

Screening for maternal postpartum depression and associations with personality traits and social support. A Polish follow-up study 4 weeks and 3 months after delivery

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Summary

Aim. To investigate the likelihood of postpartum depression and to explore maternal characteristics in terms of personality, social support and other medical and psychological data.

Method. A sample of 548 patients was investigated 4 weeks and 3 months after delivery. They responded to questionnaires containing sociodemographic questions: the EPDS (Edinburgh Postnatal Depression Scale), the PHQ-9 (Patient Health Questionnaire-9), the NEO-FFI (Personality Inventory), and the BSSS (Berlin Social Support Scales).

Results. Probable depression any time during first 3 months postpartum was prevalent among 6.38% of women, based on the following criteria: EPDS > 12 points and PHQ-9 > 9 points. A score of EPDS > 9 in the first week after delivery (ORa = 4.16; CI 1.59–10.86), a history of hospitalisation during pregnancy (ORa = 3.51; CI 1.32–9.20), a high level of neuroticism (ORa = 1.37; CI 1.05–1.77), and high buffering-protective social support (ORa = 2.56; 1.25–5.23) were significantly associated with depressive symptoms. Potential protective factors were initial breastfeeding (ORa = 0.31; CI 0.11–0.90) and high satisfaction with currently received social support (ORa = 0.41; CI 0.22–0.79). The total dropout rate was 23%.

Conclusions. New mothers who are neurotic and who suffered from physical or mental problems during pregnancy and puerperium might experience depressive symptoms more easily. They would also protect those close to them from negative information about themselves. A lack of initial breastfeeding and unsatisfactory social support played a similar role.

Key words: mood disorders, screening tools, puerperium

Introduction

Postpartum depression (PPD) is a serious mental problem. It is diagnosed as an episode of major depressive disorder during the first four to six weeks after delivery (according to DSM-5 or ICD-10, respectively) [1–3]. DSM-5 adds a specifier “with perinatal onset”, including time of pregnancy as well. It affects from 7% or 13% to 19% of women during the first 3–6 months of the postnatal period [4, 5]. Some authors report a different time of onset, such as 8 or 12 weeks or even up to one year after delivery [6, 7].

The most popular screening tools are the Edinburgh Depression Scale (EPDS) [8], the PDSS (Postpartum Depression Screening Scale), or the PHQ-9 (9-Item Patient Health Questionnaire) [9]. Due to a lack of consensus on the exact method of screening for PPD, different studies focus on different rating scales, frequently with different timing. Two or more tools are often used in order to improve the certainty of a diagnosis. Gjerdingen uses a 2-question screen and the PHQ-9 several times postpartum and initially, or in the case of a positive screening, the SCID (the Structured Clinical Interview for DSM-IV Axis I Disorders) [10]. In another American study, a multi-step screening with the EPDS and the PHQ-9 (which followed positive EPDS screenings) was administered along with the SCID [11].

The authors summarize the currently known risk factors for postpartum depression: unemployment, preterm birth or low infant weight, poor health status, and a history of mental illness (depression, postpartum depression, anxiety, premenstrual syndrome, any other diagnosis). Aspects of social support and relationship with a partner are also meaningful [5, 9, 12]. Previous European studies demonstrated the major role of neuroticism [13, 14].

The aim of this study was to assess the rate of prevalence of possible depressive symptoms in a sample of postpartum women and to investigate the characteristics of patients at risk of postpartum depression. We searched for risk factors in the context of personality, social support, and other medical and psychological data.

Material

567 women who gave birth in the Department of Obstetrics of the Medical University of Gdansk between May 2013 and June 2014 were invited to join the study. They were of at least 18 years of age and fluent in Polish. The exclusion criteria were as follows: death of a newborn child, illness of a child requiring special prenatal care, preterm labor before the end of the 32nd week of pregnancy, or any stressful life event such as death of a child or parent, divorce/marital separation, job loss, serious illness of a family member. 19 patients met these criteria, so the investigated group consisted of 548 mothers.

Methods

A cross-sectional, prospective study was designed. The study was approved by the Bioethics Committee of the Medical University of Gdansk (NKEBN/531/2011-2012). Each patient received information on the purpose and structure of the investigation and provided formal written consent. The patients filled in a questionnaire during the first week after childbirth, at the hospital. They received the next forms 4 weeks and 3 months after delivery via email or post. Women who were identified as being at risk of postpartum depression (EPDS > 12 or thoughts of harming themselves) were advised to visit a psychiatrist or a psychologist immediately for prompt diagnosis.

The initial questionnaire collected sociodemographic and medical data, and contained a battery of psychological tests. The EPDS is a 10-item self-report scale, where the maximum score is 30 points. It concerns the extent of experienced depressive symptoms within the past 7 days. In this study we assumed a score of 13 points as the cut-off point. Such an assumption yields sensitivity and specificity at the level of 84.2–93.9% and 75.2–76.7%. The Cronbach's alpha is reported as 0.87–0.88% [15]. The PHQ-9 is a tool used in screening for depression and contains 9 questions with criteria for major depressive disorder according to DSM-IV with Likert-scale responses [16]. It is available on-line at <http://www.phqscreeners.com/>. The cut-off score was 10 points. We used a simple scoring rule – summing up responses. Some psychometric features have sensitivity in the range of 75–89% and specificity of 83–91% [9]. Neither the EPDS nor the PHQ-9 were validated in a population of Polish postpartum women. The authors assumed positive result of the EPDS and the PHQ-9 (both) as “risk of postpartum depression” or “probability/likelihood of postpartum depression or depressive symptoms”. The next tool, the Personality Inventory NEO-FFI, consists of five scales: Neuroticism, Extraversion, Openness to experience, Agreeableness, and Conscientiousness. The raw points are converted into a standardized 10-point sten scale. Individual forms were purchased as required, specifically for the use in the study. Psychometric values of the NEO-FFI were proven to be satisfactory, e.g., internal consistency coefficients of subscales > 0.70 [17]. We chose the following parameters of the BSSS (Berlin Social Support Scales) to use in the study: perceived available support, need for support, support seeking, actually received support, satisfaction with support, and protective-buffering scale. The result of the scale is the arithmetic mean. Its psychometric features such as Cronbach's alpha (0.71–0.90) are satisfactory [18]. The questionnaires at the following stages consisted of the EPDS and the PHQ-9.

A statistical analysis was conducted using STATISTICA 12.0 software. We used the following statistical methods: Shapiro-Wilk test, Student's *t*-test, Mann-Whitney *U* test, χ^2 , and the Spearman's correlation. The risk factors were analyzed with the use of the odds ratio (OR) of logistic regression models: univariate (crude, ORc), bi- and multivariate (adjusted, ORa). Data is shown as mean values (with standard deviation in brackets), group size (*n*), or percentage (%). The personality trait of neuroticism was assumed a priori as a main confounding variable of psychological data. A two-tailed $p < 0.05$ was assumed to be the threshold of statistical significance.

Results

A total of 548 patients participated in the study, with a diminishing rate of participation: 75% (409 mothers) in the 4th week and 64% (374 women) in the 3rd month after delivery. 62% of the group, i.e., 341 people responded to all questionnaires, while 127 mothers (23%) resigned from the study at the hospital. One quarter decided to respond via postal letter. Responses were provided 30 days (8.15) and 100 (10.63) days after delivery on average.

Women who were lost in follow-up (23%) less frequently had higher education (62.99% vs. 85.04%; $p = 0.00$), and were more likely to be unemployed (22.05% vs. 9.03%; $p < 0.001$), to have smoked cigarettes during pregnancy (17.32% vs. 9.26%; $p = 0.01$), and to have failed to exclusively breastfeed in hospital after delivery (34.03% vs. 53.47%; $p = 0.01$). There was no difference between points scored in the EPDS (8.42 (4.30) vs. 7.82 (4.40); $p = 0.18$) or the PHQ-9 (5.65 (4.53) vs. 5.55 (4.44); $p = 0.82$).

The mean age of participants was 30.19 years (range: 18–46). On average, these women gave birth after 39.06 weeks of pregnancy (range: 32.0–42.0); this was most often a vaginal birth (68.7%), and more than half of the subjects were primiparas (54.2%). The majority of women (76.5%) resided in a city with a population over 100,000, had higher education (80%), were employed (88%), and married (80.1%).

The risk of postpartum depression during the first 3 months after childbirth, confirmed was estimated at 6.38%. 35 patients reported depressive symptoms and only 5 cases of new onset were found in patients after 3 months (Table 1).

Table 1. Number of women with elevated EPDS and PHQ-9 scores

Step: Postpartum time	EPDS > 12		PHQ > 9		EPDS > 12 and PHQ > 9	
	n	%	n	%	n	%
1. 4 weeks	48	11.73%	61	14.91%	30	7.33%
2. 3 months (new onset)	18 (10)	4.81% (2.67%)	27 (12)	7.21% (3.20%)	11 (5)	2.94% (1.34%)
Total	58	10.58%	73	13.32%	35	6.38%

EPDS – the Edinburgh Postnatal Depression Scale; PHQ-9 – the Patient Health Questionnaire-9; New onset – no elevated score in a screening tool in previous measurements

Patients at risk of postpartum depression scored significantly higher in all EPDS and PHQ-9 tests during the study: 4 weeks (15.46 (4.49) vs. 6.30 (3.83); $p < 0.001$ and 13.77 (5.12) vs. 5.18 (3.23); $p < 0.001$), and 3 months after delivery (10.47 (5.08) vs. 5.03 (3.28); $p < 0.001$ and 8.80 (4.00) vs. 4.09 (3.07), $p < 0.001$). Correlation between the tests in the 4th week was $r = 0.70$; and in the 3rd month was $r = 0.60$; ($p < 0.00$). Women at risk of postpartum depression more often had a history of psychiatric disorders ($p = 0.003$; ORc = 3.75), had visited the hospital during pregnancy more often ($p = 0.009$; ORc = 2.64) and had rarely breastfed initially ($p = 0.01$, ORc = 0.38) (Table 2).

Table 2. Sample characteristics of women with and without risk of postpartum depression based on the EPDS score of 12 points and the PHQ-9 score of 10 points. Odds ratio of univariate logistic regression model

Parameter	Screen negative	Screen positive	p	Univariate model		
	n (%) of the group			ORc	95% CI	p
History of any psychiatric disorder ^a	24 (6.25%)	7 (20%)	0.003	3.75	1.48–9.49	0.005
Premenstrual syndrome ^a	116 (30.21%)	15 (42.86%)	0.13	1.73	0.86–3.51	0.13
Relationship other than marriage ^a	70 (18.37%)	9 (25.71%)	0.31	1.54	0.69–3.44	0.29
Unemployment before childbirth ^a	36 (9.38%)	2 (5.71%)	0.68	1.71	0.39–1.71	0.51
Premature delivery ^a	39 (10.16%)	3 (8.57%)	0.99	0.83	0.24–2.85	0.77
Hospitalization during pregnancy ^a	93 (24.22%)	16 (45.71%)	0.009	2.64	1.30–5.34	0.007
Initial breastfeeding ^a	320 (83.33%)	23 (65.71%)	0.01	0.38	0.18–0.81	0.01

EPDS – the Edinburgh Postnatal Depression Scale; PHQ-9 – the Patient Health Questionnaire-9; ORc – crude odds ratio; CI – confidence interval; ^a – yes/no answer

We found that new mothers with possible depressive symptoms during the first 3 months after delivery more often scored higher than 9 points in the perinatal EPDS (71% vs. 29%; ORc = 6.32; ORa = 3.87). When we focused on personality measured with the NEO-FFI, high level of neuroticism proved to be the strongest risk factor ($p < 0.001$; ORc = 1.64). Other personality traits were significant solely in univariate regression models: extraversion $p = 0.001$; ORc = 0.76 and conscientiousness $p = 0.005$; ORc = 0.78.

Postpartum women at risk of depression assessed their social support as lower. Measured parameters of social support which were statistically significant: perceived available support ($p < 0.001$; ORc = 0.18; ORa = 0.28), actually received support ($p < 0.001$; ORc = 0.24; ORa = 0.30), with satisfaction with support ($p < 0.001$; ORc = 0.34; ORa = 0.40), and buffering-protective scale ($p < 0.001$; ORc = 2.55; ORa = 2.14) (Table 3.).

Table 3. Psychological characteristics of women with and without risk of postpartum depression based on the EPDS score of 12 points and the PHQ-9 score of 10 points. Odds ratio of univariate and bivariate logistic regression model

Test	Test scale	Screen negative	Screen positive	p	Univariate model			Model adjusted to neuroticism		
		Mean (SD) or n (%) of the group			ORc	95% CI	p	ORa	95% CI	p
EPDS	EPDS > 9 in the first week after delivery ^a	110 (28.65%)	25 (71.43%)	<0.001	6.23	2.89–13.43	<0.001	3.87	1.64–9.13	<0.001

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NEO-FFI	Neuroticism	3.99 (1.85)	5.76 (1.99)	0.000	1.64	1.34–2.01	<0.001			
	Extraversion	6.18 (1.82)	5.03 (2.11)	0.001	0.76	0.58–0.87	0.001	0.85	0.67–1.04	0.11
	Openness to experience	5.27 (1.98)	4.97 (2.05)	0.408	0.93	0.78–1.11	0.41	0.94	0.79–1.13	0.53
	Agreeableness	6.01 (2.12)	5.35 (1.52)	0.08	0.86	0.73–1.02	0.86	0.91	0.76–1.10	0.33
	Conscientiousness	6.87 (2.03)	5.85 (1.91)	0.005	0.78	0.66–0.93	0.006	0.89	0.74–1.08	0.24
BSSS	Perceived available support	3.75 (0.33)	3.47 (0.48)	0.000	0.18	0.08–0.40	<0.001	0.28	0.12–0.66	0.004
	Need for support	3.01 (0.59)	2.96 (0.66)	0.654	0.88	0.49–1.56	0.65	0.73	0.40–1.32	0.29
	Support seeking	2.95 (0.62)	2.75 (0.68)	0.069	0.61	0.35–1.05	0.07	0.56	0.31–1.00	0.05
	Actually received support	3.81 (0.32)	3.45 (0.75)	0.000	0.24	0.12–0.45	<0.001	0.30	0.15–0.61	<0.001
	Satisfaction with support	3.88 (0.41)	3.37 (0.97)	0.000	0.34	0.22–0.54	<0.001	0.40	0.25–0.66	<0.001
	Buffering-protective scale	1.77 (0.53)	2.11 (0.77)	0.001	2.55	1.47–4.44	<0.001	2.14	1.21–3.79	0.009

EPDS – the Edinburgh Postnatal Depression Scale; PHQ-9 – the Patient Health Questionnaire 9; SD – standard deviation; ORc – crude odds ratio; CI – confidence interval; ORa – adjusted odds ratio; ^a – yes/no answer; NEO-FFI – the Neo Five-Factor Personality Inventory; BSSS – the Berlin Social Support Scales

Finally, we built a multivariate logistic regression model which included the most important risk factors of postpartum depression. The EPDS score higher than 9 in the first postnatal week (ORa = 4.16), hospitalization during pregnancy (ORa = 3.51), a high level of neuroticism (ORa = 1.37), and high buffering-protective social support (ORa = 2.56) increase the risk of postpartum depression, while initial breastfeeding (ORa = 0.31) and satisfaction with received social support (ORa = 0.41) play a protective role (Table 4.).

Table 4. Selected risk factors for postpartum depression.
Multivariate logistic regression model

Parameter	ORa	95% CI	p
EPDS > 9 during the first week after delivery ^a	4.16	1.59–10.86	0.004
Hospitalization during pregnancy ^a	3.51	1.32–9.20	0.01
Buffering-protective social support (BSSS)	2.56	1.25–5.23	0.01
Neuroticism (NEO-FFI)	1.37	1.05–1.77	0.02
Initial breastfeeding ^a	0.31	0.11–0.90	0.03
Satisfaction with actual social support (BSSS)	0.41	0.22–0.79	0.008

ORa – adjusted odds ratio; CI – confidence interval; ^a – yes/no answer; EPDS – the Edinburgh Postnatal Depression Scale; NEO-FFI – the personality inventory; BSSS – the Berlin Social Support Scales.

Model adjusted for mother's age, education (higher or not), informal relationship^a, premenstrual syndrome^a, natural delivery^a, premature delivery^a, psychiatric disorders in the past^a, multipara^a,

smoking cigarettes during pregnancy^a, alcohol consumption during pregnancy^a, obesity before pregnancy^a, a history of miscarriage^a.

$\chi^2 = 74.526$, $df = 18$, $p < 0.001$, Pseudo $R^2 = 0.3182$.

Discussion

In this study we have obtained a profile of women at risk of postpartum depression. Such patients are neurotic, encounter problems with initial breastfeeding, present mood disorders even in the first week postpartum, assess their social support as lower, and have been hospitalized during pregnancy.

Personality is often investigated in the described context and a high level of neuroticism is a potential risk factor [14, 19, 20]. This is a general tendency towards low mood and negative emotions and leads patients to worse adaptation to difficult situations [17]. We may try to discern such emotional patients (even without complex psychological tools) and to pay special attention to their mood during their postpartum period. We must not forget about postpartum blues and to check the mother's mood soon after delivery. A high EPDS score may be not only a sign of postpartum blues, but also the early onset of postpartum depression, undiagnosed perinatal depression or other mental disorders requiring prompt management. On the other hand, postpartum affective disorders may be overestimated [21]. Hospitalization related to a high risk pregnancy is a specific type of stressful event. Such a risk in pregnancy is the highest concern for most future mothers and is often linked with postpartum depression in the literature [22, 23]. Breastfeeding is a well-known protective factor for postpartum depression and the association is bi-directional [24–26]. This manner of feeding brings hormonal and psychological changes that are beneficial. The issue of social support is next possible cause of postpartum depression [19, 27, 28]. We also found that a specific type of social support, present soon after delivery and providing actual satisfaction, can have a positive effect on patients' mood. On the other hand, when the patient protects others from bad news, and when she pretends to be stronger than she really is – the chance of depression increases. Explanation of a role of social support to those close to the patient could help to support her more effectively.

Our research on risk factors is useful for future meta-analysis. There are not many projects concerning postpartum depression in the eastern part of Europe [14, 19, 29, 30]. Poland does not have specific recommendations in the area of postpartum depression, nor does it have any validated screening tool. Both tools used in this study, the EPDS and the PHQ-9, can be easily administered in screening. Our additional assessment with the PHQ-9 was used in order to find a high risk group of postpartum depression. The authors published a report on the risk of postpartum depression based only on the positive outcome of the EPDS in the 4 weeks postpartum [31]. Another aspect was to relate the risk of postpartum depression to the perinatal EPDS score higher than 9 points. Even such a low score was proven significant and it is often met in other studies. Our basic criterion (> 12) raised the chances even more (ORa = 5.19; CI 1.99–13.51).

Depressive cognitive schemas are an important aspect of depression. Negative thinking, e.g., greater elaboration on negative information, can lower mood [31, 32]. In this study, a patient with a high score in the EPDS immediately after delivery would perceive herself and her situation (i.e., social support) as being worse than it actually is.

It is worth to mention that the women who resigned from the study showed more psychosocial distress. They presented a worse personal situation: lower level of education, unemployment. We cannot assume that they are not at increased risk of postpartum depression, which is a limitation of the study.

The main limitation of the study is the lack of diagnostic verification of tests results, i.e., with the use of the SCID or psychiatric diagnosis. The study sample was rather homogenous: urban population, with higher education, married; therefore the conclusions may not be generalized to more socioeconomically diverse populations. Even though we considered a number of empirically supported risk factors, a large proportion of the variance still remains unexplained (as seen in Pseudo R^2). In subsequent projects, it is advisable to examine patients more frequently and for a longer period of time, even up to one year after delivery, to obtain more complete data on postpartum depression.

Conclusions

We estimated the risk of postpartum depression any time during the first 3 months after delivery to be 6.38%. Women who are neurotic, were hospitalized during pregnancy, are not satisfied with their social support, and who pretended to cope well with their situation and encountered problems with initial breastfeeding require more careful monitoring of their mental status. An assessment of mood immediately after delivery is another important issue.

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