SSR Institute of International Journal of Life Sciences
ISSN (O): 2581-8740 | ISSN (P): 2581-8732
Naykodi *et al*., 2025
doi: 10.21276/SSR-IIJLS.2025.11.4.3

Original Article

open access

Effect of Short Interconceptional Period on Maternal Outcome in Patients with Previous LSCS at a Tertiary Care Centre

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Received: 24 Feb 2025/ Revised: 21 Apr 2025/ Accepted: 24 Jun 2025

ABSTRACT

Background: Short interconceptional period (ICP), defined as <18 months between a live birth and next conception, is associated with increased maternal and neonatal complications, especially among women with previous Caesarean section (CS). This study evaluates maternal and fetal outcomes in such women.

Methods: A prospective analytical study was conducted at Rajiv Gandhi Medical College and Chhatrapati Shivaji Maharaj Hospital, Thane, over two years (Jan 2023–Dec 2024). A total of 150 women with a previous lower-segment Caesarean section (LSCS) and short ICP were enrolled. Data on maternal demographics, scar thickness, delivery mode, and complications were collected and analyzed using appropriate statistical tests.

Results: Majority of women (51%) had an ICP between 12–18 months, with a mean ICP of 11.58±5.54 months. Vaginal birth after Caesarean (VBAC) was achieved in 100 (66.7%) women, while 50 (33.3%) underwent repeat CS. Significant association was found between shorter ICP and preterm delivery ($p<0.05$), with 75% of women with ≤6 months ICP delivering before 37 weeks. Scar thickness >3.5 mm was significantly associated with successful VBAC ($p<0.05$). The most common RCS indication was refusal for trial of labor (22%). Postpartum hemorrhage (5.33%) and wound sepsis (4.67%) were the most frequent complications.

Conclusion: Short ICP is significantly associated with adverse perinatal outcomes, higher RCS rates, and increased maternal complications. Adequate spacing and postpartum counseling are critical to improve outcomes.

Key-words: Short Interconceptional Period, Previous Caesarean Section, Maternal Outcome, VBAC

INTRODUCTION

The interval between pregnancies—known as the interpregnancy interval (IPI) or interconceptional period (ICP)—can significantly affect maternal and fetal outcomes.

How to cite this article
Naykodi PS, Ubale SM, Parmar BK, Senapati J. Effect of Short Interconceptional Period on Maternal Outcome in Patients with Previous LSCS at a Tertiary Care Centre. SSR Inst Int J Life Sci., 2025; 11(4): 7818-7825.

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ICP is defined as the time between a live birth and conception of the next pregnancy. Short intervals (commonly defined as <6 or <18 months) are particularly associated with adverse events such as preterm birth, low birth weight, and neonatal complications, while longer intervals (>60 months) may also carry risks [1,2].

Modifying pregnancy spacing is one of the few modifiable risk factors available to women. Short ICPs may be prevented by timely postpartum contraception, but avoiding long intervals is often limited by subfertility or socio-economic factors. Mechanisms proposed for adverse outcomes with short ICPs include maternal

doi: 10.21276/SSR-IIJLS.2025.11.4.3

nutritional depletion and behavioral risk factors, often described as a J-shaped risk curve [3,4].

Meanwhile, the global increase in CS rates is a growing concern. WHO recommends a CS rate between 5–15%, but many nations report rates far exceeding this. [5,6] CS introduces long-term risks such as uterine scarring, infection, and complications in subsequent pregnancies. [5] Some studies report lower fertility rates and longer IPIs following CS, though others report no significant impact [7,8].

While the lower segment CS technique offers a strong uterine scar for future pregnancies, it mandates careful delivery planning. VBAC is a viable option and often preferable to repeat CS due to fewer operative risks and lower costs. However, trial of labor after Caesarean (TOLAC) must be cautiously approached, especially with short ICPs, which have been linked to increased uterine rupture and other complications. Despite multiple studies on VBAC determinants, no universal guidelines exist, and decision-making remains individualized [9-11]. Many women must undergo many complications and related consequences after a caesarean section and a short interconceptional period [12-14].

In India, data remain scarce on VBAC outcomes concerning ICP. This study aims to evaluate delivery outcomes in women with a prior Caesarean and assess maternal and fetal complications and neonatal outcomes.

MATERIALS AND METHODS

Study Design, Population, and Duration- A prospective analytical study was conducted in the Department of Obstetrics and Gynaecology at Rajiv Gandhi Medical College and Chhatrapati Shivaji Maharaj Hospital, Thane, with a previous lower segment cesarean section (LSCS) and a short interconceptional period. The study included women who were primarily booked, registered, and willing to deliver at our tertiary care centre, with a history of one prior LSCS and a short interconceptional interval. The study duration was two years, from January 2023 to December 2024.

Sample size- Considering a confidence level of 95% and a confidence interval of 8, the number of patients in our study to achieve statistical significance is 150. This was calculated by the Survey System. The Survey System ignores the population size when it is "large" or unknown. Population size is only likely to be a factor when you work with a relatively small and known group of people (e.g. the members of an association). Hence, a sample size of 150 was considered adequate for our study.

Inclusion criteria

1. Women primarily booked and registered at our tertiary care centre with a gestation period >28 weeks.
2. Women willing for institutional delivery at our tertiary care centre.
3. Women with previous one LSCS with first conception after LSCS.

Exclusion criteria

1. Previous classical caesarean or hysterotomy scar.
2. Women with previous two or more LSCS.
3. Women with previous LSCS with pregnancy having any other outcome e.g. abortion before the present pregnancy.

Methodology- The present study was conducted at our tertiary care centre after obtaining written informed consent from participants and clearance from the Institutional Ethics Committee. Women with a history of previous lower segment Caesarean section (LSCS) and a short interconceptional period (defined as less than 18 months), with a gestational age of more than 28 weeks, were enrolled and followed till delivery. Detailed antenatal history, clinical examination, and assessment of presenting symptoms were carried out. Relevant maternal parameters such as age, education, socio-economic status, parity, and interconceptional interval were recorded. Routine antenatal investigations, including haemogram, urine examination, sugar profile, HIV, VDRL, and HBsAg, were performed. Obstetric ultrasounds and Doppler studies focused on scar thickness, placental location, and myometrial invasion. Steroids were administered in preterm or high-risk cases. Patients were monitored during labour for gestational age, signs of scar tenderness, fetal distress, and meconium-stained liquor. The mode of delivery—VBAC (including vaginal or instrumental delivery) or repeat Caesarean section (emergency or elective)—was recorded. Maternal outcomes included intraoperative and postoperative complications such as uterine rupture,

doi: 10.21276/SSR-IIJLS.2025.11.4.3

bladder injury, wound sepsis, and postpartum haemorrhage. Perinatal outcomes were evaluated based on gestational age, birth weight, neonatal respiratory distress, jaundice, sepsis, mortality, and NICU admission. The objective of the study was to assess delivery outcomes and associated maternal and fetal complications in women with a previous LSCS and a short interconceptional interval.

Statistical analysis- Quantitative data is presented with the help of Mean and Standard deviation. Comparison among the study groups is done with the help of an unpaired t-test as per the results of the normality test. Qualitative data is presented with the help of a frequency and percentage table. Association among the study groups is assessed with the help of the Fisher test, Student 't-test, and the Chi-Square test. P-value <0.05 is taken as significant.

RESULTS

A prospective analytical study involving 150 patients with a previous LSCS and short interconceptional period (ICP) was conducted. The majority were aged 26–30 years (63.33%), followed by 21–25 years (22.67%). Only 8.67% were under 20, and 8 patients were over 30 years. The mean age was 25.8±3.35 years. Most patients were from urban areas (59.33%).

Based on the Modified Kuppuswamy Scale (MKS), 44% belonged to the upper middle class, 27% to the lower middle, and 17% to the upper class. Only 12% were from lower socioeconomic strata.

A statistically significant association was found between ICP and socioeconomic status ($p<0.05$). Among women with ICP ≤6 months, 42% were from lower socioeconomic classes. In contrast, 54% of women with ICP >12–18 months belonged to the upper middle class, and 32% to the lower middle. Only 8% of the shortest ICP group belonged to the upper class, compared to 26% and 13% in the 6–12 and 12–18 month groups, respectively.

This indicates that shorter ICPs are more common among lower socioeconomic groups, emphasizing the need for focused postpartum counseling and contraception in these populations (Table 1).

Table 1: Association of Interconceptional period and Socioeconomic Status as per MKS score of patients

Socioeconomic Status as per MKS score		≤6 months		>6-12 months		>12-18 months		Total	
		N	%	N	%	N	%	N	%
Lower	Upper Lower	5	21%	5	10%	1	1%	11	7%
	Lower	5	21%	2	4%	0	0%	7	5%
Middle	Upper middle	7	29%	18	36%	41	54%	66	44%
	Lower Middle	5	21%	12	24%	24	32%	41	27%
Upper		2	8%	13	26%	10	13%	25	17%
Total		24	100%	50	100%	76	100%	150	100%

p<0.05, Significant

In our study examining the relationship between ICP and gestational age at delivery, a statistically significant association was observed ($p<0.05$). Among women with an ICP of ≤6 months, a higher proportion delivered preterm, particularly between 34–36 weeks, with 9 patients each (37.5%) delivering between 34–35 weeks and 35–36 weeks, respectively. Only 1 woman (4.16%) from this group delivered between 37–38 weeks and another 1 (4.16%) between 39–40 weeks, while none reached 38–39 weeks.

In contrast, among those with an ICP of >12–18 months, a higher percentage had term deliveries. Specifically, 20 patients each (26.31%) delivered between 37–38 weeks and 38–39 weeks, and 12 (15.78%) between 36–37 weeks. This group had fewer very early preterm births—only 7 patients (9.21%) delivered at 34–35 weeks.

doi: 10.21276/SSR-IIJLS.2025.11.4.3

The intermediate ICP group (>6–12 months) showed a more even distribution across gestational ages, with 9 patients each (18%) delivering at both 34–35 and 36–37 weeks, and 10 patients (20%) at 37–38 weeks. Overall, shorter ICPs were strongly associated with earlier deliveries, while longer ICPs corresponded with better gestational outcomes, supporting the hypothesis that adequate interpregnancy spacing is beneficial for prolonging gestation and reducing preterm birth risk (Table 2).

Table 2: Association of Interconceptional period and Gestational Age at delivery

Gestational age at delivery	≤6 months		>6-12 months		>12-18 months		Total	
	N	%	N	%	N	%	N	%
34 - 35 weeks	9	37.5	9	18	7	9.21	25	16.67
35 – 36 weeks	9	37.5	7	14	10	13.15	26	17.33
36 – 37 weeks	4	16.67	9	18	12	15.78	25	16.67
37 - 38 weeks	1	4.16	10	20	20	26.31	31	20.67
38 - 39 weeks	0	0.00	9	18	20	26.31	29	19.33
39 - 40 weeks	1	4.16	6	12	7	9.21	14	9.33
Total	24	100	50	100	76	100%	150	100%

p<0.05, Significant

In our study, 76 patients (51%) had an interconceptional period (ICP) of >12–18 months, 50 (33%) had >6–12 months, and 24 (16%) had ≤6 months. The mean ICP was 11.58 ± 5.54 months. Scar thickness was a key parameter for evaluating uterine integrity. Most patients had a scar thickness >3–3.5 mm (42%) or >3.5 mm (38.66%), suggesting good VBAC potential. Thinner scars were observed in 21 patients (14%) with >2–3 mm and 8 patients (5.33%) with ≤2 mm thickness. Among VBAC patients (n=100), 44% had scar thickness >3.5 mm, 41% had >3–3.5 mm, 9% had >2–3 mm, and 6% had ≤2 mm. In the RCS group (n=50), 44% had >3.5 mm, another 44% had >3–3.5 mm, 24% had >2–3 mm, and 4% had ≤2 mm. There was a significant association (p<0.05) between scar thickness and successful VBAC. Overall, 100 patients delivered vaginally (VBAC), and 50 underwent repeat Caesarean section (Fig. 1).

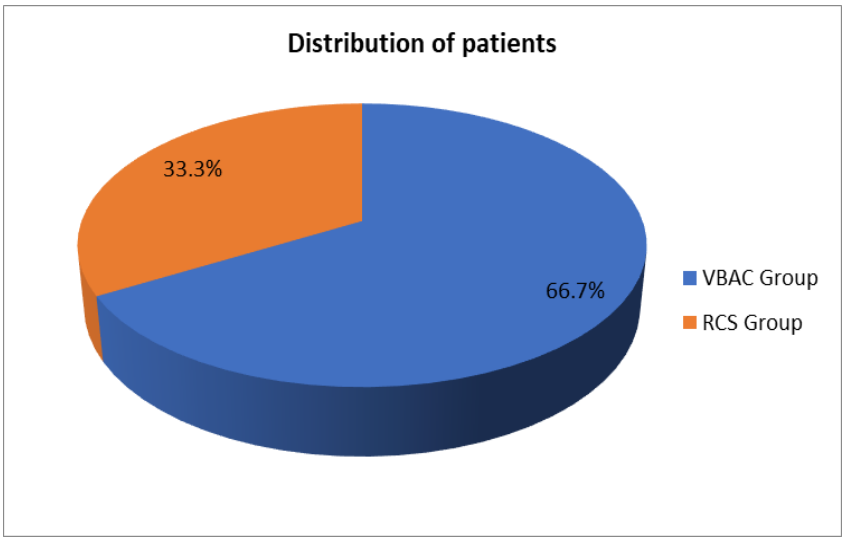

Fig. 1: Distribution of patients according to Type of Delivery

Out of 100 VABC delivery 78 (52%) had normal vaginal delivery, 14 (9.3%) had Ventouse delivery and 8 (5.3%) had Outlet forceps delivery. Out of 50 RCS, 30 (20.1%) were emergency Caesarean sections and 20 (13.3%) were elective Caesarean sections. In our study, among the 50 patients who underwent RCS, a statistically

doi: 10.21276/SSR-IIJLS.2025.11.4.3

significant association was found between ICP and the mode of RCS (p<0.05). Out of the 16 patients (32%) with an ICP of ≤6 months, 9 (18%) underwent elective Caesarean and 7 (14%) underwent emergency Caesarean. This group had the highest proportion of elective RCS cases. Among those with an ICP of >6–12 months, 19 patients (38%) underwent RCS, with a majority (14 patients, 28%) undergoing emergency Caesarean and only 5 (10%) elective. In the group with an ICP of >12–18 months, 15 patients (30%) had RCS, comprising 9 emergency (18%) and 6 elective (12%) procedures. There was a significant association between interconceptional period and mode of delivery in the RCS group (p<0.05) (Table 3).

Table 3: Association of Interconceptional Period and Mode of Delivery in RCS Group

Interconceptional Period	Total		Emergency		Elective	
	N	%	N	%	N	%
≤6 months	16	32%	7	14%	9	18%
>6-12 months	19	38%	14	28%	5	10%
>12-18 months	15	30%	9	18%	6	12%
Total	50	100%	30	60%	20	40%

p<0.05, Significant

Women with a very short ICP (≤6 months) were more likely to undergo elective repeat Caesarean sections, likely due to concerns about scar integrity. Emergency RCSs were more frequent in women with intermediate ICPs, highlighting how pregnancy spacing influences delivery decisions (p<0.05).

Among 50 patients who underwent RCS, the most common indication was refusal for trial of labour (22%), reflecting the role of patient preference. This was followed by fetal distress (16%) and severe PIH (14%). Other causes included scar tenderness and CPD (10% each), failed induction (8%), non-progress of labour (6%), oligohydramnios and BOH (4% each), and obstructed labour, DTA, and abruption (2% each).

In the emergency RCS group, fetal distress (26.7%) and scar tenderness (16.7%) were most frequent; in elective RCS, refusal for TOLAC (50%) and PIH (25%) predominated. Postoperative complications included PPH in 8 (5.33%), wound sepsis in 7 (4.67%), bladder injury in 4 (2.67%), and both hysterectomy and uterine rupture in 2 (1.33%) patients (Table 4).

Table 4: Distribution of patients according to Operative and Post-Partum Complications

Operative and Postpartum Complications	Number of Patients	
	N	Percentage (%)
Wound sepsis	7	4.67
Bladder Injury	4	2.67
Caesarean hysterectomy	2	1.33
Uterine rupture	2	1.33
Post-partum haemorrhage	8	5.33
No complications	131	87.33

DISCUSSION

A prospective analytical study was undertaken with a view to analyze the maternal and perinatal outcome in patients with previous LSCS with short interconceptional period, with special reference to the mode of delivery and rate of VBAC, was studied.

In our study maximum number of patients were from the age group between 21-30 years (86%). 8.67% of study patients were having age<20 years and only 5.33% were having age>30 years. The mean age of study patients was 25.80±3.35 years. The lowest age reported was 17 years, and the highest was 33 years.

doi: 10.21276/SSR-IIJLS.2025.11.4.3

Fatima Al-Jasmi et al conducted a study, "interpregnancy distance and risk of spontaneous labour" median age was 27.6 years [15]. Mahande and Obure [16] also mentioned that Women with shorter IPIs were more likely to be young (<19 years), employed, and with higher educational attainment than the referent group.

In this study maximum of 76 patients (51%) have an interconceptional period between>12-18months. The mean interconceptional period in this study is 11.58±5.54 months. In a study conducted by Stamilio *et al.* 3136 patients had an interconceptional period of less than 18 months, out of which 1741 (55.51%) had an interconceptional period between >12-18months [17].

In this study, maximum patients 31(20.67%) were of gestational age between 37-38 weeks followed by 38-39 weeks 29(19.33%), 35-36weeks (17.33%), 34-35 and 36-37 weeks 25(16.67%) each with mean gestational age of 37 weeks±2 weeks. In this study, 76 (50.67%) patients were preterm i.e. gestational age <37 weeks. In this study, patients with interconceptional group ≤6 months maximum of 22 patients (91.67%) were preterm i.e. less than 37 weeks, and a maximum of 9 patients (37.5%) had gestational age between 34-35 weeks and 35-36 weeks in each. There was a significant association between interconceptional period and duration of gestation ($p<0.05$). In a study conducted by Stamilio DM majority of patients with short interconceptional period had preterm delivery (i.e.<37 weeks) [11]. A study was done by Fatima Al-Jasmi et al to study the effect of interpregnancy interval on the risk of spontaneous preterm birth. The median gestational age was 35 weeks in patients with short interpregnancy intervals [15].

In our study 100 patients delivered vaginally (normal-78, Ventouse-14, Outlet Forceps-8) and 50 patients needed repeat caesarean section (Emergency-30, Elective- 20). In this study, the VBAC success rate is 66.33% (100 of 150) for patients with an interconceptional period of less than 18 months. There was no significant association between interconceptional period and mode of delivery (i.e. VBAC or RCS) ($p>0.05$).

In a similar study conducted by Huang et al, the VBAC success rate was 79% (64 of 81 cases) for patients with interdelivery interval of less than 19 months compared with 85.5% (943 of 1104 cases) for patients with interdelivery interval of more than or equal to 19 months [18]. In a study conducted by Stamilio *et al.* [11], they found no effect of short interconceptional period on VBAC failure rate. In this study, it was observed that most of the cases of elective LSCS were in the ≤ 6 months interconceptional group. There was a significant association between interconceptional period and mode of delivery in the RCS group. However, there was no significant association between interconceptional period and mode of delivery in the VBAC group.

In our study 15 patients had prior vaginal delivery, out of which 12 (80%) had successful VBAC and 3(20%) had repeat caesarean section. These findings were like a study conducted by Singh N et al in which 75 % of patients with previous vaginal delivery(s) had successful VBAC [19]. This indicates that women with previous vaginal delivery(s) have a better chance for a successful VBAC.

The postpartum haemorrhage as a complication was present in 8(5.33%) patients; wound sepsis in 7 (4.67%), bladder injury in 4 (2.67%), Caesarean hysterectomy and Uterine rupture in 2 (1.33%) each. A total of 19 patients had operative and post-partum complications, and some patients had more than one complication. Agrawal *et al.* [21] and Garg *et al.* [22].

CONCLUSIONS

This study highlights the significant impact of a short ICP on maternal and neonatal outcomes in women with a previous lower-segment Caesarean section (LSCS). A considerable proportion of the study population (16%) had an ICP of ≤6 months, and this group showed a markedly higher incidence of preterm deliveries, with over 75% delivering before 37 weeks. VBAC was successfully achieved in 66.7% of the cases, with scar thickness playing a critical role—patients with scar thickness>3.5 mm had better chances of VBAC success. On the other hand, repeat Caesarean sections (RCS) were more common in women with very short ICPs, especially when associated with clinical concerns such as fetal distress, scar tenderness, or refusal for trial of labor. Operative and postpartum complications, including postpartum hemorrhage and wound sepsis, were more frequently observed in the RCS group. These findings emphasize the importance of proper counseling and postpartum contraceptive support to ensure adequate spacing between pregnancies. By encouraging optimal birth intervals and individualized delivery planning, healthcare providers can significantly reduce maternal and perinatal risks. Strengthening postpartum family

doi: 10.21276/SSR-IIJLS.2025.11.4.3

planning services and increasing awareness, especially in lower socioeconomic groups, can improve outcomes in women with prior LSCS.

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