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# Frequency of Postpartum Depression in Patients Undergoing Caesarean Section

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## ABSTRACT

Postpartum depression (PPD) is a common mental health disorder affecting women after childbirth, but its risk varies across clinical and obstetric contexts. However, evidence regarding the association between CS-related maternal, socioeconomic, surgical, and neonatal factors and the development of PPD remains inconsistent. **Objectives:** To determine the frequency of PPD among women undergoing Caesarean section and its association with education level, socioeconomic status, type of Caesarean section, complications, history of mental health issues, and neonatal complications. **Methods:** This descriptive cross-sectional study was conducted at the Combined Military Hospital (CMH) Quetta from February 2025 to June 2025. A total of 91 postpartum women who delivered via Caesarean section were included using non-probability consecutive sampling. Data were collected using the Edinburgh Postnatal Depression Scale (EPDS) with a cutoff score of ≥13 to define PPD. Statistical analysis was performed using SPSS version 26.0, and associations between PPD and categorical variables were assessed using the chi-square test. **Results:** The mean age of participants was 32.14 ± 8.34 years, and the average parity was 2.52±1.68. Postpartum depression was identified in 22 (24%) women. Stratified analysis showed no statistically significant association between PPD and education level (p=0.864), socioeconomic status (p=0.493), type of Caesarean section (p=0.978), complications (p=0.656), history of mental health issues (p=0.794), or neonatal complications (p=0.895). **Conclusions:** The prevalence of PPD among women undergoing Caesarean section was 24%. However, no significant associations were found with maternal, socioeconomic, surgical, or neonatal factors (all p>0.05). Routine screening and psychological support are essential to address PPD effectively.

## INTRODUCTION

Postpartum depression (PPD) is a significant public health concern, affecting the mental health of new mothers globally. It is characterized by mood swings, irritability, anxiety, and depressive symptoms occurring within the postpartum period, usually peaking within the first six weeks after childbirth. PPD is multifactorial, arising from a combination of biological, psychological, and social determinants that interact to influence vulnerability. Biologically, the abrupt decline in estrogen and progesterone after delivery, dysregulation of the hypothalamic–pituitary–adrenal (HPA) axis, and surgery-related inflammatory responses—particularly following Caesarean section (CS) can contribute to mood disturbances and reduced stress tolerance. Psychologically, prior anxiety or depression, negative birth experiences, perceived loss of control during labour, and poor coping mechanisms are known contributors. Socially, inadequate family support, lower socioeconomic status, interpersonal conflict, and neonatal illness or NICU admission can exacerbate maternal stress and increase the risk of PPD [1]. Among the various factors associated with PPD, the mode of delivery, particularly Caesarean section (CS), has emerged as a critical determinant in recent years [2]. C-sections, either elective or emergent, are conducted to protect the mother and/or child in certain obstetrical conditions. Yet the psychological implications

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of this surgical procedure, particularly PPD, remain to be fully investigated. According to some reports, women who undergo CS may have a higher risk of suffering PPD than women with spontaneous vaginal delivery (SVD) [3]. This risk may be mediated by mechanisms such as surgical morbidities, postoperative pain, delayed mobilization, and disappointment with unmet birth expectations [4]. Higher rates of CS worldwide have increased the importance of studying its psychological effects. According to the WHO, cesarean section rates above 10–15% are not medically justified, but in most countries these rates have risen sharply, underscoring the importance of investigating CS sequelae, including PPD [5]. Cultural and social attitudes toward the preferred mode of delivery may also add psychological burden, especially in settings where vaginal delivery is culturally expected [6]. Recent evidence has emphasized a stronger relationship between emergency CS and PPD, compared with elective CS or vaginal delivery. The urgency and unpredictability of emergency CS may heighten psychological stress and loss of control, increasing susceptibility to PPD [7]. Elective CS, although planned, can still affect psychological well-being as women may experience anticipatory anxiety or reduced autonomy during the childbirth process [8]. Furthermore, other maternal and contextual contributors, including pre-existing mental health conditions, socioeconomic disadvantage, inadequate support systems, and neonatal complications, have been consistently linked to PPD [9]. Their interaction with the surgical aspects of CS warrants particular attention, as postoperative recovery, physical limitations, and neonatal outcomes may intensify psychological vulnerability. Recent research also implicates inflammatory and neuroendocrine mediators in the development of PPD following CS, suggesting potential biological pathways linking surgical stress to postpartum mood disorders [10]. Understanding the incidence and risk factors of PPD among women undergoing CS is essential for designing targeted preventive interventions. Prompt recognition and appropriate management of PPD can prevent long-term adverse outcomes for both mother and child. Integrating mental health screening into routine obstetric and postoperative care may therefore improve maternal well-being and overall outcomes [11]. Despite extensive research on postpartum depression (PPD), the specific contribution of Caesarean section (CS) to PPD risk remains poorly defined, with inconsistent findings across studies. Many earlier investigations compare CS to vaginal delivery but do not adequately differentiate between elective and emergency CS, nor do they simultaneously examine maternal, socioeconomic, surgical, and neonatal variables within CS populations. Moreover, most available literature focuses on general postpartum cohorts, limiting the understanding of how CS-related factors such as operative complications, postoperative pain, surgical stress, and neonatal morbidity interact with psychosocial determinants to influence PPD. This creates a clear gap in the evidence regarding which subgroups of CS patients may be more vulnerable and which clinical or social factors meaningfully predict PPD in this higher-risk surgical population. By examining these variables collectively within a uniform CS cohort, the study addresses the gap in identifying multidimensional predictors of PPD after CS, enabling more precise screening and more tailored postpartum psychological support strategies for this increasingly common mode of delivery.

This study aimed to specifically target women undergoing Caesarean section to determine the frequency of PPD and evaluate its association with education level, socioeconomic status, type of CS, perioperative complications, history of mental health issues, and neonatal outcomes.

## METHODS

This descriptive cross-sectional study was conducted at the Combined Military Hospital (CMH) Quetta from February 2025 to June 2025. The sample size was calculated using the reported frequency of postpartum depression (6.3%) from a study by Yousafzai *et al.* with a 95% confidence level and a margin of error (d) of 5%. The calculated sample size was 91 patients [12]. (This prevalence was the best available estimate from the local literature at the time of protocol development and was used solely for planning purposes. Although the observed PPD prevalence in our study was higher (24%), sample size calculations are based on anticipated rather than actual prevalence; the achieved sample of 91 participants still provides a meaningful estimate of PPD frequency, albeit with a wider confidence interval than originally intended.) A non-probability consecutive sampling technique was employed to recruit participants who met the inclusion criteria. The study included postpartum women aged 18–45 years who underwent Caesarean section within the past six weeks and provided written informed consent. Women with known psychiatric disorders before pregnancy, severe postpartum complications requiring intensive care, or those who declined to participate were excluded. The study was conducted after obtaining approval (Approval No. CMH QTA-IERB/69/2025) from the hospital's ethical review committee, and written informed consent was obtained from each participant before inclusion. Data collection was done using a structured questionnaire that recorded demographic variables, obstetric history, and neonatal outcomes. The presence of postpartum depression was assessed using the Edinburgh Postnatal Depression Scale (EPDS), with a predefined cutoff score of

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≥13 to identify cases of depression. A cutoff score of ≥13 was used on the EPDS, as this threshold has been shown to provide optimal sensitivity and specificity for detecting probable postpartum depression in clinical and research settings. International guidelines and multiple validation studies recommend ≥13 as the standard cutoff for identifying women at risk of major depressive symptoms, including studies validating the EPDS in South Asian and similar populations. Postpartum depression was defined as a positive screening result on the EPDS (score ≥13) within six weeks postpartum. The type of Caesarean section was classified as elective or emergency based on the indication for surgery. Complications during or after surgery included infections, hemorrhage, or any other adverse events noted in the medical record. Neonatal complications included low birth weight (<2.5 kg), admission to the neonatal intensive care unit (NICU), or other adverse neonatal outcomes. Data were entered and analyzed using statistical software SPSS version 26.0. Descriptive statistics summarized the data, with categorical variables presented as frequencies and percentages, and continuous variables as means ± standard deviations. The frequency of postpartum depression was calculated as the proportion of women who screened positive for depression out of the total sample size. Associations between PPD and categorical variables were assessed using the chi-square test. The p-value <0.05 was taken as significant. "Effect size measures such as Cramér's V or odds ratios were not calculated, as the analysis was primarily exploratory and focused on identifying associations rather than quantifying their magnitude."

## RESULTS

A total of 91 participants were included in the study. The mean age of the participants was 32.14 ± 8.34 years, and the average parity was 2.52 ± 1.68. Out of 91 patients, postpartum depression was found in 22 (24%; 95% CI: 15.4%–32.6%) patients (Figure 1).

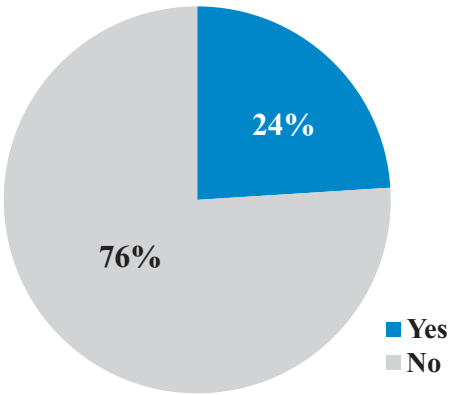


**Figure 1:** Frequency of Postpartum Depression

The study provides a stratified analysis of postpartum depression with various maternal, neonatal, and socioeconomic factors. Education Level: Among women with postpartum depression, 8 (36.4%) had a primary level of education, 10 (24.4%) had secondary education, and 4 (20.0%) had higher education. In contrast, among women without postpartum depression, 22 (63.6%) had primary education, 31 (75.6%) had secondary education, and 16 (80.0%) had higher education. The association between education level and postpartum depression was not statistically significant (p=0.864). Socioeconomic Status: Postpartum depression was observed in 8 (23.5%) women from the low socioeconomic group, 13 (27.7%) from the middle socioeconomic group, and 1 (10.0%) from the high socioeconomic group. Among women without postpartum depression, 26 (76.5%) were from the low group, 34 (72.3%) from the middle group, and 9 (90.0%) from the high group. There was no significant relationship between socioeconomic status and postpartum depression (p=0.493). Type of Caesarean Section: Postpartum depression was reported in 9 (24.3%) women who had elective Caesarean sections and in 13 (24.1%) who had emergency Caesarean sections. Among those without postpartum depression, 28 (75.7%) underwent elective Caesarean sections, and 41 (75.9%) underwent emergency Caesarean sections. This factor showed no statistically significant association with postpartum depression (p=0.978). Complications: Among women with postpartum depression, 5 (20.8%) experienced complications during or after surgery, while 17 (25.4%) did not have complications. For women without postpartum depression, 19 (79.2%) had complications, and 50 (74.6%) did not. The presence of complications was not significantly associated with postpartum depression (p=0.656). History of Mental Health Issues: Postpartum depression was observed in 3 (21.4%) women with a history of mental health issues and in 19 (24.7%) without such a history. Among women without postpartum depression, 11 (78.6%) had a history of mental health issues, while 58 (75.3%) did not. This variable did not show a significant association with postpartum depression (p=0.794). Neonatal Complications: Postpartum depression was noted in 7 (23.3%) women whose neonates had complications and in 15 (24.6%) whose neonates did not. In women without postpartum depression, 23 (76.7%) had neonates with complications, while 46 (75.4%) did not. Neonatal complications were not significantly associated with postpartum depression (p=0.895) (Table 1).

**Table 1:** Association of Postpartum Depression with Maternal, Socioeconomic, Surgical, and Neonatal Factors

| Variables | Category | Postpartum Depression Yes, n (%) | Postpartum Depression No, n (%) | Total n (%) | p-value |
|---|---|---|---|---|---|
| Education Level | Primary | 8 (36.4%) | 22 (63.6%) | 30 | 0.864 |
| | Secondary | 10 (24.4%) | 31 (75.6%) | 41 | |
| | Higher | 4 (20.0%) | 16 (80.0%) | 20 | |

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|---|---|---|---|---|---|
| Socioeconomic Status | Low | 8 (23.5%) | 26 (76.5%) | 34 | 0.493 |
| | Middle | 13 (27.7%) | 34 (72.3%) | 47 | |
| | High | 1 (10.0%) | 9 (90.0%) | 10 | |
| Type of Caesarean Section | Elective | 9 (24.3%) | 28 (75.7%) | 37 | 0.978 |
| | Emergency | 13 (24.1%) | 41 (75.9%) | 54 | |
| Complications | Yes | 5 (20.8%) | 19 (79.2%) | 24 | 0.656 |
| | No | 17 (25.4%) | 50 (74.6%) | 67 | |
| History of Mental Health Issues | Yes | 3 (21.4%) | 11 (78.6%) | 14 | 0.794 |
| | No | 19 (24.7%) | 58 (75.3%) | 77 | |
| Neonatal Complications | Yes | 7 (23.3%) | 23 (76.7%) | 30 | 0.895 |
| | No | 15 (24.6%) | 46 (75.4%) | 61 | |

## DISCUSSION

This research explored the occurrence of postpartum depression (PPD) and examined whether maternal, socioeconomic, surgical, and neonatal factors had any bearing on its development. The observed a 24% prevalence of PPD among women who underwent Caesarean section. However, no statistically significant links were identified between PPD and variables such as educational background, economic standing, type of Caesarean procedure, post-surgical complications, mental health history, or neonatal issues. These outcomes both echo and diverge from earlier findings in the literature, highlighting the complex and multifactorial nature of PPD. A study by Yousafzai *et al.* reported that PPD occurred far more frequently in patients who experienced emergency C-sections (76.6%) than in those who delivered vaginally or via elective surgery [12]. This indicates that the stress and unpredictability of emergency procedures might act as psychological triggers. Although our study did not replicate these differences between elective and emergency deliveries, the stress-related mechanisms discussed by Yousafzai *et al.* remain a credible explanation for such trends [12]. Khan *et al.* found a higher PPD prevalence of 36.69%, emphasizing the necessity of early identification and support systems [13]. They also noted a greater vulnerability to PPD among women aged 18 to 35. Our lower prevalence (24%) and lack of significant association may be due to differences in population characteristics and study design. Unlike Khan *et al.* age was not included as a primary analytic variable in our study [13], and our sample included a wider age range, which may have diluted the age-related effects observed in their cohort. Similarly, Malik *et al.* reported a substantially higher PPD prevalence among women undergoing Caesarean section (58%), suggesting a strong link between CS and postnatal depression [14]. Our findings differ, as we did not observe a significant association between the type of CS and PPD. This discrepancy may reflect differences in sampling techniques, cultural context, postpartum support systems, or methodological variations such as the timing of PPD assessment. Malik *et al.* used a smaller, more homogeneous sample, whereas our study included a broader CS population with mixed indications and postoperative experiences, which may have influenced the observed outcomes [14]. In contrast, Selvam et al. reported a lower PPD prevalence (12%) in primiparas, with a higher rate of PPD following vaginal delivery compared to Caesarean section [15]. Such divergent findings among studies may reflect differences in social norms, institutional care standards, family support systems, and the psychological meaning attached to childbirth methods in each cultural setting. Their findings emphasize the significance of contextual and sociocultural factors on PPD, rather than the delivery method alone [16, 17]. A study by Moameri *et al.* found a small but significant relationship between Caesarean delivery and PPD, particularly in emergency cases [18]. Our analysis did not replicate this association, possibly due to the smaller sample size, different population characteristics, and variations in perioperative practices. Additionally, Dousti *et al.* and Doke *et al.* emphasized the role of psychological factors—such as antenatal anxiety and perceived loss of control—which were not specifically assessed in our study and may partly explain the differences in results [19, 20].

## CONCLUSIONS

This study identified postpartum depression (PPD) in 24% of women who delivered via Caesarean section, fulfilling the primary objective of determining its frequency in this population. In addressing the second objective, no statistically significant associations were observed between PPD and maternal factors (education and history of mental health issues), socioeconomic status, surgical characteristics (elective vs. emergency CS and postoperative complications), or neonatal outcomes. These findings suggest that the variables assessed in this study may not be the key determinants of PPD among women undergoing Caesarean section and that other psychosocial or contextual influences not measured here may play a more substantial role. The results underscore the importance of routine mental health screening and supportive postpartum care for all women undergoing Caesarean section to ensure early identification and intervention for depressive symptoms.

## Authors Contribution

Conceptualization: SI
Methodology: UA, ZS
Formal analysis: ZS
Writing review and editing: UA, SBM

All authors have read and agreed to the published version of the manuscript

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## Conflicts of Interest

All the authors declare no conflict of interest.

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