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POSTPARTUM DEPRESSION DURING BREASTFEEDING WITHIN A YEAR AFTER BIRTH

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Abstract. *Postpartum depression is the most common mental disorder in the postnatal period and affects not only the mental health of the mother but also that of the child. There is no screening in Bulgaria and no data on what percentage of women suffer from postpartum depression. The aim of this study is to report how common it is in breastfeeding women within the first year after giving birth and whether there is a relationship between it and the independent variables of age and sex of the baby, as well age, place of residence, and educational level of the mother. A survey was conducted in November 2023, involving women with children up to 12 months of age ($n=431$), 86.5% of whom were breastfeeding ($n=373$). The questionnaire included the Edinburgh Postnatal Depression Scale ($\alpha=.862$) and questions on breastfeeding status and demographics. The analysis showed that 23.5% of women were likely to suffer from postpartum depression of varying severity (score ≥ 13), with 21.8% of breastfeeding women affected. The first four months are the most vulnerable for depressive symptoms, although symptoms are typical throughout the first year postpartum. None of the independent variables of baby's sex, as well age, place of residence and mother's education predicted the severity of postpartum depression, but the smaller the place where the mother lives, the lower the risk of postpartum depression. Early detection of depression, access to specialist help and the organization of psychological support for women in the postnatal period are important steps in caring for the mental health of mother and child.*

Keywords: postpartum depression; mental health; breastfeeding; motherhood.

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INTRODUCTION

Postpartum depression (PPD) is the most common mental disorder in the postnatal period and affects not only the mental health of the mother but also that of the child. It is defined as a major depressive disorder occurring after childbirth and is characterized, depending on severity, by depressed mood, loss of interest or pleasure in typical female activities, sleep and appetite disturbance, loss of energy, feelings of worthlessness or guilt, decreased concentration, and suicidal thoughts (Pearlstein et al., 2009). Half of postnatal major depressive episodes actually begin before birth and are collectively defined as peripartum depressive episodes (American Psychiatric Association, 2013). This mood disorder usually occurs two to eight weeks after childbirth but can occur at any time during the first year. The pathogenesis of PPD is currently unknown and genetic, hormonal, psychological and social factors play a role. The optimal period for screening is between the second week and the sixth month after birth (Pearlstein et al., 2009). However, this is not the case in Bulgaria and there is no data on the percentage of women affected. At the same time, one in two women believe they have experienced a depressive episode after childbirth (Dimitrova et al., 2020). Globally, an average of 17-18% of women who give birth suffer from PPD (Hahn-Holbrook et al., 2018; Wang et al., 2021), and this percentage increased significantly to 34% during the COVID-19 pandemic (Chen et al., 2022).

Breastfeeding in the first year is a protective factor against PPD (Shiga, 2023; Toledo et al., 2022; Zhao & Zhang, 2020), and early weaning of the infant increases the risk for the mother (Eastwood et al., 2011; Koutra et al., 2018; Nam et al., 2017). A meta-analysis involving 18,570 women found that the risk of developing PPD is 53% lower when the mother breastfed exclusively, i.e., did not offer complementary foods and water during the first six months (Xia et al., 2022). Protective effect of breastfeeding is partly explained by the biochemical effects on the woman, due to high levels of oxytocin, prolactin and endorphins and reduced levels of cortisol, adrenocorticotrophic hormone and retinoids (Mawson & Wang, 2013; Nagel et al., 2022; Thul et al., 2020; Uvnas-Moberg et al., 2020; Whitley et al., 2020).

Although less common, breastfeeding women also suffer from PPD. The most serious risk factor is prenatal depression. Maternal depressive symptoms before birth not only increase the risk of PPD, but also affect breastfeeding success by influencing the

mother's intention to breastfeed, duration of breastfeeding, and are associated with more serious breastfeeding difficulties (Bianciardi et al., 2023; Dias & Figueiredo, 2015; Kim et al., 2021; Liu et al., 2023; Stark et al., 2021; Ystrom, 2012). The PPD risk also increases if the mother had planned to breastfeed but that is unsuccessful for some reason and has to wean her baby (Borra et al., 2015), or if she does not receive support during breastfeeding (Chen et al., 2022; Wang et al., 2021). Depressive symptoms have an additional negative impact on breastfeeding, and problems with breastfeeding and early weaning can exacerbate maternal distress (Liu et al., 2023; Putnick et al., 2023; Ystrom, 2012). Perceived support influences a woman's emotional stability and breastfeeding success (Barandon et al., 2023), and criticism and pressure to breastfeed have a negative impact on mental health by inducing guilt and shame (Jackson et al., 2023). Early detection of depressive symptoms and timely psychotherapy can prevent the condition from worsening and the need for medication, which may be incompatible with breastfeeding.

Regarding the relationship between PPD and infant sex, as well maternal age, education, and place of residence, previous research has shown inconsistent results. In Western countries, there is little or no association between infant sex and risk of PPD, in contrast to countries such as Nigeria, India, Turkey and China, where mothers of girls are at higher risk, which is explained by cultural characteristics and the importance attached to the male sex of the newborn (Ye et al., 2022). Conversely, in the USA, the male sex of the infant has been reported to be associated with more postpartum depressive symptoms in the mother, which is explained by an influence on the woman's immune and endocrine systems during pregnancy (Cowell et al., 2021). There are also conflicting results on the association between maternal age and PPD, ranging from advocating for an association suggesting that the risk increases as the woman ages (Silverman et al., 2017), to finding no association (Eastwood et al., 2011; Wang et al., 2021), to the risk of association decreasing with increasing age (Bottino et al., 2012). We see a similar inconsistency in associating PPD with maternal education. There is evidence that education level has no significant association with depressive symptoms and does not predict PPD (Eastwood et al., 2011; He et al., 2023; Miyake et al., 2011; O'Hara & Swain, 1996; Wang et al., 2021). Nevertheless, suggestions that low education increases the risk of depressive symptoms can also be found (Matsumura et al., 2019), or that more educated women are more likely to suffer (Hancheva et al., 2022; Wu et al., 2022). Those inconsistencies

might also be explained by cultural differences between countries.

The aim of the present study was to report how common PPD is in breastfeeding women during the first year after birth and whether there is a relationship between it and the independent variables age and sex of the infant, as well as age, place of residence and educational level of the mother. The present study was executed in Bulgaria.

The research questions are:

1. What percentage of women are affected by PPD in the first year after childbirth?
2. In which period after childbirth does PPD occur most frequently in breastfeeding women?
3. Is there a relationship between PPD and infant gender, as well as age, place of residence, and educational level of breastfeeding mothers?

In addition to causing distress to the woman, PPD can seriously affect the way she cares for her child and cause emotional, social, and cognitive problems in the future (Slomian et al., 2019). Partner relationships and family dynamics are also in risk (Eslahi et al., 2021). Mothers with PPD have impaired bonding with their children (Gilden et al., 2020), resulting in a negative effect on the child attachment style (Sliwerski et al., 2020). At the same time, secure attachment in childhood is one of the prerequisites for flourishing across the lifespan (Atias & Tagareva, 2023). These effects of PPD highlight the urgency of the problem and the need for timely diagnosis and therapy in order to minimize cases with severe symptomatology and prevent long-term negative effects on the mother, child, their family, and society as a whole.

Method

A survey was conducted in November 2023 among women with children up to 12 months of age ($n=430$), of whom 86.5% were breastfeeding ($n=372$). The type of sample is a snowball sample. Table 1 shows the demographics of the breastfeeding women. The group of mothers aged 30-39 years is the most represented (61%), followed by the group aged 18-29 years (34.9%). 99.5% of the women were in a relationship. The majority of participants live in Sofia (44.4%) or in a district town (32.5%) and 82.5% have a university degree. The Edinburgh Postnatal Depression Scale was used, which is the most commonly used tool in screening programs and research

on postnatal depression. The scale has very good reliability for the sample ($\alpha=.862$). The data collected were processed with IBM SPSS Statistics. Multiple linear regression analysis and binary logistic regression were performed for the outcomes of breastfeeding women.

Table 1. Demographics of breastfeeding mothers

		n	%
Infant gender	Boy	201	54.03
	Girl	173	46.51
	Total	372	100.00
Maternal age	18-29	130	34.95
	30-39	227	61.02
	40-45	13	3.49
	Above 45 years	2	0.54
	Total	372	100.00
Marital status	In relationship	370	99.46
	Single	1	0.27
	Widow	1	0.27
	Total	372	100.00
Place of residence	Sofia	165	44.35
	District city	121	32.53
	Small city	35	9.41
	Village	29	7.80
	Abroad	22	5.91
	Total	372	100.00
Educational level	Secondary education	48	12.90
	College education	17	4.57
	University education	307	82.53
	Total	372	100.00

Results and discussion

In order to find out what proportion of women are affected by PPD, we processed the data collected. Scores equal to or greater than 13 were used to confirm PPD, and scores equal to or greater than 10 to confirm high risk (Levis et al., 2020). Table 2 presents what proportion of women who participated in the study were affected by PPD in the first year after delivery (score ≥ 13) - 23.5% of all women. There was a difference between breastfeeding and non-breastfeeding women, with 21.8% of breastfeeding women likely to have depression of varying severity (score ≥ 13) and a further 11.5% likely to have depression (score ≥ 10). Among non-breastfeeding women, 34.5% were likely to suffer from depression (score ≥ 13), but the group ($n=58$) was small

and excluded from subsequent analysis. The overall scores (23.5%) were close to those reported during the Covid-19 pandemic for Bulgarian mothers with children up to 6 months of age (22.5%) (Hancheva et al., 2022). At the same time, the results were higher than the pre-pandemic global average (17-18%) (Hahn-Holbrook et al., 2018). The results for different countries vary considerably from 3% to 38% and are explained by economic and health disparities (Hahn-Holbrook et al., 2018), providing a direction for future research in our country. In addition to the lower standard of living in Bulgaria compared to other European countries, health care practices during childbirth and the postpartum period in Bulgaria such as high cesarean rates, brief or absent skin-to-skin contact, routine separation of mother and baby after birth, lack of access to specialized postpartum care and breastfeeding support could also explain the high rate of PPD. Negative birth experience, caesarean section and lack of support are risk factors for PPD and breastfeeding and skin-to-skin contact are protective factors (Norhayati et al., 2015; Wang et al., 2021; Zhao & Zhang, 2020).

To find out in which period during the first year PPD occurs most often, we checked what percentage of breastfeeding mothers of children aged 1-3 months, 4-6 months, 7-9 months, and 10-12 months were affected. We excluded the results of women with children under 1 month, in whom symptoms may be due to postpartum blues (baby blues). As seen in Table 3, the highest proportion of mothers with PPD had children between 1 and 3 months and the lowest proportion had children between 4 and 6 months. It is also evident that depressive symptoms

are not typical only in the early postpartum period, although it seems that the first months are the most risky, which is consistent with earlier studies (Gavin et al., 2005). This is highlighted by a large cohort study which found that the first three months are at highest risk for postpartum mental disorders in mothers with a first child (Munk-Olsen et al., 2006). Screening during this period and ensuring that mother have access to support are important steps in minimizing the negative effects of PPD. The high percentage of women affected throughout the 12-month period under consideration also raises the question of what proportion of women with depressive symptoms seek professional help, are diagnosed, and undergo therapy and what proportion suffer prolonged periods after the onset of depression.

Multiple linear regression analysis was performed to determine the linear association between risk of PPD (score ≥ 10) and the independent variables of infant sex, as well as maternal age, place of residence, and education. The results showed that there is no linear relationship between the dependent and independent variables ($p=0.370$). None of the independent variables could predict the severity of PPD.

Binary logistic regression was used to examine the effect of infant sex, and maternal age, place of residence and education on the presence of risk for PPD (≥ 10). When all four independent variables were accounted for simultaneously, they did not statistically significantly predict whether the mother would present with PPD. Only place of residence was statistically significantly associated with PPD ($p \leq 0.05$), so a reduced regression model was

Table 2. PPD in breastfeeding women during the infant's first year

Sample	Postnatal depression	N	%
All women (n=430)	No (score <13)	329	76.5%
	Yes (score ≥ 13)	101	23.5%
Breastfeeding women (n=372)	No (score <13)	291	78.2%
	Yes (score ≥ 13)	81	21.8%
Non-breastfeeding women (n=58)	No (score <13)	38	65.5%
	Yes (score ≥ 13)	20	34.5%

Table 3. PPD during different periods of the first year

Infant age	Breastfeeding mothers	PPD (≥ 13)	PPD (≥ 13)
	n	N	%
1 - 3 months	111	29	26.1%
4 - 6 months	105	18	17.1%
7 - 9 months	78	17	21.8%
10 - 12 months	63	13	20.6%

run including this alone. The reduced regression model was statistically significant: $\chi^2=44.059$, $df=1$ $p<0.001$ and explained between 11.2% (Cox & Snell R2) and 14.9% (Nadelkerkes R2) of the variance in the statistic, correctly classifying 66.4% of observations (100% without PPD and 0% with PPD). The exponent of the regression coefficient $\text{Exp}(B)$ (0.725) indicates that the smaller the settlement, the lower the chance of PPD. For women living in Bulgaria, the risk is highest for those living in Sofia and lowest for those living in rural areas.

These results for place of residence support earlier studies (Syamantha Putri et al., 2023; Vigod et al., 2013), and we hypothesize that they are driven by two main factors: environmental influence and social support. Because of environmental characteristics, living in a large city may be associated with more stress that negatively affects the mother, whereas living in a less populated place, which typically offers closer contact with nature and a calmer environment, may positively affect her mental health. Results for 8 European countries suggest that exposure to polluted air and traffic noise during pregnancy may increase the risk of postnatal depression (Cadman et al., 2024). On the other hand, the presence of green spaces and in particular those with trees is associated with a lower risk (Sun et al., 2023). Also, in small settlements, the mother is more likely to be part of an extended family system that provides help and support, and this in turn reduces the risk of postnatal depression (Chen et al., 2022; Wang et al., 2021). Support from grandparents, particularly the maternal grandmother, is a protective factor for the development of maternal mental health problems postpartum (Riem et al., 2023). The combination of environmental influences and raising the child in a wider family community may explain the reported lower risk of postnatal depression in smaller settlements.

CONCLUSION

In conclusion, the levels of PPD in Bulgaria are higher than the world average and highest compared to other European countries, which is probably due to the economic and health care specificities in Bulgaria. We hypothesize that health care practices during labor and the postpartum period, such as high rates of operative deliveries, low rates of first skin-to-skin contact, separation of mother and infant during the hospital stay, limited access to breastfeeding support, and lack of midwifery follow-up in the first weeks after delivery are associated with high rates of PPD. Given that breastfeeding reduces the risk of PPD, and that the current sample is mainly represented

by breastfeeding women, a screening program that follows all mothers would probably report a significant higher percentage of affected individuals. The results show that breastfeeding women have a lower rate of PPD compared with non-breastfeeding women, with depressive symptoms being slightly higher in the early months but remaining typical throughout the first year after birth. None of the independent variables of infant sex, maternal age, place of residence, and educational level predicted the severity of PPD during breastfeeding. The place of residence was found to be associated with risk of PPD, and the smaller the place where the mother lived, the less likely she was to be affected. We assume that this is due to environmental influences and wider social support. Future research could shed further light on this topic.

The main contribution of the present study is that it provides information on PPD in breastfeeding women during the first year after birth. The studied topic is strongly related to and has a significant effect on the mental health of the community but is a little-studied topic in Bulgaria. The results presented here are a small step towards generating knowledge that is currently lacking in the country, and that would complement the research on the topic worldwide. The limitations of the study are related to the sample being unrepresentative, also the small town and village subgroups for the variable of residence being small in number. Future studies with larger samples that account for the impact of income, maternal and infant health, breastfeeding practices, health care received, and support received would further our knowledge of PPD in breastfeeding women. Early detection of postnatal depression, access to specialist help and the organization of psychological support for women in the postnatal period are important steps in caring for the mental health of mother and child.

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