

Psychological Burden in the Immediate Postpartum Period: Fear of Childbirth, Depressive Symptoms, Fatigue and Sleep Quality

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ABSTRACT

Background: The immediate postpartum period is associated with substantial psychological and physical challenges, including Fear of Childbirth (FoC), depressive symptoms, fatigue, and poor sleep quality. However, the coexistence and interrelationships of these conditions during the earliest postpartum phase remain inadequately characterized. This study assessed the prevalence of FoC, depressive symptoms, fatigue, and sleep disturbance and examined their interrelationships among postpartum women. **Materials and Methods:** A prospective analytical study was conducted among 81 women in the immediate postpartum period at a tertiary care teaching hospital in Bengaluru, India. Participants were assessed using the Wijma Delivery Expectancy/Experience Questionnaire Version B (W-DEQ-B), Edinburgh Postnatal Depression Scale (EPDS), Multidimensional Assessment of Fatigue (MAF), and Pittsburgh Sleep Quality Index (PSQI). Associations with sociodemographic and obstetric characteristics were evaluated using appropriate statistical tests, and Spearman correlation analysis was performed to examine relationships among the four psychological domains. **Results:** Severe FoC was observed in 77 women (95.1%). Mild depressive symptoms were present in 44 participants (54.3%), moderate fatigue in 45 (55.6%), and moderate sleep difficulty in 41 (50.6%). Employment status showed a significant association with severe FoC ($p=0.03$), whereas age, educational status, socioeconomic status, parity, mode of delivery, and pre-existing health conditions were not significantly associated. The mean W-DEQ-B score was 104.2 ± 17.2 , the mean EPDS score was 12.3 ± 4.8 , the mean MAF score was 25.4 ± 8.9 , and the mean PSQI score was 7.9 ± 3.3 . Fatigue demonstrated a significant positive correlation with depressive symptoms ($r=0.312$, $p=0.005$), while no significant correlations were observed between FoC and depressive symptoms, fatigue, or sleep quality. **Conclusion:** Women in the immediate postpartum period exhibited an exceptionally high prevalence of severe fear of childbirth together with substantial fatigue, sleep disturbance, and depressive symptoms. The significant association between fatigue and depressive symptoms and the relative independence of FoC from other psychological domains highlight the need for multidimensional postpartum screening and early psychological support.

Keywords: Depressive symptoms, Fear of childbirth, Immediate postpartum period, Maternal fatigue, Maternal mental health, Postpartum depression, Postpartum women, Sleep quality, W-DEQ-B.

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INTRODUCTION

The immediate postpartum period is a critical phase in maternal recovery during which women experience substantial physical, emotional, and psychological changes. Postpartum depression has received considerable clinical attention (Yamasaki *et al.*, 2026). A broader spectrum of postpartum psychological burdens

includes fear of childbirth, fatigue, and poor sleep quality. Childbirth represents one of the most profound biological and psychological transitions in a woman's life. The postpartum period is increasingly recognized not only as a phase of physical recovery but as a critical window of vulnerability during which emotional, cognitive, and behavioural disturbances may emerge or intensify (Horsch *et al.*, 2024; Wilson *et al.*, 2019). Globally, maternal mental health disorders contribute substantially to the burden of disease among women of reproductive age, with postpartum depression affecting an estimated 20-25% of mothers worldwide and considerably higher rates reported in many low- and middle-income countries (Mitchell *et al.*, 2023). A meta-analysis from India consistently places Postpartum Depression (PPD) prevalence near one in five mothers and has



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estimated PPD to be approximately 22% in 2017 (Upadhyay *et al.*, 2017), 23.5% in a later subnational meta-analysis, and 19% in 2020-2024 pooled analyses (Junaid *et al.*, 2026; Gupta *et al.*, 2025). which underscoring the magnitude of postpartum psychological morbidity in the Indian context. These conditions are associated with impaired maternal functioning, breastfeeding difficulties, reduced mother-infant bonding, adverse infant developmental outcomes, and increased healthcare utilization, emphasizing the need for early recognition and intervention.

Psychological distress surrounding childbirth extends beyond childbirth-related fear and includes depressive symptoms, fatigue, and disturbed sleep, all of which may adversely affect maternal wellbeing and early postpartum recovery (Wilson *et al.*, 2019). Fatigue has been reported in approximately 60% of women during the last trimester of pregnancy, while more than 75% report disturbed sleep, reduced vigilance, or a need for daytime naps. Fear of childbirth, traditionally investigated during pregnancy, may persist after delivery and influence emotional recovery, maternal confidence, and future reproductive decision-making. These conditions frequently coexist in clinical practice, yet they are often studied independently, resulting in an incomplete understanding of the broader psychological burden experienced by women around the time of childbirth (Tsai *et al.*, 2012; Manconi *et al.*, 2023).

The immediate postpartum period provides a unique clinical opportunity to evaluate the woman's experience of childbirth together with her recent emotional, physical, and sleep-related well-being. Although these domains are not confined to an identical time frame, they converge at the point of postpartum assessment. Childbirth-related fear reflects the woman's appraisal of the labour and delivery experience, whereas depressive symptoms and fatigue represent emotional and physical experiences during the preceding 7 days, and sleep quality reflects sleep patterns during the preceding month encompassing late pregnancy and the peripartum period (Märthesheimer *et al.*, 2025; Rüger-Navarrete *et al.*, 2023). Assessing these domains immediately after delivery therefore enables integration of the childbirth experience with the woman's recent psychological and physiological state, allowing a more comprehensive evaluation of maternal wellbeing at a clinically important transition point.

Emerging evidence suggests that depressive symptoms, fatigue, and poor sleep quality are interconnected through shared biological and psychosocial pathways, including hormonal fluctuations, inflammatory activation, circadian disruption, and reduced psychosocial resilience. However, the relationship between childbirth-related fear and these other psychological domains remains inconsistent across populations and study designs (Dencker *et al.*, 2019). Furthermore, most available studies have examined these outcomes separately, have focused predominantly on early delivery depression, or have assessed women several weeks or months after childbirth. Consequently,

data describing the concurrent prevalence and interrelationships of childbirth-related fear, depressive symptoms, fatigue, and sleep quality at the time of immediate postpartum assessment remain limited, particularly in Indian tertiary-care settings where maternal anemia, obstetric complications, and psychosocial stressors may further influence maternal mental health (Jagdale *et al.*, 2026; Massae *et al.*, 2022).

India accounts for nearly one-fifth of global births annually, yet postpartum care continues to prioritize physical recovery and neonatal outcomes, with relatively limited integration of structured psychological assessment into routine obstetric practice. Early postpartum hospitalization offers a valuable opportunity to identify women who may require psychological support before symptoms become persistent or contribute to long-term maternal morbidity. Understanding how childbirth-related fear relates to recent depressive symptoms, fatigue, and antecedent sleep quality at the time of postpartum assessment may provide important insights for multidimensional maternal mental health screening and targeted postpartum interventions in resource-constrained healthcare settings (Upadhyay *et al.*, 2017; Weingarten and Osborne, 2024).

Therefore, this prospective analytical study aimed to determine the prevalence of fear of childbirth, depressive symptoms, fatigue and poor sleep quality among women assessed within 24 hr of delivery and to examine the interrelationships among these psychological domains. In addition, the study evaluated the association of severe fear of childbirth, moderate to severe depressive symptoms, fatigue and sleep quality with selected sociodemographic and obstetric characteristics to identify factors potentially associated with heightened psychological behaviour during the immediate postpartum period.

MATERIALS AND METHODS

Study design and setting

This prospective analytical study was conducted among postpartum women admitted to the Department of Obstetrics and Gynaecology at a tertiary care hospital in Bengaluru, Karnataka, India. Participants were enrolled during the immediate (within 24 hr) postpartum period following delivery, and data were collected prospectively using structured interviews and validated assessment instruments.

Study population

A total of 81 postpartum women were included in the study.

Inclusion Criteria

- Women aged ≥ 18 years.
- Within 24 hr postpartum.
- Able to provide informed consent.

- Able to understand and respond to questionnaires.

Exclusion Criteria

- Severe medical or psychiatric illness.
- ICU admission.
- Cognitive impairment.

Data collection

Data were collected using a structured case record form that included sociodemographic and obstetric characteristics such as age, educational status, socioeconomic status, parity, mode of delivery, employment status and pre-existing health conditions.

Study instruments

Wijma Delivery Expectancy/Experience Questionnaire Version B (W-DEQ-B)

Fear of childbirth was assessed using the W-DEQ-B, a validated instrument designed to evaluate childbirth-related fear and emotional responses after delivery. The questionnaire consists of 33 items scored on a six-point Likert scale, with higher scores indicating greater fear of childbirth. Participants were categorized into low, moderate, high, and severe levels of fear according to established score ranges (Wijma *et al.*, 1998).

Edinburgh Postnatal Depression Scale (EPDS)

Depressive symptoms were assessed using the EPDS, a 10-item self-report instrument widely used for screening postpartum depressive symptoms. Total scores range from 0 to 30, with higher scores indicating greater symptom severity. Participants were categorized into minimal, mild, moderate, and severe depressive symptom groups (Cox *et al.*, 1987).

Multidimensional Assessment of Fatigue (MAF) scale

Fatigue was evaluated using the MAF. The instrument measures degree, severity, distress, impact, and frequency of fatigue. A Global Fatigue Index (GFI) was calculated according to the standard scoring procedure, with higher scores representing greater fatigue. This contains 16 items, measures four dimensions of fatigue: Degree of fatigue (Item-1), severity of fatigue (Item-2), distress of feeling fatigue (Item-3), impact of fatigue (Item-4 to 14), frequency of fatigue (Item-15), and Item-16 describes how fatigue has changed (Belza *et al.*, 1993; Fairbrother *et al.*, 2008).

Pittsburgh Sleep Quality Index (PSQI)

Sleep quality was assessed using the PSQI. It is a widely used self-report tool. It is validated in pregnancy and commonly used to assess and evaluate sleep quality and disturbances across seven components over the preceding month. This assessment includes seven component scores: subjective sleep quality, sleep latency,

duration, habitual sleep efficiency, sleep disturbances, use of sleep aids, and daytime dysfunction, which are derived from its 19 items. Global PSQI scores range from 0 to 21, with higher scores indicating poorer sleep quality (Bergamini *et al.*, 2024).

Statistical analysis

The data collected were entered into Microsoft Excel version 2108. Descriptive statistics were performed for mean, median, standard deviation, and frequency using JASP (Jeffreys's Amazing Statistics Program) statistical software version 0.19.3.0. The difference between the 2 groups was tested with the Shapiro-Wilk test for normality. If the data were normal, a Student's *t*-test was performed; if the data were not normal, then a Mann-Whitney U test was performed, and the *p*-value was obtained. An association between two independent groups was performed using the chi-square test, and the *p*-value was obtained. Significance of the *p*-value was considered at <0.05 .

RESULTS

Distribution of fear of childbirth, depressive symptoms, fatigue, and sleep difficulty

A total of 81 women in the immediate postpartum period were included in the analysis. The distribution of Fear of Childbirth (FoC), depressive symptoms, fatigue, and sleep difficulty is presented in Table 1, while the overall prevalence of the clinically relevant outcomes is summarized in Figure 1.

Severe FoC (W-DEQ-B score ≥ 85) was observed in 77 participants (95.1%), whereas only four women (4.9%) had low, moderate, or high levels of FoC. Mild depressive symptoms were the most common EPDS category and were reported by 44 women (54.3%), followed by moderate depressive symptoms in 22 women (27.2%) and severe depressive symptoms in seven women (8.6%). Moderate fatigue was reported by 45 participants (55.6%), and severe fatigue by two participants (2.5%). Regarding sleep quality, 41 women (50.6%) had moderate sleep difficulty, and one participant (1.2%) had severe sleep difficulty. Figure 1 illustrates the prevalence of severe FoC (95.1%), moderate-to-severe depressive symptoms (35.8%), moderate-to-severe fatigue (58.0%), and moderate-to-severe sleep difficulty (51.9%).

Factors associated with severe fear of childbirth

The association between severe FoC and selected sociodemographic and obstetric characteristics is presented in Table 2. Severe FoC was not significantly associated with age, educational status, socioeconomic status, parity, mode of delivery, pre-existing health conditions, or employment status (all $p>0.05$). Although a higher proportion of employed women reported severe FoC, the comparison group comprised only four women with non-severe FoC, and no statistically robust association was demonstrated in this cohort.

Composite scale scores

The descriptive statistics of the composite scores for W-DEQ-B, EPDS, MAF, and PSQI are shown in Table 6. The mean W-DEQ-B score was 104.20 ± 17.18 , indicating a high overall level of childbirth-related fear in the study population. The mean EPDS score was 12.28 ± 4.82 , the mean MAF score was 25.38 ± 8.95 , and the mean global PSQI score was 7.85 ± 3.31 .

Item-level responses on the W-DEQ-B are presented in Table 3. Among the domains assessed, the highest mean scores were observed for Dangerous (3.69 ± 1.64), Frightful (3.65 ± 1.22), Lonely (3.64 ± 1.39), Hopelessness (3.61 ± 1.48), and lose my control (3.59 ± 1.43), indicating prominent perceptions of danger, fear, loneliness, and loss of control during the childbirth experience. Concerns related to the baby were comparatively lower, with mean scores of 1.84 ± 1.14 for fantasies that the child will die and 2.13 ± 1.49 for fantasies that the child will be injured.

The multidimensional characteristics of fatigue are shown in Table 4. The highest mean score was observed for frequency of fatigue (6.41 ± 2.38), followed by degree of fatigue (5.27 ± 2.45) and distress due to fatigue (4.93 ± 2.62). The mean Global Fatigue Index (GFI) score was 25.38 ± 8.88 , indicating a moderate overall fatigue burden in the study population.

The component-wise PSQI scores are presented in Table 5. The mean global PSQI score was 7.85 ± 3.29 . Among the seven PSQI components, sleep disturbance (1.73 ± 0.52) and sleep latency (1.49 ± 0.92) had the highest mean scores, whereas use of sleep medication (0.25 ± 0.66) had the lowest score (Table 5).

Correlations among fear of childbirth, depressive symptoms, fatigue, and sleep difficulty

Spearman correlation analysis was performed to examine the relationships among the four psychological domains (Table 7). A significant positive correlation was observed between fatigue and depressive symptoms ($r=0.312$, $p=0.005$). No significant correlations were found between FoC and depressive symptoms ($r=0.057$, $p=0.610$), FoC and fatigue ($r=-0.201$, $p=0.071$), FoC and sleep quality ($r=-0.134$, $p=0.232$), fatigue and sleep quality ($r=0.103$, $p=0.362$), or sleep quality and depressive symptoms ($r=-0.023$, $p=0.841$).

DISCUSSION

This prospective analytical study investigated the prevalence and interrelationships of FoC, depressive symptoms, fatigue, and sleep quality among women in the immediate postpartum period. The findings demonstrate a substantial burden of psychological morbidity shortly after childbirth, characterized by an exceptionally high prevalence of severe FoC, clinically relevant depressive symptoms, moderate fatigue, and impaired sleep quality. Importantly, fatigue was the only domain that showed a significant association with depressive symptoms, whereas FoC was not significantly correlated with depression, fatigue, or sleep quality (Table 7). These findings suggest that childbirth-related fear may persist as a relatively independent dimension of postpartum psychological distress and highlight the need for multidimensional psychological assessment during the immediate postpartum period.

The most striking finding of the present study was the exceptionally high prevalence of severe FoC, with 95.1% of participants scoring ≥ 85 (Table 1) on the W-DEQ-B. This prevalence exceeds that

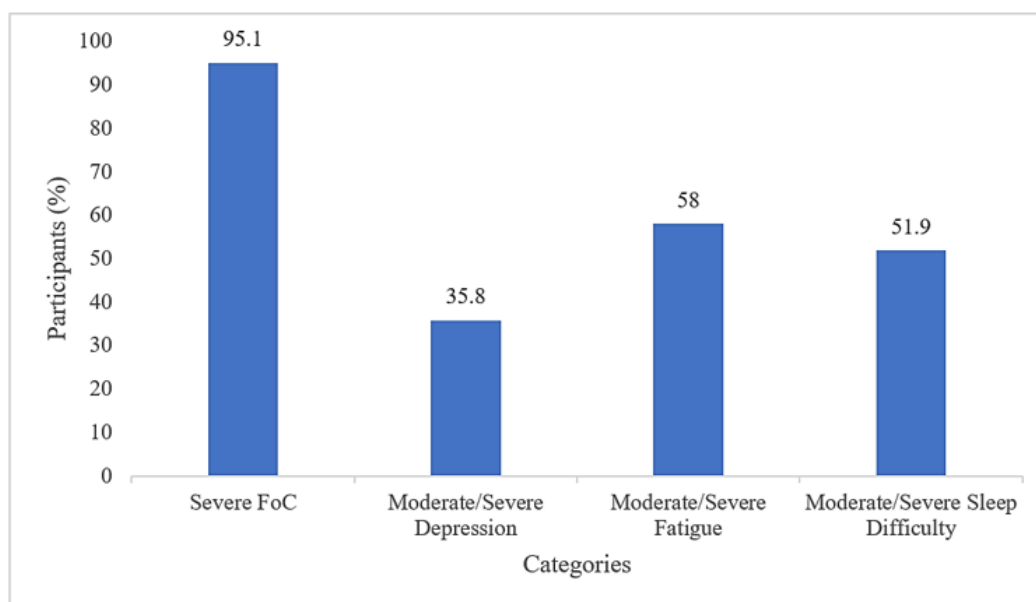


Figure 1: Prevalence of severe fear of childbirth, moderate/severe depressive symptoms, moderate/severe fatigue, and moderate/severe sleep difficulty among women in the immediate postpartum period.

Table 1: Distribution of scores for different scales used in the study (n=81).

Scales	Scores	n	%
Fear of childbirth (W-DEQ-B)	≤37 (low level of fear)	0	0
	38-65 (moderate level of fear)	1	1.23
	66-84 (high level of fear)	3	3.70
	≥85 (severe level of fear)	77	95.06
Depressive symptoms (EPDS)	0-6 (no/minimal depression)	8	9.87
	7-13 (mild depression)	44	54.32
	14-19 (moderate depression)	22	27.16
	20-30 (severe depression)	7	8.64
Fatigue (MAF)	1-12 (non or minimal)	6	7.40
	13-25 (mild)	28	34.56
	26-38 (moderate)	45	55.55
	39-50 (severe)	2	2.46
Sleep difficulty (PSQI)	0 (no sleep difficulty)	0	0
	1-7 (mild sleep difficulty)	39	48.14
	8-14 (moderate sleep difficulty)	41	50.61
	15-21 (severe sleep difficulty)	1	1.23

reported in most postpartum cohorts internationally. Postpartum studies using the W-DEQ-B have generally reported substantially lower frequencies of severe FoC, with prevalence estimates typically ranging from approximately 10% to 32% depending on the timing of assessment, cultural context, and diagnostic threshold applied (Bergamini *et al.*, 2024; Mortazavi and Mehrabadi, 2021). The markedly elevated prevalence observed in the present study is likely attributable to the timing of evaluation, as women were assessed during the immediate postpartum period, when recollection of labour pain, obstetric interventions, uncertainty during delivery, and concerns regarding maternal and neonatal outcomes remain particularly vivid. Immediate postpartum assessment captures the acute emotional and cognitive response to childbirth rather than the more stabilized psychological state observed several weeks or months later. The mean W-DEQ-B score of 104.2 further indicates that childbirth was perceived by many participants as an intensely distressing experience characterized by vulnerability, perceived danger, and loss of control.

The item-level W-DEQ-B analysis provides additional insight into the psychological profile of postpartum FoC in this cohort. The highest mean scores were observed for items related to danger, fright, loneliness, hopelessness, and loss of control, whereas concerns regarding infant death or injury were comparatively lower. This pattern is consistent with factor-analytic studies of the W-DEQ-B demonstrating that postpartum FoC is strongly influenced by emotional vulnerability, perceived threat, and disrupted self-efficacy rather than exclusively by concerns regarding neonatal outcomes (Wijma *et al.*, 1998; Varela *et al.*, 2025). The prominence of loneliness and hopelessness in

the immediate postpartum period may also reflect the abrupt transition from pregnancy to motherhood and the psychological impact of childbirth itself.

Depressive symptoms were common in the present cohort, with more than one-third of women exhibiting moderate-to-severe symptomatology. The mean EPDS score of 12.3 is comparable to findings from several hospital-based postpartum studies in South Asian populations, where elevated depressive symptoms have frequently been reported during the first postpartum week (Upadhyay *et al.*, 2017; Belza *et al.*, 1993). The Edinburgh Postnatal Depression Scale was selected because it is the most extensively validated screening instrument for postpartum depressive symptoms and has demonstrated good sensitivity and specificity across diverse cultural settings, including low- and middle-income countries (Belza *et al.*, 1993). The predominance of mild depressive symptoms in our cohort is clinically relevant because subthreshold depressive symptoms are associated with impaired maternal functioning, breastfeeding difficulties, reduced mother-infant interaction, and increased risk of progression to clinically significant postpartum depression if left unidentified and untreated (Moehler *et al.*, 2006).

Fatigue represented another major component of postpartum morbidity in the present study. More than half of the participants reported moderate fatigue, and the mean Global Fatigue Index indicated a substantial functional burden. The MAF scale was selected because it evaluates multiple dimensions of fatigue, including severity, frequency, distress, and interference with daily activities, thereby providing a more comprehensive assessment than single-item fatigue measures. The highest scores were observed for frequency and degree of fatigue, suggesting

Table 2: Sociodemographic and obstetric factors associated with FoC, depression, fatigue and sleep quality in the immediate postpartum period (n=81).

Variables	Severe level of FoC n=77 (%)	Low, moderate and high level of FoC n=4 (%)	p-value	Severe, moderate level of depression n=29 (%)	Minimal, mild level of depression n=52 (%)	p-value	Severe, moderate level of fatigue n=48 (%)	Minimal, mild level of fatigue n=33 (%)	p-value	Severe, moderate level of sleep difficulty n=42 (%)	No, mild level of sleep difficulty n=39 (%)	p-value
Age (years) ($\bar{x}$)	29 $\pm$ 4.72	27 $\pm$ 6.16	0.37	29.62 $\pm$ 4.83	29.75 $\pm$ 4.84	0.86	29.85 $\pm$ 5.09	29.48 $\pm$ 4.43	0.63	29.9 $\pm$ 4.95	29.48 $\pm$ 4.7	0.58
Educational status												
No formal education	1 (1.29)	0 (0)	0.64	1 (3.44)	0 (0)	0.24	1 (2.08)	0 (0)	0.65	0 (0)	1 (2.56)	0.51
Primary and secondary degree	13 (16.88)	0 (0)		3 (10.34)	10 (19.23)		7 (14.58)	6 (18.18)		6 (14.28)	7 (17.94)	
University degree	63 (81.81)	4 (100)		25 (86.2)	42 (80.76)		40 (83.33)	27 (81.81)		36 (85.71)	31 (87.17)	
Socio-economic status												
Low	17 (22.07)	2 (50)	0.19	5 (17.24)	5 (9.61)	0.31	10 (20.83)	11 (33.33)	0.2	11 (26.19)	10 (25.64)	0.95
Middle	60 (77.92)	2 (50)		24 (82.75)	47 (90.38)		38 (79.16)	22 (66.66)		31 (73.8)	29 (74.35)	
Parity												
Primiparity	31 (40.25)	3 (75)	0.16	12 (41.37)	22 (42.3)	0.93	16 (33.33)	18 (54.54)	0.05	17 (40.47)	17 (43.58)	0.77
Multiparity	46 (59.74)	1 (25)		17 (58.62)	30 (57.69)		32 (66.66)	15 (45.45)		25 (59.52)	22 (56.41)	
Mode of birth												
Vaginal delivery	38 (49.35)	3 (75)	0.31	11 (37.93)	30 (57.69)	0.08	24 (50)	17 (51.51)	0.89	27 (64.28)	19 (48.71)	0.41
Caesarean section	39 (50.64)	1 (25)		18 (62.06)	22 (42.3)		24 (50)	16 (48.48)		20 (47.61)	20 (51.28)	
Pre-existing health conditions												
Yes	11 (14.28)	1 (25)	0.55	2 (6.89)	10 (19.23)	0.13	8 (16.66)	4 (12.12)	0.57	7 (16.66)	5 (12.82)	0.62
No	66 (85.71)	3 (75)		27 (93.1)	42 (80.76)		40 (83.33)	29 (87.87)		35 (83.33)	34 (87.17)	
Employment status												
Employed	20 (25.97)	3 (75)	0.03	6 (20.68)	17 (32.69)	0.25	8 (16.66)	15 (45.45)	0.004	9 (21.42)	14 (35.89)	0.14
Unemployed	57 (74.02)	1 (25)		23 (79.31)	35 (67.3)		40 (83.33)	18 (54.54)		33 (78.57)	25 (64.1)	

FoC = Fear of Childbirth.

Table 3: Descriptive statistics of Wijma Delivery Expectancy/Experience Questionnaire Version B (W-DEQ-B) according to original questionnaire item numbers (n=81).

Variable	Min~Max	Mean (SD)	Median (IQR)	Variance	p value
Lack of positive feelings					
18. Happy	1~6	3.01(1.47)	3(2.00)	2.162	<0.001
16. Composed	1~6	3.18(1.46)	3(2.00)	2.153	<0.001
13. Glad	1~6	2.97(1.49)	3(2.00)	2.224	<0.001
17. Relaxed	1~6	3.24(1.43)	3(2.00)	2.063	<0.001
10. Independent	1~6	3.34(1.37)	3(1.00)	1.879	<0.001
9. Safe	1~6	2.92(1.40)	3(2.00)	1.969	<0.001
22. Self-confident	1~6	3.09(1.47)	3(2.00)	2.165	<0.001
14. Proud	1~6	2.65(1.47)	2(3.00)	2.179	<0.001
4. Strong	1~6	2.98(1.25)	3(2.00)	1.562	<0.001
5. Confident	1~6	2.91(1.32)	3(2.00)	1.755	<0.001
1. Fantastic	1~6	2.98(1.30)	3(2.00)	1.712	<0.001
Fear and pain					
19. Panic	1~6	3.21(1.58)	3(2.00)	2.518	<0.001
2. Frightful	1~6	3.65(1.22)	4(1.00)	1.504	<0.001
6. Afraid	1~6	3.44(1.46)	4(1.00)	2.150	<0.001
24. Pain	1~6	2.71(1.54)	2(3.00)	2.381	<0.001
11. Desolate	1~6	3.34(1.25)	3(1.00)	1.579	<0.001
31. Dangerous	1~6	3.69(1.64)	4(2.00)	2.716	<0.001
12. Tense	1~6	3.11(1.43)	3(2.00)	2.050	<0.001
Concerns about childbirth					
29. Natural	1~6	2.74(1.35)	3(2.00)	1.844	<0.001
28. Joyful	1~6	3.40(1.35)	3(1.00)	1.844	<0.001
30. As expected	1~6	2.59(1.31)	3(1.00)	1.719	<0.001
23. Trust	1~6	2.85(1.42)	3(2.00)	2.028	<0.001
21. Longing for a child	1~6	3.17(1.43)	3(2.00)	2.045	<0.001
Loneliness					
7. Deserted	1~6	3.48(1.37)	3(1.00)	1.878	<0.001
3. Lonely	1~6	3.64(1.39)	4(2.00)	1.958	<0.001
15. Abandoned	1~6	3.43(1.49)	3(3.00)	2.223	<0.001
8. Weak	1~6	3.37(1.39)	3(2.00)	1.926	<0.001
20. Hopelessness	1~6	3.61(1.48)	3(2.00)	2.189	<0.001
Lack of positive behaviours					
26. Control	1~6	3.19(1.40)	3(2.00)	1.985	<0.001
25. Behaved badly	1~6	3.48(1.48)	3(2.00)	2.203	<0.001
27. Lose my control	1~6	3.59(1.43)	3(2.00)	2.069	<0.001
Concerns for the baby					
32. Fantasies that the child will die	1~6	1.84(1.14)	1(1.00)	1.311	<0.001
33. Fantasies that the child will be injured	1~6	2.13(1.49)	1(2.00)	2.244	<0.001

Min- Minimum, Max- Maximum, SD - Standard deviation, IQR - Interquartile range.

that fatigue was both persistent and functionally significant. These findings are consistent with previous postpartum studies reporting that maternal fatigue remains one of the most common and disabling symptoms during the early postpartum period and is associated with reduced physical recovery, diminished caregiving capacity, lower breastfeeding confidence, and poorer psychological adjustment (Daneshmandi *et al.*, 2019; Yi and Ahn, 2024).

Sleep disturbance was similarly prevalent, with approximately half of the women experiencing moderate sleep difficulty. The mean global PSQI score exceeded the conventional threshold for poor sleep quality, indicating clinically meaningful sleep impairment within the cohort. The PSQI was chosen because it is a validated multidimensional instrument that assesses subjective sleep quality, sleep latency, duration, efficiency, disturbance, medication use, and daytime dysfunction, making it particularly suitable for postpartum populations in whom sleep disruption arises from multiple physiological and environmental factors (Motta *et al.*, 2024). The highest component scores were observed for sleep disturbance and sleep latency, findings that are biologically plausible given nocturnal infant feeding, postpartum discomfort, and hospital-related interruptions. Similar patterns of postpartum sleep fragmentation have been reported by Hunter *et al.*, 2009; Insana *et al.* (2013), who demonstrated that poor sleep quality is highly prevalent during the first postpartum weeks and may contribute to impaired maternal mood and functioning.

The most important analytical finding of the present study was the significant positive correlation between fatigue and depressive symptoms ($r=0.312$, $p=0.005$). This association is consistent with previous evidence indicating that early delivery fatigue and depression frequently coexist and may interact through shared biological and psychological mechanisms. Sleep fragmentation, inflammatory activation, hormonal fluctuations, and reduced psychosocial coping capacity have all been proposed as mechanisms linking fatigue with depressive symptomatology during the early delivery period (Baattaiah *et al.*, 2023). The observed correlation suggests that women experiencing greater physical exhaustion are also more likely to report emotional distress, reinforcing the importance of integrating fatigue assessment into routine postpartum mental health screening.

In contrast, FoC was not significantly correlated with depressive symptoms, fatigue, or sleep quality. Although FoC has often been associated with antenatal anxiety and depressive symptoms, postpartum FoC may represent a distinct psychological construct reflecting the woman's appraisal of the childbirth experience itself (Slade *et al.*, 2019; Grundström *et al.*, 2022). Women may continue to experience intense fear related to perceived danger, loss of control, traumatic obstetric experiences, or concerns regarding future childbirth even in the absence of clinically significant depression or severe sleep disturbance. The lack of significant correlations observed in our study therefore supports the concept that postpartum FoC should be assessed independently rather

Table 4: Descriptive statistics of the MAF scale (n=81).

Dimensions	Item number	Mean±SD	Min~Max
Degree of fatigue	1	5.27±2.45	1~10
Severity of fatigue	2	4.54±2.34	1~10
Distress due to fatigue	3	4.93±2.62	1~10
Impact of fatigue on daily activities	4-14	4.63±1.70	1~10
Frequency of fatigue	15	6.41±2.38	2.5~10
*How fatigue has changed	16	2.46±1.00	1~4
GFI	-	25.38±8.88	1~50

*Not included in global fatigue index calculation. Min- Minimum, Max- Maximum, SD - Standard deviation, GFI- Global fatigue index.

Table 5: Descriptive Statistics of Pittsburgh Sleep Difficulty Index Scores (n=81).

Categories		Mean±SD	Min~Max
Global PSQI score (total score)		7.85±3.289	0~21
Component 1	Subjective sleep difficulty	1.09±0.670	0~3
Component 2	Sleep latency	1.49±0.917	0~3
Component 3	Sleep duration	1.17±1.108	0~3
Component 4	Habitual sleep efficacy	1.11±1.266	0~3
Component 5	Sleep disturbance	1.73±0.521	0~3
Component 6	Use of sleep medication	0.25±0.657	0~3
Component 7	Daytime dysfunction	0.98±0.702	0~3

Min- Minimum, Max- Maximum, SD - Standard deviation, PSQI- Pittsburgh Sleep Quality Index.

Table 6: Descriptive statistics for the composite score of the scales.

Variables	Mean	SD	Skewness	Kurtosis	Min	Max
W-DEQ-B	104.198	17.18	2.143	10.085	19	65
EPDS	12.284	4.820	0.006	0.078	1	23
MAF	25.383	8.945	-0.875	0.770	1	44
PSQI	7.852	3.309	0.066	0.529	2	15

Min- Minimum, Max- Maximum, SD - Standard deviation, W-DEQ-B- Wijma Delivery Expectancy/Experience Questionnaire Version B, EPDS- Edinburgh Postnatal Depression Scale, MAF- Multidimensional Assessment of Fatigue, PSQI- Pittsburgh Sleep Quality Index.

Table 7: Correlations between variables.

Correlations	Results	Comments
EPDS - MAF	$r=0.312, p=0.005$	Significant
MAF - PSQI	$r=0.103, p=0.362$	Not significant
PSQI - W-DEQ-B	$r=-0.134, p=0.232$	Not significant
W-DEQ-B - EPDS	$r=0.057, p=0.610$	Not significant
MAF - W-DEQ-B	$r=-0.201, p=0.071$	Not significant
PSQI - EPDS	$r=-0.023, p=0.841$	Not significant

W-DEQ-B- Wijma Delivery Expectancy/Experience Questionnaire Version B, EPDS- Edinburgh Postnatal Depression Scale, MAF- Multidimensional Assessment of Fatigue, PSQI- Pittsburgh Sleep Quality Index.

than assumed to be adequately captured by depression screening alone.

Sociodemographic and obstetric variables were not significantly associated with severe FoC in this cohort, although employment status showed a statistical association in the bivariate analysis. Because only four women were classified as having non-severe FoC, these subgroup analyses should be interpreted cautiously, as the extremely small comparison group substantially limited statistical power and the precision of effect estimates.

An important methodological consideration concerns the assessment of Socioeconomic Status (SES). SES in the present study was based on participant self-report and therefore reflected perceived household economic position rather than objectively verified income. Notably, none of the participants identified themselves as belonging to a high-income group despite considerable variation in educational attainment and employment status. This finding likely reflects the subjective nature of income reporting, cultural reluctance to disclose financial status, and the tendency for individuals to evaluate economic position relative to their surrounding community rather than absolute income. Consequently, the SES variable should be interpreted as perceived socioeconomic status rather than an objective measure of income, and this subjective classification may have attenuated potential associations between SES and psychological outcomes.

The study possesses several methodological strengths. The prospective design reduced recall bias, and the simultaneous administration of four internationally validated instruments enabled a comprehensive assessment of postpartum psychological health across multiple domains. The W-DEQ-B was particularly

appropriate for capturing childbirth-specific fear, the EPDS for postpartum depressive symptoms, the MAF for multidimensional fatigue, and the PSQI for global sleep quality. The concurrent use of these instruments allowed direct examination of the overlap and independence of postpartum psychological constructs within the same cohort.

Several limitations should also be acknowledged. The study was conducted at a single tertiary care centre with a relatively small sample size, which may limit external validity. The very high prevalence of severe FoC resulted in limited variability within W-DEQ-B categories and reduced statistical power for subgroup analyses and multivariable modelling. Psychological outcomes were assessed only during the immediate postpartum period, preventing evaluation of temporal changes or causal relationships. In addition, socioeconomic status was based on subjective participant reporting rather than objective income verification. Future multicenter longitudinal studies with larger samples and repeated postpartum assessments are required to determine the persistence of FoC and its long-term impact on maternal mental health, maternal functioning, and subsequent reproductive decision-making.

CLINICAL IMPLICATIONS

The findings of this study have important implications for routine maternal care during the early post-delivery period. The exceptionally high prevalence of severe fear of childbirth together with substantial depressive symptoms, fatigue, and sleep disturbance indicates that psychological assessment should be integrated into routine post-delivery care rather than relying solely on screening for postpartum depression. Assessment during the first 24 hr after childbirth provides a valuable opportunity to identify women experiencing significant childbirth-related fear in conjunction with recent depressive symptoms, fatigue, and antecedent sleep disturbance before hospital discharge. The observed association between fatigue and depressive symptoms suggests that women presenting with marked fatigue should also be evaluated for depressive symptoms, as these conditions may coexist and contribute to impaired maternal functioning. Incorporating multidimensional screening for childbirth-related fear, depressive symptoms, fatigue, and sleep quality into routine obstetric practice could facilitate timely counselling, psychological support and structured follow-up, particularly in

tertiary-care settings where women remain accessible during the immediate post-delivery period.

STRENGTHS AND LIMITATIONS

This study has several strengths, including its prospective design, the simultaneous assessment of multiple validated psychological instruments, and the focus on the immediate postpartum period, which is often underrepresented in postpartum mental health research. However, the findings should be interpreted in light of certain limitations. The study was conducted at a single tertiary care centre with a relatively small sample size, which may limit generalizability. The predominance of severe fear of childbirth reduced variability within W-DEQ-B categories and may have limited the ability to detect associations with other variables. In addition, the assessment of psychological outcomes during the immediate postpartum period precludes causal inference regarding the observed relationships. Larger multicentre longitudinal studies are warranted to determine the persistence of postpartum fear of childbirth and its long-term impact on maternal mental health and future reproductive decisions.

FUTURE DIRECTIONS

- Longitudinal follow-up studies.
- Intervention-based research.
- Integration into routine obstetric protocols.

CONCLUSION

This prospective analytical study demonstrated an exceptionally high prevalence of severe fear of childbirth in the immediate postpartum period, accompanied by substantial levels of fatigue, sleep disturbance, and depressive symptoms. Among the psychological domains assessed, fatigue showed a significant positive association with depressive symptoms, whereas fear of childbirth was not significantly correlated with depression, fatigue, or sleep quality, suggesting that childbirth-related fear may represent a relatively independent dimension of postpartum psychological distress. These findings highlight the need for multidimensional postpartum screening strategies that extend beyond depression alone and include assessment of fear of childbirth, fatigue, and sleep quality. Early identification of women experiencing these conditions may facilitate timely psychological support and improve maternal recovery and postpartum wellbeing.

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ABBREVIATIONS

FoC: Fear of Childbirth; **W-DEQ-B:** Wijma Delivery Expectancy/Experience Questionnaire, Version B; **EPDS:** Edinburgh Postnatal Depression Scale; **MAF:** Multidimensional Assessment of Fatigue; **PSQI:** Pittsburgh Sleep Quality Index; **GFI:** Global Fatigue Index; **JASP:** Jeffrey's Amazing Statistics Program; **SD:** Standard Deviation; **IQR:** Interquartile Range; **Min:** Minimum; **Max:** Maximum.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ETHICAL CONSIDERATION

The study was conducted in accordance with the principles of the Declaration of Helsinki. Ethical approval was obtained from the Institutional Ethics Committee of the participating institution before commencement of the study. Written informed consent was obtained from all participants before enrolment, and confidentiality of participant information was maintained throughout the study.

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