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Perinatal Depression Using the EPDS in Tertiary Maternity Centers in India

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ABSTRACT

Background: Perinatal depression (PND), a prevalent mood disorder among pregnant women and new mothers, exerts profound effects on mothers and impacts the development of their children. It significantly contributes to maternal and infant morbidity worldwide. Investigating the risk factors and prevalence of PND is essential for implementing effective interventions that can mitigate its adverse effects on maternal health.

Objectives: The primary objective of this study included reporting the incidence of depression among antenatal and postnatal women receiving obstetric care at a tertiary maternity hospital. Secondary objectives included identifying associated risk factors and outlining potential management strategies for PND.

Methods: A hospital-based cross-sectional design was used for the study. The total sample consisted of 174 women, including 95 in the antenatal period and 79 in the postnatal period, undergoing obstetric care at Cloudnine Hospitals, Bangalore, India. They were evaluated for PND using the Edinburgh Postpartum Depression Scale (EPDS). Descriptive statistics were employed to analyze the data.

Results: The median scores for depression on EPDS were 9 and 10 for the antenatal and postnatal groups, respectively, with a prevalence rate of 22%. Statistical analysis revealed no significant differences in depression incidence between the two groups (p<0.55). However, maternal age and previous mental health concerns emerged as significant risk factors for PND.

Conclusion: Despite previous indications of variance in depression incidence between antenatal and postnatal women, our findings show no significant differences between these two groups. Healthcare providers must prioritize the identification and management of PND to enhance outcomes for both mothers and children.

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1. Introduction

Pregnancy represents a notably vulnerable period in a woman's life. Alongside health concerns, such as gestational diabetes, hypertension, and anemia, mental health issues also present significant challenges.[1] Perinatal depression (PND) is a nonpsychotic depressive episode ranging from mild to severe that occurs during pregnancy and persists for up to 1 year after childbirth.[2] A systematic literature review revealed a mean global PND rate of 26.3%.[2] Globally, it is a significant contributor to maternal and infant morbidity,[3] necessitating careful monitoring of the mother due to the increased risk of suicidal behavior associated with it.[4] Suicidal ideation is a common aspect of screening for PND. Recent evidence suggests antenatal and postnatal depression have distinct causes and symptoms.[4] A systematic review identified personal mental illness history, stressful life events, poor social support, maternity blues, childcare stress, chronic health conditions, gestational diabetes mellitus, and sleep disturbances as key factors correlated with PND.[2]

The Diagnostic and Statistical Manual of Mental Disorders defines postpartum depression (PPD) as the occurrence of a major depressive episode between birth and 4 weeks after birth, often characterized by symptoms such as panic, irritability, and excessive crying. Such episodes may, however, commence or persist throughout the first year after delivery.[5] In India, approximately 22% of women experience PPD.[6,7] A systematic review found higher PPD prevalence in developing regions (19.99%) than in developed regions (14.85%).[8] If left untreated, PPD can lead to long-term adverse effects for both mother and infant.[9] A systematic review found antenatal depression prevalence in Indian women ranging from 3.8% to 65%.[10] A study from South India linked depression to low education, socioeconomic status, family conflicts, unplanned pregnancies, preference for male children, multiparity, and poor obstetric history.[11] Child developmental challenges, low infant birth weight, premature delivery, and birth complications also pose significant risks for depression.[3]

Women with antenatal depression face a higher risk of PPD. A study of 333 participants found that over 50% with antepartum depression later developed PPD.[12] Maternal depression during pregnancy is associated with preterm delivery and low birth weight babies.[13] It can lead to developmental delays, cognitive functioning deficits, and behavioral problems in the offspring.[3,14] Notably, family members generally had positive attitudes toward PPD, but stigma and misconceptions persisted. Culturally sensitive education is needed to address prejudices, with nurses playing a key role in awareness efforts.[15] Therefore, screening in antenatal care can predict mental distress, enhance treatment efficiency, and promote a healthier postpartum period.[16] PPD interventions include pharmacological, psychosocial, psychological, educational, and somatic therapies. Given the variety of options and extensive comparative research, evaluating their effectiveness and acceptability is crucial for clinicians and patients.[17]

The current study aimed to investigate the incidence of depression in postnatal and antenatal women. The study intended to identify potential differences in the prevalence and severity of depression symptoms between the two groups and to explore possible risk factors contributing to the development of depression during these periods. This research is crucial for early detection and providing intervention for managing PPD in order to enhance maternal and infant outcomes. Understanding these disparities can guide the development of tailored screening and intervention initiatives to support women's mental health throughout the perinatal period, thus improving overall care for pregnant and postpartum women.

2. Materials and Methods

2.1. Study design

This is a cross-sectional observational study conducted at Cloudnine Hospitals, Bangalore, India.

2.2. Study population

This study recruited 174 women receiving perinatal care at Cloudnine Hospitals, Bangalore, including 95 in the antenatal (third trimester) and 79 in the postnatal (up to 10 days postpartum) periods. Participants were aged 18–35 years, conceived either naturally or through *in vitro* fertilization, and delivered either vaginally or via lower-segment cesarean section. Exclusion criteria included unwilling participants and those from other hospitals.

2.3. Data collection

A structured questionnaire was utilized for data collection. Depression levels in these women were assessed using the Edinburgh Postpartum Depression Scale (EPDS); the EPDS scale, Stanford,[18] was used to examine the intensity of depressive symptoms. The EPDS, a leading screening tool for PPD, consists of ten multiple-choice questions scored from 0 to 3, with a total score range of 0–30; scores >12 indicate PND. Antenatal assessments included gestational age, family type, recovery, and medical history, while postnatal assessments covered delivery mode, breastfeeding, pregnancy experience, NICU admission, infant health, and maternal conditions. Data on pregnancy type, order, education, socioeconomic status, occupation, religion, marital/family conflict, mental preparedness, and past mental health were collected for both periods.

2.4. Procedure

Participants who provided informed consent and met the inclusion criteria were included in the study. Data were collected by requesting the participants to visit the Cloudnine Hospital in Bangalore and to fill out structured questionnaires. The study protocol was approved by the ethical committee, and informed consent was obtained from all patients before inclusion.

2.5. Data Analysis

The collected data were entered into Microsoft Excel, a spreadsheet software, and analyzed using R software (version 4.0.2). Categorical variables are presented as counts and percentages and continuous variables as means with standard deviations. The Mann–Whitney U test was used to compare the medians of two groups, and a p value of <0.05 was considered statistically significant.

3. Results

3.1. Population Characteristics

A total of 174 patients were included in this study, which included 95 women in the antenatal period and 79 in the postnatal period. The mean ages of the mothers in the antenatal and postnatal groups were 29.4±2.99 and 30.4±3.04 years, respectively (Figure 1). The differences in mothers' ages between the two groups were not statistically significant.

Supplementary Figure 1 represents the different demographic characteristics of the study population.

Figure 1: Box plot showing mean age (years) ± standard deviation of mothers in the antenatal and postnatal groups.
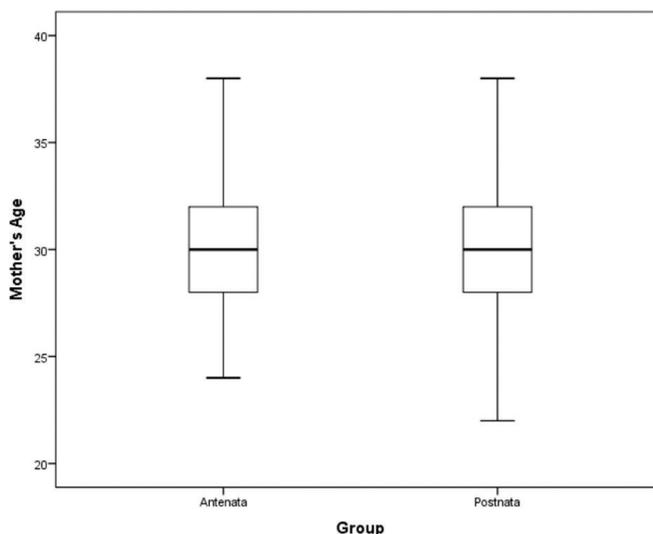

3.1.1. Antenatal Group

Data from the antenatal group revealed that 22% of the participants could be diagnosed as having major depressive disorder as per their scores on the EPDS questionnaire (Figure 2 [a]). The average age of mothers in this group was 30 years, with babies having an average gestational age of 27 weeks. Among them, 62 (77%) women reported a normal conception, and the average duration of marriage was 5 years, with 46 experiencing their first or second pregnancies. Furthermore, 43 women recovered at home after delivery, and 51 reported no delivery complications. At the time of data collection, 57 women were not engaged in paid employment. A majority of the women were identified as Hindu (44 women). Moreover, most reported no current marital conflicts (51 women) or family conflicts (54 women). A significant majority (62 women) felt mentally prepared for pregnancy and delivery, although a small portion (seven women) reported previous mental health concerns.

3.1.2. Postnatal period

In the postnatal group, 16% (13 women) of women met the criteria for major depressive disorder based on the EPDS scores (Figure 2[b]). The mean maternal age was 31 years, with all pregnancies full-term (38–40 weeks). At data collection, babies averaged 17 days postpartum, all 81 mothers had initiated

breastfeeding, and no NICU admissions were reported. Most women were moderately educated, with 64 unemployed. Marital (63) and family (60) conflicts were minimal; 62 women were mentally prepared for pregnancy and delivery, and only three had prior mental health concerns.

Figure 2: Percentage of women with major depressive syndrome. (A) Percentage of women with PPD in the antenatal period. (B) Percentage of women with PPD in the postnatal period.

PPD: Postpartum depression.
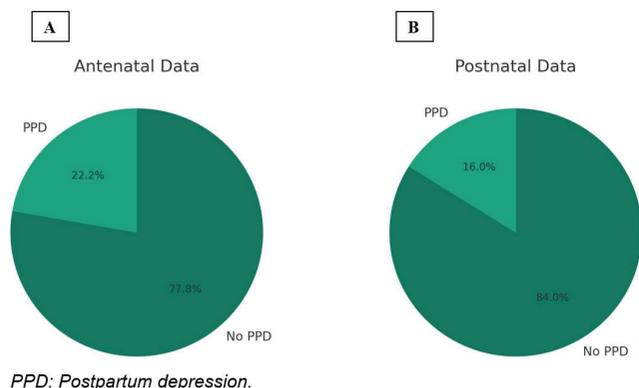
3.2. EPDS Scores

The median EPDS score was 9/30 for antenatal women and 10/30 for postnatal women (≥12 indicates potential antenatal depression). Depression score distributions were similar, ranging from 0 to 24 antenatally and from 1 to 21 postnatally (Figure 3), with no significant difference. The prevalence of PND was 22%.

Figure 3: Box plot showing the median Edinburgh Postnatal Depression Scale (EPDS) scores of the antenatal and postnatal groups.
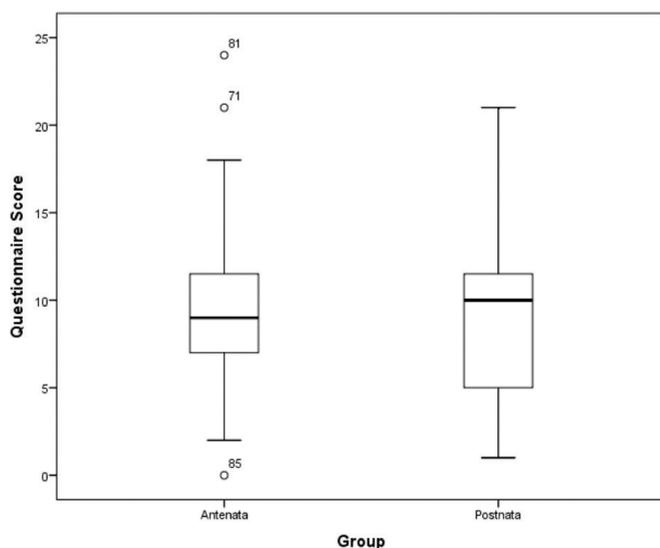
Maternal age and prior mental health issues were significant predictors of antenatal depression. Depression was slightly higher postnatally (22.8%) than antenatally (21.8%). Younger mothers (29±2.99 years) had a higher risk of antenatal depression (n=39, p=0.035), as did those with prior mental health concerns (n=14, p=0.028). No significant links were found with socioeconomic status, marital status, conception type, family/marital conflicts, or mental readiness.

3.3. Association between the incidence of PPD and different factors

In an attempt to identify the risk factors linked with PPD, statistical analysis of the various key factors revealed the following:

3.3.1. Maternal Age: The age of the mother did not show a statistically significant association with the occurrence of PPD; however, in the antenatal period, a higher incidence rate of depression was seen in younger mothers than in older mothers (p=0.035).

3.3.2. Religion: No significant association (p<0.197) was seen between the incidence of PPD in women belonging to different religions (Supplementary Figure 2[A]).

3.3.2. Education Level: There was no significant association (p<0.550) between the mothers' educational backgrounds and the occurrence of PPD. Women diagnosed with PPD belonged to various educational backgrounds, ranging from those who had received moderate levels of education to those who had pursued higher education (Supplementary Figure 2[B]).

3.3.3. Socioeconomic Status: No significant association (p<0.090) was seen between socioeconomic status and PPD. Women diagnosed with PPD hailed from diverse socioeconomic backgrounds, including middle and higher socioeconomic classes.

3.3.4. Birth Order: PPD incidence was higher in first-time mothers (18%) than in those with subsequent pregnancies (11%), though not statistically significant (p<0.540) (Figure 4[A]). This suggests greater susceptibility during first pregnancies due to physical, emotional, and lifestyle adjustments. Further research is needed to account for confounding factors like age, socioeconomic status, and mental health history.

Figure 4: Associations between the incidence of PPD and various factors, such as (A) parity; (B) previous mental health issues; (C) conflict status; and (D) mental preparedness for pregnancy and delivery.
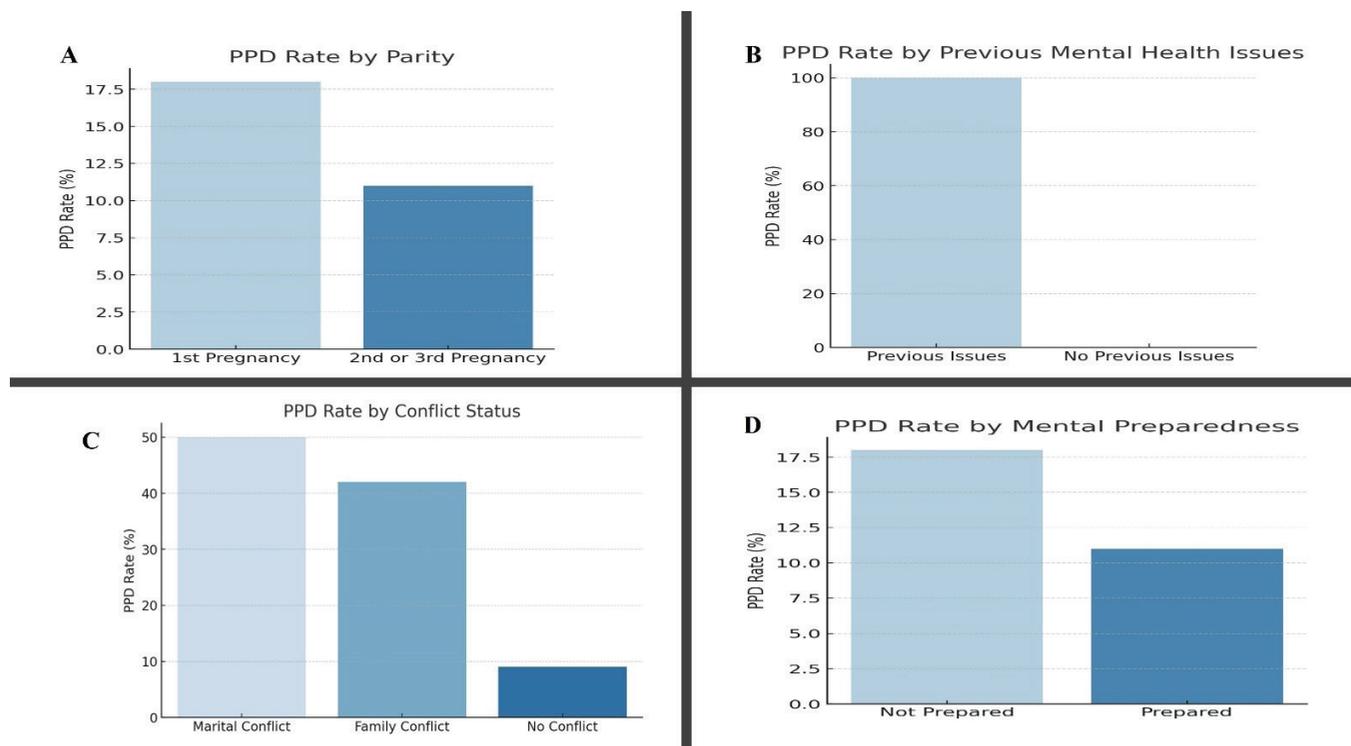
3.3.5. Previous Mental Health Issues:
A significantly positive association (p=0.028) was observed between a history of mental health issues and PPD. All the women who reported prior mental health concerns were diagnosed with PPD, highlighting a strong link between past mental health issues and the risk of PPD (Figure 4[B]).

3.3.6. Marital/Family Conflict:
Marital and family conflicts demonstrated a moderately positive, though statistically nonsignificant (p<0.140) association with the incidence of PPD. Women experiencing such conflicts had a higher incidence of PPD than those without such conflicts (Figure 4[C]).

3.3.7. Mental Preparedness:
The level of mental preparedness for pregnancy and delivery was moderately positively associated with PPD; however, this was statistically nonsignificant (p<0.32). Women who were not mentally prepared experienced a higher rate of PPD than those who were prepared, suggesting that mental preparation might potentially lower the risk (Figure 4[D]).

4.0. Discussion

This study explored depression in postnatal and antenatal women. The prevalence of depression was 22% in both groups, with no significant difference.

Research highlights the need to clarify phenotypic heterogeneity in maternal depression for personalized pharmacological treatments. Variability may arise from symptom patterns, onset timing, chronicity, recurrence, and hormonal or genetic factors.[3] In this study, among the various risk factors examined, maternal age and previous mental health concerns were identified as statistically significant predictors of depression during both periods. The findings indicate a slightly higher prevalence of postnatal depression (22.8%) compared with antenatal depression (21.1%) among women experiencing PND; however, this difference was not statistically significant. Conversely, in a prospective cohort study, the heritability of depressive symptoms was found to be 16.2% for prenatal depression and 25.7% for postnatal depression.[19]

A comparable prevalence rate of PND (20.6%) was observed in a study conducted over 3 months on 170 randomly selected pregnant women in Mumbai, India. However, this study also found that the occurrence of PND was associated with the education level and socioeconomic status of these women.[11] In an observational study of 123 participants in Mumbai, India, the prevalence of PPD was 4.87% based on EPDS screening on postpartum days 3 and 14. In

contrast, a study conducted in Palestine involving 380 mothers (18–44 years) reported a higher PPD prevalence of 33.9%, with significant predictors including a stressful pregnancy, low social support, and husbands with lower education levels.[5]

The postpartum period is vital for both mother and infant, with maternal care essential for their physical, emotional, and psychological well-being.[20] In the current study, maternal age, religion, education, socioeconomic status, and breastfeeding showed no significant links to PPD. Prior mental health issues had a strong association, while marital/family conflicts and mental preparedness showed moderate links. Primigravid women had a significantly higher PPD incidence. A recent review from India has also shown similar risk factors for PPD, encompassing a history of psychiatric illness, stress, marital conflicts, pregnancy complications, and financial difficulties. Pregnant women with a history of depression should be evaluated to reduce the risk of PPD occurrence/recurrence.[21] Further, other reported risk factors for PPD in India include domestic violence, lack of spousal support, and the birth of a female baby.[22]

A recent study by Froeliger *et al.* (2024) that used multivariate analysis to investigate factors associated with PPD indicates that a history of psychiatric illness is associated with higher risks of developing PPD.[23] Furthermore, a longitudinal study of 615 women identified prior depression and stress as key risk factors for PPD from pregnancy to 5 years postpartum.[17] A hospital-based study in urban Pune found that 26.3% of 240 postnatal mothers had EPDS scores ≥13, indicating depression. PPD was significantly linked to social support, attention shift to the baby, and partner support, but not to sociodemographic factors.[6]

Maternal age emerged as a notable factor contributing to the onset of antenatal depression in our investigation. This aligns with the findings from a study in South India, which included 314 pregnant women undergoing prenatal checkups. The results indicated that 21.98% of the women suffered from possible depression, with a mean EPDS score of 10.61±7.48. Younger women faced a higher risk of depression than older ones. Maternal age and health issues during pregnancy were also significantly linked to antenatal depression.[24] However, a recent study by Froeliger *et al.* (2024) indicated that women <25 years

of age or those of advanced age were at a higher risk of developing PPD.[23]

This study highlights key factors influencing PND. While maternal age and education exhibited no significant links to PPD, previous mental health issues and marital conflicts were strong predictors. Further research is needed to explore these interactions. Targeted interventions addressing modifiable risks may help reduce PPD and improve maternal well-being. Although this study provides valuable insights into PND in India, it has several limitations. The cross-sectional design of the study limits causal inferences about PND, highlighting the need for longitudinal studies to track risk progression. The sample, drawn from a specific healthcare setting, may restrict generalizability to broader populations in India. Reliance on self-reported measures introduces response bias. Incorporating clinical interviews could enhance validity.

Future research should include diverse, representative samples and explore protective factors and targeted interventions to reduce PND. Understanding its long-term impact on child development and maternal mental health can inform comprehensive care models for better maternal support.

5.0. Conclusion

This study highlights the prevalence of depression during the perinatal period, revealing no significant difference in the incidence of depression between antenatal and postnatal women. Considering this study was carried out incidentally during the COVID-19 pandemic, this is a significant finding. Maternal age and previous mental health concerns emerged as significant predictors of depression during both periods, emphasizing the importance of early identification and support for at-risk individuals. Understanding these risk factors can guide the development of tailored interventions to enhance maternal mental health and improve overall outcomes during pregnancy and the postpartum period. Given its widespread occurrence, depression warrants prioritization within national mental health initiatives. More robust research is imperative to gain a thorough understanding of the factors contributing to PND in India.

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