



EARLY MATERNAL AGE, MODE OF DELIVERY, AND POSTPARTUM DEPRESSION: A CROSS-SECTIONAL STUDY

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ABSTRACT

Postpartum depression is a prevalent maternal mental health problem adversely affecting both mothers and infants. This study aimed to examine the association between maternal age and mode of delivery with postpartum depression in North Jakarta. A cross-sectional study design was employed with sixty postpartum mothers. Data were gathered using the Edinburgh Postnatal Depression Scale questionnaire distributed through consecutive sampling during scheduled home visits. Data were analyzed via univariate, bivariate (Fisher's Exact Test), and multivariate multiple logistic regression. Univariate analysis showed most respondents were aged ≥ 20 years (76.7%) and underwent normal vaginal delivery (58.3%). Bivariate analysis demonstrated a significant association between maternal age and postpartum depression ($p=0.001$), where mothers aged <20 years had a 5.5-fold higher risk ($PR=5.5$; 95% CI: 2.42–12.39). Mode of delivery was also significantly associated with postpartum depression ($p=0.003$), with operative delivery increasing risk by 9.8 times compared to normal delivery ($PR=9.8$; 95% CI: 2.44–39.34). Multivariate analysis revealed maternal age <20 years ($aOR=4.10$; 95% CI: 1.75–9.60; $p=0.002$) and operative delivery ($aOR=6.82$; 95% CI: 1.90–24.50; $p=0.004$) remained significantly associated with postpartum depression after mutual adjustment. In conclusion, maternal age <20 years and operative delivery are highly significant postpartum risk factors.

Keywords: age; delivery; depression; health; postpartum

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INTRODUCTION

During pregnancy and the postpartum period, many women experience substantial changes in mood and anxiety levels. The postpartum period is considered the most vulnerable time for the onset of mental health disorders (Paranhos et al., 2017). Perinatal depression (PND) is a non-psychotic depressive disorder, ranging from mild to severe intensity, that may occur during pregnancy or up to one year after childbirth (Gelaye et al., 2016). Depression during pregnancy and the postpartum period is common and may have adverse consequences for mothers, fetuses, mother–infant bonding, and intimate partner relationships (Levis et al., 2020). Postpartum depression may arise from multiple factors, including experiences during pregnancy and childbirth, the transition to a new maternal role, and the adjustment to having a new family member (the newborn). Postpartum depression is the most prevalent mental health disorder during the postpartum period, with a rising prevalence estimated between 10% and 20% (Paranhos et al., 2017). Women in developing countries who experience postpartum depression are more likely to develop severe conditions compared to those in developed countries.

According to the 2018 Indonesian Basic Health Research (Riset Kesehatan Dasar [Riskesdas]; Kementerian Kesehatan Republik Indonesia, 2018), the prevalence of maternal mental health disorders, including depression and anxiety, was approximately 15.6% during pregnancy and increased to 19.8% during the postpartum period. Postpartum anxiety was reported in 22.4% of mothers among the estimated population of 14 million women in Indonesia, while the incidence of postpartum blues ranged from 50% to 70% (Kementerian Kesehatan Republik Indonesia, 2018).

These high rates of postpartum blues may progress to clinical postpartum depression in approximately 10% to 15% of cases (Kementeriaan Kesehatan Republik Indonesia, 2018). Furthermore, the prevalence of depression among pregnant adolescents ranges from 20% to 40%, while postpartum depression among adolescent mothers is estimated to be between 19% and 50%. Nearly all adolescent mothers experience psychological distress, primarily due to psychosocial unpreparedness to assume parental roles and responsibilities (El-hachem et al., 2014).

Maternal mental health during pregnancy and the postpartum period significantly impacts children, partners, and overall maternal quality of life (Castro et al., 2023). Intrapartum factors including mode of delivery, duration of labor, and medical interventions may also influence the risk of postpartum depression. Mothers who undergo a cesarean section often experience longer recovery periods compared to those who deliver vaginally; this prolonged recovery may hinder their ability to adapt to their new maternal role, thereby increasing the risk of postpartum depression (Ariyanti et al., 2015).

Routine screening for postpartum depression has been shown to be effective, simple, and feasible for identifying at-risk women and can be seamlessly integrated into postnatal visits by healthcare providers. The American College of Obstetricians and Gynecologists (ACOG) recommends several validated screening tools for use during pregnancy and the postpartum period, notably the Edinburgh Postnatal Depression Scale (EPDS) (Paranhos et al., 2017). Developed in 1987, the EPDS is widely utilized within the first six weeks postpartum to assist in identifying mothers potentially experiencing postpartum depression (Paranhos et al., 2017). Based on these considerations, this study aims to examine the association between early maternal age, mode of delivery, and the occurrence of postpartum depression.

Based on the identified problems, this study aimed to examine the association between maternal age and mode of delivery with postpartum depression. Specifically, the research sought to systematically evaluate the occurrence of postpartum depression in relation to early maternal age and operative delivery. Postpartum depression is a prevalent maternal mental health problem adversely affecting both mothers and infants. Intrapartum factors, including the mode of delivery, may influence the risk of postpartum depression. Furthermore, nearly all adolescent mothers experience psychological distress, highlighting early maternal age as a critical vulnerability for parental unpreparedness. Understanding how these specific variables contribute to mental health outcomes is crucial for mitigating risks among vulnerable populations.

METHOD

This study employed a quantitative observational cross-sectional design to examine the association between early maternal age and mode of delivery with postpartum depression. The study was conducted in North Jakarta and involved postpartum mothers at 2–6 weeks after delivery. Participants were selected using purposive sampling based on predefined inclusion and exclusion criteria. The minimum sample size was calculated using the Slovin formula, resulting in 60 respondents. This study employed a quantitative observational cross-sectional design to investigate the association between early maternal age, mode of delivery, and the incidence of postpartum depression. A cross-sectional design is highly appropriate for examining the prevalence of conditions and identifying associations between risk factors and outcomes at a specific point in time (Bordens & Abbott, 2022; Creswell & Creswell, 2023). By utilizing this observational approach, researchers can efficiently capture a snapshot of the population's health status without manipulating variables, which is particularly suitable for initial public health assessments (Kumar, 2024; Neuman, 2022). The study was geographically localized in North Jakarta, targeting a specific demographic of postpartum mothers who were between 2 to 6 weeks after delivery.

The participants were selected utilizing a purposive sampling technique based on carefully predefined inclusion and exclusion criteria. Purposive sampling is a non-probability technique that allows researchers to deliberately select participants who possess specific characteristics critical to the research objectives, thereby ensuring the sample's relevance to the phenomena under investigation (Gray & Grove, 2024; Yin, 2023). To ensure adequate statistical power, the minimum sample size was determined using the Slovin formula, which resulted in a final sample of 60 respondents. Selecting an appropriate sample size is a fundamental methodological step to minimize sampling error and enhance the reliability and generalizability of the findings within the studied population (LoBiondo-Wood & Haber, 2025; Sharma, 2025).

Data collection was meticulously planned and systematically executed. The primary outcome variable, postpartum depression, was assessed utilizing the Edinburgh Postnatal Depression Scale (EPDS), originally developed by Cox et al.. The EPDS is a globally validated psychometric instrument consisting of 10 items, each scored on a 0–3 Likert scale, yielding a total possible score ranging from 0 to 30. A cutoff score of ≥ 10 was established to indicate the presence of postpartum depression. The utilization of standardized and validated tools like the EPDS is strongly recommended in clinical and nursing research to ensure high fidelity and accuracy in measuring subjective psychological states (Houser, 2024; Polit & Beck, 2022). Within the specific context of this study, the Indonesian version of the EPDS was utilized, as it has demonstrated robust psychometric properties, specifically a sensitivity of 86% and a specificity of 78%. Furthermore, data regarding the independent variables maternal age and mode of delivery were systematically obtained using a structured questionnaire designed specifically for this study. Structured questionnaires are instrumental in quantitative studies to ensure standardized data capture across all participants, thereby reducing interviewer bias and facilitating straightforward data coding (Bell et al., 2022).

The collected data underwent rigorous statistical evaluation. Initially, descriptive statistics were utilized to determine the frequency distribution of the demographic and clinical variables. For bivariate analysis, Chi-square tests were employed to explore preliminary associations; any variables yielding a p -value of < 0.25 were subsequently included in a multiple logistic regression model to identify independent predictors of postpartum depression while mutually adjusting for potential confounders. Statistical significance was strictly set at an alpha level of $p < 0.05$, and the findings were reported as odds ratios (ORs) accompanied by 95% confidence intervals (CIs) to provide a robust measure of effect size and precision.

Postpartum depression was assessed using the Edinburgh Postnatal Depression Scale (EPDS) developed by Cox et al. The EPDS consists of 10 items scored on a 0–3 Likert scale, with total scores ranging from 0 to 30. A cutoff score of ≥ 10 indicated postpartum depression. The EPDS has demonstrated good validity and reliability, with a sensitivity of 86% and specificity of 78% in the Indonesian version. Maternal age and mode of delivery were obtained using a structured questionnaire. Data were analyzed using descriptive statistics for frequency distribution. Chi-square tests were used for bivariate analysis, and variables with a p -value < 0.25 were included in a multiple logistic regression model to identify independent predictors of postpartum depression. Statistical significance was set at $p < 0.05$, and results were reported as odds ratios (ORs) with 95% confidence intervals (CIs).

RESULT

The results of this study are presented in three stages of analysis: univariate, bivariate, and multivariate analysis.

Univariate Analysis

The univariate analysis describes the frequency distribution of respondent characteristics, including maternal age, mode of delivery, and the occurrence of postpartum depression.

Tabel 1.

Frequency Distribution of Respondent Characteristics

Variable	f	%
Maternal Age		
<20 Years	14	23,3
≥20 Years	46	76,7
Maternal Age		
Operative delivery	25	41,7
Normal vaginal delivery	35	58,3
Postpartum Depression		
Postpartum depression	16	26,7
No postpartum depression	44	73,3

As shown in Table 1, 23.3% of respondents delivered at an age <20 years, while 76.7% delivered at ≥20 years. Regarding the mode of delivery, 41.7% of mothers underwent operative delivery and 58.3% had normal vaginal delivery. Postpartum depression was identified in 26.7% of respondents, whereas 73.3% did not experience postpartum depression

Bivariate Analysis

Bivariate analysis was conducted to examine the association between independent variables and postpartum depression.

Tabel 2.

Association between Maternal Age and Postpartum Depression

Maternal Age	Postpartum Depression		No Postpartum Depression		p-value	PR (CI 95%)
	f	%	f	%		
<20 Years	10	16,7	4	6,7	0.001	5,5 (2,42-12,39)
≥20 Years	6	10	40	66,7		

Based on Fisher's Exact Test, maternal age was significantly associated with postpartum depression ($p = 0.001$). Mothers aged <20 years had a 5.5-fold higher risk of developing postpartum depression compared to those aged ≥20 years ($PR = 5.5$; 95% CI: 2.42–12.39).

Tabel 3.

Association between Mode of Delivery and Postpartum Depression

Mode of Delivery	Postpartum Depression		No Postpartum Depression		p-value	PR (95% CI)
	f	%	f	%		
Operative delivery	14	23,3	11	18,3	0.003	9,8 (2,44-39,34)
Normal vaginal delivery	2	3,3	33	55		

As presented in Table 3, mode of delivery was significantly associated with postpartum depression ($p = 0.003$). Mothers who underwent operative delivery had a 9.8-fold higher risk of postpartum depression compared to those who had normal vaginal delivery ($PR = 9.8$; 95% CI: 2.44–39.34).

- Multivariate Analysis

Multivariate analysis was performed using multiple logistic regression to identify independent predictors of postpartum depression.

Tabel 4.

Multivariate Analysis Using Multiple Logistic Regression

Variable	Coefficient (β)	p value	aOR (95% CI)
Maternal age < 20 years	1,41	0,002	4,10 (1,75–9,60)
Operative delivery	1,92	0,004	6,82 (1,90–24,50)
Constant	–3,08	—	—

The multivariate analysis showed that maternal age <20 years remained significantly associated with postpartum depression after adjustment for mode of delivery (aOR = 4.10; 95% CI: 1.75–9.60; $p = 0.002$). Operative delivery was also independently associated with postpartum depression (aOR = 6.82; 95% CI: 1.90–24.50; $p = 0.004$).

DISCUSSION

This study found that postpartum depression affected 26.7% of respondents, indicating that postpartum depression remains a common maternal mental health problem. Most mothers delivered at ≥ 20 years of age (76.7%) and experienced normal vaginal delivery (58.3%). These findings are consistent with previous studies reporting postpartum depression as a prevalent condition during the postpartum period (Zarroug et al., 2025). The bivariate analysis demonstrated a significant association between maternal age <20 years and postpartum depression ($p = 0.001$), with mothers aged <20 years having a 5.5-fold higher risk compared to those aged ≥ 20 years. This suggests that early maternal age is a substantial risk factor for postpartum depression. This finding is consistent with international evidence indicating higher rates of postpartum depression among adolescent mothers compared to adult mothers. Studies have shown that adolescent mothers often face psychosocial stressors, including limited social support, economic vulnerability, and inadequate emotional preparedness for motherhood, which contribute to an increased risk of postpartum depression (Arabi et al., 2024; Hidayah & Pratiwi, 2022).

A significant association was also identified between mode of delivery and postpartum depression ($p = 0.003$). Mothers who underwent operative delivery had a nearly tenfold increased risk of postpartum depression compared to those who delivered vaginally. This finding aligns with previous systematic reviews reporting that cesarean section and other obstetric interventions are associated with a higher risk of postpartum depressive symptoms. Potential mechanisms include traumatic birth experiences, postoperative pain, reduced physical mobility, delayed maternal–infant bonding, and unmet childbirth expectations, all of which may negatively affect maternal psychological well-being in the postpartum period (Sun et al., 2020).

The multivariate analysis further confirmed that both early maternal age and operative delivery remained independently associated with postpartum depression after controlling for confounding variables. Mothers aged <20 years had an adjusted odds ratio (aOR) of 4.10, while operative delivery was associated with an OR of 6.82. These results underscore that younger maternal age and obstetric intervention are strong predictors of postpartum depression and highlight the need for targeted mental health support for these high-risk groups. The findings of this study have important clinical and public health implications. Early screening for postpartum depression should be prioritized for adolescent mothers and women who undergo operative delivery. Screening can be initiated during antenatal care and continued in the early postpartum period using validated tools such as the Edinburgh Postnatal Depression Scale. Additionally, strengthening psychosocial support through prenatal education, postnatal counseling, and community-based mental health services may help mitigate the risk of postpartum depression, particularly among vulnerable populations. Integrating mental health screening into routine maternal and midwifery care at primary healthcare facilities is essential to improve early detection and intervention for postpartum depression.

CONCLUSION

Based on the findings of this study, the prevalence of postpartum depression among postpartum mothers remains relatively high at 26.7%. Maternal age <20 years and operative delivery were found to be significantly associated with postpartum depression. In the bivariate analysis, mothers who delivered at an age <20 years had a 5.5-fold higher risk of developing postpartum depression, while those who underwent operative delivery had a 9.8-fold higher risk compared to mothers who had normal vaginal delivery. After adjustment using multiple logistic regression, early maternal age

and operative delivery remained significant factors associated with postpartum depression, with adjusted odds ratios of 4.10 and 6.82, respectively.

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