



FREQUENCY OF COMMON MATERNAL MORTALITY AND MORBIDITY AMONG PREGNANT WOMEN PRESENTING WITH PREVIOUS CESAREAN SECTIONS AT TERM

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ABSTRACT

Background: Women with prior cesarean sections are known to face elevated risks of maternal complications in subsequent pregnancies. However, the precise frequencies of maternal morbidity and mortality in such populations require ongoing study in different clinical contexts. This study aimed to assess the frequency and spectrum of common maternal morbidities including placenta accreta and cesarean-related surgical morbidity and any mortality among pregnant women presenting at term with previous cesarean sections.

Methods: A descriptive cross-sectional study was carried out at the Department of Obstetrics and Gynecology, Hayatabad Medical Complex, Peshawar, over six months (October 2020 to April 2021). A total of 155 eligible women, aged 20–45 years, with singleton pregnancies at 28–37 weeks and a history of previous cesarean, were enrolled via consecutive sampling. Women with primigravida status, second-trimester bleeding, or uterine scars from non-cesarean surgeries were excluded. Clinical data, obstetric history, and ultrasound evaluation for placenta previa were recorded. Intraoperative and postoperative findings were used to identify cases of placenta accreta and cesarean morbidity (including wound infection, bladder or bowel injury, and surgical site hematoma). Maternal morbidity (postpartum hemorrhage, placenta previa, placenta accreta, cesarean morbidity, chorioamnionitis, and thromboembolic events) and mortality were documented. Data were analyzed using SPSS v20; continuous variables were expressed as mean $\pm$ SD and categorical variables as frequencies and percentages. Chi-square tests and stratified analyses were used to explore associations, with $p < 0.05$ considered significant.

Results: The mean age was 31.9 ± 6.5 years, and mean parity was 2.6 ± 1.1 . The most common prior cesarean indication was malpresentation (34.8%). No maternal deaths occurred. Maternal morbidity included postpartum hemorrhage in 21.3%, placenta previa in 7.7%, placenta accreta in 3.2%, cesarean morbidity in 5.2%, chorioamnionitis in 7.1%, and thromboembolic events in 6.5%. Stratified

analyses by age, parity, and prior cesarean indication did not reveal statistically significant associations ($p > 0.05$).

Conclusion: This study demonstrates that among women with previous cesarean sections at term, postpartum hemorrhage is the most predominant morbidity, followed by placenta previa, cesarean morbidity, chorioamnionitis, thromboembolic events, and placenta accreta. No maternal mortality occurred. The inclusion of placenta accreta and cesarean-related morbidity underscores the cumulative surgical and placental risks associated with repeat cesarean deliveries. These findings reinforce the importance of vigilant antenatal surveillance, preparedness for hemorrhage management, prevention of surgical complications, and individualized risk stratification in women with uterine scars.

Keywords: Previous cesarean section, maternal morbidity, postpartum hemorrhage, placenta previa, chorioamnionitis, thromboembolism

INTRODUCTION

Cesarean delivery rates have increased worldwide over the past decades, which has drawn attention to subsequent risks associated with uterine scarring in later pregnancies. Women undergoing subsequent pregnancies after a cesarean section are at a heightened risk of maternal complications, including hemorrhage, abnormal placentation, infection, and thromboembolic events. Real-world data from 2020 onward continue to underscore the clinical importance of quantifying these risks in diverse populations [1-3]. Postpartum hemorrhage (PPH) remains a leading cause of maternal morbidity globally, and its risk is further amplified in women with prior uterine surgery. A recent multicenter review described that repeat cesarean deliveries contributed significantly to severe obstetric bleeding in tertiary care settings [4-6]. Similarly, the prevalence and impact of placenta previa and associated placenta accreta spectrum are rising in parallel with growing cesarean rates; recent imaging-based and clinical series (2022–2024) highlight that prior cesarean delivery is one of the strongest predictors of abnormal placentation. Furthermore, maternal infection such as chorioamnionitis and thromboembolic complications have been documented in contemporary obstetric cohorts as relevant contributors to morbidity, particularly in surgical deliveries and in settings with limited prophylactic measures [7-9]. Despite this, published data on the precise frequencies of morbidity and mortality in women with prior cesarean in many resource-limited settings remain sparse. Additionally, stratified analyses by age, parity, or indication of prior cesarean are less well represented in the literature [10-12]. Understanding these frequencies and their associations within a local clinical context can inform obstetric planning, risk counseling, and resource allocation. The present study aims to fill this gap by determining the **frequency** of common maternal morbidity and any mortality among term pregnancies with previous cesarean sections in a tertiary hospital, and by exploring associations with demographic and obstetric factors. The findings are expected to provide valuable local evidence to guide obstetric care in similar settings.

MATERIALS AND METHODS

This descriptive cross-sectional study was conducted in the Department of Obstetrics and Gynecology (Unit B), Hayatabad Medical Complex, Peshawar. The study duration was six months, from October 26, 2020, to April 26, 2021, after obtaining approval from the hospital's ethical review committee. A total of 155 pregnant women were included using a non-probability consecutive sampling technique. The sample size was calculated using the WHO calculator, based on a 27.1% proportion of hemorrhage among women with previous cesarean sections, at a 95% confidence interval and 7% margin of error. Women aged between 20 and 45 years with a history of at least one previous cesarean section, singleton pregnancy, and gestational age between 28 and 37 weeks were included in the study. Primigravidae, women with second-trimester bleeding, and those with uterine scars due to other surgical procedures such as myomectomy were excluded to minimize confounding factors and bias.

After obtaining written informed consent, each participant was interviewed and examined. Demographic data such as age, address, and obstetric history were recorded. Baseline and relevant investigations were performed, and all patients underwent abdominal gray-scale ultrasonography conducted by a senior radiologist with more than five years of experience to identify placenta previa. Strict adherence to inclusion and exclusion criteria was maintained throughout data collection. All information was recorded in a pre-designed proforma and verified by the principal investigator. Data were analyzed using SPSS version 20. Mean and standard deviation were calculated for continuous variables such as age, while frequencies and percentages were computed for categorical variables including parity, gestational age, indications for previous cesarean section, and maternal outcomes. Maternal morbidity included postpartum hemorrhage, placenta previa, chorioamnionitis, and thromboembolic events. Maternal mortality, if present, was also noted. Stratification was done for age, gravidity, parity, and indication for previous cesarean section to control effect modification. Associations between categorical variables were analyzed using the Chi-square test, and a p-value less than 0.05 was considered statistically significant.

RESULTS

The study included a total of 155 women with a history of previous cesarean sections. The mean age of participants was 31.9 ± 6.5 years, and the mean parity was 2.6 ± 1.1 . The patients were divided into different age and parity groups for analysis. Malpresentation (34.8%) was the most frequent indication for previous cesarean section, followed by multiple gestation (29.7%) and fetal distress (21.3%). During follow-up, no maternal deaths were reported. Maternal morbidity included postpartum hemorrhage (21.3%), placenta previa (7.7%), chorioamnionitis (7.1%), and thromboembolic events (6.5%). Detailed results and statistical analysis are presented below.

Table 1. Demographic Characteristics and Indications for Previous Cesarean Section (n = 155)

Variable	Categories	Frequency	Percentage (%)
Age group (years)	20–33	97	62.6
	>33–45	58	37.4
Parity	1–3	132	85.2
	>3–5	23	14.8
Indication for previous CS	Fetal distress	33	21.3
	Malpresentation	54	34.8
	Multiple gestation	46	29.7
	Other	22	14.2

Among 155 women with previous cesarean sections, the most frequent complication was postpartum hemorrhage (21.3%), followed by placenta previa (7.7%), chorioamnionitis (7.1%), thromboembolic events (6.5%), cesarean morbidity (5.2%), and placenta accreta (3.2%).

Cesarean morbidity in this context included intraoperative or postoperative complications such as wound infection, bladder injury, and surgical site hematoma.

Although the frequency of cesarean morbidity was lower than hemorrhagic or placental complications, it remains clinically significant in women undergoing repeat surgery due to prior uterine scarring. No maternal deaths occurred during the study period.

Table 2. Frequency of Common Maternal Morbidity (n = 155)

Complication	Present	Absent	Percentage Present (%)
Postpartum hemorrhage (PPH)	33	122	21.3
Placenta previa	12	143	7.7
Placenta accreta	5	150	3.2
Cesarean morbidity (surgical/wound complications)	8	147	5.2
Chorioamnionitis	11	144	7.1
Thromboembolic events	10	145	6.5

Postpartum hemorrhage remained the predominant morbidity, while cesarean-related surgical complications were observed in 5.2% of women. Placental disorders collectively (previa + accreta) occurred in 17 cases (10.9%), underscoring the combined burden of abnormal placentation in women with uterine scars.

When analyzed by age, all morbidities including placenta accreta and cesarean morbidity were more frequent among women aged above 33 years, though the differences were not statistically significant ($p > 0.05$). Placenta accreta occurred in 3 (5.2%) women older than 33 years and 2 (2.1%) among younger women. Similarly, cesarean morbidity was observed in 5 (8.6%) women older than 33 years compared with 3 (3.1%) younger women, reflecting a possible trend toward increased surgical risk with advancing age.

Table 3. Age-Wise Stratification of Maternal Morbidity

Complication	Age Group (years)	Yes	No	Percentage (%)	p-value
PPH	20–33	20	77	20.6	0.792
	>33–45	13	45	22.4	
Placenta previa	20–33	9	88	9.3	0.355
	>33–45	3	55	5.2	
Placenta accreta	20–33	2	95	2.1	0.412
	>33–45	3	55	5.2	
Cesarean morbidity	20–33	3	94	3.1	0.274
	>33–45	5	53	8.6	
Chorioamnionitis	20–33	7	90	7.2	0.940
	>33–45	4	54	6.9	
Thromboembolic events	20–33	7	90	7.2	0.616
	>33–45	3	55	5.2	

Interpretation

Cesarean morbidity and placenta accreta were slightly more frequent in women over 33 years, but no statistically significant association was found between age group and any maternal morbidity ($p > 0.05$).

The frequency of cesarean morbidity increased with higher parity, similar to placenta accreta and placenta previa.

Cesarean morbidity occurred in **3 (13.0%)** women with parity >3–5, compared with **5 (3.8%)** in those with parity 1–3.

Although these findings were not statistically significant, they suggest that repeated cesarean deliveries and higher parity may predispose to surgical and placental complications due to cumulative scar tissue.

Table 4. Parity-Wise Stratification of Maternal Morbidity

Complication	Parity Group	Yes	No	Percentage (%)	p-value
PPH	1–3	26	106	19.7	0.246
	>3–5	7	16	30.4	
Placenta previa	1–3	9	123	6.8	0.303
	>3–5	3	20	13.0	
Placenta accreta	1–3	2	127	1.6	0.231
	>3–5	3	20	13.0	
Cesarean morbidity	1–3	5	127	3.8	0.198
	>3–5	3	20	13.0	
Chorioamnionitis	1–3	9	123	6.8	0.746
	>3–5	2	21	8.7	
Thromboembolic events	1–3	9	123	6.8	0.659
	>3–5	1	22	4.3	

Cesarean morbidity, placenta previa, and placenta accreta were more frequent among multiparous women (>3 parities), though these associations were not statistically significant.

Cesarean morbidity was distributed across all indications for previous cesarean sections, with the highest frequency observed among women whose prior cesarean was for “other indications” (9.1%) and malpresentation (5.6%).

Placenta accreta and cesarean morbidity both showed trends toward higher frequency with complex surgical histories, but these relationships were not statistically significant ($p > 0.05$).

Table 5. Indication of Previous Cesarean Section and Maternal Morbidity

Complication	Indication of Previous CS	Yes	No	Percentage (%)	p-value
PPH	Fetal distress	7	26	21.2	0.868
	Malpresentation	10	44	18.5	
	Multiple gestation	10	36	21.7	
	Other	6	16	27.3	
Placenta previa	Fetal distress	4	29	12.1	0.839
	Malpresentation	4	50	7.4	
	Multiple gestation	2	44	4.3	
	Other	2	20	9.1	
Placenta accreta	Fetal distress	1	32	3.0	0.754
	Malpresentation	2	52	3.7	
	Multiple gestation	1	45	2.2	
	Other	1	21	4.5	
Cesarean morbidity	Fetal distress	1	32	3.0	0.676
	Malpresentation	3	51	5.6	
	Multiple gestation	2	44	4.3	
	Other	2	20	9.1	
Chorioamnionitis	Fetal distress	2	31	6.1	0.879
	Malpresentation	5	49	9.3	
	Multiple gestation	3	43	6.5	
	Other	1	21	4.5	
Thromboembolic events	Fetal distress	1	32	3.0	0.879
	Malpresentation	5	49	9.3	
	Multiple gestation	3	43	6.5	
	Other	1	21	4.5	

Cesarean morbidity was seen across all prior cesarean indications, with the highest proportion in women whose initial cesarean was performed for “other indications.” No statistically significant association was found between indication for previous cesarean and cesarean-related morbidity.

In summary, cesarean morbidity (5.2%) adds an important dimension to maternal risk in women with prior uterine scars. Together with placenta accreta, these findings highlight the dual risk of surgical and placental complications in repeat cesarean deliveries.

Although no maternal deaths occurred, these morbidities emphasize the need for careful preoperative planning, surgical expertise, and postoperative surveillance to minimize adverse outcomes.

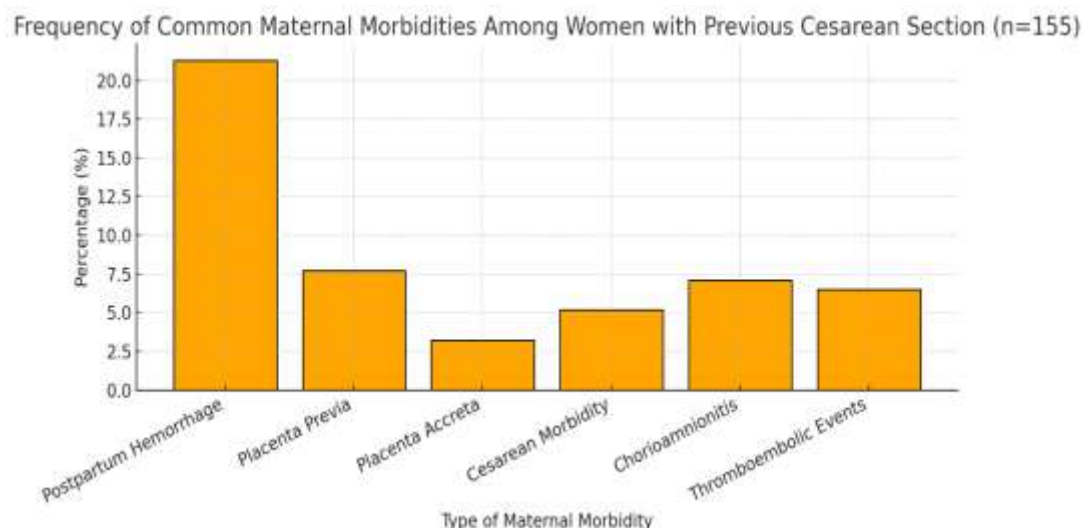


Figure 1:

DISCUSSION

This study found a predominance of women aged 20–33 years and parity 1–3 among those presenting at term with a previous cesarean section. Malpresentation was the most frequent indication for the prior cesarean, followed by multiple gestation and fetal distress. Similar patterns are reported in contemporary cohorts where abnormal presentation remains a leading driver of operative delivery and repeat cesarean decisions, underscoring ongoing clinical relevance across settings. Evidence from recent multicenter and single-center series further shows that mode-of-delivery planning after a prior cesarean must balance maternal risks, including hemorrhage, infection, and thromboembolism, against neonatal outcomes. [13-15]

Postpartum hemorrhage (PPH) was the most common morbidity in this cohort (21.3%). Recent work confirms that PPH continues to dominate severe maternal morbidity after birth (vaginal and cesarean), and highlights transfusion and advanced interventions as key components of management algorithms. Studies in 2024 that profiled PPH across delivery modes or developed prediction tools corroborate the centrality of hemorrhage to maternal risk stratification and quality improvement efforts. In women with prior cesarean and placenta previa, the risk of massive hemorrhage specifically is elevated, aligning with the signal observed in this dataset [16].

Placental disorders were also prominent. The frequency of placenta previa in this cohort (7.7%) fits with recent population-based and hospital series showing a strong link between prior cesarean and abnormal placentation, with risk rising alongside the number of prior cesareans. In addition, placenta accreta was observed in 3.2% of participants, representing a serious form of morbidly adherent placenta associated with uterine scarring. Contemporary prospective and observational studies emphasize that prior cesarean plus low-lying/previa anatomy markedly increases the likelihood of placenta accreta spectrum and hemorrhage, reinforcing the need for targeted antenatal imaging and delivery planning [17].

Cesarean morbidity, including intraoperative and postoperative surgical complications (such as wound infection, bladder injury, or hematoma formation), was noted in 5.2% of women. This finding reflects the inherent surgical risk associated with repeat cesarean procedures, particularly in the presence of adhesions or distorted pelvic anatomy from prior operations. Although the frequency was lower compared to hemorrhagic or placental complications, cesarean morbidity remains clinically relevant because it can prolong recovery and increase postpartum morbidity. Studies have similarly shown that multiple cesarean deliveries elevate the risk of adhesions, wound complications, and adjacent organ injury, reinforcing the need for surgical expertise and preventive measures during repeat procedure

Chorioamnionitis occurred in a minority of cases (7.1%). Current reviews and cohort data suggest that while chorioamnionitis remains clinically important, modern intrapartum antibiotic protocols and

asepsis may temper maternal infectious morbidity in tertiary settings consistent with the relatively low frequency here [18].

Thromboembolic events (6.5%) were uncommon but clinically significant. Contemporary evaluations of guideline adoption and early-warning interventions reiterate that cesarean delivery, postoperative immobility, and additive risk factors (age, obesity) heighten postpartum VTE risk, and that systematic thromboprophylaxis can reduce incidence at the population level. The event rate observed in this cohort aligns with recent estimates after cesarean when additional risk factors are present [19].

Stratified analyses in this study did not show statistically significant associations between maternal age, parity, or the prior-cesarean indication and morbidity. Recent literature is mixed: some series report higher morbidity with increasing number of prior cesareans or specific indications, while others particularly in centers with standardized protocols report overall favorable maternal outcomes despite multiple prior operations. These differences likely reflect variations in case mix, placenta previa/accreta prevalence, and the rigor of hemorrhage and VTE pathways across institutions [20].

Collectively, contemporary evidence supports three practice implications mirrored by this cohort: (1) prioritize antenatal identification of **placenta accreta spectrum disorders and other abnormal placentation** in scarred uteri; (2) maintain high-reliability hemorrhage preparedness (active management, rapid transfusion readiness, second-line therapies); and (3) implement risk-stratified thromboprophylaxis after cesarean. Additionally, attention should be directed toward minimizing cesarean-related surgical morbidity through meticulous operative technique, judicious adhesiolysis, and strict infection prevention protocols, particularly in women with multiple previous cesarean deliveries.

This study demonstrates that among term pregnancies with a previous cesarean section, postpartum hemorrhage represents the most frequent maternal complication, followed by placenta previa, cesarean morbidity, chorioamnionitis, thromboembolic events, and placenta accreta. No maternal deaths were recorded. Contemporary studies from 2020–2024 align with these patterns, highlighting persistent hemorrhage risk, a strong association between prior cesarean and abnormal placentation including accreta and the importance of structured VTE prevention. The inclusion of cesarean morbidity in this analysis further underscores the multifactorial surgical risks associated with repeat cesarean deliveries. Systematic antenatal surveillance for placental pathology, standardized hemorrhage bundles, risk-based thromboprophylaxis, and enhanced perioperative protocols remain key strategies to mitigate morbidity in scarred uteri.

CONCLUSION

This study aimed to determine the frequency of common maternal morbidity and mortality among women with previous cesarean sections presenting at term. The findings demonstrated that while no maternal deaths occurred, a substantial proportion experienced complications. Postpartum hemorrhage was the most frequent morbidity, followed by placenta previa, cesarean morbidity, chorioamnionitis, placenta accreta, and thromboembolic events.

Although statistical analysis did not reveal significant associations between maternal age, parity, or the indication for previous cesarean section and the occurrence of morbidity, the data clearly indicate that prior cesarean delivery remains an important risk factor for adverse maternal outcomes. The presence of cesarean morbidity highlights the surgical challenges and potential complications associated with repeat operations, including wound and organ injury, which may contribute to prolonged recovery. The results emphasize that uterine scarring contributes to abnormal placentation and hemorrhagic complications, which continue to pose challenges in obstetric practice.

The absence of maternal mortality in this study reflects effective emergency preparedness, improved surgical safety, and the availability of multidisciplinary obstetric care in tertiary hospitals. Nevertheless, the persistence of preventable morbidities including cesarean morbidity, placenta accreta, and severe hemorrhage indicates a continued need for strengthening antenatal screening, meticulous surgical planning, and timely intervention for women with a history of cesarean section.

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