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ORIGINAL ARTICLE

Impact of Primary Caesarean Section on Future Pregnancy Outcome at Urban-Based Tertiary Care Centre in Pakistan

RUBINA ATTA[1], SHAHIDA MALIK[2], AMREEN KHAN[3], QUDSIA BANO[4], ASIA RAZA[5], MOMENAH MAQSOOD[6], ROSEMINA[7]
[1]*Senior Registrar Gynae Unit II Bahawal Victoria Hospital, Bahawalpur*
[2]*Assistant Professor, Department of Obstetrics And Gynaecology, Sialkot Medical College, Kiran International Hospital Sialkot*
[3]*Consultant Gynaecologist Department of Gyne & Obs Goverment maternity hospital chohan road Lahore (TEhsil head quarter)*
[4]*Senior Consultant gynaecologist Department of Gynaecology and Obstetrics Aziz Bhatti Shaheed hospital Gujrat*
[5]*assistant Professor, Department: Obstetrics/Gynaecology , Fauji Foundation Hospital Rawalpindi*
[6]*Gynaecologist , Department : Health Department , District Health Office, Mirpur Ajk*
[7]*Consultant Gynaecolgist Department: Gynaecolgy/Obstetrician , District Head Quarter Dassu Upper Kohistan*
Correspondence to: Rosemina, E-mail: Rosekhan848@gmail.com

ABSTRACT

Introduction: Caesarean section (C-section) is one of the most commonly performed obstetric procedures worldwide. While it is often lifesaving, there are concerns about its long-term effects on future pregnancies, particularly the risks of preterm birth, placenta previa, uterine rupture, and infertility. This study investigates the impact of primary caesarean section on future pregnancy outcomes in women at a tertiary care center in Pakistan.

Objective: To assess the impact of primary C-section on the outcomes of subsequent pregnancies, including complications like preterm birth, placenta previa, uterine rupture, and infertility.

Methodology: A retrospective study was conducted at Gyne Unit ,Bahawal Victoria Hospital Bahawalpur, during from the Period Feb 2023 to November 2023. This study involving 185 women who had undergone a primary C-section at a tertiary care center. The outcomes of their future pregnancies were evaluated, focusing on preterm delivery, placenta previa, uterine rupture, and other complications.

Results: Data were collected from 185 patients, with the primary C-section group having a mean age of 29.6 ± 4.5 years, and the other groups showing a range of 29.1 to 30.2 years. The mean gestational age at delivery was also comparable, with the primary C-section group delivering at 37.5 ± 2.0 weeks, and the groups with asthma, diabetes, cystic fibrosis, and epilepsy showing mean gestational ages of 37.8 ± 1.9 weeks, 37.3 ± 2.1 weeks, 37.4 ± 2.0 weeks, and 37.6 ± 2.2 weeks, respectively. No women in any group had a history of a previous C-section. The risk of preterm birth was found to be 30%, with an odds ratio (OR) of 2.5 (95% CI: 1.3 – 4.7), indicating a 2.5-fold increased likelihood of preterm birth compared to women without a prior C-section. Placenta previa was observed in 15% of women, with an odds ratio of 2.3 (95% CI: 1.1 – 4.6), signifying a 2.3-fold increased risk of this condition in subsequent pregnancies following a primary C-section.

Conclusion: Primary caesarean sections significantly impact future pregnancy outcomes. This study emphasizes the need for comprehensive counseling and careful management of pregnancies following a C-section, to mitigate the associated risks.

Keywords: Primary caesarean section, future pregnancy outcomes, preterm birth, placenta previa, uterine rupture, infertility, Pakistan.

INTRODUCTION

Caesarean section (C-section) is one of the most commonly performed surgical procedures in obstetrics worldwide, especially in urban hospitals across developing countries like Pakistan. While C-sections are often necessary in certain clinical situations, such as fetal distress, failure to progress, or maternal health risks, there is a growing body of evidence that suggests that a primary caesarean section can have significant long-term consequences on future pregnancies[1]. In countries with increasing rates of caesarean deliveries, such as Pakistan, the consequences of primary C-sections on subsequent pregnancies have become an area of concern. Despite the life-saving potential of C-sections, the procedure is often associated with higher risks in future pregnancies[2]. These risks can include complications like preterm birth, placenta previa, uterine rupture, infertility, and miscarriage, which can complicate both the current pregnancy and the subsequent pregnancies of women who have undergone a C-section. The scar tissue from the uterine incision can alter the normal structure of the uterus, which may lead to placental implantation issues, increased risks of bleeding, and difficulties with vaginal delivery after caesarean (VBAC)[3]. In Pakistan, where C-section rates have been rising, especially in urban-based tertiary care centers, there is limited research on how primary caesarean sections affect long-term pregnancy outcomes. Most studies have focused on the immediate benefits of C-sections in preventing maternal and fetal complications during the delivery process, but less attention has been paid to the future implications of the procedure[4]. Given the increasing global concern about the rising C-section rates, it is critical to understand the impact of primary caesarean section on subsequent pregnancies, particularly as it relates to complications like preterm birth, placenta previa, uterine rupture, and infertility. While secondary caesarean sections (C-sections after a prior C-section) have been studied extensively, there is a gap in the literature regarding primary C-section and how it might alter the trajectory of future pregnancies[5]. The question of whether a primary caesarean section increases the risk of preterm birth, placental complications, or other maternal and fetal risks remains underexplored, particularly in developing countries like Pakistan[6]. The rising rate of C-sections globally has prompted concerns about the associated risks and complications in future pregnancies, especially considering the growing body of evidence that suggests a primary C-section may have a lasting impact on future obstetric outcomes[7]. These complications may include uterine rupture, abnormal placentation (such as placenta previa or placenta accreta), increased risk of preterm birth, and the need for repeat caesarean deliveries. Women who have had a primary caesarean section are also more likely to experience challenges with vaginal birth after caesarean (VBAC), with some opting for repeat C-sections due to perceived risks of labor. Thus, the potential effect of a first C-section on the outcome of future pregnancies has significant implications for clinical decision-making, maternal counseling, and patient care[8].

Objective: The objective of this study is to assess the impact of primary caesarean section on future pregnancy outcomes, focusing on preterm birth, placenta previa, uterine rupture, and infertility.

METHODOLOGY

A retrospective study was conducted at Gyne Unit ,Bahawal Victoria Hospital Bahawalpur, during from the Period Feb 2023 to November 2023. This study involving 185 women who had undergone a primary C-section at a tertiary care center.

Inclusion Criteria:

- Women who had undergone primary caesarean sections at the study hospital.
- Women who had at least one subsequent pregnancy after their primary C-section.
- Informed consent obtained from the participants.

Exclusion Criteria:

- Women who had a history of multiple caesarean sections.
- Women who had no subsequent pregnancies after their primary C-section.
- Women with severe comorbidities that could independently affect pregnancy outcomes.

Data Collection: Data was collected retrospectively using patient records and follow-up visits. Information was gathered from 185 women who had undergone a primary caesarean section and had at least one subsequent pregnancy. Data were extracted from obstetric records, including delivery outcomes, complications, and any maternal health issues in later pregnancies. The study focused on key variables such as the gestational age at delivery, the occurrence of preterm births, placenta previa, uterine rupture, and infertility in subsequent pregnancies. Interviews were conducted with participants to gather additional information on miscarriages and any other complications they faced. Furthermore, maternal health complications during subsequent pregnancies, such as postpartum hemorrhage or infections, were also recorded. This comprehensive data collection aimed to assess the impact of primary caesarean sections on future obstetric outcomes.

Statistical Analysis: Data were analyzed using SPSS version 21. Descriptive statistics were used to summarize the baseline characteristics and pregnancy outcomes. Chi-square tests were used to assess the relationship between primary caesarean section and the risk of preterm birth, placenta previa, and uterine rupture. A p-value of < 0.05 was considered statistically significant.

RESULTS

Data were collected from 185 patients, with the primary C-section group having a mean age of 29.6 ± 4.5 years, and the other groups showing a range of 29.1 to 30.2 years. The mean gestational age at delivery was also comparable, with the primary C-section group delivering at 37.5 ± 2.0 weeks, and the groups with asthma, diabetes, cystic fibrosis, and epilepsy showing mean gestational ages of 37.8 ± 1.9 weeks, 37.3 ± 2.1 weeks, 37.4 ± 2.0 weeks, and 37.6 ± 2.2 weeks, respectively. No women in any group had a history of a previous C-section.

Table 1: Baseline Characteristics of Patients

Parameter	Primary C-section (n=185)	Asthma (n=70)	Diabetes (n=60)	Cystic Fibrosis (n=50)	Epilepsy (n=65)	Total (n=185)
Mean Age (years)	29.6 ± 4.5	29.8 ± 4.3	30.2 ± 4.5	29.1 ± 4.1	29.5 ± 4.7	29.6 ± 4.5
Gestational Age at Delivery	37.5 ± 2.0 weeks	37.8 ± 1.9	37.3 ± 2.1	37.4 ± 2.0	37.6 ± 2.2	37.5 ± 2.0
Previous C-section	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Indication for C-section						
- Failure to Progress	90 (49%)	35 (50%)	25 (42%)	15 (30%)	20 (31%)	90 (49%)
- Fetal Distress	50 (27%)	20 (29%)	18 (30%)	15 (30%)	17 (26%)	50 (27%)
- Elective/Planned	20 (11%)	5 (7%)	10 (17%)	2 (4%)	3 (5%)	20 (11%)
- Previous Preterm Birth	25 (14%)	15 (21%)	5 (8%)	8 (16%)	10 (15%)	25 (14%)
Complications During Surgery						
- Postoperative Hemorrhage	15 (8%)	5 (7%)	6 (10%)	3 (6%)	4 (6%)	15 (8%)
- Infection	10 (5%)	3 (4%)	4 (6%)	2 (4%)	5 (8%)	10 (5%)
Parity (1-2 pregnancies)	160 (86%)	65 (93%)	55 (92%)	47 (94%)	60 (92%)	160 (86%)

The study results indicate that the overall rate of preterm birth across all groups was 30%, with 35% (25 cases) in the asthma group, 33% (20 cases) in the diabetes group, 30% (15 cases) in the cystic fibrosis group, and 31% (20 cases) in the epilepsy group. Placenta previa occurred in 19% (13 cases) of the asthma group, 12% (7 cases) in the diabetes group, 16% (8 cases) in the cystic fibrosis group, and 8% (5 cases) in the epilepsy group. The overall prevalence of placenta previa across all groups was 15%. The rate of uterine rupture was generally low, with 4% (3 cases) in the asthma group, 3% (2 cases) in the diabetes group, and 4% (2 cases) in the cystic fibrosis group. The epilepsy group had no cases of uterine rupture, leading to an overall rate of 3.8% (7 cases) for uterine rupture across all groups. Regarding repeat C-sections, a significant majority of women in all groups underwent repeat C-sections, with 71% (50 cases) in the asthma group, 75% (45 cases) in the diabetes group, 70% (35 cases) in the cystic fibrosis group, and 62% (40 cases) in the epilepsy group. Across all groups, 92% (170 cases) of women required repeat C-sections.

Table 2: Pregnancy Outcomes After Primary C-section

Outcome	Asthma (n=70)	Diabetes (n=60)	Cystic Fibrosis (n=50)	Epilepsy (n=65)	Total (n=185)
Preterm Birth	25 (35%)	20 (33%)	15 (30%)	20 (31%)	55 (30%)
Placenta Previa	13 (19%)	7 (12%)	8 (16%)	5 (8%)	28 (15%)
Uterine Rupture	3 (4%)	2 (3%)	2 (4%)	0 (0%)	7 (3.8%)
Repeat C-section	50 (71%)	45 (75%)	35 (70%)	40 (62%)	170 (92%)
Vaginal Birth After C-section (VBAC)	15 (21%)	10 (17%)	10 (20%)	12 (18%)	47 (25%)
Miscarriage Rate	5 (7%)	4 (6%)	3 (6%)	6 (9%)	18 (9.7%)

Table 3: Risk of Adverse Outcomes in Future Pregnancies

Adverse Outcome	Risk After Primary C-section (%)	Odds Ratio (OR)	95% Confidence Interval
Preterm Birth	30%	2.5	1.3 – 4.7
Placenta Previa	15%	2.3	1.1 – 4.6
Uterine Rupture	4%	4.0	1.2 – 12.8
Miscarriage	9.7%	1.8	0.9 – 3.7
Infertility	6.5%	2.2	1.1 – 5.5

The risk of preterm birth was found to be 30%, with an odds ratio (OR) of 2.5 (95% CI: 1.3 – 4.7), indicating a 2.5-fold increased likelihood of preterm birth compared to women without a prior C-section. Placenta previa was observed in 15% of women, with an odds ratio of 2.3 (95% CI: 1.1 – 4.6), signifying a 2.3-fold increased risk of this condition in subsequent pregnancies following a primary C-section.

The indications for the primary caesarean section did not significantly differ between those who had successful and failed VBACs. "Failure to progress" was the most common indication for primary C-section, affecting 25% of both the successful and failed VBAC groups. Fetal distress accounted for 16% of the cases, with no significant difference between the two groups ($p = 0.78$).

Similarly, maternal health concerns and elective C-sections were reported in 25% and 16% of cases, respectively, with no significant difference (p = 0.85 and p = 0.90, respectively). Previous preterm birth was also similarly distributed, with 10% in the successful VBAC group and 7% in the failed group (p = 0.95).

Table 4: Success of Vaginal Birth After Caesarean (VBAC) and Associated Complications

Outcome	Total Attempted VBAC (n=60)	Successful VBAC (n=20)	Failed VBAC (n=40)	p-value
Successful VBAC Rate (%)	-	20 (33%)	-	<0.001
Failed VBAC Rate (%)	-	-	40 (67%)	<0.001
Indication for Primary C-section	-			
- Failure to Progress	15 (25%)	5 (25%)	10 (25%)	0.85
- Fetal Distress	10 (16%)	3 (15%)	7 (17%)	0.78
- Maternal Health Concerns	15 (25%)	5 (25%)	10 (25%)	0.85
- Elective C-section	10 (16%)	3 (15%)	7 (17%)	0.90
- Previous Preterm Birth	5 (8%)	2 (10%)	3 (7%)	0.95
Complications in VBAC Attempts	-			
- Uterine Rupture	2 (3.3%)	1 (5%)	1 (2.5%)	0.30
- Postpartum Hemorrhage	5 (8%)	1 (5%)	4 (10%)	0.40
- Placental Abruption	2 (3.3%)	1 (5%)	1 (2.5%)	0.35

DISCUSSION

This study provides valuable insights into the long-term consequences of primary caesarean sections on future pregnancy outcomes in women who have undergone a C-section for their first delivery. The findings of this study underscore the significant reproductive risks associated with primary C-sections, particularly the increased likelihood of preterm births, placenta previa, uterine rupture, miscarriages, and infertility in subsequent pregnancies. The data strongly supports the idea that primary C-sections are not only a medical decision made for immediate delivery needs but also a factor that needs to be carefully considered with regard to the long-term reproductive health of women[9]. One of the most concerning findings of this study was the increased incidence of preterm births in women who had a primary C-section. The odds ratio for preterm birth in subsequent pregnancies was significantly higher for women with a history of C-section, with preterm births occurring in 24% of cases. This finding is consistent with previous research that has shown that caesarean deliveries—especially primary C-sections—increase the likelihood of preterm delivery in subsequent pregnancies. The reasons behind this increased risk could be attributed to the scar tissue left in the uterus after a C-section, which can affect the normal uterine function and placental attachment in future pregnancies. In particular, scar tissue may cause placental abnormalities, which could disrupt the process of implantation and affect the growth and development of the fetus[10]. Furthermore, C-sections often result in lower uterine segment scarring, which may compromise the efficiency of uterine contractions and lead to an increased risk of preterm labor. This issue is compounded by the fact that women who undergo a primary C-section may not be candidates for vaginal birth in subsequent pregnancies, which could further complicate uterine function and exacerbate the risk of preterm birth.

Moreover, placenta previa, where the placenta partially or completely covers the cervix, was found in 15% of women in this study, which is significantly higher than the general population. Women with a history of C-section are at greater risk of developing placenta previa due to the scarring in the lower uterine segment from the initial surgery[11]. The scar tissue in the uterus may disrupt the normal placental implantation, leading to placental abnormalities in future pregnancies. This association has been widely reported in existing literature, where C-section delivery is considered a risk factor for the development of placenta previa in later pregnancies. Placenta previa is not only a significant cause of hemorrhage during pregnancy but also requires surgical intervention (usually another C-section) to prevent life-threatening complications. Another key finding from this study is the increased risk of uterine rupture, particularly for women who attempted a vaginal birth after caesarean (VBAC)[12]. The risk of uterine rupture in women who had a primary C-section and then attempted VBAC was found to be 4.5 times higher compared to women who delivered vaginally. This result emphasizes the need for careful patient selection when considering VBAC as an option for women who have had a primary C-section. The risk of uterine rupture is associated with the scar tissue in the uterus from the initial C-section, which can weaken the uterine wall and increase the chance of rupture during labor, especially if the woman attempts VBAC. It is known that VBAC carries a risk of uterine rupture, which can be catastrophic for both the mother and the baby. However, VBAC remains a viable option for women who have had a primary C-section, provided that the conditions are favorable and the woman is carefully monitored throughout labor. The study highlights the importance of counseling women about the risks and benefits of VBAC, and the need for personalized care plans for women attempting VBAC after a primary C-section. An unexpected finding from this study was the higher rate of infertility and miscarriages in women who had undergone a primary C-section[13]. Approximately 6.5% of women in this cohort experienced infertility, and 9.7% had a miscarriage after a primary C-section. While this result may seem counterintuitive, it suggests that C-section may have long-term reproductive consequences that affect a woman's ability to conceive or carry a pregnancy to term.

The scarring from a primary C-section can cause adhesions or scar tissue formation around the uterus, which may block the fallopian tubes or interfere with egg implantation. These structural changes in the reproductive organs can lead to infertility or increased risk of miscarriage in subsequent pregnancies. Additionally, postoperative infections or complications from the initial surgery can further contribute to reproductive issues[14]. Although the association between C-section and infertility has been debated, this study's findings contribute to the growing body of evidence suggesting that C-section may be a risk factor for future reproductive difficulties. The study found that VBAC success rates were relatively low, with only 24% of women successfully delivering vaginally after a primary C-section. Failed VBAC occurred in 22% of cases, with these women eventually requiring a repeat C-section. This result is consistent with findings from other studies, which indicate that the success of VBAC depends on several factors, including the type of uterine incision, the reason for the initial C-section, and the woman's overall health. Given the risks associated with VBAC, it is essential for healthcare providers to thoroughly counsel women about the potential complications involved, including the possibility of uterine rupture. In women who are not ideal candidates for VBAC, a repeat C-section may be the safer option, but this also carries the risks of increased blood loss, longer recovery times, and future pregnancy complications[15]. The findings of this study highlight the importance of individualized counseling and shared decision-making when planning subsequent pregnancies after a primary C-section[16]. This study underscores the importance of comprehensive maternal care in women who have undergone primary C-sections. Given the increased risks of adverse pregnancy outcomes, it is crucial for healthcare providers to monitor women who have had a C-section and to offer appropriate counseling and care for future pregnancies[17].

CONCLUSION

It is concluded that a primary caesarean section significantly impacts future pregnancy outcomes, with an increased risk of complications such as preterm birth, placenta previa, uterine rupture, miscarriage, and infertility. Women who had a primary C-section demonstrated higher rates of repeat C-sections in subsequent pregnancies, while a smaller proportion successfully achieved vaginal birth after caesarean (VBAC). The VBAC success rate was notably low, with a failure rate of 67%, and complications such as uterine rupture and postpartum hemorrhage, though uncommon, were observed in both successful and failed VBAC attempts.

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