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ORIGINAL ARTICLE

Postpartum depression: bipolar or unipolar? Analysis of 434 Polish postpartum women

Rafał R. Jaeschke,[1] Dominika Dudek,[1] Roman Topór-Mądry,[2] Katarzyna Drozdowicz,[1] Wojciech Datka,[1] Marcin Siwek,[1] Janusz Rybakowski[3]

[1]*Section of Affective Disorders, Department of Psychiatry, Jagiellonian University Medical College, Kraków, Poland.* [2]*Institute of Public Health, Jagiellonian University Medical College, Kraków, Poland.* [3]*Department of Adult Psychiatry, Poznań University of Medical Sciences, Poznań, Poland.*

Objective: To assess the prevalence of soft bipolar features in a sample of women with postpartum depressive symptoms, as well as to compare the sociodemographic and obstetric characteristics of subjects with bipolar or unipolar postpartum depressive symptomatology.
Methods: Four hundred and thirty-four participants were enrolled in this cross-sectional study. Postpartum depression (PPD) symptoms were assessed using the Edinburgh Postnatal Depression Scale (EPDS), while the Mood Disorder Questionnaire (MDQ) was used to screen for bipolarity features.
Results: Of the 434 participants, 66 (15.2%) scored $\geqslant$ 13 points on the EPDS, thus fulfilling the screening criteria, and 103 scored $\geqslant$ 7 points on the MDQ. In comparison with non-depressed subjects, the women who scored positively on the EPDS were significantly more likely to exhibit symptoms of bipolar spectrum disorders (38 vs. 21%; chi-square test, p = 0.015). Women with bipolar PPD symptomatology were significantly younger than those exhibiting unipolar PPD symptoms (31.0±4.8 years vs. 28.5±4.1 years; *t*-test, p = 0.03). The groups did not differ in terms of obstetric characteristics.
Conclusion: Our findings suggest that patients with PPD symptomatology may be more likely to exhibit soft bipolarity features as compared with non-depressed women.

Keywords: Postpartum depression; bipolarity; personality; EPDS; MDQ

Introduction

Postpartum depression (PPD) is a significant public health concern,[1,2] affecting approximately 10-20% of women within the first 3 months after delivery.[3] While the ICD-10 implies that PPD can only be diagnosed within the first 6 weeks postpartum,[4] Sharma & Khan found that the risk period for the disorder lasts until week 12.[5]

While the core symptomatology of PPD does not differ from that of non-puerperal major depressive disorder (MDD),[6] some additional features can also be observed (notably, low self-esteem, tension, and hypochondria[7]). If left unrecognized and untreated, PPD leads to significant morbidity, with numerous adverse outcomes, including significant impairment for the woman, compromised mother-infant bonding, ineffective breastfeeding, and worse developmental outcomes in the newborn.[6] It has also been suggested that PPD is an important correlate of suicidality among postpartum women.[8]

There is a substantial body of evidence to suggest that bipolar spectrum disorders (BSD)[9-11] are significantly more prevalent among women with PPD than in the general population.[12-15] Given the fact that up to 50% of patients with postpartum exacerbations of BSD remain misdiagnosed as suffering from MDD,[16] some diagnostic strategies for bipolar postnatal depression have been proposed in recent years. According to Sharma et al.,[17] bipolar PPD may be highlighted by subclinical hypomanic symptoms during pregnancy and the postpartum period, atypical depression, antidepressant-induced mood elevation, psychotic features, and family history of bipolar disorder (BD). However, in view of the paucity of evidence, accurate diagnosis of BSD in the postnatal period remains challenging.[18] Providing affected individuals with early and adequate treatment is crucial, as the use of antidepressants alone (i.e., without mood stabilizers) is known to be a risk factor for suicide and infanticide in postpartum women with BD.[19] Within this context, the available diagnostic and screening methods require further improvements. Of note, Clark et al.[20] and Merrill et al.[21] have recently advocated the concurrent use of the Edinburgh Postnatal Depression Scale (EPDS)[22] and the Mood Disorder Questionnaire (MDQ)[23] as an effective method of differentiating MDD from BD in postpartum women.

The primary objective of our study was to analyze the prevalence of bipolar symptoms (as indicated by positive MDQ scores) among Polish women with or without postpartum depressive symptomatology (as measured with the EPDS). We also set out to perform correlation analyses between bipolar symptoms and PPD symptomatology.

Correspondence: Rafał R. Jaeschke, Section of Affective Disorders, Department of Psychiatry, Jagiellonian University Medical College, ul. Kopernika 21a, 31-501 Kraków, Poland.
E-mail: rafal.jaeschke@gmail.com
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To minimize the risk of spectrum bias,[24] we focused solely on puerperal women with no psychiatric history. As a secondary objective, we compared the sociodemographic characteristics of subjects with bipolar or unipolar PPD symptomatology.

Methods

Study design, setting, and participants

We recruited inpatients aged $\geqslant$ 18 years who had recently delivered babies in the obstetric wards of five hospitals located in the Lesser Poland region (four hospitals in Kraków and one in Tarnów). Enrollment was underway between November 2009 and February 2013. At baseline, prior to inclusion in the study, staff members provided the patients with detailed information about the methods and objectives of the trial. All participants signed informed consent forms. At discharge, the participants were provided with sets of self-rating questionnaires to be filled in between 6 and 12 weeks postpartum and mailed back to the primary investigator (RRJ). The time frame chosen here strikes a balance between the ICD-10 diagnostic criteria for PPD[4] and the clinical findings[5] (as outlined in the Introduction).

We applied the following exclusion criteria: personal history of severe mental illness (including BD) and/or psychiatric treatment, delivery of a stillborn child, life-threatening condition in the newborn, and severe medical comorbidities. The clinical interviewers assessed whether the approached patients met any of the exclusion criteria.

The study protocol was approved by the Bioethics Committee of the Jagiellonian University Medical College (Kraków, Poland; decision no. KBET/160/B/2009).

Measurements

Edinburgh Postnatal Depression Scale (EPDS)

The EPDS, a self-report instrument consisting of 10 items rated on a 0-3 scale, was used to screen for PPD symptomatology.[22] Following the systematic review by Gibson et al.,[25] we adopted the cutoff score of 13 points.

Mood Disorder Questionnaire (MDQ)

The MDQ was used to screen for DSM-IV-defined BSD (i.e., BD type I, BD type II, and BD not otherwise specified). As suggested in the original study by Hirschfeld et al.,[23] this tool can be utilized as a case-finding instrument in trials encompassing subjects with a lifetime history of mania or hypomania.

The MDQ consists of three parts[26]:

- A 13-item checklist of hypomanic signs. The consecutive questions are intended to reflect the two dimensions of hypomania: energized-activity (E/A; items 3, 5, 8, 9, and 10) and irritable-racing thoughts (I/R; items 2, 6, 7, 12, and 13). The first item (mood elevation) is thought to be the least specific, and is hence not included in the subcategories.
- Symptom clustering.
- An item referring to symptom-related impairment.

We applied both the original MDQ criteria[23] and modified ones (by setting the screening benchmark at seven positive responses to section-1 items while excluding divisions 2 and 3). Use of the modified MDQ criteria in screening for BD in community-based samples of pregnant and postpartum women was recently advocated by Frey et al.[27]

Statistical analysis

Pearson's rank correlation analysis was used to assess correlations between symptoms of PPD and bipolar symptoms. The chi-square test was used to analyze associations between PPD and BSD symptomatology. A two-tailed Student's *t*-test and the Mann-Whitney *U* test were used to compare population means.

The threshold of statistical significance was set at $p \leqslant 0.05$.

Statistical analyses were performed in SPSS version 20 and Statistica version 10.

Results

Out of 607 women approached, 124 refused to take part in the study, 23 were lost to follow-up, and 26 met at least one of the exclusion criteria. Overall, the questionnaires were completed by 434 subjects, for a participation rate of 71.5%. Table 1 shows the general sociodemographic and obstetric characteristics of the study sample.

Altogether, 66 out of 434 participants met the EPDS screening criteria (15.2%), while 103 women scored $\geqslant$ 7 points on the MDQ (23.7%). The original MDQ screening criteria[23] were met by 20 subjects (4.6%). Association analysis revealed that women with PPD symptoms were significantly more likely to exhibit bipolar symptoms (Table 2). There was also a significant positive correlation between EPDS and MDQ scores (Pearson's correlation coefficient = 0.222; $p < 0.01$); Figure 1 shows the scatter plot.

In terms of sociodemographic differences, the women with bipolar PPD symptomatology were significantly younger than subjects exhibiting unipolar PPD symptoms. There were no differences in any of the obstetric variables (Table 3).

Discussion

In line with our preliminary results,[28] the final report of this study suggests that bipolar symptoms may be more prevalent in women with postpartum depressive symptoms as compared to non-depressed mothers.

Our study indicates that women with postpartum depressive symptomatology are significantly more likely to exhibit bipolar symptoms. This finding remains consistent with previous trials performed in Canada,[5,14] the U.S.,[15,21,29] Poland,[13,30] and South Korea.[31] In the bigger picture, this conclusion is congruous with the large body of evidence which suggests that about 25-40% of patients with MDD actually present with subthreshold hypomanic symptoms.[32] This issue was addressed in the DSM-5 by adding a category of MDD with mixed features, which

requires the presence of three or more hypomanic or manic symptoms accompanying a major depressive episode.[33]

From a pathophysiological standpoint, this finding of high prevalence of bipolar symptoms in women with PPD symptoms remains in line with the ample evidence that supports a triggering role of childbirth in BD exacerbations.[34-36] Also, the results of this study add to the existing body of data suggesting that younger age of onset may denote bipolar depression.[37,38]

Following up-to-date clinical guidelines, we performed EPDS screening between 6 and 12 weeks postpartum.[39] The point prevalence of PPD symptoms observed over this period (15.2%) remains consistent with the current epidemiological data on the incidence of PPD during the initial 12 weeks postpartum, ranging from 2.9[40] to 16.5%[41] (with pooled estimates of 7.1-13% for unipolar PPD[3,42]).

While the EPDS is both a recognized tool for facilitating diagnosis of PPD[4,43] and a proxy measure for the disorder (commonly used in clinical trials[44]), one shall remember that a positive score may denote a wide range of mental health problems.[45,46] In a study encompassing a large sample of women admitted to an obstetrical hospital, Wisner et al.[47] found that MDD and generalized anxiety disorder were the most prevalent primary diagnoses among participants who obtained positive scores on the EPDS (68.5 and 52.2%, respectively), followed by BSD (22.6%). Notably, over 80% of women diagnosed with unipolar depressive disorders had comorbid anxiety disorders. The fact that the EPDS consists of two sections, covering symptoms of both depression (items 1, 2, 6-10) and anxiety (items 3-5),[48] may further contribute to the prevalence of false-positive results.[49] Therefore, in clinical practice, the EPDS should be used as an auxiliary tool, "alongside professional judgement and clinical interview."[39] In the broader picture, however, controversies around the possible interpretations of EPDS outcomes seem to reflect a larger discussion about the validity of PPD as a separate disorder rather than a spectrum of disorders.[50,51]

Nevertheless, the potential benefits from widespread use of the EPDS should not be underestimated, as EPDS screening has been shown to lead to significantly greater reductions in psychiatric morbidity among young mothers as compared to women screened by clinical assessment.[52]

The original MDQ screening criteria for bipolarity[23] were met by 4.6% of our participants. This figure is marginally higher in comparison to the results of previous population-based studies (ranging from 2.5 to 3.7%),[53-56] suggesting that BSD meeting the DSM-IV-TR criteria may be more prevalent in postpartum women than in the general population. When modified MDQ criteria were applied,[27] the ratios of positive scores were remarkably high (23.9% for the cutoff score of 7 points), highlighting the aforementioned heterogeneity of community-based data on the prevalence of BSD.[28]

To minimize the impact of spectrum bias, we decided to exclude patients with a history of severe mental illness or psychiatric treatment. In doing so, we followed the advice

Table 1 Sociodemographic and obstetric features of the study population (n=434)

Variable	
Sociodemographic data	
Age, mean ± SD	30.2±4.3 years
Age, range	20-43 years
Education	
Primary	2 (~0.5)
Vocational	29 (~6.5)
Secondary	105 (24)
Higher	298 (69)
Employment status	
Self-employed	53 (12)
Working full-time	285 (66)
Working part-time	28 (6)
Unemployed	47 (11)
Students	9 (~2)
Pensioners	5 (1)
Both studying and working	7 (~2)
Marital status	
Married	391 (90)
Divorced	3 (~1)
Civil partnership	32 (7)
Single	8 (~2)
Place of abode	
City, population > 500,000	216 (50)
City, population 100-500,000	36 (8)
City, population 50-100,000	14 (3)
City, population 20-50,000	32 (~8)
City, population ⩽ 20,000	19 (4)
Village	117 (27)
Obstetric data	
Pregnancy duration, mean ± SD	38.9±2.7 weeks
Primiparity	237 (55)
Number of previous pregnancies	
1	123 (28)
2	49 (11)
3	14 (3)
4	7 (2)
5	3 (~0.7)
6	1 (~0.3)
Apgar score, mean ± SD	9.58±0.92
Perceived severity of delivery, mean ± SD*	4.96±3.01
Spontaneous vaginal delivery	280 (65)
Cesarean section	154 (35)
Prolonged delivery	58 (13)
Premature delivery	123 (28)
Subdural anesthesia/analgesia	84 (19)

Data presented as n (%), unless otherwise specified.
SD = standard deviation.
* Rated on a 0-10 visual analog scale.

Table 2 Ratios of bipolar symptoms (MDQ) in women with or without postpartum depressive symptomatology (EPDS)

	EPDS < 13 pts.	EPDS ⩾ 13 pts.	χ^2	p-value
MDQ < 7 pts.	290	41	8.61	0.003
MDQ ⩾ 7 pts.	78	25		

EPDS = Edinburgh Postnatal Depression Scale; MDQ = Mood Disorder Questionnaire.

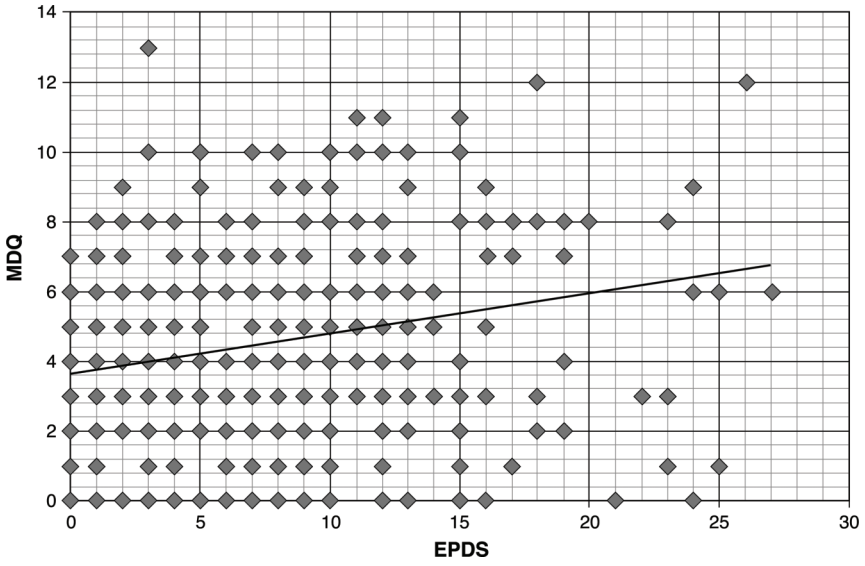

Figure 1 Scatter plot of Edinburgh Postnatal Depression Scale (EPDS) scores against Mood Disorder Questionnaire (MDQ) scores in the sample of women between 6 and 12 weeks postpartum.

Table 3 Sociodemographic and obstetric features of women with presumed unipolar or bipolar postpartum depressive symptomatology

	Unipolar* (n=41)	Bipolar† (n=25)	Statistics		
			t	df	p-value
Quantitative variables					
Age, mean ± SD	31.02±4.81	28.48±4.14	2.19	64	0.03‡
Duration of pregnancy (weeks), mean ± SD	39.23±1.65	39.19±3.35	0.06	58	0.95
Apgar score, sum of ranks	1,060	710	385.00	0.48	
Perceived severity of delivery, sum of ranks§	1,030.50	680.50	355.50	0.37	
			χ^2		p-value
Qualitative variables, n (%)					
Place of abode					
City or a town	32 (78)	16 (64)	0.918		0.34
Village	9 (22)	9 (36)			
Primiparous	24 (58)	19 (76)	1.38		0.24
Non-primiparous	17 (42)	6 (24)			
Spontaneous vaginal delivery	21 (51)	18 (72)	1.98		0.16
Cesarean section	20 (49)	7 (28)			
Prolonged delivery	3 (7)	3 (12)	0.04		0.84
Normal duration of delivery	38 (93)	22 (88)			
Subdural anesthesia/analgesia during labor	8 (19)	5 (20)	0.002		0.96
No anesthesia/analgesia during labor	33 (81)	20 (80)			

df = degrees of freedom; EPDS = Edinburgh Postnatal Depression Scale; MDQ = Mood Disorder Questionnaire; SD = standard deviation.
* EPDS $\geqslant$ 13 points and MDQ $<$ 7 points; † EPDS $\geqslant$ 13 points and MDQ $\geqslant$ 7 points.
‡ $p < 0.05$ denotes statistical significance.
§ Rated on a 0-10 visual analog scale.

of Montori et al.,[24] who emphasized that enrolling "both patients in whom the disease is unequivocally advanced and patients who are unequivocally free of disease" into a diagnostic test study may hamper its reliability, as in clinical practice one does not make differential diagnoses in patients lacking any diagnostic uncertainty. The authors went on to conclude that "the 'right' population for a diagnostic test study includes (1) those in whom we are uncertain of the diagnosis; (2) those in whom we will use the test in clinical practice to resolve our uncertainty; and (3) patients with the disease who have a wide spectrum of severity and patients without the disease who have symptoms commonly associated with it."[24] The sample enrolled in our study seems to meet the above-delineated assumptions, thus improving the generalizability of the findings. As reported in the recent Cochrane review by Molyneaux et al.,[57] this approach in widely adopted in contemporary studies of postpartum depressive symptomatology.

The main limitation of our study derives from the indirectness of the findings, as we used self-rating questionnaires and screening tests (EPDS and MDQ) instead of structured clinical interviews.[58] The observational design of the trial yields a higher risk of prognostic imbalance.[59] Also, the relatively low number of participants who met the original MDQ criteria may have hampered the precision of our estimation,[60] and the low number of patients who met the exclusion criteria (n=26) may suggest an impact of selection bias (a recognized limitation in observational studies in general[59]). On the other hand, the large sample size is an important advantage of our study, diminishing the risk of type II errors.[61]

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Disclosure

The authors report no conflicts of interest.

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