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Understanding the Recurrence of Cesarean Sections: Common Causes and Outcomes

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Abstract

Background: Cesarean sections (C-sections) are among the most common surgical procedures worldwide, with an increasing trend in both first-time and recurrent cesareans. Recurrent C-sections, in particular, pose significant risks for maternal and neonatal outcomes, yet many are performed due to the recurrence of initial cesarean indications or maternal request.

Methods: This prospective observational study aimed to compare the causes and outcomes of recurrent versus first-time C-sections among 120 women at Bangabandhu Sheikh Mujib Medical University (BSMMU) and Universal Medical College & Hospital Ltd. in Dhaka, Bangladesh, over a one-year period. Of the participants, 72 had recurrent C-sections and 48 had first-time C-sections.

Results: The most common cause for recurrent C-sections was the recurrence of the initial cesarean indication (38.9%), while fetal distress was the leading cause of first-time C-sections (33.3%). Recurrent C-sections were associated with longer operative times (55.4 ± 12.3 minutes vs. 48.7 ± 10.5 minutes; $p < 0.001$) and greater blood loss (550 ± 150 mL vs. 470 ± 110 mL; $p = 0.005$). Uterine rupture occurred in 4.2% of recurrent cases, with no cases in first-time C-sections. Postpartum hemorrhage rates were similar (13.9% vs. 12.5%; $p = 0.623$). Neonatal outcomes, including NICU admissions (16.7% vs. 8.3%) and respiratory distress (12.5% vs. 10.4%), were slightly higher in recurrent C-sections but not statistically significant.

Conclusion: This study highlights the need for careful decision-making in recurrent C-sections to minimize complications.

Keywords: Cesarean section; Recurrent cesarean; first-time cesarean; Maternal outcomes; Neonatal outcomes.

Introduction

Cesarean section (C-section) is a vital surgical intervention used to ensure the safety of both mother and child during childbirth when complications arise [1]. Over the years, the rate of C-sections has steadily increased worldwide, with recurrent C-sections becoming a growing concern [2]. While an initial C-section is often performed due to specific medical indications such as fetal distress or labor dystocia, the likelihood of undergoing a repeat cesarean in subsequent pregnancies is significantly higher. This trend contributes to the global rise in C-section rates, prompting further investigation into the causes and outcomes associated with recurrent C-sections compared to first-time procedures [3].

Recurrent C-sections often stem from the medical rationale of avoiding

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complications associated with labor after an initial cesarean delivery. Previous cesarean indication repeats are among the most common causes of recurrent cesareans, where the same issues that led to the initial surgery, such as fetal distress or malpresentation, reappear in subsequent pregnancies [4]. In contrast, first-time C-sections tend to be driven more by acute complications during labor, such as fetal distress or abnormal fetal positioning [5] For many women, the decision to undergo a repeat cesarean is influenced by factors such as perceived safety, convenience, and maternal request [6]. Maternal request for elective repeat cesarean sections is becoming increasingly common, accounting for a significant proportion of recurrent C-sections [7].

Understanding the clinical and demographic differences between recurrent and first-time C-sections is crucial in improving maternal and neonatal health outcomes [8]. Studies suggest that women undergoing recurrent C-sections are generally older and have higher parity than those undergoing a first-time cesarean [9]. This is understandable, as women with recurrent C-sections have had previous deliveries and tend to be in more advanced stages of their reproductive lives [10]. Additionally, maternal comorbidities such as hypertensive disorders and diabetes are more prevalent in the recurrent C-section group, which may influence the decision to opt for a surgical delivery rather than attempting vaginal birth [11]. These factors contribute to a distinct clinical profile for women undergoing recurrent C-sections.

The outcomes of recurrent C-sections are also distinct from those of first-time C-sections. Research has shown that recurrent C-sections are often associated with longer operative times and increased blood loss compared to first-time procedures [12]. This is partly due to the presence of surgical adhesions from previous surgeries, which complicates the procedure and increases the risk of intraoperative complications. Additionally, the risk of uterine rupture, although low, is present in recurrent C-sections, particularly in women who have undergone multiple cesareans [13]. Other complications such as postpartum hemorrhage and maternal infection are common in both groups but tend to be slightly higher in recurrent C-sections due to the cumulative surgical trauma [14].

Neonatal outcomes also differ between recurrent and first-time C-sections. Babies born via recurrent C-sections are at an increased risk of respiratory complications, often requiring neonatal intensive care unit (NICU) admission [15]. This is because scheduled cesareans are frequently performed before labor begins, potentially leading to premature lung development. In contrast, neonates from first-time C-sections, although still at risk for complications, are less likely to experience severe respiratory distress. This difference in neonatal outcomes highlights the importance of carefully assessing the timing and indications for both recurrent and first-time cesareans [16].

Recurrent C-sections differ from first-time C-sections in terms of their causes, maternal characteristics, and outcomes. While recurrent C-sections are often performed out of caution or maternal preference, they are associated with unique risks that require careful management. The growing prevalence of recurrent cesareans underscores the need for continued research into the safest and most effective strategies for managing subsequent pregnancies after an initial C-section. By better understanding these differences, healthcare providers can improve decision-making processes, ultimately enhancing maternal and neonatal outcomes.

Objective

The objective of this study was to analyze and compare the causes and outcomes of recurrent cesarean sections versus first-time cesarean sections, with a focus on identifying the factors influencing the decision to perform a repeat cesarean and understanding the associated maternal and neonatal outcomes.

Methodology & Materials

This prospective, observational study was conducted over 1 year from June 2023 to July 2024 at Bangabandhu Sheikh Mujib Medical University (BSMMU) and Universal Medical College & Hospital Ltd, Dhaka, Bangladesh. A total of 120 women undergoing C-sections were included, with 72 in the recurrent C-section group and 48 in the first-time C-section group. Inclusion criteria consisted of pregnant women scheduled for elective or emergency C-sections who consented to participate, while those with unrelated high-risk pregnancies or incomplete medical records were excluded. Data on maternal demographics, clinical characteristics, and surgical outcomes were collected from medical records, covering variables such as age, BMI, parity, hypertensive disorders, diabetes, and gestational age. Primary outcomes focused on operative time, blood loss, and major complications (e.g., uterine rupture, postpartum hemorrhage), while secondary outcomes included neonatal complications like NICU admission and respiratory distress. Statistical analysis was performed using SPSS version (25), with continuous variables compared using the independent t-test and categorical variables analyzed using the Chi-square or Fisher's exact test, with a significance threshold set at $P < 0.05$. Ethical approval was obtained from the institutional ethics committee and all participants provided informed consent prior to data collection.

Results

Table 1 compares the demographic and clinical characteristics of 120 women undergoing either recurrent or first-time C-sections. The average age was slightly higher in the recurrent C-section group (31.2 years) compared to the first-time group (30.2 years), though this difference was not statistically significant. Similarly, women with recurrent

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C-sections had a higher average BMI (28.5 kg/m²) than those with first-time C-sections (27.0 kg/m²), but the difference was not significant. Gestational age was comparable between the groups. Parity, however, was significantly higher in the recurrent C-section group (P = 0.042), indicating that women with recurrent C-sections had more previous births. While hypertensive disorders and diabetes were more prevalent in the recurrent C-section group, the differences were not statistically significant.

Table 2 outlines the common causes for C-sections in the study population of 120 women. Among women with recurrent C-sections, the most frequent cause was a repeat of the previous Cesarean indication (38.9%), followed by elective C-sections due to maternal request (22.2%). In the first-time C-section group, the most common cause was fetal distress (33.3%), followed by malpresentation (20.8%). Other causes, such as placenta previa, were relatively consistent between the two groups, while 25.1% of first-time C-sections were attributed to "other" causes, compared to 5.6% in the recurrent group.

Table 3 summarizes the maternal and neonatal outcomes between recurrent and first-time C-section groups. Operative time was significantly longer for recurrent C-sections (55.4 minutes) compared to first-time C-sections (48.7 minutes, P<0.001). Blood loss was also greater in the recurrent C-section group (550 mL vs. 470 mL, P = 0.005). Uterine rupture occurred in 4.2% of recurrent C-sections, while no cases were observed in the first-time group. Postpartum hemorrhage rates were similar between the two groups, as were neonatal ICU admissions, neonatal respiratory distress, and maternal infections, with none of these outcomes showing statistically significant differences.

Table 1: Demographic and Clinical Characteristics of the Study Population (N = 120)

Characteristic	Total (N = 120)	Recurrent C-section (N = 72)	First-time C-section (N = 48)	P-value
Age (years, mean ± SD)	30.8 ± 4.7	31.2 ± 4.5	30.2 ± 4.9	0.245
BMI (kg/m², mean ± SD)	27.9 ± 5.4	28.5 ± 5.8	27.0 ± 4.7	0.058
Gestational Age (weeks)	38.2 ± 1.3	38.1 ± 1.2	38.4 ± 1.4	0.134
Parity (mean ± SD)	2.1 ± 1.2	2.3 ± 1.1	1.8 ± 1.2	0.042
Hypertensive Disorders (%)	18 (15%)	14 (19.4%)	4 (8.3%)	0.087
Diabetes (%)	24 (20%)	18 (25%)	6 (12.5%)	0.051

Table 2: Common Causes for C-sections (N = 120)

Cause	Recurrent C-section (N = 72)	Percentage (%)	First-time C-section (N = 48)	Percentage (%)
Previous Cesarean Indication Repeats	28	38.90%	0	0.00%
Elective due to Maternal Request	16	22.20%	6	12.50%
Fetal Distress	10	13.90%	16	33.30%
Malpresentation	8	11.10%	10	20.80%
Placenta Previa	6	8.30%	4	8.30%
Other	4	5.60%	12	25.10%

Table 3: Maternal and Neonatal Outcomes

Outcome	Recurrent C-section (N = 72)	First-time C-section (N = 48)	P-value
Operative Time (minutes, mean ± SD)	55.4 ± 12.3	48.7 ± 10.5	<0.001
Blood Loss (mL, mean ± SD)	550 ± 150	470 ± 110	0.005
Uterine Rupture (%)	3 (4.2%)	0 (0.0%)	N/A
Postpartum Hemorrhage (%)	10 (13.9%)	6 (12.5%)	0.623
Neonatal ICU Admission (%)	12 (16.7%)	4 (8.3%)	0.148
Neonatal Respiratory Distress (%)	9 (12.5%)	5 (10.4%)	0.526
Maternal Infection (%)	6 (8.3%)	2 (4.2%)	0.314

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Discussion

This study aimed to examine and compare the causes and outcomes of recurrent cesarean sections (C-sections) versus first-time C-sections. The findings provide insight into the reasons behind the increase in recurrent C-sections and the potential risks associated with these procedures. These results also align with global trends, where recurrent C-sections have become more prevalent due to various clinical, social, and maternal factors. In the context of increasing C-section rates worldwide, understanding these trends is critical for optimizing maternal and neonatal outcomes and reducing unnecessary surgical interventions.

In this study, the most common cause for recurrent C-sections was the recurrence of the initial cesarean indication, accounting for 38.9% of cases. This observation aligns with findings from various studies, which report that prior cesarean indications such as labor dystocia, fetal distress, or malpresentation often persist in subsequent pregnancies, making repeat cesareans a common recommendation [17] Additionally, 22.2% of recurrent C-sections were elective, often at the maternal request, reflecting the global trend of women opting for repeat cesareans due to concerns about labor pain, convenience, and fears of potential complications during vaginal delivery [18]. In contrast, the most common cause for first-time C-sections was fetal distress, present in 33.3% of cases. This is consistent with other studies that show acute obstetric complications like fetal distress, malpresentation (20.8%), and placental issues such as placenta previa (8.3%) are the main drivers of primary cesarean deliveries [19].

Several studies have also emphasized the role of patient preference and healthcare provider recommendations in the rising rate of repeat cesarean sections. For example, a systematic review by Betrán et al., identified maternal request as a significant factor contributing to the increase in elective repeat C-sections globally [20]. Similarly, Clark et al., found that healthcare providers often favor repeat cesareans to avoid the perceived risks associated with labor after cesarean delivery, further contributing to the rise in recurrent cesareans [21].

Recurrent C-sections in this study were associated with longer operative times and greater blood loss compared to first-time C-sections. The mean operative time for recurrent C-sections was 55.4 ± 12.3 minutes, significantly longer than the 48.7 ± 10.5 minutes for first-time C-sections ($p < 0.001$). This finding is consistent with the literature, where repeat C-sections often require more time due to the presence of adhesions from previous surgeries, which complicate tissue dissection and increase the technical difficulty of the procedure [22]. Longer operative times are also linked to increased blood loss, with recurrent C-sections in our study showing a mean blood loss of 550 ± 150 mL compared to 470 ± 110 mL in first-time cesareans ($p = 0.005$).

Similar trends were reported in a study by Gyamfi-Bannerman et al., which found that each subsequent cesarean increases the likelihood of surgical complications such as excessive blood loss, adhesions, and longer recovery times [23]. These findings highlight the cumulative risks of multiple cesareans, suggesting that clinicians should carefully weigh the benefits and risks of performing repeat cesareans, particularly in women with more than two previous C-sections.

Uterine rupture, though rare, was observed in 4.2% of women undergoing recurrent C-sections in this study, while no cases were recorded in first-time cesareans. This complication is well-documented in the literature as a risk associated with multiple cesareans. According to Curtin et al., the risk of uterine rupture increases with the number of previous cesareans, particularly in women with a history of classical or vertical uterine incisions [24]. Given the potentially life-threatening nature of uterine rupture, it is crucial for healthcare providers to monitor women with multiple previous cesareans closely and discuss the risks of repeat surgery.

Postpartum hemorrhage was observed in both groups, with a slightly higher incidence in recurrent C-sections (13.9%) compared to first-time C-sections (12.5%), although this difference was not statistically significant ($p = 0.623$). The incidence of postpartum hemorrhage increases with the number of cesarean deliveries, as confirmed by several studies. In their investigation of postpartum hemorrhage rates, Anderson and Etches found that the likelihood of severe hemorrhage is significantly higher in women with multiple cesareans, largely due to the increased surgical complexity and tissue trauma associated with repeat procedures [25].

The study showed that infants born via recurrent C-sections were more likely to require neonatal intensive care unit (NICU) admission (16.7%) compared to those born via first-time C-sections (8.3%). Neonatal respiratory distress was also observed more frequently in infants born via recurrent cesarean (12.5%) than in those born via first-time cesarean (10.4%). Although these differences were not statistically significant, they reflect a trend reported in other studies. Neonates born via scheduled cesareans, particularly before labor onset, are at a higher risk of respiratory complications due to the absence of the hormonal and physiological changes that occur during labor and help prepare the neonate's lungs for breathing [26].

Research by Jain et al., supports these findings, indicating that elective cesareans performed before 39 weeks of gestation are associated with an increased risk of neonatal respiratory distress syndrome and NICU admissions [27]. Similarly, Stamilio et al., found that neonates born via repeat cesareans had higher rates of NICU admissions due to respiratory complications, emphasizing the need for careful

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timing and decision-making regarding the scheduling of cesarean deliveries [28].

The rising incidence of recurrent C-sections poses significant challenges for both healthcare providers and patients. The results of this study highlight the need for strategies to reduce unnecessary repeat cesareans, particularly those driven by maternal request or non-urgent medical indications. Encouraging shared decision-making between healthcare providers and patients, providing adequate counseling about the risks and benefits of repeat cesareans, and exploring alternatives such as attempting vaginal delivery where appropriate are crucial steps in addressing this issue.

Several recent studies, including those by Clark et al. and Zhang et al., have emphasized the importance of individualized care and risk assessment in managing women with previous cesareans [21,29]. The decision to perform a repeat cesarean should be based on a thorough evaluation of the patient's medical history, the number of previous cesareans, and the presence of any complicating factors that may increase the risk of maternal or neonatal complications.

Limitations of the study

This study has several limitations that should be acknowledged. Firstly, the sample size of 120 women, though sufficient for basic comparisons, may not be large enough to generalize the results to a broader population. Secondly, the study was conducted at two specific hospitals in Dhaka, Bangladesh, which may limit the applicability of the findings to other regions with different healthcare systems and practices. The study did not explore long-term maternal and neonatal outcomes, which could provide a more comprehensive understanding of the consequences of recurrent and first-time C-sections.

Recommendations

It is crucial to provide comprehensive counseling to women regarding the risks and benefits of both elective repeat C-sections and first-time cesareans. Healthcare providers should engage in shared decision-making with patients to ensure they make informed choices about their delivery options. Strategies to reduce unnecessary recurrent C-sections should be implemented, including the careful consideration of alternative delivery methods in appropriate cases, such as trial of labor after cesarean (TOLAC) when suitable.

Conclusion

This study provides valuable insights into the differences in causes and outcomes between recurrent and first-time cesarean sections. The most common reason for recurrent C-sections was the recurrence of the initial cesarean indication, while fetal distress was the primary cause for first-time cesareans. Recurrent C-sections were associated with longer operative times, increased blood loss, and higher rates of uterine rupture compared to first-time cesareans. Although the incidence of postpartum hemorrhage and neonatal complications such as NICU admissions and respiratory distress was slightly higher in the recurrent C-section group, these differences were not statistically significant.

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Conflicts of interest

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Ethical approval

The study was approved by the Institutional Ethics Committee.

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