Original Article

The Influence of Childbirth Route on Postpartum Depression: A Cross-sectional Study from Eastern Province of Saudi Arabia

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Abstract

Background: Becoming a mother carries many challenges that can impact a woman's life. The childbirth route, whether vaginal or cesarean, may affect maternal mental health, leading to postpartum depression with various physical, emotional, and behavioral changes.

Objectives: To evaluate the association of postpartum depression with the childbirth route, also to measure its frequency and point prevalence at a single time and place among Saudi women.

Methods: A Correlational cross-sectional study was conducted from September 1, 2023, to January 31, 2024, at the King Faisal University Polyclinic, targeting Saudi women within their first six months postpartum. The sociodemographic and obstetrical data were retrieved, while the Edinburgh assessment questionnaire was utilized to assess symptoms of postpartum depression. Statistical analysis was performed using SPSS version 26.

Results: In total, 257 qualifying mothers were analyzed with ages ranging from 18 to 45 years (mean age 29.7 ± 6 years). A small proportion, 17.1% experienced psychological issues during pregnancy, 30.4% encountered pregnancy complications, 41.2% had their first childbirth, and 84% delivered vaginally. Exactly 59.9% reported depression, 38.1% had mild, 19.1% moderate, and 2.7% severe depression. In the initial analysis, age 31-40 years, higher education, and obstetric characteristics revealed statistical associations with moderate/severe postpartum depression (Chi-square test $p < 0.05$). Normal vaginal birth, multiparity, and antepartum complications were identified as the predictors of moderate/severe postpartum depression.

Conclusion: A 22% prevalence of moderate to severe postpartum depression was retrieved. The modifications in birth care strategies and postpartum counseling in addressing postpartum depression help achieve a happy motherhood.

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Introduction

Postpartum depression is a major health concern for women of childbearing age, significantly adding to the overall maternal disease burden.[1] Postpartum Depression (PPD) refers to a type of depression that

can occur one to three weeks after a woman has given birth and is characterized by a minimum of two weeks of low mood, or loss of interest or pleasure, along with at least five additional symptoms: change in appetite or weight, insomnia or hypersomnia, psychomotor agitation or retardation, decreased energy or fatigue, sense of worthlessness or guilt, difficulty concentrating or making decisions, and recurrent thoughts of death, dying or suicide.[2] The fifth edition of the Psychiatric Diagnostic Manual describes peripartum depression as a subtype of major depressive disorder. It states that for this diagnosis to be given, symptoms must begin during pregnancy or within the first four weeks after giving birth.[3] Neuropsychiatric disorders like PPD contribute to approximately 14% of the global disease burden, underscoring the critical need to address maternal mental well-being.[4]

The reported clinical manifestations of postpartum depression include self-blame, emotions of remorse for failing to take care of the baby, poor self-worth, disinterest in their environment, confusion, and suicidal intentions, which may continue as long as a year after giving birth.[5] Postpartum depression affects 10 to 25% of women after childbirth, with variation in prevalence across the globe and influenced by socioeconomic, psychological problems, unintended pregnancy, and lack of support.[6] The concerns are now being raised in the emerging literature that the route of delivery may influence the development of PPD, because poor management of the normal vaginal delivery can leave parturients with long-lasting traumatic memories that, if unaddressed, deepen into chronic depression.[7] Undergoing emergency cesarean birth is frequently linked to PPD with long-lasting psychological impact, because the hope to accomplish a normal vaginal delivery is shifted to cesarean section, leading to disappointment and depression.[8] A small proportion of research data have not yet concluded an association of PPD with birth route, including research in the Western Province of Saudi Arabia.[9] Several other factors, beyond delivery mode, that compound PPD risk are poor support, low education and income, young age, problems in marital relationships, and unmet desired childbirth expectations.[10,11]

The rationale of this study is that the postpartum depression research data is scarce in the Eastern Province; no study has yet assessed the association between the mode of delivery and PPD development among Saudi mothers living in Al Ahsa City of Eastern Province, Saudi Arabia. Therefore, the current study aimed to fill the gap in this research domain, primarily evaluating the association between postpartum depression and the mode of childbirth, and by measuring its frequency and point prevalence at a single point in time and place. Additionally, assessing the association of confounding antepartum and postpartum events, along with sociodemographic variables that contribute to PPD.

Methods

Correlational cross-sectional research was conducted at the King Faisal University Polyclinic in Al Ahsa, a city in Eastern Province of Saudi Arabia, from September 1, 2023, to January 31, 2024. Ethical approval for the research was obtained from the King Faisal University Research Deanship (KFU-REC-2023-AUG-ETHICS 1474). Saudi women above 18 years of age, residing in Al Ahsa Eastern Province, and recently given birth within the last 6 months were eligible participants. The non-Saudi respondents, women with twin delivery, and those with psychological problems before pregnancy, were not included in the study. A pretested Arabic questionnaire was utilized for the eligible 257 participants via convenience sampling after obtaining their free consent to participate. The information regarding sociodemographic features and obstetrical data was retrieved. The Edinburgh Assessment scale questionnaire was utilized to assess symptoms of postpartum depression.[12]

The data was gathered and analyzed with SPSS version 26. Two-tailed statistical techniques were utilized with a significance threshold of 0.05, regarding p-values below 0.05 as significant. The EPDS (Edinburgh postnatal depression scale) overall value was calculated by adding the points of each item. The overall value or depression score was categorized into four severity scales: None, mild, moderate, and severe, with score values of (0–6), (7–13), (14–19), and (20–30), respectively. These severity ranges were followed from published research.[13] A descriptive analysis was performed utilizing frequency distributions and percentages for variables including demographics, psychological background, and obstetric information. The associations of demographics and obstetric features with depression ranges were examined using the Pearson chi-square test for significance, with the exact probability test applied for low-frequency distributions. For the analysis, EPDS scores of moderate and severe depression were combined. Women scoring 14 and higher (14-30) were categorized as exhibiting Moderate/Severe PPD, indicating a cohort with clinically meaningful symptoms. These rearrangements align with recognized clinical standards and were selected to enable a straightforward

examination of elements linked to significant postpartum depression. The Moderate/Severe combination provided an adequate sample size for statistical modeling and created a group whose symptoms obviously required clinical intervention. Afterwards, a multiple stepwise logistic regression model was used to determine adjusted predictors of moderate/severe PPD in the recent mothers.

Results

In total, 257 qualifying mothers were analyzed, ages ranging from 18 to 45 years (mean age 29.7 ± 6 years). The majority were university graduates. Most had lower earnings, with others distributed across mid-range and higher salary levels. Regarding parity, the majority had only one child, while others had more than one child. Table 1 displays detailed information about the socio-demographic features of the participants.

Table 1: *Socio-demographic information of Saudi mothers*

Variables	n	%
Age range (years)		
18- 20	14	5.4%
21-30	135	52.5%
31-40	96	37.4%
> 40	12	4.7%
Educational level		
Secondary / below	70	27.2%
University / above	187	72.8%
Monthly Earnings in Riyals		
Less than 5000	88	34.2%
5000-10000	66	25.7%
10000-15000	67	26.1%
15000-20000	12	4.7%
Greater than 20000	24	9.3%
Number of children		
1	85	33.1%
2	66	25.7%
3	57	22.2%
> 3	49	19.1%

The obstetric data revealed that 17.10% women had suffered pregnancy complications, the majority had a planned pregnancy, spontaneous onset of labor, and it was the first childbirth among 41.2% of recent mothers. Two-thirds of participants had psychological and social problems in pregnancy.

The mode of delivery and labor details of participants are depicted in Figure 1, where the majority had normal spontaneous vaginal deliveries, and labor lasting 6-10 hours for spontaneous deliveries.

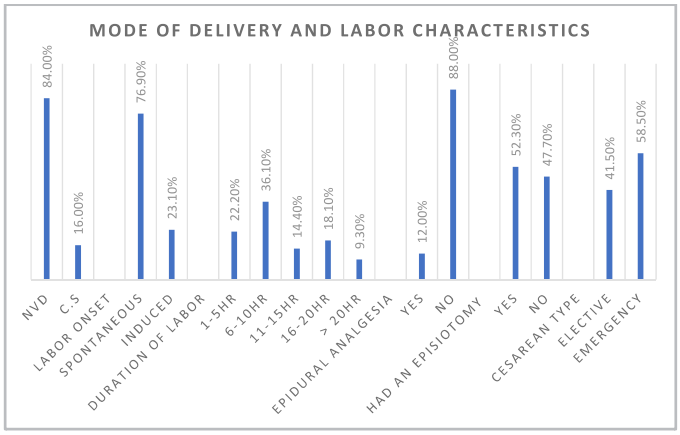

Figure 1: *Mode of delivery and labour characteristics of the participants.*

The Edinburgh Assessment questionnaire revealed that 93% of study mothers could laugh and find humor in situations, 93.8% anticipated activities with excitement, 73.5% undeservedly blamed themselves, 79% faced unnecessary anxiety, and 78.2% felt fearful or anxious without justification. Only 7.4% had been coping as well as ever. Moreover, 17.1% experienced sleep difficulties because of unhappiness, 19.8% felt sad or miserable, 6.6% cried due to unhappiness, and 7% had thought of harming themselves.

The intensity and extent of depression are depicted in Figure 2. A total of 59.9% of the mothers had suffered postpartum depression, which was mild in 98, moderate in 49, and severe only in 8 of the recent mothers. Therefore moderate to severe depression prevalence calculated was 22%.

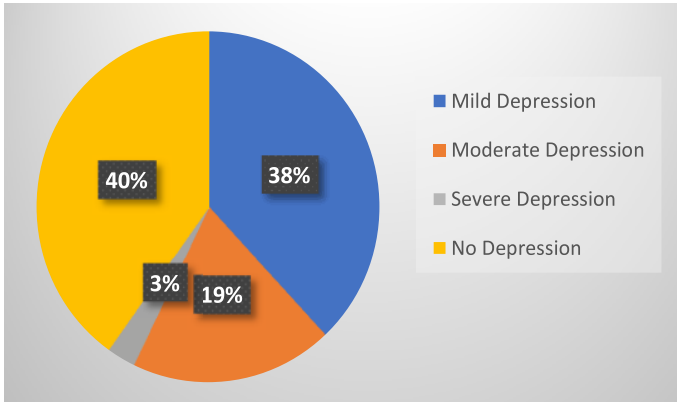

Figure 2. Severity of depression among Saudi mothers in recent childbirth.

Table 2 shows the initial analysis of sociodemographic and obstetric characteristics with the depression severity scales. The moderate /severe depression (desired outcome variable) was found statistically significant in women aged 31-40 years (p=0.001), advanced education (p=0.003), higher earnings (p=0.001), and in women

having more than 3 children (p=0.001). Further, moderate to severe depression was found linked to women who had psychological or social problems during pregnancy, with normal vaginal delivery (p= 0.003), and having a labour duration of 11-15 hours (p=0.001).

Table 2: *Associations of Socio-demographic and Obstetric Characteristics with Moderate/Severe Postpartum Depression.*

Variables	PPD						p-value
	None		Mild		Moderate/ Severe		
Age range (years)							.001*$
31-40	34	35.4%	36	37.5%	26	27.1%	
Educational level							.003*
University / above	77	41.2%	61	32.6%	49	26.2%	
Monthly income							.001*$
> 20000 SR	9	37.5%	5	20.8%	10	41.7%	
Number of children							.001*$
> 3	16	32.7%	13	26.5%	20	40.8%	
Did you suffer from psychological or social problems during pregnancy?							.021*$
Yes	0	0.0%	7	63.6%	4	36.4%	
No	103	41.9%	91	37.0%	52	21.1%	
Mode of delivery							.003*
NVD	78	36.1%	84	38.9%	54	25.0%	
C.S	25	61.0%	14	34.1%	2	4.9%	
Was this delivery considered to be your first experience?							.001*
Yes	56	52.8%	36	34.0%	14	13.2%	
No	47	31.1%	62	41.1%	42	27.8%	
For how long was the labor (hours)?							.001*
11-15	8	25.8%	2	6.5%	21	67.7%	

Footnotes:
Acronym: PPD, Postpartum Depression; EPDS, Edinburgh Postnatal Depression Scale; NVD, Normal Vaginal Delivery; C.S., Cesarean Section.
**The p-value evaluates the connection of each variable with the target outcome variable: Moderate/Severe PPD (EPDS ≥ 14), employing Pearson's Chi-square test, statistically significant at p < 0.05, $: Exact probability test*

Table 3: *Multiple Stepwise Logistic Regression for Predictors of Moderate to Severe PPD.*

Predictors	*p*	OR_A	95% CI	
			Lower	Upper
Age	.048	1.25	1.00	7.19
Unplannedpregnancy	.001	3.02	1.59	5.73
Psychological problems during pregnancy	.031	2.97	1.10	7.96
Pregnancy complications	.043	2.07	1.02	4.18
Multiple deliveries	.001	2.73	1.54	4.86
Normal vaginal delivery	.046	1.90	1.10	4.12

In the multiple stepwise logistic regression analysis (Table 3), unplanned pregnancy, psychological problems during pregnancy, and multiparity were strong predictors of PPD. Women aged 31-40 years and a normal vaginal delivery are found to be modestly significant predictors of moderate to severe PPD.

Discussion

Postpartum depression places a mother in a miserable motherhood. Although several reasons for its existence have been established, the association of PPD with the mode of delivery is still controversial. To get insight into which route of delivery influences PPD, the current study findings highlighted that the more frequent moderate to severe PPD was observed in 22% of the recent mothers who had normal vaginal deliveries. Likewise, Dubey[14] et al. reported a 30.8% depression prevalence with normal vaginal birth, which may be because the participants belonged to rural areas, had low education status, and low economic class. In comparison, we had educated participants and urban residents.

Contrary to current findings, the South African study by Duma et al.[15] pointed out that emergency cesarean was responsible for 39.9% of PPD, and the contributing risk factor was unemployment. AlNaser et al.[16] from Riyadh estimated a higher prevalence of 38.5% depression with cesarean births, which was compounded by stressful events during pregnancy, a non-supportive husband, and lack of an earning source. Similarly, the participants in our study also experienced psychological or social problems and had some pregnancy complications.

Furthermore, a Japanese study by Baba et al.[17] has also found the association of mild PPD with the cesarean birth, having 3.7% at one month and lowering to 2.8% at the sixth-month period. An observational cohort study by Doke et al.[18] reported that cesarean delivery has a heightened risk of postnatal depression. Another large meta-analysis revealed that emergency cesareans were linked to a greater incidence of minimal post-delivery depression compared to normal vaginal birth.[19] Similarly, Yusufzai et al. also found PPD more with emergency cesarean delivery.[20] The PPD in cesarean births may stem from the fact that it compromises maternal capability to nurse the newborn comfortably and makes it difficult to run household activities and other family affairs. While Faisal et al.[21] could not conclude a correlation between the mode of delivery and PPD.

The significant independent predictors of moderate to severe PPD in the current study are an unplanned pregnancy, multiparity, psychological problems during

pregnancy, and pregnancy complications. The normal vaginal delivery has 1.9 times the adjusted odds for PPD risk (OR=1.90, 95%CI 1.10--4.2). Therefore, vaginal delivery and women aged 31-40 are found to be modestly significant predictors of PPD. Similarly, the Japanese study[17] cited earlier described that instrumental vaginal birth at six months postnatal was also a modest predictor of mild PPD, with an adjusted odds ratio of 1.25 and 95% CI, 1.02–1.52. Likewise, the cohort study[18] cited above, cesarean delivery had the adjusted odds of 1.86 times the risk of PPD development with 95% CI 1.14 to 3.03, and age below 25 years had 2 2-fold higher risk of postpartum depression. Whereas normal vaginal delivery and women aged 31-40 were the modest risk factors for PPD.

According to Alsayed et al.[22] the significant PPD predictors included having previous depressive episodes, a longer period between difficult life events, and a negative attitude toward pregnancy, which are dissimilar findings, but the PPD prevalence of 20.9 % is close to the current findings. Wubetu et al.[23] documented a low prevalence of PPD and found that being widowed, having no support, a sick hospitalized baby, or experiencing the death of a close person had a significant association with postpartum depression. An Indonesian study by Putri et al.[24] found that the demographic data have an association with PPD, as mothers living in urban areas had a slightly higher prevalence of PPD than in rural areas, and pregnancy complications were associated with having 3-fold higher odds for PPD. Similarly, current results indicate a 2-fold risk of PPD with pregnancy complications. Tembo et al.[25] also conducted a study in rural Malawi, found that insufficient family support in the postpartum phase raised the risk of PPD by 2.5 times. The identified risk factors, like rural and urban areas and poor family support, are dissimilar to our risk predictors because we focused on the antepartum and intrapartum events to obtain a closer view of how these confounding variables interplay with the mode of delivery and in PPD. The prolonged duration of labor, 11-15 hours, was significantly associated (p=.001) with moderate to severe PPD, but did not appear to be a predictor in the multiple logistic regression analysis; instead, multiparity, psychosocial, and pregnancy complications are found to be significant PPD risk predictors.

The study findings reflected a significant association (p=.003) of moderate to severe postpartum depression among women who have undergone normal vaginal delivery, which is not consistent with most of the cited literature, which often links PPD to emergency C-section or difficult instrumental delivery. The adjusted odds ratio of all the confounding variables in the stepwise multiple logistic regression indicated vaginal delivery as a modest predictor of the PPD. This may be due to the overlooked and unmeasured confounders like birth trauma, postpartum hemorrhage, stillbirth, or non-empathetic attitudes of healthcare givers that were not evaluated. In addition to regional cultural differences, lack of continuous support during the labor process, and an absence of support in the household affairs in the puerperium from family members and the social circle may have led to PPD. Therefore, there is a need for multicentre randomized research trials with large sample sizes that would establish a clear and valid association of PPD with both routes of delivery: cesarean and vaginal, examining the depression categories (none, mild, moderate & severe) individually to investigate possible variations in risk factors across the entire range of symptom severity.

Regarding the limitations, the cross-sectional design precludes any determination of causality between the identified factors and postpartum depression. Moreover, the utilization of convenience sampling constrains the generalizability of our results due to the possibility of selection bias.

Conclusion

The normal vaginal delivery was significantly associated with moderate to severe postpartum depression, with a point prevalence of 22%. The significant predictors of PPD identified were multiparity, unplanned pregnancy, psychological problems during pregnancy, and pregnancy complications. The vaginal delivery and advanced maternal age are identified as modest predictors of PPD. This warrants further large randomized research trials. Modifications in birth care approaches and postpartum counseling to the targeted mothers, involving family members in addressing their mental health, especially postpartum depression.

Ethical Approval: Ethical approval for the research was obtained from the King Faisal University Research Deanship (KFU-REC-2023-AUG-ETHICS1474).

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Authors' Contribution

FT: Conception & design, analysis & interpretation of data, drafting of article, critical revision for important intellectual content and final approval.

MNA: Conception & design, acquisition of data, analy-

sis & drafting of article interpretation of data, drafting of article, critical revision for important intellectual content, final approval

MMA: Acquisition of data, drafting of article, drafting of article critical revision for important intellectual content, final approval

HNA: Acquisition of data, analysis & interpretation of data, drafting of article and final approval.

AAA: Conception & design, acquisition of data, drafting of article, and final approval

EY: Conception & design, drafting of the article, article revision, and final approval.

References:

1. Tolossa T, Fetensa G, Yilma MT, Abadiga M, Wakuma B, Besho M, et al. Postpartum depression and associated factors among postpartum women in Ethiopia: a systematic review and meta-analysis. Public health Rev. 2020; 41(1):1-20. doi.org/10.1186/s40985-020-00136-3
2. Alrida N, Al-Zu'bi B. Prevalence and Risk Factors of Postpartum Depression among Women: A Review Paper. Babali Nurs Res. 2023;4(4):540-51. doi.org/ 10.37363/bnr.2023.44291
3. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders. 5th ed. Washington, DC: American Psychiatric Publishing; 2022.
4. Liu X, Wang S, Wang G. Prevalence and Risk Factors of Postpartum Depression in Women: A Systematic Review and Meta-analysis. J Clin Nurs. 2021;31(19-20): 2665-77. doi: 10.1111/jocn.16121
5. Gastaldon C, Solmi M, Correll CU, Barbui C, Schoretsanitis G. Risk factors of postpartum depression and depressive symptoms: umbrella review of current evidence from systematic reviews and meta-analyses of observational studies. Br J Psychiatry. 2022; 221(4): 591–602. doi:10.1192/bjp.2021.222
6. Smorti M, Ponti L, Pancetti F. A comprehensive analysis of post-partum depression risk factors: the role of socio-demographic, individual, relational, and delivery characteristics. Front Public Health. 2019;7(295):1-10 doi: 10.3389/fpubh.2019.00295
7. Shribalaji S, Vaishnavi S, Sharu AJ, Binu L, Kummar M. Postpartum depression and its risk factors: A Review. Int J Sci Res Arch. 2024;13(1):977–82. doi.org/ 10.30574/ijsra.2024.13.1.1691
8. Liu TC, Peng HC, Chen C, Chen CS. Mode of delivery is associated with postpartum depression: Do women with and without depression history exhibit a difference? Healthcare (Basel). 2022;10(7):1308. doi: 10.3390/healthcare10071308.
9. Alturki Y, Badea S, Kasmi O, Alhashmi L, Arab T. Association Between Mode of Delivery and Postpartum Depression: A Cross-Sectional Study in Saudi Arabia. Cureus. 2023;15(10): 47013. doi:10.7759/cureus.47013
10. Fan Q, Long Q, De Silva V, Gunarathna N, Jayathilaka U, Dabrera T, et al. Prevalence and risk factors for postpartum depression in Sri Lanka: A population-based study. Asian J Psychiatry. 2020;47(1):101855 https://doi.org/10.1016/j.ajp.2019.101855
11. Yokoyama M, Tanaka K, Sugiyama T, Arakawa M, Miyake Y. Cesarean Section is Associated with Increased Risk of Postpartum Depressive Symptoms in Japan: the Kyushu Okinawa Maternal and Child Health Study. J Affect Disord. 2021; 278(1): 497-501
12. Using the EPDS as a screening tool [Internet]. COPE; 2020. [cited 2023 Aug]. Available from: https:// www.cope.org.au/health-professionals/health-professionals-3/calculating-score-epds/.
13. McCabe-Beane J E, Segre L S, Perkhounkova Y, Stuart S, O'Hara M W. The identification of severity ranges for the Edinburgh Postnatal Depression Scale. J Reprod Infant Psychol. 2016;34(3), 293–303. doi.org/ 10.1080/02646838.2016.1141346
14. Dubey A, Chatterjee K, Chauhan VS, Sharma R, Dangi A, Adhvaryu A. Risk factors of postpartum depression. Ind Psychiatry J. 2021;30(1):127-131. doi: 10. 4103/0972-6748.328803
15. Duma N, Madiba T. The Prevalence of Peripartum Depression and Its Relationship to Mode of Delivery and Other Factors Among Mothers in Ixopo, Kwazulu-Natal, South Africa. S Afr J Psychol. 2020;50(4): 530 –539. doi. 10.1177/0081246320931355
16. AlNaser RS, Altharwi K, Derbah MS, Gharibo SO, Fallatah SA, Alotaibi SG, et al. Prevalence and predictors of postpartum depression in Riyadh, Saudi Arabia: A cross-sectional study. PLoS One. 2020;15(2): 0228 666.
17. Baba S, Ikehara S, Eshak ES, Ueda EK, Kimura T, Hiroyasu I. Association Between Mode of Delivery and Postpartum Depression: The Japan Environment and Children's Study (JECS). J Epidemiol. 2023; 33(5): 209-216. doi.org/10.2188/jea.JE20210117
18. Doke PP, Vaidya VM, Narula APS. Assessment of difference in postpartum depression among cesarean and vaginally delivered women at 6-week follow-up in hospitals in Pune District, India: an observational cohort study. BMJ Open. 2021;11(1): 052008. doi:10.1136/bmjopen-2021-052008

19. Sun L, Wang S, Li XQ. Association between mode of delivery and postpartum depression: A systematic review and network meta-analysis. Aust N Z J Psychiatry. 2021;55(6):588-601. doi: 10.1177/0004867420954284
20. Yousafzai S, Hayat N, Nighat P. Frequency of postpartum depression in operative vs spontaneous vaginal delivery. Gomal J Med Sci. 2024;22(2): 142-46.
21. Faisal-Cury A, Menezes PR. Type of delivery is not associated with maternal depression. Arch Women Ment Health. 2019;22(1):631–35. doi: 10.1007/ s00737-018-0923-1
22. Alsayed NA, Altayyeb JF, Althuniyyan LS, Alzubaidi SK, Farahat F, Althuniyyan L. Prevalence of postpartum depression and associated risk factors among women in Jeddah, Western Saudi Arabia. Cureus. 2021; 13(4): 14603
23. Wubetu AD, Engidaw NA, Gizachew KD. Prevalence of postpartum depression and associated factors among postnatal care attendees in Debre Berhan, Ethiopia, 2018. BMC Pregnancy Childbirth. 2020;20(189):1-9 doi: 10.1186/s12884-020-02873-4
24. Putri AS, Wurisastuti T, Suryaputri IY, Mubasyiroh R. Postpartum Depression in Young Mothers in Urban and Rural Indonesia. J Prev Med Public Health. 2023; 56(3):272-281. doi: 10.3961/jpmph.22.
25. Tembo C, Portsmouth L, Burns S. Postnatal depression and its social-cultural influences among adolescent mothers: A cross-sectional study. PLOS Glob Public Health. 2023;3(6):0002025. doi.org/10.1371/ journal.pgph.0002025