



Original Article

## Fetomaternal Outcome in Term Pregnancies with Short Interpregnancy Interval

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### ABSTRACT

**Introduction:** Short interpregnancy interval (IPI), defined as the duration of less than 18 months between a previous delivery and conception, is common in developing countries and has been associated with adverse maternal and neonatal outcomes. This study aimed to evaluate the fetomaternal outcomes in term pregnancies with short IPI.

**Materials and Methods:** A prospective observational study was conducted at Basaveshwara Teaching and General Hospital and Sangameshwara Teaching Hospital, Kalaburagi, from June 2024 to November 2025. A total of 100 term pregnancies with previous live births were enrolled. Maternal outcomes including anemia, pregnancy-induced hypertension (PIH), premature rupture of membranes (PROM), oligohydramnios, postpartum hemorrhage, and scar dehiscence were recorded. Mode of delivery and indications for cesarean section were documented. Fetal outcomes assessed included birth weight, APGAR scores, congenital anomalies, stillbirth, and NICU admissions.

**Results:** Anemia was the most common maternal complication (59%), followed by PROM (15%), postpartum hemorrhage (10%), oligohydramnios (7%), PIH (6%), and scar dehiscence (9%). Cesarean delivery was performed in 63% of cases, with scar tenderness (30.2%), previous LSCS (25.4%), and fetal distress (19%) as leading indications. Neonatal outcomes showed low birth weight in 18%, NICU admissions in 21%, APGAR score <7 at 1 minute in 20% and at 5 minutes in 10%, congenital anomalies in 5%, and stillbirth in 1%.

**Conclusion:** Short IPI is associated with significant maternal and neonatal morbidity, higher cesarean rates, and increased NICU admissions. These findings underscore the importance of promoting adequate birth spacing through postpartum counseling, nutritional supplementation, and family planning interventions to improve fetomaternal outcomes.

**Keywords:** Short interpregnancy interval, maternal complications, neonatal outcomes, cesarean section, low birth weight, NICU admission.

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### INTRODUCTION

Interpregnancy interval (IPI) is defined as the period between a previous delivery and the conception of the subsequent pregnancy. Optimal spacing between pregnancies is a crucial determinant of maternal and neonatal health outcomes[1]. The World Health Organization (WHO) recommends an interpregnancy interval of at least 18 to 24 months to minimize the risk of adverse maternal and fetal outcomes[2]. Despite this recommendation, short interpregnancy intervals—commonly defined as less than 18 months—remain prevalent, particularly in developing countries, due to factors such as limited access to contraception, low awareness of birth spacing benefits, sociocultural norms, and unintended pregnancies[3].

Short interpregnancy intervals have been associated with multiple maternal complications. Maternal nutritional depletion is a key mechanism, as pregnancy and lactation consume substantial maternal reserves of macro- and micronutrients, including iron, folate, and calcium.[4] Insufficient recovery between pregnancies can lead to anemia, increasing the risk of preterm labor, hemorrhage, and complications during delivery. In addition, inadequate uterine recovery and persistent inflammatory changes from the preceding pregnancy may predispose women to conditions such as scar tenderness or dehiscence, preterm rupture of membranes (PROM), and hypertensive disorders of pregnancy.[5,6] Maternal age and parity further influence these risks, with younger women often having better physiological recovery compared with older mothers, who may also face reproductive challenges such as diminished ovarian reserve, infertility, or increased risk of chromosomal abnormalities[7,8].

The impact of short interpregnancy intervals extends to neonatal outcomes as well. Several studies have demonstrated that neonates born after short IPIs are at a higher risk of low birth weight (<2.5 kg), small-for-gestational-age (SGA) birth, preterm delivery, and low APGAR scores at 1 and 5 minutes.[9] These infants are more likely to require admission to the neonatal intensive care unit (NICU) for conditions such as respiratory distress, hyperbilirubinemia, or growth restriction. Infant mortality has also been shown to be higher in pregnancies following short intervals[10]. The underlying mechanisms include insufficient maternal nutrient replenishment, inadequate folate stores, and persistent systemic inflammation, all of which compromise placental function and fetal growth.[11,12]

The relationship between interpregnancy interval and adverse pregnancy outcomes may be further influenced by maternal age and sociodemographic factors. Women with delayed childbearing, particularly those over 30 years of age at first birth, often experience shorter interpregnancy intervals, either due to intentional pregnancy planning or reproductive time constraints.[13,14] Advanced maternal age itself carries independent risks, including chromosomal abnormalities, infertility, and complications such as preeclampsia, gestational diabetes, and cesarean delivery.[15] Consequently, women delaying subsequent pregnancies must weigh the risks of a shortened interpregnancy interval against those of delayed conception. Other contributing factors such as unintended pregnancy, lower socioeconomic status, perinatal loss in the previous pregnancy, and cultural influences—may vary according to maternal age and social context, potentially modifying the association between short interpregnancy intervals and adverse outcomes.[16] The evidence underscores the importance of identifying short interpregnancy interval as a modifiable risk factor in obstetric care. Interventions such as postpartum counseling, promotion of effective contraception, nutritional supplementation, and intensified antenatal surveillance can mitigate the negative consequences associated with short IPIs.[15] Comprehensive education regarding the health benefits of adequate birth spacing should be provided at every healthcare contact point, particularly in the immediate postpartum period, to optimize both maternal and neonatal outcomes. Despite extensive research, limited data exist regarding fetomaternal outcomes in term pregnancies specifically within the context of short interpregnancy intervals in developing countries, where sociocultural and resource-related factors may exacerbate risks. Understanding these outcomes is essential for informing clinical practice, guiding family planning policies, and implementing targeted maternal and neonatal healthcare strategies.

This study aims to investigate the fetomaternal outcomes in term pregnancies with short interpregnancy intervals, focusing on both maternal complications and neonatal health indicators.

## **MATERIALS AND METHODS**

This study was designed as a prospective observational study to evaluate fetomaternal outcomes in term pregnancies with short interpregnancy intervals. The study was conducted at Basaveshwara Teaching and General Hospital and Sangameshwara Teaching Hospital, Kalaburagi. Data collection was performed between June 2024 and November 2025. A total of 100 cases meeting the inclusion criteria were enrolled in the study.

### **Inclusion Criteria**

- Women with term pregnancies who had previous live births.
- All antenatal cases, whether booked or unbooked.
- Maternal age above 18 years.

### **Exclusion Criteria**

- Primigravida women.
- Grand multipara women.

### **Data Collection**

Eligible participants were identified from the obstetric wards of the study hospitals. Demographic data, obstetric history, and clinical findings were recorded. Interpregnancy interval was calculated as the duration between the previous delivery and the conception of the current pregnancy.

### Maternal Outcome Assessment

Maternal outcomes including anemia, pregnancy-induced hypertension (PIH), premature rupture of membranes (PROM), oligohydramnios, postpartum hemorrhage, and intraoperative findings such as scar dehiscence were recorded from hospital records.

### Mode of Delivery

The mode of delivery (cesarean section, vaginal delivery, or VBAC) was documented along with the indications for cesarean delivery.

### Fetal Outcome Assessment

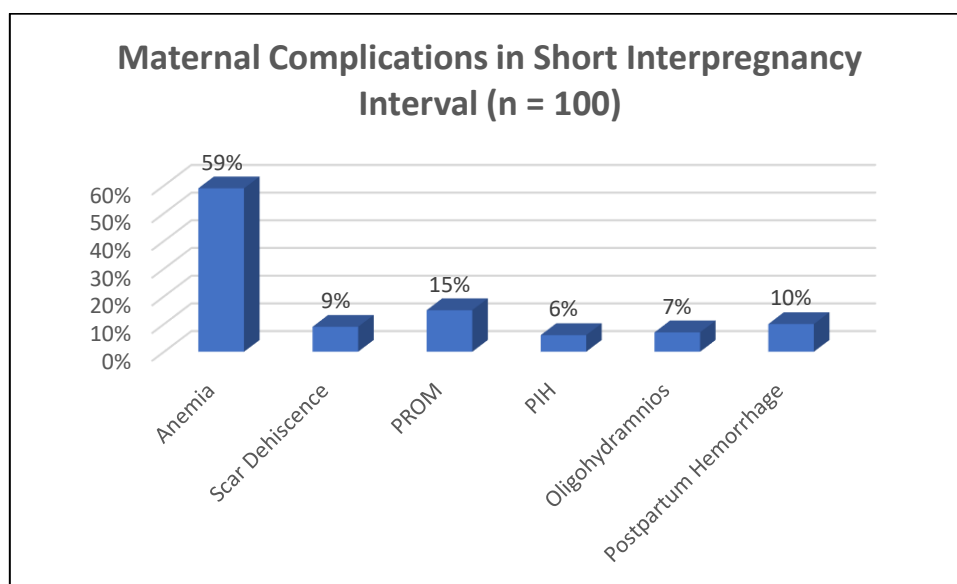
Fetal outcomes including birth weight, presence of congenital anomalies, APGAR scores at 1 and 5 minutes, stillbirths, and NICU admissions were recorded.

## RESULTS

In this study of 100 term pregnancies with short interpregnancy intervals (IPI), maternal complications were frequently observed (Table 1, Figure 1). Anemia was the most prevalent complication, affecting 59% of women, with a mean hemoglobin of 10.25 g/dL. Other notable maternal complications included premature rupture of membranes (PROM) in 15% of cases, postpartum hemorrhage in 10%, oligohydramnios in 7%, pregnancy-induced hypertension (PIH) in 6%, and intraoperative scar dehiscence in 9%. These findings indicate that short IPI significantly affects maternal hematological status and predisposes to obstetric complications that may require heightened antenatal surveillance and timely intervention.

**Table 1: Maternal Complications in Short Interpregnancy Interval (n = 100)**

Maternal Complication	Number of Cases	Percentage (%)
Anemia	59	59%
Scar Dehiscence	9	9%
PROM	15	15%
PIH	6	6%
Oligohydramnios	7	7%
Postpartum Hemorrhage	10	10%

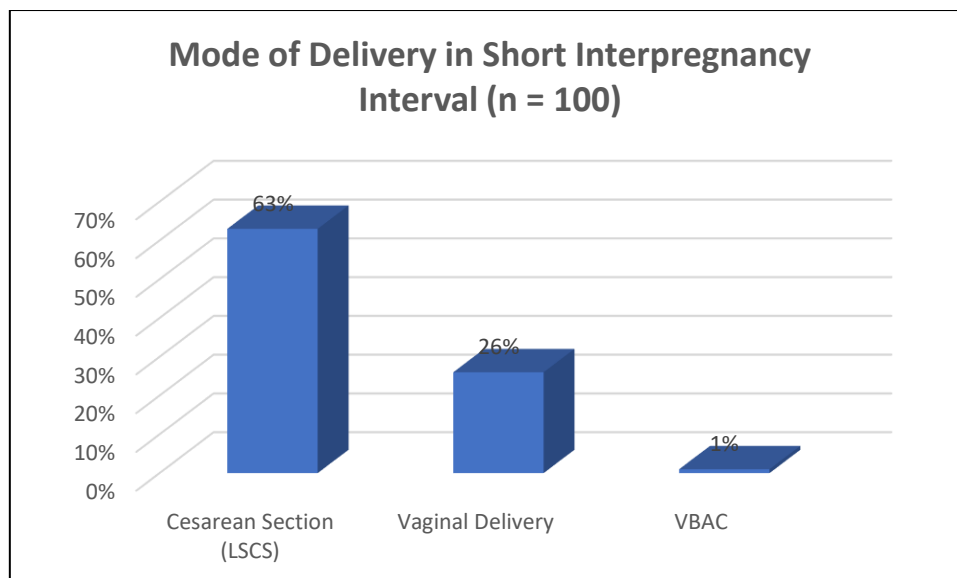


**Figure 1 Maternal Complications in Short Interpregnancy Interval (n = 100)**

Analysis of the mode of delivery revealed a predominance of cesarean sections (63%), compared to vaginal deliveries (26%) and VBAC (1%) (Table 2, Figure 2). This reflects a higher surgical intervention rate in short IPI pregnancies, possibly due to obstetric indications related to uterine recovery and previous cesarean scars.

**Table 2: Mode of Delivery in Short Interpregnancy Interval (n = 100)**

Mode of Delivery	Number of Cases	Percentage (%)
Cesarean Section (LSCS)	63	63%
Vaginal Delivery	26	26%
VBAC	1	1%



**Figure 2 Mode of Delivery in Short Interpregnancy Interval (n = 100)**

The indications for cesarean section among 63 women demonstrated that scar tenderness was the leading cause (30.2%), followed by previous LSCS (25.4%), and fetal distress (19%) (Table 3). Other less common indications included cephalopelvic disproportion (7.9%), oligohydramnios (6.3%), patient refusal for VBAC (4.8%), fetal growth restriction (4.8%), and antepartum hemorrhage (1.6%). This pattern suggests that previous cesarean scars and uterine vulnerability significantly influence surgical decision-making in short IPI pregnancies.

**Table 3: Indications for Cesarean Section (n = 63)**

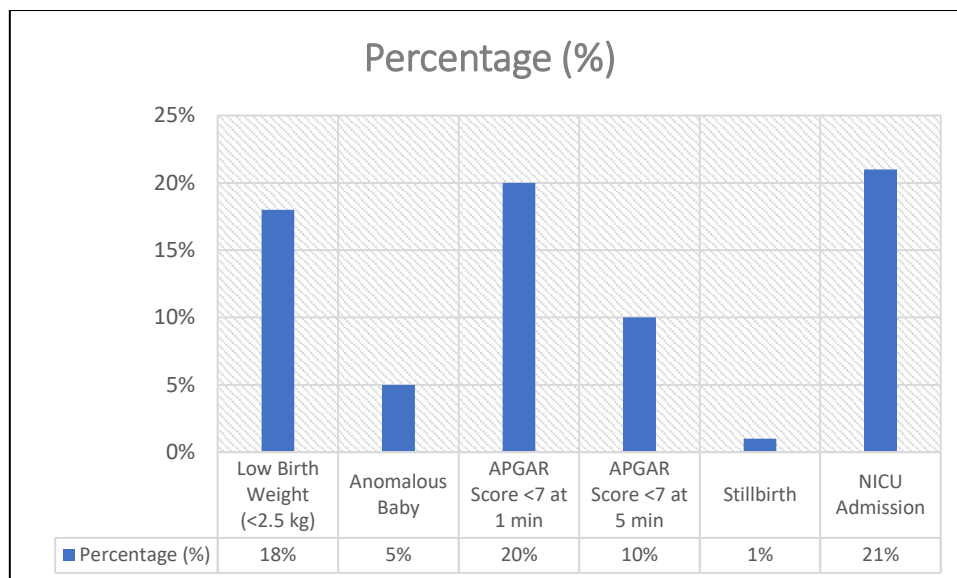
Indication	Number of Cases	Percentage (%)
Scar Tenderness	19	30.2%
Fetal Distress	12	19.0%
Previous LSCS	16	25.4%
CPD (Cephalopelvic Disproportion)	5	7.9%
Patient Not Willing for VBAC	3	4.8%
APH	1	1.6%
Oligohydramnios	4	6.3%
FGR	3	4.8%

Fetal outcomes were notably affected by short IPI. Low birth weight (<2.5 kg) occurred in 18% of neonates, and 21% required NICU admission, highlighting increased neonatal vulnerability (Table 4). APGAR scores less than 7 were estimated in 20% at 1 minute and 10% at 5 minutes, suggesting transient neonatal compromise at birth. Congenital anomalies were observed in 5% of neonates, while stillbirth was rare, occurring in only 1% of cases. These outcomes underscore the impact of insufficient birth spacing on neonatal health, emphasizing the importance of adequate interpregnancy intervals to optimize fetal growth and immediate postnatal adaptation.

**Table 4: Fetal Outcomes in Short Interpregnancy Interval (n = 100)**

Fetal Outcome	Number of Cases	Percentage (%)
Low Birth Weight (<2.5 kg)	18	18%
Anomalous Baby	5	5%
APGAR Score <7 at 1 min	20	20%
APGAR Score <7 at 5 min	10	10%
Stillbirth	1	1%
NICU Admission	21	21%

\*Estimated APGAR <7 based on mean APGAR values provided (1 min = 7, 5 min = 8) to illustrate low scores.



**Figure 2: Fetal Outcomes in Short Interpregnancy Interval**

## DISCUSSION

In this prospective observational study of 100 term pregnancies with short interpregnancy interval (IPI <18 months), we found that maternal complications were frequent, with anemia affecting 59% of women, PROM in 15%, postpartum hemorrhage in 10%, oligohydramnios in 7%, PIH in 6%, and scar dehiscence in 9% (Table 1). These findings are consistent with other studies reporting increased maternal morbidity with short intervals. Preeti Lewis and Mor et al.(2020)[17] reported that short IPI was significantly associated with higher risks of anemia, PROM, and scar dehiscence compared with normal IPI, while PIH was comparatively lower in the short IPI group, echoing our observation of a relatively lower PIH rate (case-control study). Similarly, a recent case-control study from Era's Lucknow Medical College showed significant associations between short IPI and anemia, PROM, and low birth weight, supporting the trend of maternal morbidity in closely spaced pregnancies. Our study also demonstrated a high cesarean section rate (63%) in short IPI pregnancies with scar tenderness (30.2%), previous LSCS (25.4%), and fetal distress (19.0%) being leading indications (Table 3). In a large population-based cohort, Dong et al.(2023)[18] reported that short IPI ( $\leq 11$  months and 12–17 months) was associated with an increased risk of repeat cesarean delivery when compared to the 18–23 month reference group, supporting our finding of increased surgical intervention in short IPI pregnancies. The neonatal outcomes in our study – low birth weight in 18%, NICU admission in 21%, APGAR <7 at 1 minute in 20%, and <7 at 5 minutes in 10% (Table 4) – are in line with broader epidemiological evidence. A large meta-analysis by Wang et al.(2022)[19] and colleagues showed that short IPI is a risk factor for low birth weight (pooled OR = 1.33), preterm birth (pooled OR = 1.49), small for gestational age, NICU admission (pooled OR = 1.26), and congenital abnormalities, although the magnitude varied with the definitions and populations studied. Conde-Agudelo et al.(2006)[1] classic meta-analysis also documented that interpregnancy intervals <6 months were associated with increased risk of adverse perinatal outcomes including low birth weight and perinatal mortality, reinforcing the biological plausibility of our observations in an Indian cohort. The proposed mechanisms linking short IPI to adverse outcomes include maternal nutritional depletion (particularly iron and folate), incomplete uterine recovery, and persistent inflammatory changes, which may contribute to anemia, placental dysfunction, and suboptimal fetal growth. Wang et al.(2022)[19] These mechanisms have been invoked in multiple analyses and underpin WHO recommendations for a minimum 18–24 month interval between pregnancies to optimize health outcomes. Some studies, however, suggest variation in associations depending on the analytic method; for example, Hanley et al.(2017)[20] found that many adverse outcomes associated with short IPI in traditional unmatched analyses were attenuated when women were compared with themselves across successive pregnancies, indicating potential confounding by maternal characteristics. Despite these methodological nuances, the preponderance of evidence supports a real increase in adverse fetal outcomes and elevated maternal risk with short spacing.

## CONCLUSION

Short interpregnancy interval was significantly associated with increased maternal complications, including anemia, PROM, and scar-related issues. Cesarean section rates were higher, with scar tenderness and previous LSCS as leading indications. Neonatal outcomes were adversely affected, with higher rates of low birth weight, lower APGAR scores, and increased NICU admissions. Scar dehiscence also showed a clinically notable increase. These findings highlight short interpregnancy interval as a modifiable risk factor. Promoting adequate birth spacing through postpartum counseling, nutritional supplementation, and family planning interventions is essential to improve both maternal and neonatal outcomes.

## LIMITATIONS

The study was conducted in a single tertiary care center, which may limit generalizability to other populations. The sample size was relatively small, and certain outcomes such as long-term neonatal development were not assessed. Additionally, potential confounding factors like maternal nutritional status, socioeconomic status, and intercurrent illnesses were not fully controlled.

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