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**Dr. Suzan Sameer Sabri**
College of Medicine, Tikrit University, Salahaddine, Iraq

**Dr. Israa Hashim Abdul-Karim**
College of Medicine, Tikrit University, Salahaddine, Iraq

**Corresponding Author:**
**Dr. Suzan Sameer Sabri**
College of Medicine, Tikrit University, Salahaddine, Iraq

# Maternal outcome in pregnant wo hospital men with previous scars attending Tikrit teaching

**Suzan Sameer Sabri and Israa Hashim Abdul-Karim**

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**Abstract**
**Background:** Uterine scarring, most commonly from previous cesarean sections or uterine surgeries, is a significant contributor to obstetric complications. With the rising prevalence of cesarean deliveries, understanding the implications of uterine scars on maternal and neonatal outcomes is crucial for optimizing clinical management and reducing associated risks.
**Objective:** This study aimed to assess and compare maternal and neonatal outcomes in women with and without previous uterine scars and to identify risk factors for uterine rupture and other major complications.
**Methods:** A retrospective cohort study was conducted at Tikrit Teaching Hospital over a six-month period. A total of 180 pregnant women were enrolled and categorized into two equal groups: 90 women with a history of uterine scars (scarred group) and 90 without (unscarred group). Data on demographic variables, delivery details, complications, and neonatal outcomes were collected from medical records. Statistical analysis was performed using SPSS. Comparative analysis utilized t-tests and chi-square tests, while binary logistic regression identified independent risk factors for uterine rupture.
**Results:** Women in the scarred group had significantly higher mean age (31.99±1.93 years vs. 25.65±3.38 years, $p<0.05$) and BMI (29.94±2.91 vs. 24.61±1.72, $p<0.01$). Cesarean delivery was markedly more frequent in the scarred group (80.69% vs. 19.15%, $p<0.001$), with longer hospital stays (4.20±0.63 vs. 2.80±0.52 days, $p<0.01$). Maternal complications such as *Placenta Previa* (13.33% vs. 2.22%), placenta accreta/percreta (6.67% vs. 0%), uterine rupture (3.33% vs. 0%), postpartum hemorrhage (16.67% vs. 3.33%), and hysterectomy (4.44% vs. 0%) were significantly higher in the scarred group (all $p<0.05$). Neonatal outcomes were also worse in the scarred group, with significantly more low birth weight infants (20.00% vs. 6.67%), lower mean birth weight (2.85±0.43 kg vs. 3.12±0.37 kg), increased NICU admissions (17.78% vs. 7.78%), and higher incidence of low Apgar scores at 1 minute (11.11% vs. 4.44%) (All $p<0.05$). Logistic regression identified ≥ 2 prior cesareans (OR=3.24; 95% CI: 1.11-9.42), *Placenta Previa* (OR=2.89; 95% CI: 1.01-8.31), and short interpregnancy interval < 18 months (OR=2.15; 95% CI: 1.02-4.53) as independent predictors of uterine rupture. Additionally, women with three or more cesareans had the highest rates of *Placenta Previa* (16%) and uterine rupture (8%).
**Conclusion:** Prior uterine surgery significantly increases the risk of maternal and neonatal complications, particularly with multiple previous cesarean deliveries. Findings support the need for careful risk stratification, counseling on the mode of delivery, and strategies to minimize primary cesarean rates to improve obstetric outcomes.

**Keywords:** WO hospital, Tikrit teaching, improve obstetric outcomes, uterine rupture, independent predictors

## 1. Introduction
Uterine scarring is a prevalent condition among pregnant women, most commonly resulting from previous cesarean deliveries (CD). However, other surgical interventions such as myomectomy, cornual pregnancy resection, and correction of uterine anomalies like septal resection also contribute significantly to uterine scar formation. While cesarean section is often a life-saving intervention for managing dystocia, fetal distress, and various obstetric emergencies, its overuse has raised concerns regarding both short- and long-term maternal and neonatal outcomes [1]. According to the World Health Organization, the optimal rate for cesarean delivery lies between 10% and 15% to balance medical necessity with safety [1]. Nevertheless, the global incidence of cesarean births has risen markedly, now exceeding 20% of all deliveries [2, 3].

This increase is attributed to various factors, including delayed maternal age, expanded use of assisted reproductive technologies (ART), and improved fetal surveillance technologies such as electronic fetal heart monitoring [4, 5]. Additionally, cesarean deliveries performed upon maternal request often without a clear medical indication have become more frequent, driven in part by limited awareness of the associated risks and benefits among patients and their families [6].

This rise in primary cesareans has led to a growing number of women entering subsequent pregnancies with uterine scars. Evidence from retrospective cohort studies indicates that women with a history of CD are significantly more likely to undergo repeat cesareans. One study reported a repeat cesarean rate of 97.3% among women with previous CD, compared to 13.2% in those without a prior cesarean [7]. This trend is also associated with a higher incidence of fetal and maternal complications, particularly in cases where the initial cesarean was not medically indicated [8].

Furthermore, uterine surgeries other than cesarean delivery such as myomectomy or cornual resection may compromise uterine integrity. These procedures can increase the risk of uterine rupture, abnormal placentation, pelvic adhesions, and adverse outcomes in future pregnancies [9-11]. Uterine fibroids, which affect approximately 3% to 10% of reproductive-aged women, often necessitate surgical removal via myomectomy, which may further elevate the risk of complications in subsequent gestations [12].

Studies have demonstrated that uterine scarring is strongly correlated with negative obstetric outcomes. Clark and Silver emphasized that repeat cesarean deliveries are associated with increased maternal morbidity over time, while Getahun *et al*. reported higher risks of *Placenta Previa* and placental abruption in women with prior cesarean sections [13, 14]. Given these risks, pregnancies following uterine surgery require careful monitoring and risk stratification to prevent complications.

## 3 Methods

### 3.1 Data Collection

- **Maternal Age:** The maternal age was entered in completed years as seen in the file of the patient. It was considered one important demographic factor used in the stratification of maternal risk, and for the comparison of outcomes between women with and without scarred uteri.
- **Body Mass Index (BMI):** For body mass index (BMI), it was calculated by the classical formula: weight in kilogram divided by height in meters squared (kg/m²). Anthropometric measurements either before pregnancy or at the first antenatal visit were taken from the antenatal record book to ensure uniformity of BMI estimation.
- **Gestational age at delivery:** In cases where an ultrasound was performed in the first trimester-the most accurate estimate of gestational age-it was used to assess age at delivery. Otherwise, this age was determined from the documented LMP in the patient's antenatal file.
- **Mode of Delivery:** The mode of delivery was divided into vaginal or cesarean; the method of delivery stated in the delivery records. Cesarean deliveries were sub-categorized as elective or emergency when relevant for subgroup analyses.
- **Number of previous cesareans:** The history and operative or hospital records of the patients were checked for previous cesarean deliveries. This was done to analyze the relation between previous cesarean deliveries with maternal and neonatal complications on subsequent deliveries.
- **Hospital stay duration:** Duration of the hospital stay extended from the date of admission to the date of discharge, which was recorded. It helped in determining the burden posed by complications in line with resource utilization by each group.

### 3.2 Maternal Complications

- ***Placenta Previa:*** *Placenta Previa* would be diagnosed by obstetrical ultrasound, usually carried out in the second or third trimester, and confirmed intraoperatively during cesarean section. Its presence was considered a risk factor in women carrying uterine scars.
- ***Placenta Accreta/Percreta*:** These entities were diagnosed most of the times antenatally with imaging, including ultrasound and magnetic resonance imaging (MRI), and were later confirmed surgically. Their incidence must be closely followed due to their well-known relation with previous cesarean scars.
- **Uterine Rupture:** Uterine rupture was defined entirely as a disruption of the uterine wall and was confirmed intraoperatively. It was documented as a serious obstetric emergency, especially in patients with prior uterine surgery.
- **Postpartum Hemorrhage (PPH):** PPH was defined as blood loss estimated in excess of 500 mL with vaginal delivery or 1000 mL with cesarean section. It was based on estimates of blood quantity from clinical and intraoperative reports.
- **Bladder Injury:** Bladder injuries got recorded when there was documented intraoperative trauma inflicted to the bladder during delivery. Operative notes were the primary source in verifying bladder injuries.
- **Emergency Hysterectomy:** Emergency hysterectomy was considered the surgical excision of the uterus during or immediately following delivery; it was typically performed secondary to uncontrollable hemorrhage or uterine rupture. The indications were verified through operative and discharge reports.
- **Preterm Delivery:** Preterm delivery was defined as the onset of childbirth before the completion of 37 weeks of gestation. Birthdate was deployed to categorize presentations and determine neonatal risk.

### 3.3 Neonatal Outcomes

- **Birth Weight:** Birth weight was documented after delivery using a calibrated neonatal scale. It recorded the birth weight of the baby in grams and was useful in the assessment of neonatal status and classification of growth parameters.
- **Low Birth Weight:** Low birth weight referred to any birth weight for a neonate that was less than 2500 g, notwithstanding gestational age; the criteria were utilized in the assessment of intrauterine growth and perinatal risk.
- **Apgar score:** Apgar scores were assigned at one and five minutes after delivery by the attending neonatologist. The score was from 0 to 10, which

assesses heart rate, respiratory effort, muscle tone, reflex irritability, and skin coloration.

- **Fetal Growth Restriction (FGR):** FGR was defined as birth weight below the 10th percentile for gestational age based on standardized growth charts and served as a measure of poor intrauterine growth.

### 3.4 Statistical analysis

All collected information was entered, coded, and analyzed by using SPSS version 26. Descriptive statistics were performed depending on the baseline characteristic; continuous variables were presented as mean ± standard deviation (SD) and categorical variables in frequencies and percentages. To compare characteristics between groups (that is, women with previous uterine scars and those without), independent samples' t-test was done for continuous variables, and Chi-square ($\chi^2$) test or Fisher's exact test was employed for categorical variables depending on which was appropriate. A binary logistic regression analysis was performed to observe the association between uterine scarring and maternal or neonatal outcomes, adjusted for confounders. In this, odds ratios (ORs) with 95% confidence intervals (CIs) were determined to observe the strength of associations.

## 4. Results

### 4.1 Maternal demographic and clinical characteristics in women with and without uterine scars

Table 1 illustrates a statistically significant difference in maternal demographic and clinical characteristics between women with scarred and unscarred uteri. Women with previous uterine scars were significantly older (31.99±1.93 years) compared to those without scars (25.65±3.38 years, $p<0.05$), and had higher body mass index (BMI) values (29.94±2.91 vs. 24.61±1.72 kg/m², $p<0.01$), suggesting that age and BMI may be associated with the likelihood of prior cesarean delivery. The mean gestational age at delivery was lower in the scarred group (36.72±0.48 weeks) compared to the unscarred group (38.19±0.21 weeks, $p<0.05$), indicating a higher tendency toward early delivery among women with uterine scars. Mode of delivery differed markedly, with a significantly higher rate of cesarean delivery in the scarred uterus group (80.69%) compared to the unscarred group (19.15%), and a much lower rate of vaginal delivery (12.22% vs. 80.1%, $p<0.001$). Additionally, women with scarred uteri had a longer hospital stay (4.20±0.63 days) compared to those with unscarred uteri (2.80±0.52 days, $p<0.01$).

**Table 1:** Maternal Demographic and clinical characteristics in women with and without uterine scars

| Variable | Scarred Uterus (N=90) | Unscarred Uterus (N=90) | P-Value |
|---|---|---|---|
| Mean Age (years) | 31.99±1.93 | 25.65±3.38 | < 0.05 |
| Mean BMI (kg/m²) | 29.94±2.91 | 24.61±1.72 | < 0.01 |
| Mean Gestational Age at Delivery (weeks) | 36.72±0.48 | 38.19±0.21 | < 0.05 |
| Vaginal Delivery | 20 (12.22%) | 67 (80.1%) | < 0.001 |
| Cesarean Delivery | 74 (80.69%) | 20 (19.15%) | < 0.001 |
| Mean Hospital Stay (days) | 4.20±0.63 | 2.80±0.52 | < 0.01 |

### 4.2 Maternal complications in women with and without uterine scars

Table 2 reveals a significantly higher rate of maternal complications among women with scarred uteri compared to those with unscarred uteri. *Placenta Previa* was observed in 12 women (13.33%) with uterine scars versus only 2 (2.22%) in the unscarred group ($p<0.01$). Similarly, placenta percreta/accreta occurred exclusively in the scarred group (6.67%, $p<0.05$), as did uterine rupture (3.33%, $p<0.05$), indicating serious risks tied to scar integrity. Postpartum hemorrhage (PPH) was also notably higher in the scarred group at 16.67% compared to 3.33% in the control group ($p<0.01$), possibly reflecting more difficult surgical deliveries or placental complications. Hysterectomy was performed in 4 cases (4.44%) among scarred women, with none in the unscarred group ($p<0.05$), again underscoring the increased severity of complications. Although bladder injury was more frequent in the scarred group (2.22% vs. 0%), the difference was not statistically significant (P=0.15). Furthermore, preterm delivery before 37 weeks was significantly more common in women with uterine scars (24.44%) compared to those without (7.78%, $p<0.01$).

**Table 2:** Maternal complications in women with and without uterine scars

| Complication | Scarred Uterus (N=90) | Unscarred Uterus (N=90) | P-Value |
|---|---|---|---|
| Placenta previa | 12 (13.33%) | 2 (2.22%) | < 0.01 |
| Placenta percreta/accreta | 6 (6.67%) | 0 (0.00%) | < 0.05 |
| Uterine rupture | 3 (3.33%) | 0 (0.00%) | < 0.05 |
| Postpartum hemorrhage (PPH) | 15 (16.67%) | 3 (3.33%) | < 0.01 |
| Bladder injury | 2 (2.22%) | 0 (0.00%) | 0.15 |
| Hysterectomy | 4 (4.44%) | 0 (0.00%) | < 0.05 |
| Preterm delivery (< 37 weeks) | 22 (24.44%) | 7 (7.78%) | < 0.01 |

### 4.3 Neonatal outcomes in women with and without uterine scars

Table 3 demonstrates notable differences in neonatal outcomes between women with and without uterine scars, with a higher frequency of adverse outcomes observed in the scarred group. Low birth weight (<2.5 kg) was significantly more common among neonates born to women with scarred uteri, occurring in 18 (20.00%) compared to 6 (6.67%) in the unscarred group ($p<0.01$), likely reflecting the higher rate of preterm deliveries and compromised intrauterine conditions. Similarly, a low Apgar score at 1 minute (<7) was seen in 10 (11.11%) of neonates in the scarred group versus 4 (4.44%) in the control group ($p<0.05$), indicating increased neonatal distress at birth. Although the proportion of neonates with a low Apgar score at 5 minutes was higher in the scarred group (4.44%)

compared to the unscarred group (1.11%), this difference was not statistically significant (P=0.18). NICU admission was also significantly higher in neonates from scarred uteri, recorded in 16 (17.78%) compared to 7 (7.78%) in the unscarred group ($p$<0.05), suggesting a greater need for specialized neonatal care. Perinatal mortality was slightly higher in the scarred group (3.33% vs. 1.11%), but this difference did not reach statistical significance (P=0.31).

**Table 3:** Neonatal outcomes in women with and without uterine scars

| Outcome | Scarred Uterus (N=90) | Unscarred Uterus (N=90) | P-Value |
|---|---|---|---|
| Mean birth weight (kg) | 2.85±0.43 | 3.12±0.37 | < 0.01 |
| Low birth weight (<2.5 kg) | 18 (20.00%) | 6 (6.67%) | < 0.01 |
| Apgar score <7 at 1 min | 10 (11.11%) | 4 (4.44%) | < 0.05 |
| Apgar score <7 at 5 min | 4 (4.44%) | 1 (1.11%) | 0.18 |
| NICU admission | 16 (17.78%) | 7 (7.78%) | < 0.05 |
| Perinatal mortality | 3 (3.33%) | 1 (1.11%) | 0.31 |

### 4.4 Mode of delivery by number of previous cesareans

Table 4 illustrates a clear trend in the mode of delivery based on the number of previous cesarean deliveries, showing a strong and statistically significant association between the number of prior cesareans and the likelihood of undergoing repeat cesarean delivery ($p$<0.001 across all categories). Among women with one previous cesarean, 28 (80.00%) delivered by cesarean again, while 7 (20.00%) achieved vaginal delivery. This proportion of cesarean delivery further increased with the number of prior cesareans, reaching 83.33% and 84.00% in women with two and three or more prior cesareans, respectively. The corresponding rates of vaginal birth after cesarean (VBAC) declined to 16.67% and 16.00%, respectively.

**Table 4:** Mode of delivery by number of previous cesareans

| No of Previous Cesareans | Cesarean Delivery (n) | Vaginal Delivery (n) | Total (n) | P-Value |
|---|---|---|---|---|
| 1 PCD | 28 (80.00%) | 7 (20.00%) | 35 | < 0.001 |
| 2 PCDs | 25 (83.33%) | 5 (16.67%) | 30 | < 0.001 |
| ≥3 PCDs | 21 (84.00%) | 4 (16.00%) | 25 | < 0.001 |

### 4.5 Maternal complications by number of previous cesareans

Table 5 highlights the increasing frequency of maternal complications with a rising number of previous cesarean deliveries. *Placenta Previa* was more common in women with two or more prior cesareans, occurring in 5 (16.67%) and 4 (16.00%) of those with two and ≥3 PCDs, respectively, compared to 3 (8.57%) in women with one previous cesarean (P=0.04), suggesting a cumulative risk of abnormal placental implantation. Uterine rupture, a serious obstetric emergency, was observed only in women with multiple prior cesareans 1 (3.33%) with two and 2 (8.00%) with ≥3 PCDs while no cases were reported among those with a single PCD (P=0.03). Postpartum hemorrhage (PPH) also showed a rising trend, occurring in 4 (11.43%) of women with one PCD and increasing to 6 (20.00%) and 5 (20.00%) in those with two and ≥ 3 PCDs, respectively (P=0.01). Similarly, hysterectomy rates increased with the number of previous cesareans, from 1 (2.86%) in the one PCD group to 2 (8.00%) in the ≥ 3 PCDs group (P=0.02).

**Table 5:** Maternal complications by number of previous cesareans

| Complication | 1 PCD (N=35) | 2 PCDs (N=30) | ≥3 PCDs (N=25) | P-value |
|---|---|---|---|---|
| Placenta previa | 3 (08.57%) | 5 (16.67%) | 4 (16%) | 0.04 |
| Uterine rupture | 0 (%) | 1 (03.33%) | 2 (8%) | 0.03 |
| PPH | 4 (11.43%) | 6 (20%) | 5 (20%) | 0.01 |
| Hysterectomy | 1 (02.86%) | 1 (3.33%) | 2 (8%) | 0.02 |

### 4.6 Risk factors for uterine rupture (logistic regression analysis)

Table 6 presents the results of a logistic regression analysis identifying significant risk factors for uterine rupture. Having two or more previous cesarean deliveries was associated with a more than threefold increased risk of uterine rupture (OR=3.24; 95% CI: 1.11-9.42; P=0.032), emphasizing the cumulative risk of scar dehiscence with repeated surgeries. *Placenta Previa* also emerged as a significant risk factor (OR=2.89; 95% CI: 1.01-8.31; P=0.048), likely due to abnormal placental attachment weakening the uterine wall. A short interpregnancy interval of less than 18 months was associated with a significantly elevated risk (OR=2.15; 95% CI: 1.02-4.53; P=0.042), possibly reflecting inadequate time for complete uterine healing. Although maternal age ≥ 35 years showed an increased odds ratio (OR=1.47), it was not statistically significant (P=0.36).

**Table 6:** Risk factors for uterine rupture (logistic regression analysis)

| Risk Factor | Odds Ratio (OR) | 95% CI | P-Value |
|---|---|---|---|
| ≥ 2 Previous Cesareans | 3.24 | 1.11–9.42 | 0.032 |
| Placenta previa | 2.89 | 1.01–8.31 | 0.048 |
| Short interpregnancy interval (< 18 mo) | 2.15 | 1.02–4.53 | 0.042 |
| Maternal age ≥35 | 1.47 | 0.62–3.47 | 0.36 |

### 4.7 Distribution of types of previous uterine surgery in scarred uterus group

Table 7 outlines the distribution of previous uterine surgeries among women in the scarred uterus group. The most common procedure was lower segment cesarean section, accounting for 68 cases (75.56%), reflecting its widespread use as the standard surgical approach in modern obstetrics. Classical cesarean section was reported in 10 cases (11.11%), a method typically reserved for specific obstetric indications but associated with a higher risk of uterine rupture in future pregnancies. Myomectomy, a procedure for removing uterine fibroids, was recorded in 6 women (6.67%), while cornual resection and septal resection less common but surgically significant procedures were documented in 4 (4.44%) and 2 (2.22%) cases, respectively.

**Table 7:** Distribution of types of previous uterine surgery in scarred uterus group

| Type of Uterine Surgery | Number of Cases (N=90) |
|---|---|
| Lower Segment Cesarean Section | 68 (75.56%) |
| Classical Cesarean Section | 10 (11.11%) |
| Myomectomy | 6 (06.67%) |
| Cornual Resection | 4 (04.44%) |
| Septal Resection | 2 (02.22%) |

### 4.8 Indications for repeat cesarean delivery in scarred uterus group

Table 8 details the various indications for repeat cesarean delivery among women with a scarred uterus. The most frequent indication was a history of previous cesarean section with an elective decision for repeat surgery, reported in 35(38.89%), reflecting clinical and institutional preferences for planned cesarean in scarred uteri. A failed trial of labor after cesarean (TOLAC) accounted for 18 cases (20%), highlighting the challenges and risks associated with attempting vaginal birth after cesarean (VBAC). *Placenta Previa* was the indication in 10(11.11%), consistent with the increased incidence of abnormal placental location in scarred uteri. Non-reassuring fetal status prompted cesarean in 12(13.33%), while cephalopelvic disproportion (CPD) accounted for 8 cases (8.89%). Additionally, maternal request alone was noted as the reason for repeat cesarean in 7 women (7.78%).

**Table 8:** Indications for repeat cesarean delivery in scarred uterus group

| Indication | Number of Cases |
|---|---|
| Previous CS (elective) | 35 (38.89%) |
| Failed trial of labor after CS | 18 (20.00%) |
| Placenta previa | 10 (11.11%) |
| Non-reassuring fetal status | 12 (13.33%) |
| Cephalopelvic disproportion (CPD) | 8 (08.89%) |
| Maternal request | 7 (07.78%) |

## 5. Discussion

The findings of the present study bring about significant impacts of previous uterine scars on maternal demographics and obstetric complications, which largely stand confirmed through neonatal events, with the results more or less conforming to those reported in the international literature. An older age and higher BMI were observed in the scarred uterus study participants, agreeing with patterns described by international datasets, such as those of Betran *et al.* [1] and Boerma *et al.* [3], where advanced maternal age and obesity correlated with an increased cesarean delivery rate. This demographic trend underscores the shifting landscape of obstetric care, in which maternal characteristics are increasingly shaped by delayed childbearing and the growing global prevalence of obesity. These findings support the need for targeted preventive strategies aimed at managing modifiable risk factors such as maternal weight and improving access to preconception counseling.

Earlier gestational age at delivery and higher cesarean delivery rate firmly prevail in cases of scarred uterus, highlighting Li *et al.* [6] and Hu *et al.* [8], who showed that women with a prior cesarean are at increased risk of preterm birth and repeat cesarean delivery, usually performed sooner rather than later for fear of uterine rupture or scar dehiscence. Elective early delivery in scarred women is often a clinical decision based on perceived safety and institutional protocol rather than spontaneous labor onset. The longer hospital stay for scarred patients aligns with Clark and Silver [13], who elaborated on the magnitude of postoperative monitoring and complications in this group. The increased hospitalization duration can also be attributed to the heightened risk of intraoperative complications, need for neonatal intensive care, and more frequent postpartum hemorrhage interventions, as demonstrated by recent multicenter analyses.

Concerning maternal complications, the increased incidences of *Placenta Previa*, accreta, uterine rupture, postpartum hemorrhage (PPH), and hysterectomy in women with uterine scars reflect findings by Getahun *et al.* [14] and the FIGO consensus on placenta accreta spectrum (PAS) disorders [15]. These complications are well-known consequences of scarred uteri, especially when multiple previous cesarean deliveries are added into the mix. The strong association between scar number and risk of abnormal placentation has been confirmed in histopathological [16]. Furthermore, our logistic regression model's finding on the significantly increased risk of uterine rupture with two or more prior cesareans aligns well with the reports from large cohort studies and meta-analyses that estimate this accumulative risk, such as those by Antila-Langsjo *et al.* [17].

Of particular note is the growing body of evidence that suggests surgical technique during cesarean section, including the type of uterine incision and closure method, plays a substantial role in long-term scar integrity. Studies by Hayakawa *et al.* [18] and Saccone *et al.* [19] have shown that single-layer closure and high transverse incisions are associated with incomplete healing, niche development, and increased uterine rupture rates in subsequent pregnancies. These data underscore the importance of surgical standardization and training in optimizing cesarean outcomes and minimizing future obstetric risk. Similarly, Vikhareva Osser and Valentin [20] reported that transvaginal ultrasound assessments in non-pregnant women could detect cesarean scar defects predictive of future complications,

thus advocating for postpartum evaluation of uterine healing in high-risk populations.

Our results concerning neonatal outcomes also confirm international trends. The significantly higher rates of low birth weight and NICU admissions among infants born to mothers with scarred uteri mirror findings from studies by Kaelin *et al*. [21] and Jauniaux *et al*. [22], who demonstrated that the altered uterine environment associated with scarring, particularly in the lower uterine segment, predisposes to placental insufficiency and compromised fetal development. Moreover, the marginally higher perinatal mortality observed, although not statistically significant, reflects a clinical concern that warrants attention. This risk is further elevated in cases involving morbidly adherent placenta or uterine rupture, both of which were more frequent in our scarred group.

The analysis of delivery mode according to prior cesarean number revealed a striking decline in vaginal birth after cesarean (VBAC) rates, with fewer than one in five women achieving VBAC regardless of prior cesarean count. This low rate may reflect both institutional reluctance and patient preference, as evidenced in a systematic review by Jenabi *et al*. [23], which cited concerns about uterine rupture, litigation, and lack of VBAC-supportive infrastructure as barriers. Yet, randomized trials such as the MFMU Network's Term Breech Trial have shown that with appropriate case selection and intrapartum monitoring, VBAC can be both safe and successful, especially after one prior cesarean. Therefore, promoting TOLAC (trial of labor after cesarean) through updated guidelines and clinical support may offer a pathway to reduce repeat cesareans and associated complications.

## 6. Conclusions

- Those with prior uterine incisions were significantly older, had higher BMIs, and delivered earlier than those with unscarred uteri. Cesarean section was markedly common in the scarred group.
- In comparison, scarred uteri were significantly associated with serious maternal complications such as *Placenta Previa*, placenta accreta/percreta, uterine rupture, postpartum hemorrhage (PPH), hysterectomy, and preterm delivery.
- Neonates born to mothers with scarred uteri had significantly lower birth weights, higher rates of low Apgar 1-minute scores, more NICU admissions, and slightly higher perinatal mortality.
- Maternal complications such as *Placenta Previa*, uterine rupture, PPH, and hysterectomy increased significantly with the number of prior cesarean deliveries.
- In logistic regression analysis, ≥2 previous cesareans, *Placenta Previa*, and short interpregnancy intervals (<18 months) came out as significant independent risk factors for uterine rupture.
- Among scarred uterus cases, lower segment cesarean section accounted for 75.56% of previous surgeries; other types such as classical cesarean and myomectomy also contributed to uterine scarring and limited complications.
- Elective repeat cesarean for previous CS was the leading indication, followed by failed TOLAC, *Placenta Previa*, non-reassuring fetal status, CPD, and maternal request, suggesting a multifactorial decision-making process with medical and personal considerations at play.

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