symptoms a cut off of 13 or higher could be defendable. In case a highly sensitive screening is desired, a cut off score of 11 could be preferable considering that false positives also put a high emotional burden on both patient and relatives (37).

The ideal strategy in primary care is one of a high sensitivity but particularly targeting women at risk. Primary care provides are best placed to inventory risk factors and to identify vulnerable women. The questionnaire was sent to the participants in the first three months after delivery, which is considered the high-risk period for the onset of PND (1). Nevertheless, there is a non-negligible number of cases with an onset of PND between three and six months after delivery (7, 17, 28). These woman are at greater risk of remaining under the radar than women presenting with symptoms in the expected, more vulnerable, time span (38). For screening purposes, the cut off score on the EDPS might therefor be adjusted to the time between delivery and screening. False negatives are least desired in the first months after delivery and false positive results probably do less harm in this time window. In the second term after delivery, we could focus on woman presenting with symptoms and screen with a higher (regular) cut off score. In this period, women are mainly followed by primary caregivers and access to primary care is certainly lower than to hospital care. Primary caregivers are also confident with the context of their patients. Therefore, it is important that these caregivers learn to recognize risk factors of PND and to timely screen and detect the first onset of symptoms.

In line with other research, we identified two risk factors for developing PND (6, 35). First, women who experienced negative feelings during pregnancy where significantly more at risk than women who did not experience these feelings. In contrast, woman who reported a history of PND were, according to this study, not more at risk developing PND while women taking antidepressants approached the risk zone (although not significantly). It is assumable that women in these groups are considered as high risk for PND and they might therefor be better surrounded with attention and support from professionals and relatives. On the other hand, there is still a taboo on reporting negative feelings during pregnancy and we should consider an under-diagnosis of depression in these vulnerable groups. Shame and the minimization of symptoms by mother and relatives push mothers in social isolation. To reach these vulnerable mothers and offer them the support they need, we might consider leaving the loaded term 'depression' and rather refer to 'being in stress' (39, 40). In addition, the intake of antidepressants during a pregnancy might refer to a more unstable situation while a history of depression might have moved to background history. Primary care providers should therefor pay particular attention to women who take antidepressant and should not assume that this medication does not protect patients against PND.

A second single risk factor for PND was the presence of a partner whose support limited to the provision of material support. As in other studies, woman who only experienced emotional support or experienced insufficient support were less vulnerable (41). The accent on the provision of material support might cover up for a more profound and structural underlying problem in the relationship. Primary caregivers are in general caregivers of the family and therefor relatively well aware of the intrafamily relationships. In case of relational problems, a screening for PND might be indicated.

Socio-demographic features were not withheld as risk factors in this study. We should consider that mapping income by profession might not be accurate enough to predict financial stability as the prevalence of material deprivation in the working class young families is raising (17) (https://www.statistiekvlaanderen.be/en). Most women in our study lived together with a partner or were in a relationship. The physical absence of a partner seemed not a risk factor for PND. Most women probably organized themselves and provided adequate back up measures (social network) in case of needs. Parity appeared not to be a risk factor for PND among our participants in contrast with findings in other studies where first parity is considered as a risk condition (1).

As mentioned before, the participants were recruited from an implementation project to reduce maternity stay after delivery and were well surrounded with care. One of the inclusion criteria of the project was the availability of a postpartum care plan (during 10-14 day after delivery) implying the scheduled visit of a midwife and home maternity care and home help on request. Social support is

considered as an important protective factor (42). In home care organisation, particular attention should therefore be payed to the support of new mothers and their close family.
An unplanned pregnancy seemed not a risk factor for PND in our study. Nevertheless, with a p-value of 0.07, it was the closest non-significant risk factor and therefor this condition deserves attention. Unplanned does not necessary refers to unwanted which is more likely to negatively influence mental wellbeing (35). In our study, not a single woman described the pregnancy as unwanted although it is very unlikely that in that case women would have participated.
In our study, there were no women reporting the use of alcohol during their pregnancy and we therefor deleted this factor in the final analysis. Campaigns for alcohol abstinence during pregnancy were successful in many countries (43, 44). A handful of women smoked during pregnancy but this condition was not predicting PND.
Obstetric conditions as a caesarean and mother or child complications did not affect the risk on a PND. In case of postpartum or postnatal complications, women were very well surrounded and supported after delivery and in their maternity period, which is a protective factor (26, 45). The provision of (para-) medical care is well organized and low threshold in Belgium, in particular in the context of this project of shortened stay after delivery (27). During the project, we registered only a very small number of readmission of mother or child. The threshold to lengthen the hospital stay in case of medically suspicious conditions in mother or child was indeed very low.
Most participants were breastfeeding but the women not breastfeeding seemed not particularly at risk for PND. The cause-consequence relationship between breastfeeding and depression is subject to debate (10, 24). Here, we should add that in the project of shortened stay, women were very well instructed and guided through the breastfeeding process, as this was one of the spearhead outcomes of the project. However, breastfeeding progressively lost ground in favour of bottle-feeding during the first three months after birth.

INMPLICATIONS for RESEARCH and PRACTICE

In this study, we identified two main risk factors for developing PND in women participating in the 'short stay in maternity program': negative feelings during pregnancy and the provision of only material support by the partner.

In primary care, these indicators are easy to screen and to register and add to a more effective screening for PND. Primary caregivers should be well aware of these risk factors since they are most confident with the context of their patients and access to primary care is low. The most commonly used screening instrument for PND is, until now, the EDPS. In further research, the cut off score might be adjusted to the objectives and to the target population of screening. Risk profiling of women at risk for PND should therefore be further investigated.

Declaration

- **Ethics** approval and consent to participate: The authors assert that all procedures contributing to this work comply with the ethical standards of the relevant national and institutional committees on human experimentation and with the Helsinki Declaration of 1975, as revised in 2008. All procedures involving human subjects/patients were approved by the Medical Ethical Board of the University Hospitals of Leuven under the number MP006123.
- **Consent for publication**: all authors explicitly consent for publication
- The **datasets** generated and/or analysed during the current study are available in the link: https://kuleuven-

my.sharepoint.com/:x:/g/personal/birgitte_schoenmakers_kuleuven_be/Edo4z0SDbElIkRcDDNWWR38B7I-Rw6p1CIMfVBN4ThOHnQ?e=7FUmag

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- **Authors' contributions**
  1. Conception and design of the research: JL, TH, BS
  2. Acquisition of data: JL
  3. Analysis of data: JL,BS
  4. Drafting the article: JL,BS
  5. Revision the article: JL, TH, BS
  6. All authors read and approved the final manuscript.
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TABLES

Table 1: background features and risk indicator for PND

Parameter	**N (%°)**	P value Chi² for equal proportions
Age 18+	130 (99,24%)	<.0001
Marital status		<.0001
- divorced	1 (0,76%)	
- married/ officially cohabiting	112 (85, 5%)	
- relationship	18 (13, 74%)	
Profession		<.0001
- worker	2 (1,53%)	
- senior management	58 (44,27%)	
- lower management	44 (33,59%)	
- formally unemployed	7 (5, 34%)	
- independent	20 (15, 27%)	
Parity		<.0001
- first	58 (44.27%)	
- second	50 (38.17%)	
- third	20 (15.2%)	
- fourth	2 (1.53%)	
- fifth or more	1 (0.76%)	
Smoking	5 (3.82%)	<.0001
Depression history	15 (11.45%)	<.0001
Antidepressants history	11 (8.40%)	<.0001
Postnatal depression history	4 (3.05%)	<.0001
Negative feelings	19 (14.50%)	<.0001
Unplanned pregnancy	15 (11.45%)	<.0001
Complication pregnancy	23 (17.56%)	<.0001
Pre-term delivery	14 (10.69%)	<.0001
Caesarean	22 (16.79%)	<.0001
Complication child	2 (1.53%)	<.0001
Complications post-partal	3 (2.29%)	<.0001
Breast feeding	117 (89.31%)	<.0001
Support partner		<.0001
- only emotional	3 (2.29%)	
- only material	7 (5.34%)	
- insufficient	7 (5.34%)	
- sufficient	113 (86.26%)	
- no partner	1 (0.76%)	
Abuse during pregnancy	1 (0.76%)	<.0001
Violence during pregnancy	1 (0.76%)	<.0001
EDPS positive score	16 (12.21%)	<.0001

Table 2: Multivariate analysis with the dichotomised EDPS-score as dependent variable (reference = score > 13)

Independent variable	**p Chi²**
Age 18+	0.7081
Marital status	0.3578
Profession	0.8157
Parity	0.7393
Smoking	0.3951
Depression history	0.3277
Antidepressants history	0.0708**
Postnatal depression history	0.4277
Negative feelings	<.0001*
Unplanned pregnancy	0.0693**
Complication pregnancy	0.5704
Pre-term delivery	0.5398
Caesarean	0.8232
Complication child	0.5950
Complications post-partal	0.2584
Breast feeding	0.5398
Support partner	0.0047*
Abuse during pregnancy	0.7081
Violence during pregnancy	0.7081

*significant at a 0.005 level

**nearly significant at a 0.005 level

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