ORIGINAL ARTICLE

Postpartum Depression in Females Presenting with Poor Sleep Quality During Third Trimester of Pregnancy

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ABSTRACT

Objective: To assess the frequency of postpartum depression in females presenting with suboptimal sleep quality in the third trimester of pregnancy.

Study Design: It was an Analytical Prospective study

Place and Duration of Study: Department of Obstetrics & Gynecology, Imran Idrees Teaching Hospital, Sialkot. Duration of study was 10 months from 28th February 2024 to 15th December 2024.

Materials and Methods: A total of 200 females meeting the inclusion criteria were enrolled through non-probability consecutive sampling. Women aged 18–40 years with gestational age ≥34 weeks and poor sleep quality were included, while those with multiple fetuses, systemic diseases (e.g., pre-eclampsia, gestational diabetes, renal or liver disease, and anemia) were excluded. After delivery, participants were followed for one month and evaluated for postpartum depression with the Edinburgh Postnatal Depression Scale (EPDS) by a consultant psychiatrist at Imran Idrees Teaching Hospital, Sialkot. Data were recorded and analyzed using SPSS version 23, with Chi-square applied for stratified analysis.

Results: Mean maternal age was 28.7 ± 6.7 years, mean gestation age 37.8 ± 1.8 weeks. Sleep disturbance was pervasive (PSQI 13.3 ± 4.4 > cut‑off 5), and 56 of 200 mothers (28 %) screened positive for postpartum depression (PPD). PPD prevalence did not differ by age group (<30 vs >30 y, p = 0.653), parity (p = 0.271), or delivery mode (p = 0.280) thus, poor sleep quality, rather than obstetric factors, was the key correlate of PPD.

Conclusion: The frequency of postpartum depression was high in females presenting with poor sleep quality during third trimester of pregnancy

Key Words: *Depression, Maternal Health, Pregnancy, Sleep Quality, Third Trimeste.*

Introduction

Postpartum depression is characterized by occurrence of mild to severe depressive symptoms within 1 year after childbirth.[1] Females face a heightened risk of mood disorders during the postpartum period, with poor postpartum sleep potentially serving as a modifiable risk factor for depression.[2]

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Received: February 19, 2025; Revised: June 16, 2025
Accepted: June 20, 2025

In the postpartum phase, mothers who were not engaged in employment, did not have access to childcare assistance, or regarded the infant's nocturnal sleep behavior as a considerable issue encountered elevated levels of exhaustion.[3] The female with depression cannot cope with her baby like she is unable to maintain breastfeeding, positions the infant incorrectly during sleep, neglects to ensure timely vaccinations for the infant, does not prioritize the infant's safety, exhibits frequent irritability, provides insufficient comfort during initial interactions with the infant, repeatedly contemplates inflicting harm upon the infant, and, in certain instances, engages in abusive behavior towards the infant.[4]

Limited research has been conducted on maternal fatigue, specifically concerning its presence during the entirety of gestation and the subsequent postpartum phase.[5] Research on the relationship between depressive symptoms and prenatal subjective sleep quality has revealed that pregnant women who screen positive or fit the diagnostic

https://doi.org/10.57234/jiimc.june25.2440

criteria for depression report far lower levels of felt sleep quality.[6] There is general agreement that there is a reciprocal relationship between mood and sleep since disrupted (low quality) sleep is strongly linked to depression. During pregnancy and the postpartum period, sleep disturbances are frequent in women's lives. It has been proposed that sleep disruption is an additional element that might explain why women are more likely to experience depression during the postpartum period than throughout other times of their lives. Although postpartum depression is common and linked to sleep disorders, some research has tried to offer pregnant women a sleep-focused intervention to see if it can enhance sleep and, in turn, the mood of the mother after giving birth, but this hasn't been successful.[7] A study reported that 38.88 % of mothers experienced poor sleep quality and 19 % developed postpartum depression, while a 2023 investigation found that within the first three months after delivery the overall incidence of depression was 12.1 %, of which 7.1 % represented severe cases.[8,9] In 2021, according to a research, the prevalence of depression six weeks after giving birth was 17.4% (95% CI 16.73–18.17) of the world's population, with 18.6% (95% CI 18.0–19.2) in lower and middle income countries.[10] Another study conducted in Japan found the period prevalence of 11.5% in 6–12 months after birth.[11] Poor subjective sleep quality during pregnancy independently predicts the emergence of postnatal depressive symptoms as seen in another study that showed that six weeks postpartum mothers reporting poor sleep quality were almost three times more likely to screen positive for depression than their well-rested counterparts (31.2 % vs. 10.5 %), highlighting the critical interplay between early postnatal sleep disturbance and maternal mental health[12,13] So the aim of this study is to assess the frequency of postpartum depression in females presenting with poor sleep quality during the third trimester of pregnancy. It has been noticed from literature that different regions of the world showed varied frequency of postpartum depression among females who had poor sleep quality in pregnancy especially during the third trimester. But we have not been able to find any local evidence which can help us in deciding the extent of the problem in the local population. In a country like Pakistan, the females usually ignore such conditions and these lead to more hazardous outcomes. So we want to conduct this study to get local evidence regarding the extent of the problem as well as update local guidelines to screen such cases on an early basis and prevent the patients from developing hazardous conditions.

Operational Definition

- **Poor sleep quality**

It was defined as score≥5 by using Pittsburgh Sleep Quality Index (PSQI) during the third trimester of pregnancy.[14]

- **Postpartum depression**

It was labelled if Edinburg Postnatal Depression Scale (EPDS) score was >10 after 1 month of delivery[15]

Materials and Methods

It was an Analytical Prospective study that took place in Department of Obstetrics & Gynecology Imran Idrees Teaching Hospital, Sialkot after taking approval from IRB no (ref: 2024/IITH/RA/0026). The duration of the study was from 28th February 2024 to 15th December 2024. The sample size of 200 were calculated using Raosoft online sample size calculator with 95% confidence level, 5% level of significance and taking expected percentage of postpartum depression i.e. 17% in females presenting with poor sleep quality during the third trimester of pregnancy.[16] The sample selection was non probability, consecutive sampling. According to the operational definition, women between the ages of 18 and 40 who had poor sleep quality and a gestational age of at least 34 weeks (as determined by LMP) were eligible for participation. The exclusion criteria was the presence of Multiple fetus (on USG), Females with systemic problems e.g. PIH (BP≥140/90mmHg) or pre-eclampsia (Bp≥140/90mmHg with or without proteinuria ≥+1 on dipstick method), gestational Diabetes (BSR>186mg/dl and on medical record), renal disease (creatinine >1.2mg/dl), liver problem (ALT>40IU, AST>40IU), anemia (Hb<10mg/dl). 200 females who fulfilled the inclusion criteria were enrolled in the study by convenience sampling. Informed consent was obtained. Additionally, all of the fundamental demographic data (name, age, gestational age, and parity) was recorded. Then females were followed-up till delivery. Mode of delivery was noted. After delivery, females were followed-up for 1 month.

https://doi.org/10.57234/jiimc.june25.2440

After one month, females were assessed for postpartum depression by using Edinburgh Postnatal Depression Scale EPDS scale by a consultant psychiatrist. Patients were referred to the Department of Psychiatry, Imran Idrees Teaching and Allied Hospitals Sialkot. If a major depressive disorder took place within 4 weeks after delivery, then postpartum depression was labeled (as per operational definition). To address the recognized difficulty of re-engaging SVD mothers in routine OPDs at discharge each participant received an appointment card for a twice-weekly postpartum mental health checkup, women who missed these slots were screened during their infant's scheduled immunization visit. All antenatal data was entered on a standard form by two obstetric residents while the one-month Edinburgh Postnatal Depression Scale (EPDS) assessments were administered by a senior psychiatry resident. All this information was recorded through questionnaire. The collected data was analyzed statistically by using SPSS version 23. Quantitative variables like age, gestational age Pittsburgh Sleep Quality Index PSQI score and EPDS score were presented as mean ± S.D. Qualitative variables like postpartum depression and mode of delivery (vaginal cesarean) were presented as frequency and percentage was calculated for parity. Data was stratified for age, parity and mode of delivery. Chi square was applied to compare postpartum depression between stratified groups. P-value <0.05 was considered as significant.

Results

Table I shows the mean age of participants was 28.68 ± 6.67 years, ranging from 18 to 40 years. The mean gestational age at delivery was 37.75 ± 1.75 weeks, with a minimum of 35 weeks and a maximum of 40 weeks. Sleep quality and mental health assessments, the mean Pittsburgh Sleep Quality Index (PSQI) score was 13.3 ± 4.37, indicating poor sleep quality among participants, with scores ranging from 6 to 20. The mean Edinburgh Postnatal Depression Scale (EPDS) score was 9.15 ± 8.42, with a minimum of 0 and a maximum of 30, reflecting varying levels of postpartum depressive symptoms.

Table II shows that vaginal delivery was the most common mode, observed in 74 participants (37.0%), followed by cesarean section in 67 participants (33.5%) and instrumental delivery in 59 participants (29.5%), with a total of 200 deliveries recorded. In terms of parity distribution, 54 participants (27%) were nulliparous, while 55 participants (27.5%) had one prior birth, 47 participants (23.5%) had two, 25 participants (12.5%) had three, and 19 participants (9.5%) had four previous births, making a total of 200 women.

Table III shows that for age, among 120 women aged <30 years, 35 (29.2%) had PPD, while 85 (70.8%) did not. Among 80 women aged >30 years, 21 (26.3%) had PPD, while 59 (73.8%) did not with the p-value of 0.653.

For parity, 109 women were primi, of whom 34 (31.2%) had PPD, whereas 75 (68.8%) did not. Among 91 multiparous women, 22 (24.2%) had PPD, while 69 (75.8%) did not, with a p-value of 0.271.

Mode of delivery shows 67 women had a cesarean section, with 14 (20.9%) experiencing PPD and 53 (79.1%) not affected. Among 74 women who had vaginal delivery, 23 (31.1%) developed PPD, while 51 (68.9%) did not. Among 59 women with instrumental delivery, 19 (32.2%) had PPD, while 40 (67.8%) did not with a p-value of 0.280.

Table I: Descriptive Statistics of Maternal Characteristics, Sleep Quality, and Depression Scores (n= 200)

Parameter	Mean	Minimum	Maximum
Age (years)	28.68±6.67	18	40
Gestational Age (weeks)	37.75±1.75	35	40
PSQI score*	13.3±4.37	6	20
EPDS score**	9.15±8.42	0	30

*** Pittsburgh Sleep Quality Index**
****Edinburgh Postnatal Depression Scale**

Table II: Distribution of Delivery Modes and Parity (n= 200)

	Frequency	Percent
MOD		
Cesarean section	67	33.5
Vaginal delivery	74	37.0
Instrumental delivery	59	29.5
Total	200	100.0
Parity		
Nulliparous	54	27
One	55	27.5
Two	47	23.5
Three	25	12.5
Four	19	9.5
Total	**200**	**100.0**

Table III: Comparison of Postpartum Depression with Age, Parity, and Mode of Delivery (MOD)

Parameter	Category	Postpartum Depression: Yes (n)	Postpartum Depression: No (n)	Total (n)	Chi Value	p-value
Age (years)	<30	35	85	120	0.203	0.653
	>30	21	59	80		
Parity	Primary	34	75	109	1.21	0.271
	Multiple	22	69	91		
Mode of Delivery (MOD)	Cesarean Section	14	53	67	0.28	
	Vaginal Delivery	23	51	74	2.54	0.280
	Instrumental delivery	19	40	59		

Discussion

A major public health issue that impacts both mother health and baby care is postpartum depression (PPD). Pregnancy-related sleep issues, especially during the third trimester, have been found to be possible risk factors for the emergence of PPD. The demographic characteristics of the study population provide valuable context for interpreting the findings. The participants' average age was 28.68 ± 6.67 years, ranging from 18 to 40 years while the mean gestational age was 37.75 ± 1.75 weeks, with a range of 35 to 40 weeks, indicating that most participants were in the later stages of pregnancy, when sleep disturbances tend to peak due to physiological and psychological stressors. The results revealed a frequency of 28% for PPD, as measured by the Edinburgh Postnatal Depression Scale (EPDS), while the mean Pittsburgh Sleep Quality Index (PSQI) score of 13.32±4.37 indicated significant sleep disturbances. These findings provide critical insights into the association between prenatal sleep quality and postpartum mental health in a resource-constrained setting.

The frequency of PPD (28%) observed in this study is consistent with findings from other low- and middle-income countries (LMICs). A study in Ethiopia reported a PPD prevalence of 33% among women with poor sleep quality during pregnancy, emphasizing the interplay of psychosocial stress and insufficient mental health resources.[16] Similar findings were observed in Brazil, where the PPD prevalence was 31%, with poor prenatal sleep identified as a key contributor.[17] These rates are notably greater than those recorded in nations with high incomes (HICs), where PPD prevalence ranges from 9-13%.[9,18] For instance, a large longitudinal study from the United States in 2021 found that women with poor sleep quality during the third trimester had a PPD prevalence of 15%, suggesting disparities in healthcare access, socioeconomic factors, and cultural influences.[19] Several recent Asian studies corroborate these findings. Wu et al. (2020) identified a PPD prevalence of 22.14% among Chinese women with poor prenatal sleep, illustrating the adverse effects of sleep disturbances on mental health outcomes.[20] In South Asia, a study revealed PPD rates ranging between 24.3 % (95% Confidence Interval (CI) 19.03 to 30.47), with poor sleep quality emerging as a primary modifiable risk factor.[21] These findings suggest that women in LMICs may be disproportionately affected by PPD due to compounding stressors, including limited healthcare access, sociocultural expectations, and economic challenges. Additionally, the bidirectional relationship between poor sleep quality and depression has been extensively documented. Insufficient sleep exacerbates mood disorders, while depression disrupts sleep architecture, creating a vicious cycle. A cross sectional study conducted in 2024 reinforced this, showing that women with sleep disturbances during pregnancy are at a threefold higher risk of developing PPD.[22] The physiological basis of this relationship has also been explored in recent studies. Ko et al. (2020) demonstrated that disrupted sleep patterns during pregnancy may dysregulate cortisol levels and inflammatory responses, both of which are implicated in the pathogenesis of PPD.[23]

The elevated PSQI scores observed in our study (mean 13.32±4.37) are higher than those reported in studies from HICs. For instance, research in Japan found mean PSQI scores of 8.6 during the third trimester, with a PPD prevalence of 11.5%. [24] This discrepancy underscores the role of sociocultural and economic factors in exacerbating sleep and mental health challenges in LMICs. The current study highlight the significant association between poor sleep quality and PPD, suggesting that sleep disturbances during pregnancy act as a precursor to postpartum mood disorders. In Pakistan's sociocultural context, stressors such as financial instability, gender-based roles, and limited family

https://doi.org/10.57234/jiimc.june25.2440

support may amplify the impact of poor sleep on maternal mental health. [25]Addressing these factors is essential to reduce the burden of PPD in resource-limited settings. The findings of this study have important clinical implications. Screening for sleep quality during antenatal visits using validated tools such as the PSQI can aid in early identification of at-risk individuals. Interventions targeting sleep disturbances during pregnancy, such as cognitive behavioral therapy for insomnia (CBT-I) or mindfulness-based therapies, have demonstrated significant improvements in sleep quality and reductions in PPD risk. [26] Additionally, healthcare providers should consider integrating psychosocial support into antenatal care programs to address the sociocultural stressors that may contribute to poor mental health outcomes. From a public health perspective, raising awareness about PPD and its link with prenatal sleep quality is critical. Maternal age, parity, and delivery route showed no statistically significant relationship with postpartum depression once severe third-trimester sleep disturbance was accounted for. This pattern likely reflects a dominant mediating effect of poor sleep quality, which can mask smaller obstetric influences, and is compounded by wide confidence intervals around subgroup estimates.

Community-based programs that educate families about the importance of maternal mental health and provide support networks could help alleviate societal barriers to care. In resource-limited settings like the Department of Obstetrics & Gynecology, Imran Idrees Teaching Hospital, integrating mental health screening and interventions into routine obstetric care is a feasible and effective strategy. The strengths of the study include its setting in a tertiary care teaching hospital, which allowed for a diverse sample of participants. Additionally, the use of validated tools such as the PSQI and EPDS enhances the reliability of the findings. By following participants into the postpartum period, the study provides valuable insights into the temporal relationship between poor prenatal sleep quality and PPD.

Conclusion

This study shows a strong correlation between poor sleep quality during the third trimester of pregnancy and an increased prevalence of postpartum depression (28%). These findings highlight the need for early screening and interventions targeting sleep disturbances to reduce the risk of postpartum depression. Integration of mental health support into routine antenatal care and raising awareness about maternal mental health are key steps, especially in resource-poor settings. Although there are certain limitations, the study provides local insights and shows the requirement for further research to come up with effective strategies in preventing and managing postpartum depression.

Limitation of the Study

The study's limitations include its single-center, non-probability consecutive sampling design, which constrains external validity and may introduce selection bias. Moreover, the deliberate exclusion of obstetric comorbidities such as pre-eclampsia, gestational diabetes, and anemia likely led to an underestimation of postpartum-depression prevalence. Additionally, reliance on self-administered psychometric instruments (PSQI and EPDS) renders the findings susceptible to measurement error and response bias. Furthermore, the follow-up horizon was limited to one month postpartum, potentially missing late-onset depressive episodes.

Future Implications

Future studies should aim to explore the long-term consequences of poor sleep quality during pregnancy on both maternal and infant health outcomes. Prospective longitudinal studies with extended follow-up periods would help clarify the trajectory of PPD and its associated factors. Randomized controlled trials evaluating the efficacy of sleep-focused interventions during pregnancy in reducing PPD risk are also warranted. Expanding the scope of research to include diverse populations across LMICs and HICs could provide a more comprehensive understanding of the sociocultural and economic factors influencing maternal mental health.

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CONFLICT OF INTEREST

Authors declared no conflicts of Interest.

GRANT SUPPORT AND FINANCIAL DISCLOSURE

Authors have declared no specific grant for this research from any funding agency in public, commercial or nonprofit sector.

DATA SHARING STATEMENT

The data that support the findings of this study are available from the corresponding author upon request.