Original Article

Prevalence of Post-Partum Depression (PDD) and Factors Associated with it Among Postnatal Mothers Visiting A Tertiary Care Centre – A Cross Sectional Study

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ABSTRACT

Background: Postpartum depression (PPD) is a major maternal mental-health problem with significant consequences for both mother and infant. Prevalence in India varies widely, with higher rates reported in southern states. Limited data are available from northern Karnataka, particularly Kalaburagi, despite regional socioeconomic vulnerabilities. Therefore, the present was undertaken to estimate the prevalence of postpartum depression and identify associated sociodemographic, obstetric, neonatal, and psychosocial determinants among mothers attending the immunisation clinic of a tertiary care centre in Kalaburagi.

Methods: An analytical cross-sectional study was conducted among 380 postpartum mothers using systematic random sampling. Data were collected through a pre-tested questionnaire and the Edinburgh Postnatal Depression Scale (EPDS). A cutoff score of ≥13 identified probable PPD. Associations were examined using Chi-square tests, and significant variables (p < 0.20) were included in multivariable logistic regression. Adjusted odds ratios (AOR) with 95% confidence intervals (CI) were computed.

Results: The prevalence of probable PPD was 29.2%, while 28.4% had possible depression (EPDS 8–12). Lower education (45.3% vs. 18.7%), low socioeconomic status (40.6% vs. 20.9%), unwanted pregnancy (52.0% vs. 20.9%), infant illness (47.0% vs. 24.2%), husband's alcohol use (46.8% vs. 16.9%), low family support (50.4% vs. 17.7%), poor marital relationship (53.9% vs. 12.8%), and family conflict (45.1% vs. 17.4%) were significantly associated with PPD (p < .05). In multivariable analysis, key predictors included low socioeconomic status (AOR 2.36, 95% CI: 1.31–4.24), unwanted pregnancy (AOR 3.12, 1.77–5.48), infant illness (AOR 2.09, 1.15–3.78), and low family support (AOR 3.58, 2.06–6.23).

Conclusion: Socioeconomic vulnerability, unintended pregnancy, neonatal illness, and inadequate family support are major determinants. Incorporating routine PPD screening into immunisation clinics and strengthening family-centered psychosocial support services are essential for early detection and improved maternal and child health outcomes.

Keywords: Postpartum depression, Edinburgh Postnatal Depression Scale, immunisation clinic, maternal mental health, psychosocial determinants.

INTRODUCTION:

Postpartum depression (PPD) is a major maternal mental-health disorder occurring within the first year following childbirth, marked by persistent sadness, anhedonia, irritability, fatigue, and functional impairment [1]. It is more severe and prolonged than transient postpartum blues and has substantial consequences for maternal wellbeing, child development,

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and family functioning [2,3]. Global estimates suggest PPD affects 10–20% of postpartum women, but the burden is significantly higher in low- and middle-income countries due to social adversity, limited mental-health services, and heightened obstetric and psychosocial stressors [4].

In India, pooled prevalence ranges between 18% and 25% [5], with studies from South India reporting substantial burden. Research from Udupi documented a prevalence of 21.5% [6], while studies from Mangaluru reported rates between 23–34% [7,8]. Goa-based research also reported prevalence close to 30% [9]. A recent Karnataka study by Nisarga et al. reported a prevalence of 44%, suggesting substantial geographical and socioeconomic variation within the state [10]. A comprehensive Indian review concluded that southern states such as Karnataka, Kerala, and Tamil Nadu show some of the highest PPD burdens nationally [11].

Risk factors for PPD are multidimensional. Socioeconomic disadvantage, low education, and financial strain consistently elevate risk [6–8]. Obstetric determinants—including unintended pregnancy, delivery complications, and lack of antenatal preparedness—significantly increase vulnerability, with meta-analyses showing women with unintended pregnancies have up to 2.5-fold higher odds of developing PPD [5]. Neonatal factors such as infant illness, NICU stay, and birth complications further intensify maternal stress, as shown in studies from Udupi and Ethiopia [6,12]. Psychosocial determinants—particularly low family support, marital strain, family conflict, and husband's alcohol use—are especially influential in the Indian cultural context, where extended families play a central role in postpartum care [7,8,13].

Consequences of untreated PPD are profound. It is associated with impaired mother–infant bonding, early cessation of breastfeeding, developmental delays, increased risk of diarrheal and febrile illnesses in infants, and long-term maternal morbidity [14–16]. Early detection is therefore essential. The Edinburgh Postnatal Depression Scale (EPDS), developed by Cox et al. [17] is widely used and recommended for screening. Immunisation clinics provide an ideal setting for routine PPD screening, as they ensure near-universal contact with postpartum mothers during the early months after delivery. However, data on PPD from northern Karnataka, particularly Kalaburagi, remain limited despite the region's socioeconomic diversity and known maternal-health disparities.

Therefore, the present study aimed to estimate the prevalence of postpartum depression and identify associated sociodemographic, obstetric, neonatal, and psychosocial determinants among mothers attending the immunisation clinic of a tertiary care centre in Kalaburagi, Karnataka.

Materials and methods:
The present cross-sectional study was conducted among mothers attending the immunisation clinic of a tertiary care centre in Kalaburagi, Karnataka. The centre caters to families from urban, peri-urban, and rural areas, ensuring diverse representation. Immunisation clinics were chosen because they provide consistent access to postpartum mothers during routine vaccination visits, making them an effective platform for postpartum mental-health screening. The study was conducted over six months, including data collection, supervision, data entry, and verification.

Study population: The study population consisted of postpartum mothers accompanying their infants for vaccination at the immunisation clinic.

Inclusion criteria:
- Mothers aged ≥18 years
- Mothers between 6 weeks and 6 months postpartum
- Provided informed written consent

Exclusion criteria:
- Mothers with known severe psychiatric illness under active treatment
- Mothers with critical illness at the time of data collection
- Mothers whose infants were critically ill or hospitalised
- Non-consenting mothers

Sample size:
The sample size was calculated using the prevalence (p) of postpartum depression reported by Nisarga et al. (2023), who documented a prevalence of 44%.

Sample size was calculated using following formula:
$n = Z^2 p(1-p)/d^2$. Using a prevalence estimate of 44% from Nisarga et al. [10], with a 95% confidence level (Z = 1.96) and 5% margin of error (d = 0.05), the minimum required sample size was 378, which was rounded to 380. Thus, 380 postpartum mothers were enrolled in the study.

A systematic random sampling method was used, a random starting number was selected, followed by every k-th eligible mother until the daily quota was achieved.

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Data collection procedure:

Before initiating data collection each day, the investigator obtained the list of mothers scheduled for child immunisation. Using the predetermined sampling interval, eligible mothers were approached consecutively according to the systematic sampling plan. Each potential participant was explained the purpose of the study in her preferred language, either Kannada or Hindi. Written informed consent was obtained from those who agreed to participate.

Interviews were conducted in a designated private area within or adjacent to the immunisation clinic to ensure confidentiality and minimize distractions. This setting allowed mothers to feel comfortable and secure while discussing personal and sensitive matters.

Each participant underwent a structured face-to-face interview conducted by a trained female research investigator familiar with maternal and child health issues. The use of a female interviewer facilitated rapport-building and encouraged open communication, especially for sensitive psychosocial questions. The interview began with sociodemographic details, followed by obstetric history, neonatal factors, and psychosocial variables.

Once the general questionnaire was completed, the Edinburgh Postnatal Depression Scale (EPDS) was administered [17]. The investigator read each item aloud, if required, and clarified any doubts regarding the phrasing or meaning of the questions without leading the participant toward specific responses. During the interview, mothers showing visible distress or hesitancy were gently reassured and offered short breaks to maintain comfort. If any mother reported suicidal thoughts or demonstrated severe emotional symptoms while responding to the EPDS, the interviewer immediately informed the supervising clinician and facilitated referral to the Psychiatry Department.

RESULTS:

Table 1 : Sociodemographic and obstetric characteristics of participants

Variable	Number	Percentage
Age (years)		
<20	48	12.6
20–24	162	42.6
25–29	132	34.7
≥30	38	10.0
Education		
<High school	150	39.5
High school & above	230	60.5
Socioeconomic status		
Lower	170	44.7
Lower-middle	137	36.1
Middle/upper	73	19.2
Family type		
Nuclear	198	52.1
Joint	182	47.9
Parity		
Primiparous	207	54.5
Multiparous	173	45.5
Pregnancy intention		
Wanted	278	73.2
Unwanted	102	26.8

Table 1 presents the sociodemographic and obstetric profile of the 380 participants. The majority of mothers were between 20–24 years (42.6%) and 25–29 years (34.7%), indicating that most women in the sample were in their early to mid-reproductive years. More than half (60.5%) had completed high school or higher education, whereas 39.5% had lower educational attainment. Socioeconomic distribution showed that 44.7% belonged to the lower socioeconomic class, with an additional 36.1% in the lower-middle category, reflecting the economically vulnerable catchment of the tertiary care center. Slightly more mothers lived in nuclear families (52.1%) compared to joint families (47.9%). Obstetrically, primiparous women comprised 54.5% of the sample, while 26.8% reported their most recent pregnancy as unwanted.

Table 2 : Association between participant characteristics and Postpartum Depression

Variable	PPD Present	Percentage	χ² / p - value
Education			χ² = 12.87, p < .001
<High school	68	45.3	
High school+	43	18.7	
Socioeconomic status			χ² = 11.81, p = .001
Lower	69	40.6	
Middle+	42	20.9	
Husband's alcohol use			χ² = 19.42, p < .001
Yes	72	46.8	
No	39	16.9	
Pregnancy intention			χ² = 15.87, p < .001
Unwanted	53	52.0	
Wanted	58	20.9	
Infant illness			χ² = 9.34, p = .002
Yes	39	47.0	
No	72	24.2	
Family support			χ² = 23.61, p < .001
Low	71	50.4	
Moderate/high	40	17.7	

Table 2 shows, significant differences were found across all variables, indicating strong bivariate relationships. Mothers with lower education had a substantially higher prevalence of PPD (45.3%) compared to those with higher education (18.7%), χ^2 = 12.87, p < .001. Similarly, lower socioeconomic status was associated with a significantly higher proportion of PPD cases (40.6%) relative to middle and upper groups (20.9%), χ^2 = 11.81, p = .001. Psychosocial contributors also emerged prominently; husband's alcohol use was strongly linked to PPD (46.8% vs. 16.9%), χ^2 = 19.42, p < .001. Among obstetric variables, unwanted pregnancies demonstrated the highest proportion of PPD (52.0%), χ^2 = 15.87, p < .001. Additionally, infant illness and low family support were both significantly associated with higher PPD prevalence (47.0% and 50.4%, respectively).

Table - 3: Multivariable logistic regression predicting Postpartum Depression

Predictor	AOR	95% CI	p-value
Low socioeconomic status	2.36	1.31–4.24	.004
Unwanted pregnancy	3.12	1.77–5.48	<.001
Infant illness	2.09	1.15–3.78	.015
Low family support	3.58	2.06–6.23	<.001

Table 3 presents the adjusted results of logistic regression analysis identifying independent predictors of postpartum depression. Four variables remained significant after controlling for potential confounders. Low socioeconomic status was associated with more than twice the odds of experiencing PPD (AOR = 2.36, 95% CI [1.31, 4.24], p = .004). Unwanted pregnancy emerged as a strong predictor, with more than triple the odds of PPD (AOR = 3.12), p < .001. Infant illness was also significantly associated with PPD, doubling the likelihood of depressive symptoms (AOR = 2.09, p = .015). The strongest predictor in the model was low family support, which increased the odds of PPD by more than threefold (AOR = 3.58, p < .001).

Table – 4: Psychosocial factors and their association with PPD

Variable	PPD present	Percentage	χ² / p-value
Social support			χ² = 41.23, p < .001
High	21	11.1	
Moderate	27	22.5	
Low	63	50.4	
Marital relationship			χ² = 28.71, p < .001
Good	28	12.8	
Average	42	28.8	
Poor	41	53.9	
Family conflict			χ² = 17.26, p < .001
Yes	73	45.1	
No	38	17.4	

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Table 4 highlights the strong role of psychosocial variables in postpartum depression. Social support demonstrated a graded, significant association; only 11.1% of women with high support had PPD, compared with 50.4% among those with low support, $\chi^2 = 41.23$, $p < .001$. Marital relationship quality showed a similar pattern: mothers reporting poor marital relationships had markedly higher PPD prevalence (53.9%) than those with good relationships (12.8%), $\chi^2 = 28.71$, $p < .001$. Additionally, family conflict was strongly associated with PPD, with nearly half (45.1%) of conflicted families experiencing depression, $\chi^2 = 17.26$, $p < .001$.

Table – 5: Distribution of EPDS scores

Category	Score Range	Number	Percentage
No depressive symptoms	0–7	161	42.4
Possible depression	8–12	108	28.4
Probable depression	≥13	111	29.2
Mean EPDS score	—	10.7 (SD = 5.9)	
Median EPDS score	—	10 (IQR = 6–15)	

Table 5 summarizes the distribution of EPDS scores across the sample. Approximately 29.2% of mothers fell within the "probable depression" category (EPDS ≥ 13), while another 28.4% fell into the "possible depression" range (scores 8–12). This indicates that more than half (57.6%) of the participants exhibited at least some depressive symptoms. The mean EPDS score was 10.7 (SD = 5.9), and the median score of 10 (IQR = 6–15) shows a moderately elevated symptom burden within the population.

DISCUSSION:

In the present study, the prevalence of probable postpartum depression (PPD) was 29.2% among mothers attending the immunisation clinic. This figure indicates that nearly one in three postpartum women in Kalaburagi experience significant depressive symptoms. Our prevalence is similar to that reported in rural Udupi (21.5%) [6], Mangaluru (23–34%) [7,8], and Goa (~30%) [9], showing that PPD is consistently high across various regions of South India. However, it is considerably lower than the 44% documented by Nisarga et al. in 2023 [10]. The higher prevalence in their study may reflect differences in population composition, particularly the higher proportion of mothers from disadvantaged backgrounds, as well as variation in psychosocial stressors, healthcare-seeking patterns, and postpartum timing.

Sociodemographic factors: In our study, socioeconomic status emerged as a significant determinant. Mothers belonging to lower socioeconomic classes had a PPD prevalence of 40.6%, compared to 20.9% among those in middle/upper socioeconomic groups. This aligns with findings from Udupi, where low-income mothers showed PPD prevalence exceeding 30% [6], and from Mangaluru, where low socioeconomic status was associated with prevalence between 28–32% [7,8]. These consistent observations suggest that economic stress, limited access to supportive resources, and financial instability substantially elevate psychological vulnerability during the postpartum period.

Lower educational attainment (< high school) in our study was associated with 45.3% prevalence of PPD compared with 18.7% among mothers with higher education. Similar trends were reported in a Goa study, where women with low literacy exhibited PPD prevalence above 30% [9]. Although education did not remain significant in our multivariate model, its strong bivariate association suggests it may act through socioeconomic status, health literacy, or coping capacity.

Obstetric factors: Unwanted pregnancy was a major predictor of PPP in our sample. More than half (52.0%) of mothers with unwanted pregnancies screened positive for PPD, compared with 20.9% among those with wanted pregnancies. This mirrors findings from Nisarga et al. [10], who also reported significantly higher depressive symptoms among mothers with unintended pregnancies. Furthermore, a national meta-analysis demonstrated that unintended pregnancy increases PPD risk by approximately 2.5 times [5], supporting the association observed in our study (AOR 3.12, 95% CI: 1.77–5.48).

Neonatal factors: Infant illness was significantly associated with higher PPD prevalence in our study (47.0% vs 24.2% among mothers of healthy infants). This finding is consistent with evidence from Udupi, where mothers of sick infants had depressive symptoms ranging between 35–45% [6], and similar studies from Ethiopia showing PPD prevalence above 48% among mothers whose infants required medical care [12]. The stress associated with caring for a medically ill infant—combined with fatigue, hospital visits, and financial burden—likely explains this heightened vulnerability.

Psychosocial factors: Psychosocial determinants showed the strongest associations with PPD. Mothers reporting low family support in our study had a PPD prevalence of 50.4%, compared with 17.7% among those with moderate to high support. A Mangaluru-based study similarly identified poor support as a key predictor, with depressive symptoms affecting 40–45% of inadequately supported mothers [7]. The JSAFOG study from rural Karnataka also reported high PPD (approximately 35–40%) among mothers exposed to poor familial support and domestic conflict [13].

Marital relationship quality demonstrated a clear gradient in our sample: PPD prevalence was 12.8% among those reporting good relationships, 28.8% among those with average relationships, and 53.9% among those with poor marital relationships.

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These findings correspond with studies across India showing that poor spousal communication and conflict predict depression rates above 40% [11,13].

In the adjusted model, low socioeconomic status (AOR 2.36), unwanted pregnancy (AOR 3.12), infant illness (AOR 2.09), and low family support (AOR 3.58) remained robust predictors. These findings reinforce the bio-psycho-social framework of PPD, where economic hardship, reproductive autonomy, neonatal health, and interpersonal support pathways interact to shape maternal mental health outcomes.

A global review reported PPD prevalence ranging from 15% to 30% in LMICs [4], matching our identified prevalence (29.2%). Studies from Ethiopia also demonstrated similar determinants, particularly infant illness and low support, associated with PPD rates exceeding 45% [12]. The biological and psychosocial consequences of PPD noted globally—impaired mother–infant bonding [14], early breastfeeding cessation [15], and increased infant morbidity [16]—underscore the need for early intervention in our setting as well.

CONCLUSION:
In conclusion, the study highlights the need for routine screening, timely referral, and family-centered support interventions within postpartum and immunisation services. Early identification and targeted support for high-risk mothers are critical to improving maternal wellbeing and child health outcomes.

Declaration:
Conflicts of interests: The authors declare no conflicts of interest.
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