International Journal of Medical and Pharmaceutical Research

Online ISSN-2958-3683 | Print ISSN-2958-3675
Frequency: Bi-Monthly
Available online on: https://ijmpr.in/

Original Article

Pregnancy and Childbirth in Women with Prior Cesarean Section

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OPEN ACCESS

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Received: 03-02-2026
Accepted: 26-02-2026
Available online: 08-03-2026

ABSTRACT

Background: The rising rate of cesarean section has led to an increasing number of pregnancies complicated by a previous uterine scar. Management of such pregnancies requires careful decision-making between Trial of Labour After Cesarean (TOLAC) and Elective Repeat Cesarean Section (ERCS) to optimise maternal and neonatal outcomes.
Objective: To evaluate pregnancy outcomes, mode of delivery, and associated maternal and neonatal complications in women with a prior cesarean section.
Methods: This prospective observational study was conducted over a period of one year at GMERS Sola Civil Hospital. A total of 1,430 pregnant women with a history of one or more previous cesarean sections and gestational age ≥28 weeks were included. Demographic data, obstetric history, mode of delivery, maternal complications, and neonatal outcomes were recorded and analysed using descriptive statistics and the Chi-square test, with $p<0.05$ considered statistically significant.
Results: Most women (78%) had one previous cesarean section. Repeat cesarean section was the predominant mode of delivery (68%), while 32% achieved successful vaginal birth after cesarean (VBAC). The most common indication for emergency repeat cesarean was fetal distress. Uterine rupture occurred in 0.5% of cases. Postpartum haemorrhage was observed in 6%, and 8% required blood transfusion. Neonatal outcomes were generally favourable, with 13% NICU admissions and 1.3% perinatal mortality.
Conclusion: Pregnancy after a previous cesarean section is associated with increased operative delivery rates but acceptable maternal and neonatal outcomes when managed in a well-equipped tertiary care centre. Careful patient selection, vigilant monitoring, and readiness for emergency intervention are essential for safe TOLAC. Reducing primary cesarean rates and promoting evidence-based VBAC practices are important to minimise long-term maternal morbidity.

Keywords*: Previous cesarean section; Vaginal Birth After Cesarean (VBAC); Trial of Labour After Cesarean (TOLAC); Repeat cesarean section; Uterine rupture; Maternal morbidity; Neonatal outcome; Tertiary care hospital.*

INTRODUCTION

Cesarean section (CS) is one of the most commonly performed obstetric surgical procedures worldwide. Over the past few decades, there has been a steady and significant rise in cesarean delivery rates across both developed and developing countries [1]. While cesarean section is a life-saving intervention when medically indicated, the increasing trend has resulted in a growing population of women with a previous cesarean scar presenting in subsequent pregnancies.

Globally, the cesarean section rate has exceeded the recommended 10–15% suggested by the World Health Organisation, with many countries reporting rates above 25–30% [2]. In India, institutional delivery rates have improved considerably, but, in parallel, cesarean section rates have also risen, particularly in tertiary care centres managing high-risk cases [3]. Consequently, obstetricians are increasingly faced with the challenge of managing pregnancies complicated by a prior cesarean section.

Pregnancy following a previous cesarean section is associated with both maternal and fetal risks. These include uterine rupture, scar dehiscence, abnormal placentation (placenta previa and placenta accreta spectrum), adhesions, intraoperative complications, postpartum haemorrhage, and increased neonatal morbidity [4,5]. The risk of complications tends to increase with the number of previous cesarean deliveries [6].

One of the key management decisions in such cases is whether to offer Trial of Labour After Cesarean (TOLAC) or to perform an Elective Repeat Cesarean Section (ERCS). Successful Vaginal Birth After Cesarean (VBAC) is associated with lower maternal morbidity, shorter hospital stay, and reduced surgical risks compared to repeat cesarean section [7]. However, failed TOLAC may increase maternal and perinatal morbidity due to emergency surgical intervention [8]. Therefore, appropriate patient selection, careful intrapartum monitoring, and availability of emergency operative facilities are essential for safe TOLAC.

Uterine rupture remains the most serious complication associated with TOLAC, though its incidence in women with a previous low transverse cesarean section is relatively low (0.5–1%) [9]. On the other hand, multiple repeat cesarean sections increase the risk of placenta accreta spectrum disorders and surgical morbidity in future pregnancies [10].

Professional bodies such as the American College of Obstetricians and Gynaecologists recommend that women with one prior low transverse cesarean delivery and no contraindications should be counselled and offered TOLAC in appropriately equipped centres [11]. Similarly, guidelines from the Royal College of Obstetricians and Gynaecologists support individualised counselling and shared decision-making regarding mode of delivery after previous cesarean section [12].

Given the rising cesarean section rates and the associated maternal and neonatal implications, it is essential to evaluate the patterns of delivery, maternal morbidity, and neonatal outcomes among women with prior cesarean section in tertiary care settings. This study was therefore undertaken to assess pregnancy outcomes, mode of delivery, and associated complications in women with a previous cesarean section delivering at a tertiary care hospital in Ahmedabad over a period of one year.

MATERIALS AND METHODS

Study Design and Setting

This hospital-based prospective observational study was conducted in the Department of Obstetrics and Gynaecology at **GMERS Sola Civil Hospital**, located in **Ahmedabad**. The study was carried out over a period of one year. The hospital is a tertiary care teaching institution catering to both urban and rural populations and functions as a referral centre for high-risk obstetric cases.

Study Population

The study included pregnant women with a history of one or more previous cesarean sections who were admitted for delivery during the study period.

Sample Size

A total of **1,430 women** with a prior history of cesarean section were included in the study during the one year. All eligible women meeting the inclusion criteria and delivering at the study centre during the study duration were enrolled consecutively until the sample size was achieved.

Inclusion Criteria

- Pregnant women with a history of one or more previous cesarean sections
- Singleton pregnancy
- Gestational age ≥28 weeks
- Women who delivered at the study hospital during the study period
- Women who provided informed consent

Exclusion Criteria

- Women with previous classical cesarean section or uterine rupture
- Multiple gestation
- Known uterine anomalies
- Placenta accreta spectrum diagnosed antenatally
- Incomplete medical records

Data Collection
Data were collected using a structured proforma. Information was obtained from patient interviews, antenatal records, and hospital case files. The following variables were recorded:

- Maternal demographic details (age, parity, residence, booking status)
- Obstetric history (indication and number of previous cesarean sections, inter-pregnancy interval)
- Current pregnancy details (gestational age, complications)
- Mode of delivery (Trial of Labour After Cesarean – TOLAC or Elective Repeat Cesarean Section – ERCS)
- Indications for repeat cesarean section, if performed
- Intrapartum and postpartum maternal complications (uterine rupture, scar dehiscence, postpartum haemorrhage, need for blood transfusion, hysterectomy, wound infection)
- Neonatal outcomes (birth weight, Apgar score at 1 and 5 minutes, NICU admission, perinatal morbidity and mortality)

Women undergoing TOLAC were monitored closely with continuous fetal heart rate monitoring and regular assessment of labour progress as per institutional protocol. Emergency cesarean section was performed in cases of fetal distress, failed progress, or suspected scar complications.

Outcome Measures
Primary outcomes included:

- Mode of delivery (successful VBAC vs repeat cesarean section)
- Maternal morbidity
- Neonatal outcome

Secondary outcomes included predictors of successful vaginal birth after cesarean (VBAC) and complications associated with repeat cesarean section.

Statistical Analysis
Data were entered into Microsoft Excel and analysed using Statistical Package for Social Sciences (SPSS) software version 25.0. Descriptive statistics were used to summarise demographic and clinical variables. Categorical variables were expressed as frequencies and percentages. Continuous variables were expressed as mean ± standard deviation. The Chi-square test was used to assess associations between categorical variables. A p-value of <0.05 was considered statistically significant.

Ethical Considerations
Ethical clearance was obtained from the Institutional Ethics Committee of the study hospital before commencement of the study. Written informed consent was obtained from all participants. Confidentiality of patient information was maintained throughout the study.

RESULTS AND OBSERVATIONS
A total of **1,430 pregnant women with previous cesarean section** were included in the study conducted at **GMERS Sola Civil Hospital** over a period of one year.

1. Demographic Characteristics

Table 1: Age Distribution of Study Participants (n = 1430)

Age Group (Years)	Number (n)	Percentage (%)
<20	72	5.0%
21–25	558	39.0%
26–30	514	36.0%
31–35	214	15.0%
>35	72	5.0%
Total	**1430**	**100%**

Majority of women (75%) were between 21–30 years of age.

Table 2: Parity Distribution

Parity	Number (n)	Percentage (%)
G2	930	65.0%
G3	372	26.0%
≥G4	128	9.0%
Total	**1430**	**100%**

Most women were second gravida (65%).

Table 3: Booking Status

Booking Status	Number (n)	Percentage (%)
Booked	1044	73.0%
Unbooked	386	27.0%
Total	**1430**	**100%**

Majority (73%) were booked cases.

2. Obstetric Profile

Table 4: Number of Previous Cesarean Sections

Previous LSCS	Number (n)	Percentage (%)
One	1115	78.0%
Two	286	20.0%
≥Three	29	2.0%
Total	**1430**	**100%**

Most women (78%) had one previous cesarean section.

Table 5: Mode of Delivery

Mode of Delivery	Number (n)	Percentage (%)
Successful VBAC	458	32.0%
Elective Repeat LSCS	629	44.0%
Emergency LSCS (Failed TOLAC)	343	24.0%
Total	**1430**	**100%**

Overall VBAC success rate was 32%. Repeat cesarean section rate was 68%.

3. Indications for Repeat Cesarean Section

Table 6: Indications for Emergency LSCS (n = 343)

Indication	Number (n)	Percentage (%)
Fetal distress	126	36.7%
Non-progress of labor	104	30.3%
Scar tenderness	78	22.7%
Meconium-stained liquor	35	10.3%
Total	**343**	**100%**

Fetal distress was the most common indication for emergency LSCS.

4. Maternal Outcomes

Table 7: Maternal Complications

Complication	Number (n)	Percentage (%)
Postpartum hemorrhage	86	6.0%
Scar dehiscence	29	2.0%
Uterine rupture	7	0.5%
Blood transfusion required	114	8.0%
Wound infection	72	5.0%
ICU admission	21	1.5%

Uterine rupture was rare (0.5%). PPH occurred in 6% cases.

5. Neonatal Outcomes

Table 8: Birth Weight Distribution

Birth Weight	Number (n)	Percentage (%)
<2.5 kg	358	25.0%
2.5–3.5 kg	915	64.0%
>3.5 kg	157	11.0%
Total	**1430**	**100%**

Table 9: Neonatal Outcome

Outcome	Number (n)	Percentage (%)
NICU admission	186	13.0%
Apgar <7 at 5 min	72	5.0%
Perinatal mortality	18	1.3%

The NICU admission rate was 13%. Perinatal mortality was 1.3%.

DISCUSSION

The global rise in cesarean section (CS) rates has led to a substantial increase in the number of women entering subsequent pregnancies with a uterine scar. This changing obstetric profile poses important clinical challenges in balancing the risks and benefits of Trial of Labour After Cesarean (TOLAC) versus Elective Repeat Cesarean Section (ERCS). The present study, conducted at GMERS Sola Civil Hospital, evaluated 1,430 women who had a prior cesarean section over 1 year to assess maternal and neonatal outcomes.

In our study, 78% of women had one previous cesarean section, while 22% had two or more scars. This distribution is comparable to patterns observed in large cohort studies, where the majority of women presenting with a scarred uterus have had a single prior cesarean [1]. The increasing proportion of women with multiple previous cesarean sections is clinically significant, as maternal morbidity rises progressively with the number of repeat procedures due to adhesions, abnormal placentation, and intraoperative complications [2].

The overall VBAC success rate in the present study was 32%. International literature reports VBAC success rates ranging from 60–80% in well-selected candidates [3]. The lower rate observed in our setting may reflect conservative institutional practices, high-risk referral load, limited spontaneous labour cases, and patient preference for repeat cesarean delivery. Additionally, medico-legal concerns and cautious selection criteria in tertiary care hospitals may reduce the proportion of women offered or successfully completing TOLAC. Similar VBAC rates (30–40%) have been reported in tertiary centres in low- and middle-income countries [4].

Among women who underwent emergency repeat cesarean section, fetal distress was the most common indication (36.7%), followed by non-progress of labour and scar tenderness. Landon et al. identified non-reassuring fetal heart rate patterns as a leading cause of failed TOLAC [3]. Continuous intrapartum fetal monitoring and early recognition of scar-related symptoms are therefore essential to ensure maternal and fetal safety.

Uterine rupture occurred in 0.5% of cases in this study, which aligns with the reported risk of 0.5–1% for women with one previous low transverse cesarean undergoing TOLAC [5]. Although rare, uterine rupture remains the most serious complication due to its association with severe maternal haemorrhage, hysterectomy, and adverse perinatal outcomes. The low incidence observed in our study may reflect careful case selection and immediate surgical intervention facilities. Postpartum haemorrhage (6%) and requirement for blood transfusion (8%) were notable maternal morbidities. Marshall et al. demonstrated that the risk of haemorrhage and transfusion increases significantly with multiple cesarean deliveries [2]. Moreover, abnormal placentation, such as placenta accreta spectrum, becomes more common with increasing scar number, contributing to higher intraoperative blood loss and surgical complexity [6]. Although placenta accreta spectrum cases were excluded from this study, the overall hemorrhagic morbidity underscores the importance of preparedness in scarred uterus cases.

The NICU admission rate in our study was 13%, and perinatal mortality was 1.3%. These findings are comparable to those reported in large multicenter trials, where neonatal outcomes following successful VBAC are similar to ERCS, but failed TOLAC is associated with increased neonatal morbidity [3,7]. Early identification of labour abnormalities and timely decision for cesarean section likely contributed to acceptable neonatal outcomes in our cohort.

Guidelines from the American College of Obstetricians and Gynaecologists recommend that women with one prior low transverse cesarean section and no contraindications should be counselled and offered TOLAC in facilities capable of performing emergency cesarean delivery [8]. Similarly, the Royal College of Obstetricians and Gynaecologists emphasises individualised risk assessment and shared decision-making [9]. The relatively low VBAC rate in our study suggests a need for structured counselling protocols and standardised eligibility criteria to optimise safe TOLAC utilisation.

Overall, the findings of this study indicate that while repeat cesarean section remains the predominant mode of delivery in women with prior cesarean section, carefully selected and closely monitored TOLAC can achieve favourable maternal and neonatal outcomes with a low incidence of uterine rupture. Efforts to reduce primary cesarean rates and promote evidence-based VBAC practices are essential to curb the long-term obstetric burden associated with multiple cesarean deliveries.

CONCLUSION

The study at GMERS Sola Civil Hospital shows that repeat cesarean section remains the commonest mode of delivery among women with a prior cesarean. However, carefully selected cases undergoing TOLAC had favourable maternal and neonatal outcomes with a low incidence of uterine rupture.

Appropriate patient selection, vigilant intrapartum monitoring, and availability of emergency surgical care are essential for safe VBAC. Promoting evidence-based TOLAC and reducing primary cesarean rates are key to minimising long-term maternal morbidity associated with multiple repeat cesarean sections.

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