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**Determinants of Postpartum Paternal Depression During the First Year of Fatherhood**

Doğum Sonrası Dönemin İlk Bir Yılında Görülen Baba Depresyonunun Belirleyicileri

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**Abstract:** The aim of this study is to examine the prevalence of postpartum depression in fathers and its relationship with sociodemographic characteristics and received social support. The study population of this cross-sectional study are fathers (n=283) of infants aged 0-12 months who attended x University Hospital pediatric outpatient clinics during December 2023. Fathers' sociodemographic information, depression and social support status were questioned in the survey. The Edinburgh Postnatal Depression Scale was used to assess depression, and the Multidimensional Scale of Perceived Social Support was used to evaluate perceived social support. The prevalence of postpartum depression risk in fathers was 25.1%. The frequency of postpartum depression risk is higher in fathers who have their first child than the fathers who have a second child. Fathers of infants aged 3-5 months old have higher rates of postpartum depression risk than the fathers with infants under 3 months old (p=0.007). The risk of postpartum depression was higher in the participants who had less social support scores of the study group (p<0.001). Our study findings indicate that one in four fathers of 0-12 months old infants has high risk of postpartum depression. Postpartum depression of the fathers should be considered during the provision of routine health care services and supported socially.

**Keywords:** Paternity, Postpartum depression, Social support, Paternal behavior, Risk factors

**Özet:** Bu çalışmanın amacı babalarda doğum sonrası depresyonun yaygınlığını ve bunun sosyodemografik özellikler ve alınan sosyal destek ile ilişkisini incelemektir. Kesitsel tipte olan bu çalışmanın evrenini, 2023 Aralık ayında x Üniversite Hastanesi çocuk polikliniğine başvuran 0-12 ay arası bebeklerin babaları (n=283) oluşturmuştur. Araştırmada babaların sosyodemografik bilgileri, depresyon ve sosyal destek durumları sorgulanmıştır. Depresyonun değerlendirilmesinde the Edinburgh Postnatal Depression Scale, sosyal desteğin değerlendirilmesinde the Multidimensional Scale of Perceived Social Support ölçekleri kullanılmıştır. Babalarda doğum sonrası depresyon görülme sıklığı %25,1 bulunmuştur. İlk kez çocuk sahibi olan babalarda, ikinci kez çocuğu olan babalara göre doğum sonrası depresyon görülme sıklığı daha yüksektir. 3-5 ay arası bebek sahibi olan babaların doğum sonrası depresyon riski, 3 aydan küçük bebeği olan babalara göre daha yüksektir. Çalışma grubunun doğum sonrası depresyon puanları ile sosyal destek puanları arasında negatif ve anlamlı bir ilişki vardır. Çalışma bulgularımız 0-12 aylık bebek sahibi dört babadan birinde doğum sonrası depresyon riskinin yüksek olduğunu göstermektedir. Rutin birinci basamak sağlık hizmetlerinin sunumu sırasında babaların doğum sonrası depresyonu gözönünde bulundurulmalı ve sosyal olarak desteklenmelidir.

**Anahtar Kelimeler:** Babalık, Doğum sonrası depresyon, Sosyal destek, Ebeveyn davranışı, Risk faktörleri

**Ethics Committee Approval:** The study proposal was approved (Decision No: 938) by the İstanbul Medipol University Faculty of Medicine Non-Interventional Studies Ethics Committee in 13.11.2023.

**Informed Consent:** All participants and their parents provided both verbal and written informed consent to participate in the study.

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## 1. Introduction

Postpartum depression is defined as a major depressive episode with the peripartum onset and observed within the four weeks of pregnancy or postpartum period (1). However, this definition may cover up to a postpartum of 12 months in clinical practice (2). While postpartum depression was traditionally associated with new mothers, recent studies have focused on its occurrence among fathers (3–5).

Previous studies have reported postpartum depression rates in fathers ranging from 1.2% to 25.5% (4,6,7). Episodes of anger, behavioral changes, tendency to violence, increase in risk-taking behaviors besides other manifestations such as social withdrawal, non-specific physical symptoms, and changes in routine working hours are typical for paternal depression (3,8). PPD can have adverse health effects on child development because of the impaired quality of relationship between father and the child. There is a decrease in positive parenting practices of depressed fathers. Sensitive and warm behaviors usually decrease while negative practices such as hostile behaviors or disinterestedness tend to increase (3,9). This situation can have negative effects on fathers' communication with their families and their responsibilities towards their children (5). Such behavioral changes are quite evident especially if the mother is also depressed.

There is a limited number of studies on risk factors, frequency, and interventions needed to cope with depression in fathers. Factors such as lack of sufficient social support for fathers after becoming parents, financial difficulties, ineffective communication with partners, and challenges in adapting to the changing lifestyle are shown to contribute to paternal depression (10). The aim of our study is to examine the prevalence of paternal postpartum depression in fathers who have 0–12-month-old infants and its relationship with sociodemographic characteristics and perceived social support of the fathers.

## 2. Materials and Methods

This cross-sectional study was conducted in İstanbul during December 2023. The sample size was calculated using the OpenEpi program, assuming a postpartum depression occurrence rate of approximately 10% in fathers (4), for an unknown population size, with 5% sampling error, and a confidence level of 95%. The required sample size was calculated to be 277. Data was collected from

fathers of infants aged 0–12 months who were married with the mother of the infant and have attended consecutively to a Vakıf University Hospital's child health and disease clinic during December 2023. Participation in the study was on a voluntary basis and the data were collected through a self-administered questionnaire with the guidance of researchers. A total of 295 fathers participated in the study, and 12 were excluded because of incomplete data.

Independent variables of the study were sociodemographic characteristics and perceived social support, while depression symptom status was the dependent variable. The questionnaire consisted of questions regarding sociodemographic variables in addition to a revised form of the Multidimensional Scale of Perceived Social Support (MSPSS) and the Edinburgh Postnatal Depression Scale (EPDS).

The sociodemographic data form, prepared by the researchers through a review of current literature, included questions about participants' age, duration of marriage, education level, questions such as how they define their income level, employment status at the time of childbirth, type and ownership of housing they live in, ownership of a personal vehicle to find out their economic situation, household composition (Having grandparents living at home was defined as extended family, which was not many people. So, it was presented without any distinction as to which or how many grandparents it was.), presence of chronic illnesses or psychiatric diagnoses, planned pregnancy status, receiving education for prenatal and postpartum care, gender expectations, month, gender, and birth order of the baby among the children who are alive. In the fathers' questionnaire, information on birth history and previous pregnancies was missing for most participants, so these data were excluded from the analysis.

The perceived level of social support is measured by the MSPSS that was developed by Zimet et al. in 1988 (11). MSPSS has 12 items across three dimensions – family, friends, and significant others – and each item is evaluated on a 7-point Likert scale (1= strongly disagree, 2= mostly disagree, 3= somewhat disagree, 4= undecided, 5= somewhat agree, 6= mostly agree, 7= strongly agree). Scores on the scale ranged from 12 to 84, with higher scores indicating greater social support perception. The scale was adapted into Turkish, and the factor

structure, validity, and reliability were tested by Eker (12).

EPDS is a 10-item self-assessment scale developed by Cox et al in 1987 for detecting postpartum depression (13). The scale, later approved for use during pregnancy, comprises 10 items, each with four response options. Scores for each question range from 0 to 3, with a maximum possible score of 30. Questions 1, 2, and 4 are scored as 0-1-2-3, while the remaining questions are reverse scored as 3-2-1-0. The scale's validity and reliability for use in Turkish men were investigated by Alkan, and a Cronbach's alpha value of 0.83 and a cutoff point of 9/10 or higher is considered indicative of a high risk of postpartum depression (14).

The study proposal was approved (Decision No: 938) by the ..xxx.. University Faculty of Medicine Non-Interventional Studies Ethics Committee in 13.11.2023. Written consent was obtained from all participants.

Collected data are analyzed by SPSS 29.0 software. Descriptive statistics, including numbers and percentages for categorical variables are summarized by counts and percentages while means and standard deviations are used for continuous variables. Participants were categorised into two groups based on their EPDS scores: those with scores  $\geq 10$  were considered at high risk of depression, and those with

scores between 0-9 were considered at low risk of depression. Chi-square tests were used for comparisons between categorical variables. Unpaired t-tests were employed for group comparisons of the MSPSS, father's age, and duration of marriage. Spearman's correlation was also used to examine the relationship between the ordinal variables.

Binary logistic regression was used to investigate the predictors of postpartum depression risk according to EPDS scores. All variables with a p value below 0.25 in univariate analysis were included in the regression model. Those that had a significant impact on the dependent variable were left in the model and presented. A significance level of  $p < 0.05$  was accepted for statistical significance.

### 3. Results

The mean age of the fathers was  $33.46 \pm 5.0$  years, and the average duration of marriage was  $5.28 \pm 3.48$  years. The majority of fathers (55.5%,  $n=157$ ) had a bachelor's or associate degree, 97.9% ( $n=277$ ) were employed at the time of their child's birth, 54.8% ( $n=155$ ) lived in their own home, and 80.9% ( $n=229$ ) owned a car. The vast majority of the study group reported being in good health, with 91.2% ( $n=258$ ) reporting no chronic illnesses and 94.3% ( $n=267$ ) reporting no known psychiatric illnesses (Table 1).

**Table 1.** Paternal postpartum depression (PPD) risk by sociodemographic characteristics of the fathers. (All data presented as n (%) unless otherwise stated.)

|                                     | PPD risk       |                | Total          |                              |
|-------------------------------------|----------------|----------------|----------------|------------------------------|
|                                     | Low risk       | High risk      |                |                              |
| <b>Father's age</b> (mean $\pm$ sd) | 33.7 $\pm$ 5.0 | 32.8 $\pm$ 5.0 | 33.5 $\pm$ 5.0 | $t=1.25$<br>$p=0.214$        |
| <b>Education level</b>              |                |                |                |                              |
| Primary Education                   | 7 (58.3)       | 5 (41.7)       | 12 (100.0)     | $\chi^2=8.25$<br>$p=0.041^*$ |
| High school                         | 44 (66.7)      | 22 (33.3)      | 66 (100.0)     |                              |
| Associate and bachelor's Degree     | 119 (75.8)     | 38 (24.2)      | 157 (100.0)    |                              |
| Master's degree                     | 42 (87.5)      | 6 (12.5)       | 48 (100.0)     |                              |
| <b>Income vs expenditure</b>        |                |                |                |                              |
| Income less than expenditure        | 21 (61.8)      | 13 (38.2)      | 34 (100.0)     | $\chi^2=5.36$<br>$p=0.690$   |
| Income same as expenditure          | 76 (72.4)      | 29 (27.6)      | 105 (100.0)    |                              |
| Income more than expenditure        | 115 (79.9)     | 29 (20.1)      | 144 (100.0)    |                              |
| <b>Private car ownership</b>        |                |                |                |                              |
| Yes                                 | 178 (77.7)     | 51 (22.3)      | 229 (100.0)    | $\chi^2=5.06$<br>$p=0.024^*$ |
| No                                  | 34 (63.0)      | 20 (37.0)      | 54 (100.0)     |                              |
| <b>Residence ownership</b>          |                |                |                |                              |
| Rented                              | 90 (75.0)      | 30 (25.0)      | 120 (100.0)    | $\chi^2=0.71$<br>$p=0.699$   |
| Self-owned                          | 115 (74.2)     | 40 (25.8)      | 155 (100.0)    |                              |
| Family-owned                        | 7 (87.5)       | 1 (12.5)       | 8 (100.0)      |                              |

|  |            |           |             |               |
|--|------------|-----------|-------------|---------------|
| <b>Employment status during childbirth</b> |            |           |             |               |
| Employed                                   | 208 (75.1) | 69 (24.9) | 277 (100.0) | $\chi^2=0.22$ |
| Unemployed                                 | 4 (66.7)   | 2 (33.3)  | 6 (100.0)   | $p=0.638$     |
| <b>Household composition</b>               |            |           |             |               |
| Nuclear Family                             | 200 (75.5) | 65 (24.5) | 265 (100.0) | $\chi^2=0.69$ |
| Extended family                            | 12 (66.7)  | 6 (33.3)  | 18 (100.0)  | $p=0.406$     |
| <b>Presence of psychiatric illness</b>     |            |           |             |               |
| Yes  | 10 (62.5)  | 6 (37.5)  | 16 (100.0)  | $\chi^2=1.39$ |
| No   | 202 (75.7) | 65 (24.3) | 267 (100.0) | $p=0.238$     |
| <b>Presence of chronic illness</b>         |            |           |             |               |
| Yes  | 16 (64.0)  | 9 (34.0)  | 25 (100.0)  | $\chi^2=1.73$ |
| No   | 196 (76.0) | 62 (24.0) | 258 (100.0) | $p=0.187$     |
| <b>Marriage duration (mean±sd)</b>         |            |           |             |               |
|  | 5.2±3.5    | 5.4±3.5   | 5.3±3.5     | $t=-0.30$     |
|  |            |           |             | $p=0.763$     |
| <b>MSPSS<sup>†</sup> score (mean±sd)</b>   |            |           |             |               |
|  | 66.0±14.8  | 52.4±18.8 | 62.6±16.9   | $t=5.54$      |
|  |            |           |             | $p<0.001^*$   |

<sup>†</sup>MSPSS: Multidimensional Perceived Social Support Scale

\* $p<0.05$

Of the participants, 60.1% (n=170) were first-time fathers and 77.7% (n=220) had received no parental education on infant care or the postnatal period. The mean age of the participants' infants was 5.26±4.30 months, 51.2% (n=145) of the infants were male, 84.1% (n=238) were born following a planned

pregnancy, 1.1% (n=3) were twin pregnancies and 11.4% (n=27) were medically assisted pregnancies. More than half 64.7% (n=138) of fathers had no gender expectations before learning the sex of the baby, while of those who did, 34% (n=34) said that the baby's sex matched their expectations (Table 2).

**Table 2.** Paternal postpartum depression (PPD) risks the fathers by infant characteristics. (All data presented as n (%) unless otherwise stated.)

| PPD risk                    |            |           |             |
|-----------------------------|------------|-----------|-------------|
|                             | Low risk   | High risk | Total       |
| Infant's age                |            |           |             |
| <3 months                   | 80 (85.1)  | 14 (14.9) | 94 (100.0)  |
| 3-5 months                  | 53 (63.9)  | 30 (36.1) | 83 (100.0)  |
| 6-9 months                  | 30 (75.0)  | 10 (25.0) | 40 (100.0)  |
| 10- 12 months               | 49 (74.2)  | 17 (25.8) | 66 (100.0)  |
| Infant's gender             |            |           |             |
| Male                        | 115 (79.3) | 30 (20.7) | 145 (100.0) |
| Female                      | 97 (70.3)  | 41 (29.7) | 138 (100.0) |
| Birth order                 |            |           |             |
| First                       | 117 (68.8) | 53 (31.2) | 170 (100.0) |
| Second                      | 76 (85.4)  | 13 (14.6) | 89 (100.0)  |
| Third or more               | 19 (79.2)  | 5 (20.8)  | 24 (100.0)  |
| Planned pregnancy           |            |           |             |
| Yes                         | 179 (75.2) | 59 (24.8) | 238 (100.0) |
| No                          | 33 (73.3)  | 12 (26.7) | 45 (100.0)  |
| Prenatal Parental education |            |           |             |
| Yes                         | 53 (84.1)  | 10 (15.9) | 63 (100.0)  |
| No                          | 159 (72.3) | 61 (27.7) | 220 (100.0) |
| Match of gender expectation |            |           |             |

|                    |            |           |             |                            |
|--------------------|------------|-----------|-------------|----------------------------|
| Matched            | 21 (61.8)  | 13 (38.2) | 34 (100.0)  | $\chi^2=3.84$<br>$p=0.146$ |
| Did not Match      | 49 (74.2)  | 17 (25.8) | 66 (100.0)  |                            |
| Had no expectation | 142 (77.6) | 41 (22.4) | 183 (100.0) |                            |

\*  $p<0.05$

Of the 283 fathers, 25.1% (n=71) were identified as being at high risk of postpartum depression (EPDS $\geq$ 10). The risk of depression according to EPDS scores by socio-economic characteristics of the fathers is presented in Table 1. As can be seen from the table, the distribution of depression risk varies significantly by educational level ( $p=0.041$ ). Although no statistical difference between the groups was found in the post hoc tests, there was a significant weak negative association between educational status and EPDS score ( $r=-0.169$ ,  $p=0.004$ ). Fathers who did not own a car were found to have a higher risk of PPD than those who did ( $p=0.024$ ). Fathers at high risk of PPD also reported significantly less social support than fathers not at risk of depression ( $t = 6.23$ ,  $p<0.001$ ).

Table 2 shows the distribution of fathers' EPDS scores according to various characteristics of their infants and their birth history. The EPDS score distributions differ significantly according to the age and birth order of the infants ( $p=0.014$  and  $0.012$  respectively). According to the post-hoc analyses, fathers who had a first baby had a higher risk of depression than those who had a second baby, and those who had a baby aged 3-5 months had a higher risk of depression than those who had a baby aged less than 3 months ( $p=0.012$  and  $0.001$  respectively).

Table 3 shows the results of the binary logistic regression analysis, with depression risk status as the dependent variable. According to the results of the Hosmer-Lemeshow test, the model represents the dataset well ( $p=0.378$ ). The model's accuracy in predicting the outcome is 77.7%.

**Table 3.** Logistic regression analysis results.

|                                | %95 CI |       |         |        |       |       |
|--------------------------------|--------|-------|---------|--------|-------|-------|
|                                | B      | SE    | p       | Exp(B) | Lower | Upper |
| <i>Infant's age</i>            |        |       |         |        |       |       |
| <3 months                      |        |       | 0.062   | 1      |       |       |
| 3-5 months                     | 1.071  | 0.398 | 0.007*  | 2.919  | 1.337 | 6.373 |
| 6-9 months                     | 0.607  | 0.501 | 0.226   | 1.835  | 0.687 | 4.899 |
| 10-12 months                   | 0.530  | 0.436 | 0.223   | 1.699  | 0.724 | 3.990 |
| <i>Birth order</i>             |        |       |         |        |       |       |
| First Child                    |        |       | 0.039   | 1      |       |       |
| Second Child                   | -0.913 | 3.366 | 0.013*  | 0.401  | 0.196 | 0.823 |
| ≥ 3 Child                      | -0.515 | 0.558 | 0.356   | 0.597  | 0.200 | 1.784 |
| <i>MSPSS<sup>†</sup> Score</i> | -0.045 | 0.009 | <0.001* | 0.956  | 0.939 | 0.973 |
| Constant                       | 1.408  | 0.576 | 0.014*  | 4.088  |       |       |

<sup>†</sup>MSPSS: Multidimensional Perceived Social Support Scale

\*  $p<0.05$

As the scores obtained from the MSPSS increase, the risk of postpartum depression significantly decreases (OR=0.956, 95% CI: 0.939-0.973). The likelihood of experiencing postpartum depression for fathers with their second child is significantly lower than that of fathers with first child (OR=0.401, 95%

CI: 0.196-0.823]), and the fathers with a 3–5-month-old infant have approximately three times high risk of postpartum depression than those with an infant under 3 months old (OR=2.919, 95% CI: 1.337-6.373]).



#### 4. Discussion

In our study group, 25.1% of fathers are at high risk of postpartum depression according to EPDS scores. This rate is within the range of 1.2% to 25.5% reported in the literature (4,15). In addition, this rate is close to the prevalence of maternal postpartum depression (23.8%) reported in Türkiye (16). Some studies suggest that the rate of postpartum depression in fathers increases in parallel with the rate of postpartum depression in mothers (17,18). However, we cannot draw such a conclusion because we were not able to examine the mothers.

We have asked three questions to understand the economic status of the participants: “income vs. expenditure”, “house ownership” and “car ownership”. Of these, only car owners were found to have a lower risk of PDD. Contrary to the findings of other studies, unemployment and perceived economic status were not associated with PPD in the present study group (4,19,20). These conflicting results may be due to the different methods we have used to measure economic status or to the different characteristics of the study groups, which in our study had very low levels of unemployment and income below expenditure. Among the questions that provide information about the economic status of the family, the fact that only having a car makes a difference to the likelihood of depression may also be due to the benefits of a car, such as ease of movement, independence and reduced need for others. The increased likelihood of postpartum depression among fathers who felt less social support supports this. Furthermore, the disappearance of the effect of car ownership on PPD when adjusting for the effects of other confounding variables, such as social support, also can be interpreted as an indicator of this.

According to findings, first-time fathers have a significantly higher risk of depression than second-time fathers, and fathers with an infant aged 3-5 months have a significantly higher risk than fathers with an infant aged less than 3 months, which is consistent with other studies (20-22). Possible reasons for this finding could be the inexperience of having a first child and unfulfilled expectations of a child over time.

A decrease in social support from family, friends, and significant others was associated with an increased risk of postpartum depression in fathers. This result aligns with other studies in literature (23,24). Contrarily, it is seen that lack of social support did not increase the risk of depression

during the first 12 months postpartum for both mothers and fathers in a cohort study (25). So, it should be noted that we cannot unequivocally state that an increase in social support is a protective factor for postpartum depression in fathers (26).

A study in Türkiye reported increased rates of depression among mothers, and the over-involvement of grandparents in caring for babies was cited as a reason (27). In our study, there was a small percentage (6.4%) of people living with extended family members who had a higher, but not significant, risk of postpartum paternal depression.

The postpartum period is a time of intense physical and emotional stress. This period is thought to trigger existing psychiatric disorders in individuals (10). However, in our study, having a psychiatric illness in fathers did not emerge as a risk factor for postpartum depression contrary to other studies in the literature (4,6,28). This finding can be attributed to concerns about social stigma in Türkiye, where seeking psychological help is still perceived as a sign of mental illness or weakness (29). Therefore, as the participants were not examined, they may not have been aware of their possible diagnosis or may have refrained from reporting their illness. In addition, the reluctance of fathers to seek help, even under intense stress, and to prioritize the needs of the mother and baby, could result in fewer people receiving psychiatric diagnoses (30).

There is no significant difference between EPDS scores of fathers who have planned and unplanned newborns in our study group contrary to a similar study from Japan that has found an association between unintended pregnancy and paternal depression based on the EPDS scores (31). Having no gender expectation that was considered as a protective factor for postpartum depression in fathers by Ceyhun Peker in 2016, was not found to be a statistically significant factor in this study (15). The reason for these contrasting findings may be that the proportion of planned pregnancies and those with no gender expectation was quite high in the study group (84.1% and 64.7%, respectively).

Previous studies have shown that prenatal education regarding pregnancy and postpartum period increases fathers' awareness, early parenting experiences, emotional interactions, and emotional satisfaction. Such education is also known to reduce stress experienced by both parents before and after childbirth (32). However, the results of this study

did not support this hypothesis. The presence of the high percentage (77.7%) of participants without such education is a limitation in our study.

There is a scarcity of studies in the literature that directly examine the relationship between marital duration and paternal postpartum depression (PPD). Existing research tends to focus on aspects such as marital quality, perceived partner support, relationship satisfaction, and conflict resolution skills, rather than the length of the marriage itself (33–35). In the current study, while marital dynamics were not explicitly assessed, no significant association was found between marital duration and paternal PPD.

The most critical limitation of this study is the lack of data regarding maternal characteristics. As paternal postpartum depression is likely influenced by maternal mental health, partner support, and the quality of the co-parenting relationship, the absence of such information significantly restricts the ability to assess these potentially confounding or mediating factors. This lack of maternal data was largely attributable to the limited time available during outpatient visits and the fathers' insufficient knowledge about the mothers' psychological or health-related status. The participants were recruited from the pediatric outpatient clinics of a private university hospital, where fathers often had limited time and attention to complete the questionnaire due to the high clinic workload and the restlessness of their children. These time constraints and informational gaps collectively contributed to the

data limitations. Furthermore, the cross-sectional design precludes causal inference, and the non-random sampling method restricts the generalizability of the findings to the broader population.

## 5. Conclusion

In this study, fathers who had their first child were found to have a higher risk of postpartum depression compared to those with a second child. Fathers with infants aged 3-5 months old have more postpartum depression risk than those with infants aged <3 months. The increase in received social support was observed to decrease the risk of postpartum depression in fathers.

Understanding risk factors for postpartum depression in fathers, such as the birth order and the age of the infant, has a crucial role in preserving and improving the mental health of fathers alongside mothers in primary healthcare services through early diagnosis, treatment, and postpartum programs. Informing families about postpartum depression, especially for first-time fathers and those with infants aged 3-5 months, can contribute to the overall improvement of public health.

Healthcare workers should be aware of the risk of postpartum depression in fathers that can be as significant as in mothers. More studies should be encouraged since the limited number of research articles found in the literature regarding this issue in our country.

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