

## ORIGINAL ARTICLE

## Incidence of vaginal birth after previous cesarean section and fetal outcomes in a tertiary care hospital in Peshawar.

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**ABSTRACT... Objective:** To determine the frequency of vaginal birth after one cesarean section, along with fetal outcomes. **Study Design:** Cross-sectional study. **Setting:** Department of Gynecology and Obstetrics at Hayatabad Medical Complex, Peshawar, Pakistan. **Period:** January 2024 to July 2024. **Methods:** Women aged 20-40 years, history of one previous lower segment CS, and presenting in spontaneous labor with gestational age between 32 and 41 weeks, were analyzed. All women underwent a trial of labor in the labor room, with successful vaginal births after CS (VBAC) were noted. For those women who had unsuccessful attempts, were transferred to the operating room for emergency CS. Successful VBAC cases were monitored, and key fetal, and maternal outcomes were recorded. Data were analyzed using IBM-SPSS Statistics, version 26.0. **Results:** In a total of 149 women, the mean age, and gestational age were  $27.62 \pm 4.93$  years, and  $37.81 \pm 1.67$  weeks, respectively. VBAC was successful in 93 (62.4%) women. The mean duration of labor in successful VBAC, and unsuccessful VBAC were  $8.96 \pm 7.20$  vs.  $11.67 \pm 8.40$  hours ( $p=0.039$ ). The body mass was significantly higher among women who underwent CS ( $p=0.031$ ). Low birth weight ( $p<0.001$ ), Apgar score  $<7$  at 1 minutes ( $p=0.014$ ), and NICU admission were significantly more among women who were unsuccessful in undergoing VBAC. In terms of maternal outcomes, infection was significantly more common among women who were unsuccessful in VBAC ( $p=0.025$ ). Uterine rupture occurred in 2 (3.6%) women who were unsuccessful in VBAC ( $p=0.014$ ). Hospital stay was above 3 days in 5 (5.4%) women who had VBAC ( $p=0.030$ ). **Conclusion:** This study highlights relatively high VBAC success rate with favorable maternal and fetal outcomes. Unsuccessful VBAC was associated with prolonged labor, increased maternal complications, and poorer neonatal outcomes.

**Key words:** Cesarean Section, Infection, Low Birth Weight, Uterine Rupture, Vaginal Birth.

### INTRODUCTION

In modern obstetric practice, caesarean deliveries continue to be a crucial surgical procedure. The rates of primary and repeat cesarean section (CS) deliveries are rising globally.<sup>1</sup> Data shows that global CS rates are around 21.1%, 2-fold higher than what it was in 2000.<sup>2</sup> CS rates vary globally, ranging between 5% to 43%.<sup>2,3</sup> Owing to the safety of vaginal birth after cesarean section (VBAC) and the elevated risk of maternal problems from recurrent CS, trial labor has become a preferred method for a specific population of patients who have previously had a lower segment transverse scar.<sup>4,5</sup>

There are basically two possibilities for a parturient who has had one previous cesarean delivery,

as elective repeat caesarean section (ERCS) or VBAC. Both of these contribute to increased maternal and perinatal illness and, in some cases, mortality in separate ways.<sup>6</sup> The dangers associated with VBAC include an increased risk of endometritis, hemorrhage, transfusion, uterine rupture, and emergency caesarean surgery for the mother, as well as an increased chance of suffocation or perinatal death for the unborn child.<sup>7,8</sup> The risks are lowest when a VBAC is successful, but sadly, none of the screening techniques currently in use can reliably identify women who may succeed in this.

Numerous publications have documented a success rate of VBAC ranging from 60 to 80% when the original cesarean was performed for

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**Article received on:** 31/12/2024  
**Accepted for publication:** 05/03/2025

nonrecurring reasons.<sup>9</sup> Poor labor progress, fetal distress, cord prolapse, placenta previa, transverse lying, breech presentation, pregnancy-induced hypertension, and many pregnancies are a few of the nonrecurring grounds for CS.<sup>10,11</sup> However, the percentage of women who are offered and attempt a VBAC varies significantly throughout centers. According to data from the British government, 33% of women who have had a previous cesarean surgery will give birth vaginally in their next pregnancy, with institutional variances ranging from 6% to 64%.<sup>12</sup>

The current rate of repeat cesarean sections following one prior cesarean section exceeds the 15% WHO limit.<sup>13</sup> In our area, no research has been conducted to determine this incidence. In order to lower the risk of recurrent caesarean sections, we set out to find out how often VBAC cases occur. Then, we might provide VBAC trials to carefully chosen patients. This study was aimed to determine the frequency of vaginal birth after one CS, along with fetal outcomes.

## METHODS

This cross-sectional study conducted at the Department of Gynecology and Obstetrics at Hayatabad Medical Complex, Peshawar, Pakistan, from January 2024 to July 2024. Approval from the Institutional Ethics Committee (2094-16-10-24) was obtained. Written as well as informed consents were taken from all study participants.

Considering the proportion of VBAC as 74.7%<sup>14</sup>, with 95% confidence level and 7% margin of error, the sample size was calculated to be 149. Non-Probability Consecutive Sampling was utilized for participant selection. Inclusion criteria were women aged 20-40 years, history of one previous lower segment CS, and presenting in spontaneous labor with gestational age between 32 and 41 weeks. Women with multiple gestations, pregnancy-induced hypertension (PIH), gestational diabetes mellitus, uterine anomalies, abnormal placental localization, or malpresentation of the fetus were excluded. Women with bony pelvic deformity or contracted pelvis (as assessed by vaginal examination) were also noted included.

At the time of enrollment, demographic and clinical characteristics of all women were documented. Anemia was diagnosed as hemoglobin (Hb) below 11 g/dl. All women underwent a trial of labor in the labor room, with successful vaginal births after CS (VBAC) were noted. For those women who had unsuccessful attempts, were transferred to the operating room for emergency CS. Successful VBAC cases were monitored, and key fetal outcomes, such as intrauterine death, low birth weight, and APGAR scores below 7 at both 1 and 5 minutes, were recorded. Low birth weight was designated as birth weight below 2500 grams. A special proforma was designed to record all study data.

Data analysis was performed employing IBM-SPSS Statistics, version 26.0. Frequencies and percentages were calculated for categorical variables such as age groups, VBAC (success or failure), and APGAR scores below 7. For quantitative variables like birth weight, and hospital stay, mean  $\pm$  SD or median with interquartile range were calculated. VBAC outcomes were stratified with respect to age, and gestational age to account for potential effect modifiers. Chi-square test or Fisher's Exact test was applied post-stratification, with a p-value of  $\leq 0.05$  considered statistically significant.

## RESULTS

In a total of 149 women, the mean age was  $27.62 \pm 4.93$  years, ranging between 20 to 40 years. The mean gestational age was  $37.81 \pm 1.67$  weeks, ranging between 32 to 41 weeks. The residential affiliation of 92 (61.7%) women was urban. The mean BMI was  $27.49 \pm 2.40$  kg/m<sup>2</sup>. Anemia was diagnosed in 45 (30.2%) women. Table-I is showing baseline characteristics of women.

VBAC was successful in 93 (62.4%) women. Among 56 women who underwent CS, the main indications of were non-progress of labor, fetal distress, and uterine rupture, documented in 28 (50.0%), 26 (46.4%), and 2 (3.6%) women, respectively. The mean duration of labor in successful VBAC, and unsuccessful VBAC were  $8.96 \pm 7.20$  vs.  $11.67 \pm 8.40$  hours ( $p=0.039$ ).

The body mass was significantly higher among women who underwent CS ( $p=0.031$ ). Age ( $p=0.453$ ), gestational age ( $p=0.341$ ), residence ( $p=0.370$ ), and anemia ( $p=0.255$ ) were not found to have any significant association with VBAC. Table-II is showing comparison of characteristics of women with respect to VBAC.

Characteristics		Frequency (%)
Age (Years)	20-30	109 (73.2%)
	31-40	40 (26.8%)
Gestational age (weeks)	32-36	9 (6.0%)
	37-39	107 (71.8%)
	40-41	33 (2.1%)
Residence	Urban	92 (61.7%)
	Rural	57 (38.3%)
Body mass index (kg/m <sup>2</sup> )	<25	57 (38.3%)
	25-29.9	68 (45.6%)
	≥30	24 (16.1%)
Anemia	Yes	45 (30.2%)

**Table-I. Demographic and clinical characteristics of women (n=149)**

Characteristics		Vaginal Birth After Cesarean Section		P-Value
		Successful (n=93)	Unsuccessful (n=56)	
Age	20-30	70 (75.3%)	39 (69.6%)	0.453
	31-40	23 (24.7%)	17 (30.4%)	
Gestational age (weeks)	32-36	6 (6.5%)	3 (5.4%)	0.341
	37-39	70 (75.3%)	37 (66.1%)	
	40-41	17 (18.2%)	16 (28.6%)	
Residence	Urban	60 (64.5%)	32 (57.1%)	0.370
	Rural	33 (35.5%)	24 (42.9%)	
Body mass index (kg/m <sup>2</sup> )	<25	50 (53.8%)	18 (32.1%)	0.031
	25-29.9	33 (35.5%)	27 (48.2%)	
	≥30	10 (10.7%)	11 (19.7%)	
Anemia	Yes	25 (26.9%)	20 (35.7%)	0.255

**Table-II. Comparison of characteristics of women with respect to VBAC success**

Low birth weight ( $p<0.001$ ), Apgar score <7 at 1 minutes ( $p=0.014$ ), and NICU admission were significantly more among women were

unsuccessful in undergoing VBAC. Table-III is showing comparison of fetal outcomes among women with respect to VBAC.

Fetal Outcomes		Vaginal Birth After Cesarean Section		P-Value
		Successful (n=93)	Unsuccessful (n=56)	
Low birth weight		10 (10.8%)	22 (39.3%)	< 0.001
Apgar score <7	At 1 minute	5 (5.4%)	10 (17.9%)	0.014
	At 5 minutes	2 (2.2%)	5 (8.9%)	0.058
NICU admission		3 (3.2%)	7 (12.5%)	0.028
Intrauterine death		-	1 (1.8%)	0.196

**Table-III. Comparison of fetal outcomes with respect to VBAC**

In terms of maternal outcomes, infection was significantly more common among women who were unsuccessful in VBAC ( $p=0.025$ ). Uterine rupture occurred in 2 (3.6%) women who were unsuccessful in VBAC, and the difference was found to be statistically significant when compared to VBAC ( $p=0.014$ ). Hospital stay was above 3 days in 5 (5.4%) women who had VBAC versus 9 (16.1%) who did not have VBAC ( $p=0.030$ ). Table-IV is showing comparison of maternal outcomes with respect to VBAC.

Fetal Outcomes	Vaginal Birth After Cesarean Section		P-Value
	Successful (n=93)	Unsuccessful (n=56)	
Post-partum hemorrhage	5 (5.4%)	7 (12.5%)	0.122
Infection	2 (2.2%)	6 (10.7%)	0.025
Uterine rupture	-	2 (3.6%)	0.024
Need for blood transfusion	4 (4.3%)	9 (16.1%)	0.014
Maternal mortality	-	1 (1.8%)	0.196
Hospital stay > 3 days	5 (5.4%)	9 (16.1%)	0.030

**Table-IV. Comparison of maternal outcomes with respect to VBAC**

## DISCUSSION

This study revealed VBAC success rate as 62.4%, with significant differences in maternal and fetal outcomes between successful and unsuccessful VBAC. Tahseen and Griffiths reported a slightly

higher success rate of VBAC as 76.5%.<sup>15</sup> Charitou et al. found a comparable VBAC success rate among women managed by a midwifery-led team, underscoring the importance of consistent and skilled intrapartum care in achieving positive outcomes.<sup>16</sup> Data from United Kingdom showed that nearly 3/4<sup>th</sup> of women at term undergoing a trial of labor achieved successful vaginal delivery.<sup>17</sup> Another study from Saudi Arabia found that 66.3% women had successful VBAC,<sup>18</sup> which is very close to what was documented in this study. Data from USA documented VBAC as 88% which is clearly above than what we documented in this study.<sup>19</sup> Given Pakistan's status as a developing nation, it is preferable to offer labor trials to patients who are not completely contraindicated for vaginal delivery. As a result, it is crucial to modify this approach and refrain from offering trials to patients who have undergone CS in the past.

The literature has reported that CS carry a 3-fold higher risk of death than vaginal deliveries.<sup>20</sup> CS rates have been rising in recent years.<sup>2,3</sup> Given the higher risk of maternal problems from repeat CS and the safety of VBAC, labor trial for a specific patient group with a history of scarring has emerged as a favored approach. Among women undergoing a successful VBAC, the mean labor duration was significantly shorter ( $8.96 \pm 7.20$  hours) compared to those with an unsuccessful VBAC ( $11.67 \pm 8.40$  hours,  $p=0.039$ ) in this study. The mean labor duration for successful VBAC cases in this study is consistent with the findings of Garcia-Jimenez et al.<sup>21</sup>, who reported that longer labor durations are associated with higher rates of emergency cesarean. This trend emphasizes the importance of identifying prolonged labor as a potential predictor of VBAC failure. The shorter labor duration observed in successful VBAC cases suggests that early identification of labor progress and timely intervention are critical in improving VBAC outcomes. The association of BMI with VBAC outcomes ( $p=0.031$ ) further highlights the need for pre-pregnancy counseling and weight management in women considering VBAC. Efforts to optimize maternal health before delivery could potentially improve the likelihood of a successful VBAC.

This study's uterine rupture rate of 3.6% among unsuccessful cases is comparable to the rate reported by Tahseen and Griffiths (3.1%)<sup>15</sup>, further validating the potential risks of TOLAC. Notable maternal complications, including infection (10.7% vs. 1.1%,  $p=0.025$ ) and uterine rupture (3.6%,  $p=0.014$ ), were more frequent in unsuccessful VBAC cases. On the fetal side, adverse outcomes such as low birth weight ( $<2500$  g,  $p<0.001$ ), Apgar scores  $<7$  at 1 minute ( $p=0.014$ ), and NICU admissions were significantly more common in the unsuccessful group. These findings emphasize the importance of effective patient selection, monitoring, and counseling in achieving favorable VBAC outcomes.<sup>22,23</sup> The significantly higher rates of LBW, and NICU admissions in unsuccessful VBAC cases underline the importance of close fetal monitoring during TOLAC. This is particularly relevant in low-resource settings, where access to advanced fetal monitoring technologies may be limited. Identifying women at risk of unsuccessful VBAC through a combination of clinical assessment and predictive tools could help mitigate adverse neonatal outcomes.<sup>24,25</sup> The relatively high prevalence of LBW in this study may reflect underlying maternal nutritional deficits or limited access to antenatal care, which are common challenges in resource-constrained settings. Differences in clinical protocols, such as the use of labor augmentation or induction methods, could also explain variations in labor duration and maternal outcomes.

The findings of this study emphasize the role of comprehensive counseling in shared decision-making. Women attempting VBAC should be informed about the risks of maternal complications such as infection and uterine rupture, as well as the potential for longer hospital stays in cases of unsuccessful VBAC. Providing balanced information could empower women to make informed choices about their delivery options. One of the strengths of this study is its focus on a well-defined population, with strict inclusion and exclusion criteria that minimized confounding variables. The use of standardized diagnostic criteria for anemia and low birth weight ensured consistency in data collection and analysis.



The study's use of stratified analyses allowed for a more nuanced understanding of factors influencing VBAC success. Despite its strengths, this study has several limitations. The cross-sectional design precludes causal inferences about the relationships between VBAC outcomes and associated factors. The single-center setting and relatively modest sample size may limit the generalizability of our findings to broader populations. The lack of long-term follow-up data restricts our ability to assess enduring maternal and neonatal outcomes. Finally, potential confounders such as labor induction methods, parity, and intrapartum management were not fully accounted for in this study.

## CONCLUSION

This study highlights relatively high VBAC success rate with favorable maternal and fetal outcomes. Unsuccessful VBAC was associated with prolonged labor, increased maternal complications, and poorer neonatal outcomes. These findings underscore the importance of careful patient selection, effective intrapartum monitoring, and comprehensive counseling to optimize VBAC outcomes. Future multicenter studies with larger sample sizes and long-term follow-up data are warranted to validate our findings and inform evidence-based clinical guidelines for TOLAC management.

## CONFLICT OF INTEREST

The authors declare no conflict of interest.

## SOURCE OF FUNDING

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

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#### AUTHORSHIP AND CONTRIBUTION DECLARATION

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