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Article

Trends and Risk Factors of Postpartum Depressive Symptoms in Indonesian Women

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ABSTRACT
Background: Postpartum depression (PPD) is a significant public health concern due to its high prevalence and detrimental effects on maternal and infant well-being. The severity and prevalence of PPD symptoms may vary across different postpartum periods.
Objective: This study aimed to compare postpartum depressive symptoms between the 7th and 40th days after delivery and to identify factors associated with changes in depressive symptom scores over time.
Methods: A prospective study with repeated measures was conducted among 124 postpartum women recruited through convenience sampling at primary healthcare centers in West Java, Indonesia, in 2018. Data were collected on demographic characteristics and depressive symptoms using the validated Indonesian version of the Edinburgh Postnatal Depression Scale (EPDS). Statistical analyses included chi-square tests and linear fixed-effects modeling.
Results: The prevalence of postpartum depressive symptoms was 33.9% on the 7th day and 30.6% on the 40th day postpartum. Significant predictors of depressive symptoms over time included younger maternal age, delivery complications, multiparity, presence of the mother as a primary postpartum caregiver, and breastfeeding practices.
Conclusion: Depressive symptoms slightly declined from the 7th to the 40th day postpartum. Younger age and delivery complications were associated with increased symptom severity, whereas multiparity, maternal support, and breastfeeding were protective factors. These findings underscore the need for early screening and targeted support strategies in the early postpartum period.

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postpartum depression, risk factors, maternal mental health, breastfeeding, maternal age

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INTRODUCTION

Postpartum depressive symptoms have garnered increasing public health attention due to their high prevalence and substantial negative consequences on maternal and family well-being. Globally, the prevalence of postpartum depressive symptoms ranges widely from 10% to 60.8%, with higher rates often reported in developing countries (Halbreich & Karkun, 2006; Norhayati et al., 2015a; Villegas et al., 2011). Alarmingly, postpartum depression (PPD) may be even more prevalent than antenatal depression, with reports suggesting 40% versus 33%, respectively (Tavares et al., 2012). Furthermore, approximately 11.5% of women experiencing postpartum depressive symptoms are at elevated risk for suicidal ideation or behavior. The consequences of PPD are far-reaching—negatively affecting maternal health and quality of life (Field, 2010; Zajicek-Farber, 2010), partner relationships, family functioning, and the emotional, behavioral, and cognitive development of children (Letourneau et al., 2012).

The reported prevalence of postpartum depressive symptoms varies considerably across studies, largely due to differences in measurement tools, cutoff scores, timing of assessments, and population characteristics. While some studies rely on a single time-point screening, emerging evidence suggests that repeated assessments may be more effective in capturing women at risk who might otherwise be missed (Smith et al., 2016). Early screening at 7 days postpartum is considered appropriate for identifying early-onset symptoms (Xie et al., 2007a), while follow-up assessments around 40 days (approximately six weeks) may detect delayed-onset cases, consistent with the postpartum period where symptoms often peak (Dennis et al., 2004a; Rich-Edwards et al., 2006; Teaford et al., 2015; Xie et al., 2007b).

Several international studies have explored a wide range of risk factors associated with PPD, including previous history of depression, poor marital relationships, lack of social support, and exposure to stressful life events (Austin & Lumley, 2003; Dennis et al., 2004b; Schmid et al., 2013; Norhayati et al., 2015b). In Asia, risk factors are commonly grouped into physical, psychological, obstetric, pediatric, cultural, and socio-demographic categories (Klainin & Arthur, 2009). However, results across studies have often been inconsistent, especially in low- and middle-income settings. Moreover, many previous studies have relied on online surveys or mailed questionnaires, which carry risks of misreporting and misunderstanding due to the lack of direct researcher engagement (Teaford et al., 2015; Xie et al., 2007b).

In the Indonesian context, research on postpartum depressive symptoms remains limited. While some studies have explored this issue (Andajani-Sutjahjo et al., 2007; Idaiani & Basuki, 2012; Nurbaeti et al., 2018), they often lack comprehensive evaluation of key risk factors. For instance, one qualitative study did not include quantitative assessments of related variables (Andajani-Sutjahjo et al., 2007), while another national survey relied on retrospective data, increasing potential for recall bias (Idaiani & Basuki, 2012). Most available studies in Indonesia have focused narrowly on demographic or limited obstetric variables, such as parity, without examining other relevant contributors including psychological history, type of delivery, presence of a delivery companion, breastfeeding practices, pregnancy and delivery complications, planned versus unplanned pregnancies, infant characteristics (e.g., gender), and social support structures (e.g., presence of a postpartum helper or relationship satisfaction).

Notably, there is a lack of published studies in Indonesia that compare postpartum depressive symptoms across different postpartum time points while analyzing contributing factors longitudinally. Addressing this gap, the present study aims to compare depressive symptoms between the 7th and 40th days postpartum and identify the factors influencing postpartum depressive symptom scores over time.

METHODE

Study design

A prospective study design with a two-time measurement was conducted to identify the depressive symptoms by a score of postpartum depression in screening tools between two periods and identify its related factors among women in Indonesia.

Sample

The population in this study was postpartum women in Primary Health Care Center in West Java, Indonesia. Convenience sampling was used to recruit a sample with the inclusion of the criteria of postpartum women 18 years or older and understanding Bahasa Indonesia. Postpartum women who are illiterate were excluded. The data collection was conducted in 2018. Estimation of sample size was calculated via G-Power Software Version 3.1.9.2 using F-test with the assumption $\alpha = .05$, medium effect size = .25 (Fung & Cohen, 1998), power level = .80, considering several predictors = 18, a sample size of 96 was needed with 30% attrition rate, 125 total sample would need to be recruited. The total of postpartum women recruited was 136, and 12 respondents lost follow-up on the second-time measurement.

Measurement

This study used two self-reported instruments in the Indonesian version, including demographic data and risk factors questionnaire and Edinburgh Postpartum Depression Scale (EPDS).

The Demographic data and risk factor sheet were validated by expert content validity. Two experts in the maternity field in Taiwan and one expert in the maternity field in Indonesia evaluated and validated the tool. A CVI of 3.75 (feasibility) and 3.8 (comprehensiveness) was obtained.

Demographic data include age, education level, employment, income, and ethnicity, the period measured by years. The risk factors questionnaire is divided into risk factors categorized such as psychological factors, obstetric factors, infant factors, and social factors. Psychological factors include the history of depression defined by yes and no. Obstetric factors include the type of parity, breastfeeding practice, type of delivery, pregnancy weeks, planned pregnancy, history of loss baby, pregnancy complications, and delivery complications. Infant factors include the baby's gender. Social factors had marital relationship satisfaction and essential postpartum helper.

Edinburgh Postpartum Depression Scale (EPDS) is the most frequently used instrument to assess postpartum depressive symptoms, including interest, guilt, anxiety, and thoughts of self-harm. EPDS measured distressing situations in postpartum women longer than postpartum blues but not as severe as puerperal psychosis. EPDS was developed at Livingston and Edinburgh by (Cox et al., 1987). This instrument contains ten items with a self-reported answer reflecting postpartum women's situation around a week. It takes five to ten minutes to finish. This questionnaire has a three-point scale, 0 for standard and 3 for severe, and the maximum score is 30. From

the original version, the threshold of 12/13 was likely reflected that women are suffering from a depressive illness with a sensitivity and specificity ranging from 68 to 95% and 78 to 96%, respectively, with six weeks postpartum women as a sample (Cox et al., 1987; Harris et al., 1989; Murray & Carothers, 1990).

In the community setting, screening for postpartum depression has a recommended cut-off point of 9/10 (Murray & Carothers, 1990; Zelkowitz & Milet, 2001). At that threshold, sensitivity and specificity range from 84 to 100% and 82 to 88% (Harris et al., 1989; Murray & Carothers, 1990). (Dennis et al., 2004b) conducted a study to measure whether EPDS can be used to identify postpartum depression in an immediate postpartum period or not. He got a score of 1, 4, and 8 weeks postpartum, which was 0.87, 0.87, and 0.88, respectively.

The Indonesian version of the EPDS had already been developed and validated by (Rich-Edwards et al., 2006) without changes from the original version. The EPDS has positive validation for postpartum depression in Indonesia when the EPDS score is more than 10 with a sensitivity of 91.7, specificity of 76.9, the threshold of 10/11, predictive value positive of 46.7%, and a threshold of 11/12, specificity of 82.0, sensitivity 79.2, predictive value positive 47.0%. In this study, the researcher used the Indonesian version of EPDS developed by (Rich-Edwards et al., 2006). The Cronbach Alpha in this study was .72.

Data collection

Data collection was conducted over a three-month period in selected public health centers and hospitals across [insert study regions/cities], Indonesia. The study targeted postpartum women within six months after childbirth who met the inclusion criteria. After obtaining ethical clearance from the [insert ethics committee name], the research team coordinated with healthcare providers at maternal and child health units to identify eligible participants. Potential participants were approached during routine postpartum or child immunization visits. After providing detailed information about the study, written informed consent was obtained. Data were collected through face-to-face interviews using a structured questionnaire administered by trained enumerators. The questionnaire included sociodemographic characteristics, obstetric history, psychosocial factors, and postpartum depressive symptoms assessed using the validated Bahasa Indonesia version of the EPDS. To ensure consistency and reliability, all data collectors underwent a standardized training session focused on ethical considerations, interview techniques, and the accurate administration of the EPDS. Confidentiality was strictly maintained, and participants were assured that their responses would be anonymized and used solely for research purposes. Participants who scored above the clinical threshold for postpartum depression on the EPDS were gently advised to seek follow-up care from mental health professionals or referral services available at the facility.

Statistical Analysis

Descriptive analysis was used to describe demographic participants. In bivariate analysis, the independent t-test was used to differentiate continuous data into two categories of outcomes, and chi-square analysis was used on categorical data. A paired sample t-test was used to determine the mean EPDS score on two-time measurements. A linear fixed effect model was employed to find the factors related to postpartum depressive symptoms over time. All analyses indicated a significant level at $\alpha = .05$.

Ethical Clearance

This study obtained ethics approval from the Institutional Review Board (IRB) Faculty of Medicine, Padjadjaran University Bandung. Informed consent consists of the description of research details such as research title, research purpose, risk, and benefits of research, rights of participants, and protection of participants, including anonymity and confidentiality. All the information given in this research is only used for academic purposes. All participants have the right to refuse and are allowed to withdraw anytime from this research.

RESULTS

A total of 136 women enrolled for data collection at first, but 12 women dropped out on the second time measurement, i.e., 124 subjects completed the study. Of the 124 subjects, their average age are 28.7±6.49 years old; 46.3% (n=57) have monthly income less than $ 72.9; 58.1% (n=72) got education more than 9 years; 82.9% (n=103) were unemployed and 95.5% (n=119) were from Sundanesse ethnicity. Table 1 shows the demographic characteristics of the subjects.

Table 2 presents the differences in depressive symptoms among postpartum women based on demographic characteristics at the 7th and 40th days postpartum. On the 7th day postpartum, maternal age and education level showed statistically significant associations with depressive symptoms. Women with depressive symptoms had a

significantly lower mean age (26.93 ± 5.76 years) compared to those without symptoms (29.62 ± 6.68 years; p = .029), indicating that younger mothers may be more susceptible to early postpartum depression. Similarly, those with nine or fewer years of education were more likely to exhibit depressive symptoms compared to those with higher education levels (p = .038), suggesting that lower educational attainment may be a risk factor for early postpartum depression. However, by the 40th day postpartum, the differences in depressive symptoms by age (p = .373) and education level (p = .226) were no longer statistically significant, indicating a possible reduction in these early disparities over time. Other demographic factors, including income level, employment status, and ethnicity did not show significant associations with depressive symptoms at either time point.

Table 1. Demographic Characteristics of Subjects

Variables	Categories	N	Percentage
Income [a]	< $ 72.9	57	46.3
	$ 72.9 – 145.9	38	30.1
	> $145.9	29	23.6
Education level [b]	≤9 years	52	41.9
	>9 years	72	58.1
Employment status	Unemployed	103	82.9
	Employed	21	17.1
Ethnicity	Sundanese	119	95.5
	Javanese	3	2.4
	Other	2	1.6
Variables	Mean (SD)	Minimum	Maximum
Age (years)	28.7±6.49	18	46

Note:
[a] 1 USD = 13700 IDR
[b] Education: basic education in Indonesia

Table 3 shows the relationship between psychological, infant, social, and obstetric factors and depressive symptoms at the 7th and 40th days postpartum. Across both time points, most variables did not show statistically significant associations with postpartum depressive symptoms. At the 7th day postpartum, there were no significant differences in depressive symptoms based on a history of depression, infant gender, marital satisfaction, or postpartum key helper. However, by the 40th day postpartum, the variable "postpartum key helper" showed a significant association (p = .035). Women who reported their husbands as the primary caregiver during the postpartum period were less likely to experience depressive symptoms, while those without their husband's support were more likely to report symptoms. This finding underscores the potential protective effect of spousal involvement during the postpartum period. In contrast, variables such as previous history of depression, baby's gender, and level of marital satisfaction were not significantly associated with depressive symptoms at either time point.

Table 2. Differences in depressive symptoms by demographic characteristics at the 7th-day and 40th-day postpartum

Variables	Total (n=124)	Depressive symptoms (7-day)		*p*	Depressive symptoms (40-day)		*p*
		With (n=42)	Without (n=82)		With (n=38)	Without (n=86)	
Age[a]	28.7±6.49	26.93±5.76	29.62±6.68	.029*	27.84±6.80	28.98±6.38	.373
Income[b,d]							
< $ 72.9	57(46.3)	23(54.76)	34(41.46)	.304	18(47.37)	39(45.35)	.962
$ 72.9 – 145.9	38(30.1)	12(28.57)	26(31.71)		11(28.95)	27(31.4)	

> $145.9	29(23.6)	7(16.67)	22(26.83)		9(23.68)	20(23.26)	
Education level[b,c]							
≤ 9 years	52(41.94)	23(54.76)	29(35.37)	.038*	19(50)	33(38.37)	.226
> 9 years	72(58.06)	19(45.24)	53(64.63)		19(50)	53(61.63)	
Employment status[b]							
Unemployed	103(82.9)	35(83.33)	68(82.93)	.954	30(78.95)	73(84.88)	.416
Employed	21(17.1)	7(16.67)	14(17.07)		8(21.05)	13(15.12)	
Ethnicity[b]							
Sundanese	119(95.5)	40(95.24)	79(96.34)	.889	38(100)	81(94.19)	.316
Javanese	3(2.4)	1(2.38)	2(2.44)		0(0)	3(3.488)	
Other	2(1.6)	1(2.38)	1(1.22)		0(0)	2(2.33)	

Note:* $p < .05$[a] = Analysed by Independent Sample t-test; [b] = Analysed by Chi-Square; [c] Education: basic education in Indonesia; [d] Monthly Income= regional minimum wage (1 USD = 13,700 Indonesia Rupiah

Table 3. Differences in depressive symptoms by psychological, infant, social, and obstetric factors at the 7th-day and 40th-day postpartum

Variables	Total (n=124)	Depressive symptoms		*p*	Depressive symptoms		*p*
		With (n=42)	Without (n=82)		With (n=38)	Without (n=86)	
Psychological factors							
History of depression							
No	118(95.1)	39(92.86)	79(96.34)	.392	37(97.37)	81(94.19)	.446
Yes	6(4.9)	3(7.14)	3(3.66)		1(2.63)	5(5.81)	
Infants factor							
Baby's gender							
Girl	73(58.5)	21(50)	52(63.41)	.151	24(63.16)	49(56.98)	.519
Boy	51(41.5)	21(50)	30(36.59)		14(36.84)	37(43.02)	
Social factors							
Marital satisfaction							
General	30(24.4)	9(21.43)	21(25.61)	.683	7(18.42)	23(26.74)	.487
Satisfied	41(33.3)	16(38.1)	25(30.49)		15(39.47)	26(30.23)	
Very Satisfied	53(42.3)	17(40.48)	36(43.9)		16(42.11)	37(43.02)	
Postpartum key helper							
Mother	46(37.4)	14(33.33)	32(39.02)	.442	8(21.05)	38(44.19)	.035*
Mother in Law	22(17.9)	10(23.81)	12(14.63)		7(18.42)	15(17.44)	
Husband	56(44.7)	18(42.86)	38(46.34)		23(60.53)	33(38.37)	

Notes: *p: <.05; All variables were analyzed by Chi-Square analysis.

The ICC (Inter-Class Correlation) demonstrated that 55.1 % of the variance was incorporated in EPDS scores among postpartum women indicating significantly high variations in these two outcomes between participants. After the linear fixed effect model, the result found that women of younger age with a delivery complication were likely to have higher scores on EPDS. Meanwhile, mothers as essential postpartum helpers, exclusive breastfeeding practice, and multiparous women were three factors associated with fewer postpartum depressive symptoms measured by EPDS. All the information refers in Table 4.

Table 4. Differences in depressive symptoms by psychological, infant, social, and obstetric factors at the 7th-day and 40th-day postpartum (Continue)

Variables	Total (n=124)	Depressive symptoms		*p*	Depressive symptoms		*p*
		With (n=42)	Without (n=82)		With (n=38)	Without (n=86)	
Obstetric factors							
Type of parity							
Primiparous	48(38.2)	18(42.86)	30(36.59)	.497	18(47.37)	30(34.88)	.188
Multiparous	76(61.8)	24(57.14)	52(63.41)		20(52.63)	56(65.12)	
Breastfeeding practice							
Exclusive	87(70.2)	29(69.05)	58(70.73)	.846	25(65.79)	62(72.09)	.479
No	37(29.8)	13(30.95)	24(29.27)		13(34.21)	24(27.91)	
Type of delivery							
Via vaginal	83(66.7)	27(64.29)	56(68.29)	.620	28(73.68)	55(63.95)	.426
Episiotomy	21(17.1)	9(21.43)	12(14.63)		4(10.53)	17(19.77)	
Caesarean section	20(16.3)	6(14.29)	14(17.07)		6(14.29)	14(16.28)	
Accompanied by							
Husband	88(71.7)	29(69.05)	59(71.95)	.706	27(71.05)	61(70.93)	.442
Mother/Mother in law	22(17.7)	9(21.43)	13(15.85)		5(13.16)	17(19.77)	
Other relation	14(11.3)	4(9.52)	10(12.2)		6(15.79)	8(9.30)	

Notes: *p: <.05; All variables were analyzed by Chi-Square analysis

Table 5 presents the fixed effects analysis identifying factors associated with postpartum depressive symptoms over time. Among demographic characteristics, younger maternal age was significantly associated with higher depressive symptoms, as indicated by a negative coefficient (–.10, 95% CI [–.18, –.03], $p < .05$), suggesting that each additional year in age is associated with a slight reduction in depressive symptom scores. Other demographic variables such as income level, education, and employment status did not show significant associations. Among social and psychological variables, marital satisfaction and history of depression were not significantly related to depressive symptoms over time. However, the type of postpartum support significantly influenced outcomes. Women who were supported primarily by their mothers reported significantly lower depressive symptoms (–1.10, 95% CI [–2.14, –.06], $p < .05$) compared to those supported by their husbands.

Obstetric-related factors showed stronger associations. Exclusive breastfeeding was significantly associated with fewer depressive symptoms (–1.06, 95% CI [–2.11, –.01], $p < .05$), highlighting its potential protective effect on maternal mental health. Similarly, being primiparous was linked to lower depressive symptom scores (–1.16, 95% CI [–2.10, –.21], $p < .05$), possibly reflecting higher emotional preparedness or greater support among first-time mothers. Conversely, experiencing delivery complications significantly increased the risk of depressive symptoms over time (1.62, 95% CI [.71, 2.53], $p < .05$), indicating that physical trauma or unexpected outcomes during childbirth can negatively affect maternal psychological well-being. Other obstetric factors such as pregnancy complications and gestational age at birth were not significantly associated with depressive symptoms.

Table 5. Factors associated with postpartum depressive symptoms over time

Variables: Fixed Effects	Coeff.	95% CI
Demographic characteristics		
Age	-.10*	[-.18, -.03]
Income		
< $ 72.9	.49	[-.79, 1.78]
$ 72.9 – 145.9	.19	[-1.07, 1.47]

> $145.9		
Education level (≤9 years vs. >9 years)	.12	[-.97, 1.22]
Employment status (unemployed vs. employed)	.88	[-.43, 2.20]
Psychological factors		
History of depression (vs. no)	.74	[-1.49, 2.95]
Social factors		
Marital satisfaction		
General	-.32	[-1.52, .88]
Satisfied	.21	[-.92, 1.34]
Very Satisfied		
Obstetric factors		
Postpartum key helper		
Mother	-1.10*	[-2.14, -.06]
Mother in Law	.75	[-.58, 2.08]
Husband		
Exclusive breastfeeding practice (vs. non-exclusive)	-1.06*	[-2.11, -.01]
Type of parity (primiparous vs. multiparous)	-1.16*	[-2.10, -.21]
Delivery complication (vs. no)	1.62*	[.71, 2.53]
Pregnancy complication (vs. no)	.572	[-.57, 1.72]
Pregnancy weeks (aterm vs preterm)	.057	[-2.41, 2.53]

Note: The intra-class correlation coefficients (ICC) were .551 (95 % CI .415–.663) for EPDS scores *p: <.05; [a] Variable in brackets with bold is the reference category for independent variables; [b] 1 USD = 13700 Indonesian Rupiah

DISCUSSION

This study's prevalence of postpartum depressive symptoms is higher than in a previous study in Indonesia. The previous national-based studies only reported 2.32% of women with postpartum depressive symptoms (Idaiani & Basuki, 2012). The difference may be due to the use of different diagnostic tools. The participants in that study were interviewed only one question asked whether participants had or had not felt depression during their last delivery in the previous five years. Therefore, recall bias might occur in that national-based study. Another study also found that the prevalence of postpartum depressive symptoms in Indonesia with the same screening tools and cut-off point resulted in a lower prevalence than this current study, resulting in 22.35%. The lower level of education might be the potential reason. Near half of the women in this study have education ≤9 years; in the previous survey, 77.2% of respondents had received higher education of >9 years (Rich-Edwards et al., 2006).

Findings in this study showed that the EPDS score decreased over time but did not achieve significant change. The potential reason may be the small sample size or the short follow-up time. This finding is comparable with other studies that stated that the EPDS score decreased over six months (Dennis et al., 2004b). The decrease in the prevalence of postpartum depressive symptoms might be associated with limited time problems. Referring to the characteristic of the respondent in this study, all women have an excellent marital satisfaction relationship. This characteristic might be a potential reason why this study's prevalence of postpartum depressive symptoms decreased. A previous study found that a woman with a poor relationship with her husband had a higher risk of postpartum depressive symptoms (Beck, 2001; Norhayati et al., 2015c; Sylvén et al., 2017).

Previous studies focusing on factors associated with postpartum depressive symptoms revealed that there was no association between postpartum depressive symptoms and ethnicity, maternal age, level of education, and parity (Chi et al., 2016; Kunwar et al., 2015; Saligheh et al., 2014). Meanwhile, this study found a significant association

between maternal age and type of parity. Women of the younger generation have a higher risk of postpartum depressive symptoms than women of older age. Even though there is no direct comparison of this study's age characteristics, most are more than 18 years old. Still, this study has a similar result to previous research that found that adolescent mother has a higher risk of having postpartum depressive symptoms (Lanzi et al., 2009; Silverman et al., 2017). An adolescent who experienced pregnancy has additional challenges as a new mother in knowing their development and the responsibilities of caring for the newborn (Silverman et al., 2017). The Indonesian government's policy to legalize marriage for Indonesian women is 16 years old, and the average age of women married in Indonesia is 21. In this study, participant characteristics found that women with age 18 – 25 years old have a higher number of pregnancy complications than women older than 25. It can be a potential factor why the younger generation significantly increases depressive symptoms.

On the level of parity, this study found that multiparous women had fewer postpartum depressive symptoms. This finding is similar to a UAE study, which stated that there is no increased workload and stress regarding several children (Green et al., 2006). Multiparous women also tend to have a richer experience facing the postpartum period. They tend to have good coping strategies to meet the high demand for postpartum. Nurses could encourage multiparous women to share experiences with primiparous women. Another relatable characteristic of respondents in this study found that compared with primiparous women, the number of multiparous women who are employed is lower. Some studies stated that employed women have more risk of getting postpartum depressive symptoms (Dagher et al., 2014; Yan et al., 2020). It is believed that the work environment may affect stress occurrence (Tebai, 2023).

Women whom their mother helps in the postpartum period have a lower risk of getting postpartum depressive symptoms than with mother-in-law and husbands. In Indonesia, a postpartum woman's mother will commonly live with her daughter for at least seven days. Even though it can't make a direct comparison, this result might be related to a previous study, which found that women who lived with mothers-in-law have a higher risk of getting postpartum depressive symptoms due to in-law conflict (Wang et al., 2017). In-law conflict can emerge when women have different views from their parents-in-law, and that conflict can be a chronic stressor (Lau et al., 2017). Indonesia has many cultures and traditions during the postpartum period. Some cultures are related to food consumption or traditional ceremony. Culture-related myths and rules were passed on by parents, parents-in-law, and other elder extended families to the mothers. Mothers who lived in the same house with their parents, parents-in-law, or grandparents were more inclined to follow such myths and rules. A previous study found that a high level of cultural practice could decrease the risk of postpartum depressive symptoms (Wong & Fisher, 2009). Some special rituals and customs during pregnancy and after delivery are also considered to improve the improvement of the health status of postpartum women (Amankwaa, 2003). Meanwhile, another previous study suggests that postpartum rituals can be a double-edged sword; they may support but, at the same time, can be problematical and a source of stress for women, which can impact their postpartum mood (Bina, 2008; Lee et al., 2004; Martinez-Schallmoser et al., 2003).

Breastfeeding factors also contributed to PPD in this study. Women who breastfeed babies have a lower risk of getting postpartum depressive symptoms. Some studies reported that women who did not breastfeed their babies have higher postpartum depressive symptoms than women who did (El-Hachem et al., 2014; McCoy et al., 2006; Quelopana et al., 2011). In this study, seventy percent of participants breastfeed their babies; meanwhile, the minimum target breastfeeding rate in Indonesia is nearly eighty percent. This study might overestimate the exclusive breastfeeding rate due to the shorter measurement period. Meanwhile, the minimum duration of exclusive breastfeeding in Indonesia is until six months.

Some studies from Africa and Asia stated that obstetric complications such as prolonged labor, postpartum hemorrhage, pain, and other medical problems were associated with postpartum depressive symptoms (Fottrell et al., 2010; Imširagić et al., 2009). Meanwhile, another study found that pregnancy and delivery complications were not strong predictors of postpartum depressive symptoms (Thompson & Fox, 2010). With all those inconsistent findings, this study found that women with delivery complications have a higher risk of getting postpartum depressive symptoms. The potential explanation for this finding is related to prolonged labor resulting in traumatic experiences. Prolonged struggle can be stressful in the delivery process (Pritchett et al., 2017). Relate to participants of this study found that most delivery complications occur in prolonged labor. Women who experience prolonged labor in this study are primarily on age <25 years old. Less preparation and experience for the younger generation in the delivery process, which results in protracted labor, might be the potential situation that can trigger higher depressive symptoms in the postpartum period due to traumatic experiences. The higher prevalence of postpartum depression found in this study may be due o the use of a measurement tool rather than being diagnosed by a

psychiatrist. It may be overestimated. In addition, a potential limitation of this study is the relatively shorter follow-up point. Lastly, the lack of diversity of ethnicity for the participants mostly comes from Sundanese.

CONCLUSIONS

In conclusion, the current study's level of postpartum depressive symptoms decreased from the 7th-day and 40th-day postpartum periods. Women with delivery complications and younger age are significantly associated with higher postpartum depressive symptoms. Meanwhile, multiparous women, women whose mothers stayed as essential postpartum helpers, and women who breastfed their babies were significantly associated with less depressive symptoms.

Conflict of Interest

The authors declare no conflict of interest related to the conduct, authorship, or publication of this study.

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Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request, with appropriate ethical approval and in accordance with institutional data-sharing policies.

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