Original Article

# IMPACT OF SHORT INTER-PREGNANCY INTERVAL ON MATERNAL OUTCOME IN FEMALES PRESENTING IN LABOR WITH HISTORY OF PREVIOUS CESAREAN SECTION

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**Objective:** To find the frequency of females with short inter-pregnancy interval presenting in labour with history of previous one cesarean section and to compare maternal outcome with short versus prolonged inter-pregnancy interval.

**Methods:** It was labeled as short if <6months and will be labeled as normal if 6-18months and long if >18 months. It will be calculated as the interval between last delivery and conception of the present gestation. Total 370 females fulfilling selection criteria were enrolled in study from labor room of Department of Obstetrics & Gynecology, Lady Willington Hospital, Lahore. Informed consent was obtained. Demographic information was also be obtained. Females were asked for duration of current and previous pregnancy. Then females were divided in two groups i.e. short and normal IPI. At time of delivery, gestational age was measured and preterm delivery was labeled. After delivery, uterine rupture, and need for blood transfusion was noted. .

**Results:** Short inter pregnancy interval was seen in 136(36.76%) women and normal pregnancy interval was seen in 234(63.24%) women. Women with normal pregnancy interval among them preterm was seen in 71(30.3%) mother while women with short pregnancy interval among them preterm delivery was seen in 79(58.1%) women. Uterine rupture was significantly higher in women who had short inter-pregnancy interval as that of women with normal pregnancy interval. Blood transfusion was significantly higher in women who had short inter-pregnancy interval as that of women with normal pregnancy interval. 92%.

**Conclusions:** Results of present study revealed that a short interpregnancy interval is linked to maternal characteristics and adverse pregnancy outcomes. Spacing pregnancies appropriately could reduce the rate of low birth weight and adverse pregnancy outcomes.

**Keywords:** short inter-pregnancy interval, Cesarean section and maternal outcome.

## Introduction

The time interval between one pregnancy and the next may affect the risk of pregnancy related complications. Both short and long interpregnancy intervals (IPI) have been associated with adverse outcome, but those with short interval are more vulnerable to suffer maternal and neonatal copmlications.[1] The timing between a live birth and the next pregnancy is termed as interpregnancy interval (IPI).[2] Short and long IPI have been shown to be associated with increased risk for adverse maternal and perinatal outcomes. However, the effects of birth interval on the safety and efficacy of vaginal birth after cesarean delivery (VBAC) are less well characterized because of study design constraints and the small number of publications.[3]

Optimal IPI is an important issue affecting pregnancy results, fetal and maternal morbidity/mortality, and has economic, social and demographic significance. The definition of IPI has not yet been standardized, thereby affecting results and conclusions. Women with shorter IPI have higher risk of maternal mortality, hypertensive disorders of pregnancy, bleeding and anemia.[4,5] Inter-pregnancy interval (IPI) is defined as the period between delivery of the previous infant and conception of the current pregnancy.[6] For this study short IPI interval is defined as less than 6 months and normal if duration is 6-18 months.

It has been reported that short IPI was observed in 6.7% females in a cohort.[7] One cohort study conducted on 13331 females with previous 1 cesarean section, reported the incidence of short IPI 2.2%. Among females with short IPI, preterm delivery occurred in 9.1%, uterine rupture 2.7%, composite morbidity 4.2% and blood transfusion 2.4%. Among females with normal IPI, preterm delivery occurred in 8.6%, uterine rupture 0.9%, composite morbidity 2.2% and blood transfusion 0.7%. The difference was significant ($P<0.05$).[3] Version 21.

Another study also showed that mothers with shorter IPIs were more likely to deliver preterm as compared

to women with optimal birth spacing. Following a short IPI, 53.3% of women had preterm delivered, while 37.5% of women with optimal IPI.[8]Providing counseling about the potential negative consequences of short IPI and improving women's contraceptive use to reduce rates of unintended pregnancy likely would reduce the proportion of short IPI pregnancies.[8]

Rationale of this study is to find the find the frequency of females presenting with short inter-pregnancy interval and then compare the frequency of maternal outcome with short versus normal IPI in females presenting in labour with history of previous one cesarean section. The relation between short IPI and adverse perinatal outcomes has been attributed to maternal nutritional depletion, the competition theory and behavioral risk factors.

It was proposed that there is a J-shaped association between IPI and adverse pregnancy outcomes. This is not the effect of other common reproductive risk factors. There is a need to inform women regarding the association between adverse pregnancy outcomes and IPI, as well as the benefits of optimizing that interval. The 'ideal' time for women to space births is at least 24 months apart Pregnancy might not always be planned, but a new study suggests timing is everything.[9]

Public health programs could identify women with other risk factors for interventions to improve perinatal outcomes. But unfortunately, no local data is available which provides the information about the association of short IPI with adverse fetal outcome in previous one cesarean section. So we want to conduct this study to find local evidence and there is also a need for more studies to define the optimal IPI under local conditions. This will help to improve our practice and can implement the surveillance methods to improve IPI among femalesbelongs to local population.

## Methods

The study design is descriptive case series and setting in Unit III, Department of Obstetrics & Gynecology, Lady Willingdon Hospital, Lahore. Study Duration 6 months after approval of synopsis. Sample size of 370 cases is calculated with 95% confidence interval, 3% margin of error and taking expected percentage of short IPI i.e. 6.7% in females presenting during labor with previous one cesarean section. Total 370 females fulfilling inclusion criteria were enrolled in the study from labor room of Department of Obstetrics & Gynecology, Lady Willingdon Hospital, Lahore. Informed consent was obtained. Demographic informations (name, age, gestational age, parity) were also recorded. Females were asked for duration of current and previous pregnancy. Then females were divided in two groups i.e. short and normal IPI (as per operational definition). At time of delivery, gestational age was measured and preterm delivery was labeled (as per operational definition). After delivery, uterine rupture, and need for blood transfusion was noted (as per operational definition). All this information was collected through a pre-designed proforma. Data was analyzed by IBM SPSS version 21. Quantitative variables like age and gestational age was calculated as mean and standard deviation. Qualitative variables like short IPI, preterm delivery, uterine rupture, and blood transfusion was calculated as frequency and percentage. Parity was also be presented as frequency. Both groups were compared by using chi-square test for preterm delivery, uterine rupture, and blood transfusion in both short and normal IPI. P-value ≤0.05 was taken as significant. Data was stratified for age and parity. Chi-square test was applied post-stratification taking p-value≤0.05 as significant.

## Results

Women with normal IPI among them preterm was seen in 71(30.3%) mother while women with short IPI among them preterm delivery was seen in 79(58.1%) women. Frequency of preterm delivery was significantly higher in women with short IPI as that of women with normal IPI. i.e. (p-value=0.000) **Table-1**Uterine rupture was significantly higher in women who had short IPI as that of women with normal pregnancy interval. i.e. Short IPI: 53.7% vs. Normal IPI: 29.1%, p-value=0.000. **Table-2**

Blood transfusion was significantly higher in women who had short IPI as that of women with normal IPI. i.e. Short IPI: 63.2% vs. Normal IPI: 32.5%, p-value=0.000. **Table-3**

**Table-1:** (n=370) Preterm delivery in terms of Inter pregnancy Interval.

| | | Pregnancy internal | | |
|---|---|---|---|---|
| | | < 6 Months | ≥ S6 Months | Total |
| Preterm Delivery | Yes | 79 (58.1%) | 71 (30.3%) | 150 |
| | No | 57 (41.9%) | 163 (69.7%) | 220 |
| Total | | 136 (100%) | 234 (100%) | 370 |

*hi-Square Test= 27.47, p-value= 0.000*

**Table-2:** (n=370) Uterine rupture in terms of Inter pregnancy Interval.

| | | Pregnancy internal | | |
|---|---|---|---|---|
| | | < 6 Months | ≥ S6 Months | Total |
| Uterine rupture | Yes | 73 (53.7%) | 68 (29.1%) | 141 |
| | No | 63 (46.3%) | 166 (70.9%) | 229 |
| Total | | 136 (100%) | 234 (100%) | 370 |

*hi-Square Test= 22.09, p-value= 0.000*

**Table-2:** (n=370) Uterine rupture in terms of Inter pregnancy Interval.

| | | Pregnancy internal | | |
|---|---|---|---|---|
| | | < 6 Months | ≥ S6 Months | Total |
| Blood Transfusion | Yes | 86 (63.2%) | 76 (32.05%) | 162 |
| | No | 50 (36.8%) | 158 (67.5%) | 208 |
| Total | | 136 (100%) | 234 (100%) | 370 |

*hi-Square Test= 33.05, p-value= 0.000*

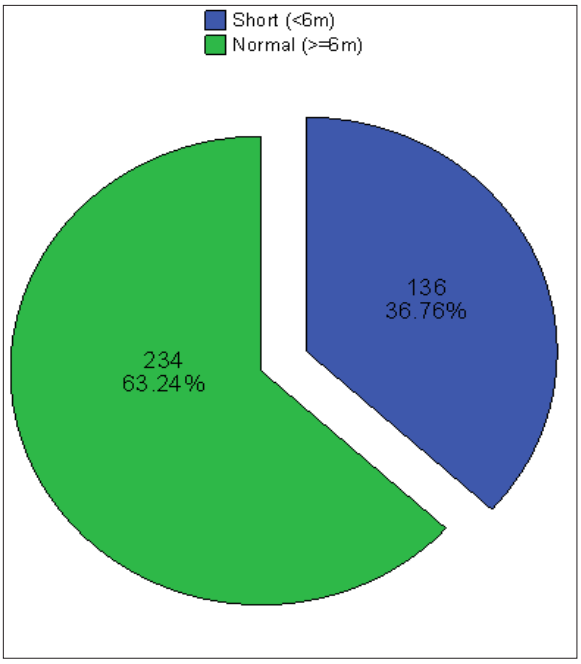


**Fig-1:** Inter-pregnancy interval of women

## Discussion

Interpregnancy interval (IPI) is an important issue affecting pregnancy outcome, has economic, social and demographic significance. Each year, about 529,000 pregnant women die from complications during pregnancy and childbirth, in which 99% is from developing countries and only 1% from developed countries .[10,11]

IPI shorter than six months after a live birth may be a leading cause of induced abortion, miscarriage, and still birth, because the uterus needs time to recover after a previous pregnancy. Short IPI have been linked to increase the risk for preterm birth, low birth weight, small gestational age, dystocia and maternal morbidity and mortality. Early neonatal death, which attributes to most perinatal death, is caused by preterm birth and low-birth weight. Stillbirth accounts to be 74.0% of all perinatal deaths.[11] Furthermore, maternal nutritional depletion and other postpartum related stress increases the risk of perinatal and infant mortality in subsequent pregnancy for closely spaced pregnancies.[12] Some researchers have argued that short intervals between pregnancies merely identify women already at higher reproductive risk, either because of underlying disorders, socioeconomic status or life style factors.[13] Short IPI are also associated with a variety of other adverse pregnancy outcomes, including uterine rupture with trial of labour after caesarean, birth defects, childhood behavioral conditions, and even maternal death. Despite the knowledge of pregnancy risks attributable to inadequate birth spacing, over one third (35%) of pregnancies occur <6 months following a preceding birth.[14] In this study frequency of short IPI was seen in 136(36.76%) women. Mean age of women with short term IPI was 30.73±6.38 years. Frequency of preterm delivery, uterine rupture and blood transfusion was significantly higher in women with short IPI i.e. Preterm delivery: <6 months: 58.1% vs. >6 months: 30.3%, Uterine rupture: <6 months: 53.7% vs. >6 months: 29.1% & blood transfusion: <6 months: 63.2% vs. >6 months: 32.5% respectively. Stratification of age and parity of women showed that all these parameters i.e. frequency of preterm delivery, uterine rupture and blood transfusion was high in women with shot IPI. David M. Stamilio in his study reported that an interval <6 months was associated with increased risk of uterine rupture (adjusted odds ratio [aOR] 2.66, 95% CI; 1.215.82), major morbidity (aOR 1.95, 95% CI 1.04 3.65), and blood transfusion (aOR 3.14, 95% CI 1.42 6.95). Long IPI was not associated with an increase in major morbidity.[3]

Stephen J Ball in his study showed that their study does not support the existence of a causal effect of short IPI on adverse birth outcomes and they proposed that the associations between short intervals and adverse birth outcomes in other studies may be due to unmeasured confounding by persistent maternal factors.[7] DeFranco EA in his study assessed the association between IPI and subsequent pregnancy outcome. The results of the study showed that shortest IPIs (<6 months) increased the risk of extreme PTB. IPIs of <6 months and 6-12 months increased the overall risk of PTB & PTB recurrence.

It was concluded that the risk of PTB and its recurrence increases with short IPIs, even after adjustment for co-existing risk factors. This highlights the importance of counseling women with either an initial term or preterm birth to wait at least 12 months between delivery and subsequent conception.[15] Abd el-hamid from Egypt in his study reported that about one third of women in G 1 (IPI:<6) and G2 (IPI:6<12) had a large amount of blood loss and less than one fourth in G3 (IPI:12<18) and G4 (IPI:18<24). This may be due to high incidence of preterm labor; preeclampsia and anemia in G1 and G2 may effect on uterine contractility. Frequency of early preterm labor was also significantly higher in women with short IPI i.e. G1(IPA:<6): 45% vs. G2(IPI:6<12): 13.3%.[16,17] A meta-analysis of 67 studies conducted in 62 countries, as well as an additional study from Brazil, revealed that, poor maternal and perinatal outcomes were associated with IPI between 6-18 months or longer than 59 months.[18,19] Also, a study from Bangladesh revealed that, miscarriage, preterm labor, stillbirth, pre-eclampsia and high blood pressure were more likely with IPI shorter than six months and longer than 75 months; premature rupture of membranes was more likely with intervals 6-14 months long; and edema was significantly more likely after IPI longer than 50 months.[20] However, it may also be possible that these women had previous complications such as preeclampsia that recurred in the successive pregnancy. Short IPIs might be attributed to other factors such as poor socioeconomic status and previous perinatal death which are also common among women with short IPI. Alternatively, maternal infections, malaria, iron deficiency anemia, maternal stress or life style compounding to an already nutritionally depleted body may have contributed to these complications.[21,22] Based on the study results an awareness program is needed to raise women knowledge regarding the adverse effects of IPI and the importance of antenatal follow-up.

## Conclusion

Results of present study revealed that a short interpregnancy interval is linked to maternal characteristics and adverse pregnancy outcomes. Spacing pregnancies appropriately could reduce the rate of low birth weight and adverse pregnancy outcomes. There should be a health awareness program on the association between adverse pregnancy outcomes and short and normal birth intervals and on the benefits of optimizing the birth interval.

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