

Original Article

Assessment of postpartum psychological disorders among women in Rangpur Division, Bangladesh: An analytical cross-sectional study.

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ABSTRACT

Background: Postpartum psychological disorders, including depression, anxiety, and perceived stress, are major public health concerns that adversely affect maternal well-being, infant development, and family functioning. Women living in low-resource settings such as Bangladesh are particularly vulnerable because of limited access to mental health services, inadequate social support, and socioeconomic challenges.

Objective: To determine the prevalence of postpartum depression, anxiety, and perceived stress among postpartum women in Rangpur Division and to identify associated sociodemographic, obstetric, and psychosocial factors.

Methods: An analytical cross-sectional study was conducted among 300 postpartum women aged ≥ 18 years who were 6–14 weeks postpartum and attending five healthcare facilities in Rangpur Division, Bangladesh. Participants were selected using cluster sampling over six months. Descriptive statistics summarized participant characteristics. Associations were assessed using chi-square tests, while Poisson regression with robust standard errors was performed to estimate adjusted prevalence ratios (aPRs) with 95% confidence intervals (95% CIs). A p-value < 0.05 was considered statistically significant.

Results: The mean age of participants was 26.4 ± 4.2 years, and 70% resided in rural areas. Probable postpartum depression (EPDS ≥ 13) was identified in 28% of participants, 32% experienced moderate-to-severe anxiety, and 25% reported high perceived stress. Women with poor social support had a significantly higher prevalence of probable postpartum depression (aPR = 1.8; 95% CI: 1.32–2.46; $p < 0.001$). Unintended pregnancy was independently associated with moderate-to-severe anxiety (aPR = 1.6; 95% CI: 1.15–2.21; $p = 0.005$).

Conclusion: Postpartum psychological disorders are common among women in Rangpur Division, particularly among those with poor social support and unintended pregnancies. Routine postpartum mental health screening using validated instruments, together with counseling services, community-based psychosocial support, and targeted interventions for high-risk women, should be integrated into maternal healthcare services to improve maternal mental health outcomes in Bangladesh.

INTRODUCTION

The postpartum period is an important time in a woman's life that involves a lot of physical, psychological, and social changes. While most women adapt well to these changes, a large number develop postpartum psychological disorders such as postpartum depression (PPD), postpartum anxiety (PPA), and increased perceived stress. These conditions adversely affect maternal health, mother-infant bonding, breastfeeding practices, infant cognitive and emotional development, and overall family functioning. Postpartum depression is found in 15–20% of women worldwide, and is even more common in low- and middle-income countries, due to socioeconomic differences, scarcity of mental health care facilities and poor postpartum support services (1,2). Postpartum psychological disorders are of multiple origins, due to a complex interaction between biological, psychological, obstetric and social factors. Childbirth-related changes in hormones, lack of sleep, breastfeeding challenges, unplanned pregnancy, obstetric problems, intimate partner violence, financial stress, and poor social support all have been identified as significant factors that contribute to maternal psychological distress. Existing mental health problems and chronic medical conditions also predispose to developing postpartum depression and anxiety in the postnatal period (3,4). Maternal mental illness can be linked to poor infant growth, delayed neuro-development, poor maternal quality of life, and poor adherence to infant health care, as well as a risk for maternal self-harm (5). Maternal mental health is a neglected aspect of postnatal care in several developing countries, including Bangladesh. Progress has been made in the reduction of mortality to mothers and neonates, but general psychological assessment is not always integrated into health care after a baby has been born. The poor awareness of postpartum psychological disorders, social stigma, limited availability of trained professionals, and poverty are the major barriers women have to seeking mental health services in rural communities. Many women who have been affected experience clinically significant symptoms but are never diagnosed and treated (6). The World Health Organization (WHO) emphasizes the need for a holistic approach to postnatal care, which should involve monitoring the mother's mental health in addition to her postpartum physical healing. There are standardized questionnaires that have been found to have good validity and reliability for screening women for higher risk of postpartum psychological disorders: the Edinburgh Postnatal Depression Scale (EPDS), the Generalized Anxiety Disorder-7 (GAD-7), the Perceived Stress Scale-10 (PSS-10), and the Oslo Social Support Scale (OSLO-3). Identification using these validated tools enables prompt counseling, psychosocial support, referral, and intervention, thereby contributing to better maternal and infant health outcomes (7). Although several studies have investigated postpartum depression in Bangladesh, few have simultaneously examined postpartum depression, anxiety, perceived stress, and associated psychosocial factors using validated screening instruments. In addition, there is limited evidence from northern Bangladesh, particularly from the Rangpur Division. The rural population, socio-economic disadvantage, lack of specialist mental health care, and cultural factors could make this region more susceptible to postpartum psychiatric problems. Thus, there is a need for region-specific evidence to inform maternal mental health policies and improve postpartum health care services (8). Hence, this study aimed to identify the prevalence of postpartum depression, anxiety, and perceived stress among the women who were visited at the healthcare facilities during the postpartum period in the Rangpur Division of Bangladesh and to find out the sociodemographic, obstetric, and psychosocial factors associated with the three conditions. Results can inform the incorporation of universal mental health (U-MH) screening and

psychosocial intervention (PSI) in the postpartum setting, to ultimately enhance maternal mental wellbeing and child health in Bangladesh (9).

Materials and Methods

Study Design and Setting

This analytical cross-sectional study was conducted over six months from January 2025 to June 2025 among postpartum women attending five healthcare facilities in Rangpur Division, Bangladesh. The study sites included Rangpur Medical College & Hospital, two district hospitals, and two community clinics, representing both urban and rural populations within the division.

Study Population

The study population comprised postpartum women attending postnatal care services during the study period. Eligible participants were biological mothers aged 18 years or older, between 6 and 14 weeks postpartum, residing in Rangpur Division, and willing to provide written informed consent. Women with severe medical illness, known psychiatric disorders preventing effective communication, cognitive impairment, or any condition precluding participation in the interview were excluded from the study.

Sample Size

The sample size was calculated using the single population proportion formula, assuming a prevalence of postpartum depression of 25%, a 95% confidence level, a 5% margin of error, a design effect of 1.2, and a 10% allowance for non-response, resulting in a minimum required sample size of approximately 300 participants. A cluster sampling technique was employed, with participating healthcare facilities serving as sampling clusters. Eligible postpartum women attending these facilities during the study period were recruited consecutively until the required sample size was achieved.

Data Collection

Data were collected through face-to-face interviews conducted by trained female research assistants using a structured questionnaire administered in Bangla. Interviews were performed in private consultation rooms to ensure participant privacy and confidentiality. Postpartum depression was assessed using the validated Bangla version of the Edinburgh Postnatal Depression Scale (EPDS-B). Scores of 10 or higher indicated possible postpartum depression, whereas scores of 13 or higher indicated probable postpartum depression. Anxiety symptoms were evaluated using the Generalized Anxiety Disorder-7 (GAD-7) questionnaire, with scores of 5, 10, and 15 representing mild, moderate, and severe anxiety, respectively. Perceived stress was measured using the Perceived Stress Scale-10 (PSS-10), with scores of 20 or above indicating high perceived stress. Social support was assessed using the Oslo Social Support Scale (OSLO-3), which categorizes participants into poor (3–8), moderate (9–11), and strong (12–14) social support. Additional information was collected regarding participants' sociodemographic characteristics, parity, pregnancy intention, mode of delivery, breastfeeding difficulties, intimate partner violence during the previous year, postpartum counseling, obstetric complications, and newborn outcomes. The EPDS and GAD-7 were used as screening instruments rather than diagnostic tools, and women with positive screening results were advised to seek further clinical evaluation.

Quality Control

Before data collection, all interviewers received standardized training regarding study objectives, interview techniques, ethical conduct, and administration of the assessment tools. The questionnaire was pretested before commencement of the study, and necessary modifications were made to improve clarity and consistency. Approximately 10% of participants were re-interviewed to assess data consistency, while the internal reliability of the psychological assessment instruments was evaluated using Cronbach's alpha, with a minimum acceptable value of 0.70.

Statistical Analysis

Data were entered into Microsoft Excel and analyzed using IBM SPSS Statistics version 26.0 (IBM Corp., Armonk, NY, USA). Continuous variables are presented as mean ± standard deviation (SD), whereas categorical variables are expressed as frequencies and percentages. Associations between categorical variables were evaluated using the Chi-square (χ^2) test, while the independent-samples t-test was used to compare continuous variables where appropriate. Variables demonstrating clinical relevance or a p-value <0.20 in the bivariate analysis were entered into a multivariable Poisson regression model with robust standard errors to estimate adjusted prevalence ratios (aPRs) and corresponding 95% confidence intervals (95% CIs) for factors associated with probable postpartum depression (EPDS ≥ 13) and moderate-to-severe anxiety (GAD-7 ≥ 10). Multicollinearity among independent variables was assessed using the Variance Inflation Factor (VIF), and no significant multicollinearity was detected (VIF <5). Missing data were handled using complete-case analysis because the proportion of missing values was minimal. A two-tailed p-value <0.05 was considered statistically significant.

Ethical Considerations

The study protocol was approved by the Ethics Review Committee of the Army Nursing College, Rangpur, Bangladesh (Approval No. 344/07/25). The study was conducted in accordance with the ethical principles of the Declaration of Helsinki (2013 revision). Written informed consent was obtained from all participants before enrollment. Participation was voluntary, and participants were assured that all information would remain confidential and anonymous throughout the study.

Results

A total of 300 postpartum women were enrolled in the study, all of whom met the eligibility criteria and completed the assessment. The conceptual framework illustrating the relationships among sociodemographic, obstetric, psychosocial, and psychological variables is presented in Figure 1. The sociodemographic profile of participants is summarized in Figures 2–4 and Table 1. Most women were aged 25–29 years (45%), followed by 20–24 years (35%) and 30–34 years (20%) (Figure 2). A majority (70%) resided in rural areas, while 30% lived in urban settings (Figure 3). Regarding educational status, 45% had completed secondary education, 40% had primary education, and 15% had tertiary education (Table 1). Monthly household income ranged from less than 15,000 BDT (30%) to more than 25,000 BDT (20%), with half of the participants reporting incomes between 15,000 and

25,000 BDT (Figure 4). Obstetric characteristics are presented in Table 2. Overall, 180 (60%) women had vaginal deliveries, whereas 120 (40%) underwent cesarean section. Perceived social support varied across the study population, with 40% reporting strong support, 35% moderate support, and 25% poor support (Figure 5). Psychological assessment findings are shown in Figure 6 and Tables 3–4. Based on the EPDS, 84 (28%) participants screened positive for probable postpartum depression, while 105 (35%) had possible depression and 111 (37%) had no depressive symptoms (Table 3). Moderate-to-severe anxiety was identified in 32% of participants, whereas 40% experienced mild anxiety and 28% had no clinically significant anxiety (Figure 6). Regarding perceived stress, 150 (50%) women reported low stress, while 75 (25%) each experienced moderate and high stress (Table 4). The associations between psychosocial factors and psychological outcomes are presented in Tables 5 and 6. Poor social support was significantly associated with probable postpartum depression ($\chi^2 = 18.45$, $p < 0.001$), and women with poor social support had a 1.8-fold higher prevalence of probable depression than those with stronger support (Table 5). Similarly, unintended pregnancy was significantly associated with moderate-to-severe postpartum anxiety ($\chi^2 = 14.92$, $p = 0.005$), with affected women demonstrating a 1.6-fold higher prevalence of anxiety compared with women whose pregnancies were intended (Table 6).

Table 1. Educational Level of the Study Participants (n = 300)

Educational Level	Frequency (n)	Percentage (%)
Primary	120	40.0
Secondary	135	45.0
Tertiary	45	15.0
Total	300	100.0

Table 1 shows the educational attainment of the study participants. Secondary education was the most common educational level (45%), followed by primary education (40%). In comparison, only 15% had completed tertiary education, indicating that most postpartum women had attained basic to intermediate levels of education.

Table 2. Mode of Delivery Among the Study Participants (n = 300)

Delivery Type	Frequency (n)	Percentage (%)
Vaginal Delivery	180	60.0
Cesarean Section	120	40.0
Total	300	100.0

Table 2 summarizes the obstetric characteristics of the participants according to the mode of delivery. Vaginal delivery was reported by 60% of women, whereas 40% underwent cesarean section, demonstrating that vaginal birth remained the predominant delivery method in the study population.

Table 3. Depression Screening Among the Study Participants Using the Edinburgh Postnatal Depression Scale (EPDS) (n = 300)

Depression Category	Frequency (n)	Percentage (%)
No Depression	111	37.0

Possible Depression	105	35.0
Probable Depression	84	28.0
Total	300	100.0

Table 3 presents postpartum depression screening results based on the Edinburgh Postnatal Depression Scale. Approximately one-third of participants (28%) screened positive for probable postpartum depression, while 35% demonstrated possible depressive symptoms, indicating a substantial burden of depressive symptoms among postpartum women.

Table 4. Perceived Stress Levels Among the Study Participants (n = 300)

Stress Level	Frequency (n)	Percentage (%)
Low	150	50.0
Moderate	75	25.0
High	75	25.0
Total	300	100.0

Table 4 illustrates the distribution of perceived stress among postpartum women. Half of the participants reported low perceived stress. In contrast, one-quarter experienced moderate stress and another quarter reported high stress, suggesting that elevated stress affected a considerable proportion of the study population.

Table 5. Association between perceived social support and postpartum depression among study participants.

Social Support	No Depression	Possible Depression	Probable Depression	Total
Poor	30	40	35	105
Moderate	45	35	25	105
Strong	36	30	24	90
Total	111	105	84	300

$\chi^2 = 18.45$; $p < 0.001$; Adjusted Prevalence Ratio (aPR) for poor social support = 1.8.

Table 5 demonstrates the relationship between perceived social support and postpartum depression. Women reporting poor social support had the highest proportion of probable postpartum depression. Statistical analysis revealed a significant association between lower social support and depressive symptoms ($\chi^2 = 18.45$, $p < 0.001$), while multivariable analysis indicated that poor social support was independently associated with an approximately 1.8-fold higher prevalence of probable postpartum depression.

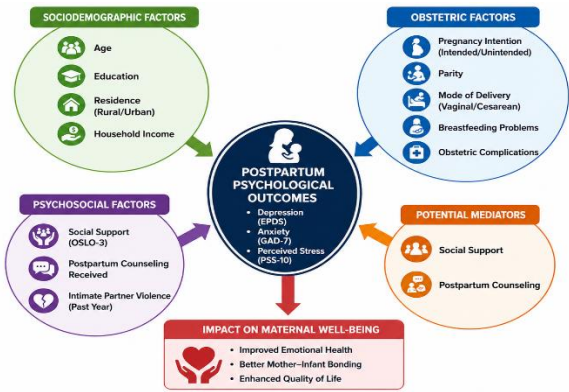
Table 6. Association Between Pregnancy Intention and Postpartum Anxiety (n = 300)

Pregnancy Intention	No Anxiety	Mild Anxiety	Moderate–Severe Anxiety	Total
Intended	80	90	50	220
Unintended	24	30	26	80
Total	104	120	76	300

$\chi^2 = 14.92$; $p = 0.005$; Adjusted Prevalence Ratio (aPR) for unintended pregnancy = 1.6.

Table 6 presents the association between pregnancy intention and postpartum anxiety. Women with unintended pregnancies experienced a higher proportion of moderate-to-severe anxiety compared with those whose pregnancies were intended. This association was statistically significant ($\chi^2 = 14.92$, $p = 0.005$), and unintended pregnancy was associated with a 1.6-fold higher prevalence of postpartum anxiety after adjustment for potential confounding variables.

Figure 1. Conceptual Framework of Factors Associated with Postpartum Psychological Outcomes



This conceptual framework illustrates the hypothesized relationships between sociodemographic, obstetric, and psychosocial factors and postpartum psychological outcomes among women in Rangpur Division, Bangladesh. Sociodemographic variables (age, education, residence, and household income), obstetric characteristics (pregnancy intention, parity, mode of delivery, breastfeeding problems, and obstetric complications), and psychosocial determinants (social support, intimate partner violence, and postpartum counseling) may influence the occurrence of postpartum depression, anxiety, and perceived stress. The framework also highlights the mediating role of social support and counseling in promoting maternal psychological well-being.

Figure 2. Age Distribution of the Study Participants (n = 300)

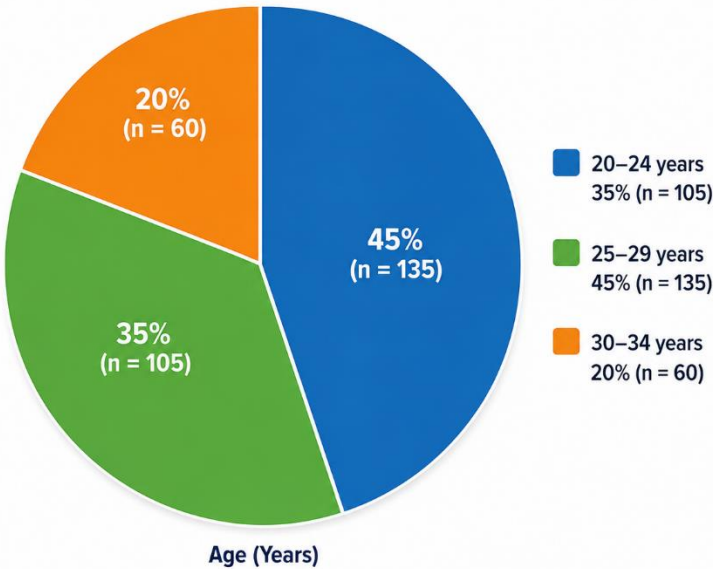


Figure 2 presents the age distribution of postpartum women included in the study. Participants were categorized into three age groups: 20–24 years, 25–29 years, and 30–34 years. Women aged 25–29 years constituted the largest proportion of the study population.

Discussion

This analytical cross-sectional study assessed postpartum psychological health among 300 women attending healthcare facilities in Rangpur Division, Bangladesh. The findings demonstrated a considerable burden of postpartum psychological symptoms, with 28% of participants screening positive for probable postpartum depression, 35% showing possible depression, and 32% experiencing moderate-to-severe anxiety. Furthermore, one-quarter of participants reported high perceived stress. Poor social support and unintended pregnancy were independently associated with adverse psychological outcomes, highlighting the importance of psychosocial determinants in maternal mental health. These findings are consistent with previous evidence indicating that postpartum psychological disorders remain a significant public health concern in low- and middle-income countries (10,11). The prevalence of probable postpartum depression observed in the present study is comparable to reports from South Asian countries, where postpartum depression affects approximately one-quarter to one-third of mothers. A recent systematic review from low-resource settings similarly reported higher rates of maternal depression than those observed in high-income countries, largely attributable to socioeconomic hardship, limited access to mental health services, and inadequate family support (12,13). Bangladesh continues to face challenges in integrating mental health assessment into routine maternal healthcare, and the present findings reinforce the need for systematic postpartum psychological screening. Social support emerged as one of the strongest predictors of maternal psychological well-being. Women reporting poor social support had significantly higher rates of probable postpartum depression than those receiving moderate or strong support. Similar findings have been reported in recent studies demonstrating that emotional, practical, and family support substantially reduce maternal stress and depressive symptoms while improving maternal adaptation during the postpartum period (14,15). Strengthening family involvement and community-based support programs may therefore represent effective strategies for reducing the burden of postpartum mental health disorders. Unintended pregnancy was also significantly associated with moderate-to-severe postpartum anxiety, with affected women demonstrating a 1.6-fold higher prevalence of anxiety. Previous studies have consistently shown that unintended pregnancy contributes to maternal emotional distress through financial insecurity, inadequate preparation for childbirth, and reduced social support (16,17). These findings emphasize the importance of comprehensive antenatal counseling, family planning services, and psychological support for women experiencing unplanned pregnancies. The predominance of rural participants (70%) may partly explain the relatively high prevalence of psychological symptoms observed in this study. Rural women often experience reduced access to specialized maternal mental healthcare, lower educational attainment, transportation barriers, and greater socioeconomic disadvantage compared with urban populations. Similar disparities have been reported across Bangladesh and other developing countries, where geographical inequalities contribute to delayed recognition and treatment of postpartum psychological disorders (18,19). Half of the participants reported low perceived stress; however, one-quarter

experienced high stress, indicating that a substantial proportion of mothers remain psychologically vulnerable during the early postpartum period. Although perceived stress was not evaluated as an independent outcome in multivariable analyses, previous research has demonstrated strong associations between elevated stress, postpartum depression, impaired breastfeeding, and poorer infant developmental outcomes (20,21). Routine stress assessment during postnatal visits may facilitate earlier identification of women requiring psychosocial intervention. The present findings support current World Health Organization recommendations advocating routine screening for maternal mental health during postnatal care using validated instruments such as the Edinburgh Postnatal Depression Scale and Generalized Anxiety Disorder-7 questionnaire. Early identification, appropriate counseling, and timely referral to mental health services may substantially improve maternal well-being and child health outcomes, particularly in resource-constrained settings (22,23). This study provides contemporary evidence regarding postpartum psychological health among women in northern Bangladesh, a region where published data remain limited. The inclusion of multiple healthcare facilities and the simultaneous assessment of depression, anxiety, perceived stress, and psychosocial determinants strengthen the clinical relevance of the findings. Nevertheless, the cross-sectional design precludes causal inference, and reliance on self-reported screening instruments may have introduced reporting bias. Future longitudinal and interventional studies are warranted to evaluate the long-term effectiveness of psychosocial support and postpartum mental health interventions in Bangladesh (24).

Limitations

This study has several limitations. First, its cross-sectional design precludes establishing causal relationships between risk factors and postpartum psychological outcomes. Second, data were collected from healthcare facilities in a single division of Bangladesh, which may limit the generalizability of the findings to other regions. Third, psychological outcomes were assessed using validated screening instruments rather than clinical diagnostic interviews. Finally, self-reported responses may have been subject to recall and social desirability bias despite efforts to ensure participant confidentiality.

Conclusion

This study demonstrated a substantial burden of postpartum psychological disorders among women in Rangpur Division, Bangladesh, with considerable proportions screening positive for depression, anxiety, and elevated perceived stress. Poor social support and unintended pregnancy were identified as significant factors associated with adverse psychological outcomes. These findings emphasize the need to integrate routine mental health screening into postnatal care using validated instruments such as the Edinburgh Postnatal Depression Scale and Generalized Anxiety Disorder-7 questionnaire. Strengthening psychosocial support, expanding postpartum counseling services, and improving access to community-based maternal mental healthcare may facilitate early identification and timely intervention, ultimately enhancing maternal well-being and infant health outcomes in resource-limited settings.

Ethical Statement

This study was approved by the Ethics Review Committee, Army

Nursing College, Rangpur, Bangladesh (Approval No. 344/07/25). The research was conducted in accordance with the ethical principles of the Declaration of Helsinki (2013 revision). Written informed consent was obtained from all participants before enrollment. Participation was voluntary, and participants were informed of their right to withdraw from the study at any stage without any consequences. Confidentiality and anonymity of all collected data were strictly maintained, and women who screened positive for significant psychological distress were provided with appropriate counseling and referral to available mental health services.

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Conflict of Interest

The authors declare that they have no competing financial or non-financial interests related to this study.

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Informed Consent Statement

Written informed consent was obtained from all participants before enrollment in the study. Participation was voluntary, and all participants were informed of the study objectives, procedures, potential risks, and their right to withdraw at any time without affecting the healthcare services they received.

Author Contributions (ICMJE)

Conceptualization and study design: Julekha Akhter, Kamrul Hasan

Data collection: Julekha Akhter

Data analysis and interpretation: Julekha Akhter, Kamrul Hasan

Manuscript drafting: Julekha Akhter

Critical revision of the manuscript for important intellectual content: Kamrul Hasan

All authors reviewed, approved the final version of the manuscript, and agree to be accountable for all aspects of the work, ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Final approval of the manuscript: All authors reviewed and approved the final version of the manuscript and agree to be accountable for all aspects of the work.

Data Availability Statement

The datasets generated and/or analyzed during the current study are available from the corresponding author upon reasonable request. Participant-level data are not publicly available because of ethical and confidentiality considerations.

References

1. Beck CT, Twomey T. Posttraumatic growth after postpartum psychosis. *MCN Am J Matern Child Nurs.* 2023;48(6):303-311. doi:10.1097/NMC.0000000000000954.
2. Bergink V, Akbarian S, Byatt N, Chandra PS, Cirino N, Dazzan P, et al. Postpartum psychosis and bipolar disorder: review of neurobiology and expert consensus statement on classification. *Biol Psychiatry.* 2026;99(8):740-747. doi:10.1016/j.biopsych.2025.10.016.
3. Critchley CJC. Physical therapy is an important component of postpartum care in the fourth trimester. *Phys Ther.* 2022;102(5):pzac021. doi:10.1093/ptj/pzac021.
4. Dennis CL, Singla DR, Brown HK, Savel K, Clark CT, Grigoriadis S, et al. Postpartum depression: a clinical review of impact and current treatment solutions. *Drugs.* 2024;84(6):645-659. doi:10.1007/s40265-024-02038-z.
5. Hicks LE, Graf MD, Yeo S. Prenatal exercise and its effects on postpartum mental health: a systematic review and meta-analysis. *Arch Womens Ment Health.* 2025;28(3):515-524. doi:10.1007/s00737-024-01525-2.
6. Hiiragi K, Obata S, Misumi T, Miyagi E, Aoki S. Psychological stress associated with the COVID-19 pandemic in postpartum women in Yokohama, Japan. *J Obstet Gynaecol Res.* 2021;47(6):2126-2130. doi:10.1111/jog.14776.
7. Jackson L, De Pascalis L, Harrold JA, Fallon V, Silverio SA. Postpartum women's psychological experiences during the COVID-19 pandemic: a modified recurrent cross-sectional thematic analysis. *BMC Pregnancy Childbirth.* 2021;21:625. doi:10.1186/s12884-021-04071-2.
8. Jauniaux E, Aplin JD, Fox KA, Afshar Y, Hussein AM, Jones CJP, et al. Placenta accreta spectrum. *Nat Rev Dis Primers.* 2025;11:40. doi:10.1038/s41572-025-00624-3.
9. Jensen MCH, Holm C, Jørgensen KJ, Schroll JB. Treatment for women with postpartum iron deficiency anemia. *Cochrane Database Syst Rev.* 2024;12:CD010861. doi:10.1002/14651858.CD010861.pub3.
10. Kumari S, Koppad R, Singh A, Singh B, Qazi MS, Jaber Amin MH. Prevalence of cognitive dysfunction and associated behavioral changes, lactational failure, and their determinants among postpartum women in South India: a community-based study. *Int J Gynaecol Obstet.* 2025;170(3):703-716. doi:10.1002/ijgo.70062.
11. Monteiro F, Pereira M, Canavarro MC, Fonseca A. Be a Mom, a web-based intervention to promote positive mental health among postpartum women with low risk for postpartum depression: exploring psychological mechanisms of change. *Front Psychiatry.* 2021;12:701107. doi:10.3389/fpsy.2021.701107.
12. Osianlis E, Thomas EHX, Li Q, Bellgrove M, May T, Chapman D, et al. ADHD in females: survey findings on symptoms across hormonal

- life stages. *J Psychiatr Res.* 2026;193:208-215. doi:10.1016/j.jpsychires.2025.11.035.
13. Pan WL, Lin LC, Kuo LY, Chiu MJ, Ling PY. Effects of a prenatal mindfulness program on longitudinal changes in stress, anxiety, depression, and mother-infant bonding of women with a tendency to perinatal mood and anxiety disorder: a randomized controlled trial. *BMC Pregnancy Childbirth.* 2023;23:547. doi:10.1186/s12884-023-05873-2.
 14. Pritschet L, Taylor CM, Cossio D, Faskowitz J, Santander T, Handwerker DA, et al. Neuroanatomical changes observed over the course of a human pregnancy. *Nat Neurosci.* 2024;27(12):2253-2260. doi:10.1038/s41593-024-01741-0.
 15. Qiu L, Xu H, Li Y, Ma X, Zhang D, Yang Q. Barriers to professional psychological help among pregnant women in China: a qualitative study. *BMC Psychiatry.* 2024;24:609. doi:10.1186/s12888-024-06053-y.
 16. Saharoy R, Potdukhe A, Wanjari M, Taksande AB. Postpartum depression and maternal care: exploring the complex effects on mothers and infants. *Cureus.* 2023;15(8):e41381. doi:10.7759/cureus.41381.
 17. Scroggins JK, Brandon D, Reuter-Rice K, Min SH, Yang Q. Changes in maternal psychological symptom profiles from 2 to 6 months postpartum: an application of latent transition analysis. *Arch Womens Ment Health.* 2024;27(2):309-316. doi:10.1007/s00737-023-01407-z.
 18. Shirabe R, Okuhara T, Okada H, Goto E, Kiuchi T. Changes in maternal coping strategies from pregnancy to postpartum among Japanese women: a prospective longitudinal study. *Womens Health (Lond).* 2025;21:17455057251407853. doi:10.1177/17455057251407853.
 19. Smith KB, Zdaniuk B, Ramachandran SO, Brotto LA. A longitudinal case-control analysis of pain symptoms, fear of childbirth, and psychological well-being during pregnancy and postpartum among individuals with vulvodynia. *Midwifery.* 2022;114:103467. doi:10.1016/j.midw.2022.103467.
 20. Sun M, Peng J, Lommel L. Prevalence and correlates of weight stigma among postpartum women in China. *Int J Environ Res Public Health.* 2022;19(22):14692. doi:10.3390/ijerph192214692.
 21. Suzuki S. Changes in psychological status of postpartum women due to the COVID-19 pandemic in Japan. *J Matern Fetal Neonatal Med.* 2022;35(16):3012-3013. doi:10.1080/14767058.2020.1814250.
 22. Tan HS, Tan CW, Sultana R, Chen HY, Chua T, Rahman N, et al. The association between epidural labor analgesia and postpartum depression: a randomized controlled trial. *Anaesthesia.* 2024;79(4):357-367. doi:10.1111/anae.16178.
 23. Wagner KA, St Laurent CW, Pekow P, Marcus B, Rosal MC, Braun B, et al. The impact of a lifestyle intervention on postpartum cardiometabolic risk factors among Hispanic women with abnormal glucose tolerance during pregnancy: secondary analysis of a randomized trial. *J Phys Act Health.* 2024;21(1):40-50. doi:10.1123/jpah.2023-0145.
 24. Wang Y, Cai Q, Xu X, Gu J. Influencing factors of postpartum depression, anxiety, and comorbid conditions among Chinese women: a prospective study. *Int J Gynaecol Obstet.* 2026;172(2):500-509. doi:10.1002/ijgo.70364.