

# Impact of Short Inter Pregnancy Interval on Anemia, Miscarriage and Fetal Low Birth Weight Babies

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## ABSTRACT

**Background:** The interval of time is observed like a modifiable and important risk factor between pregnancies for hostile birth outcomes. The preterm birth incidences, small gestational age birth and LBW (low birth weight) have showed a J shaped strong relation to the interval in between pregnancies.

**Aim:** To determine the frequency of anemia, miscarriage and fetal low birth weight babies in women with short inter pregnancy interval.

**Methodology:** A total of 284 women with gestational age < 20 weeks with parity 1-4 and short inter-pregnancy interval were included in the study. Patients were booked and followed up until the delivery. Pregnancy outcomes (miscarriage, anemia and low birth weight) were noted. The results were statistically analyzed using SPSS v25.0. Qualitative variables were measured in the form of frequencies and percentages. Quantitative variables were measured in the form of Mean±S.D. Chi-square test was applied for stratification. The statistical significance was taken at  $p \leq 0.05$ .

**Results:** Age range in this study was from 20 to 35 years with mean age of  $30.028 \pm 2.24$  years. Miscarriage was seen in 9.2%, Anemia in 75.7% and Low Birth Weight Babies in 7.7%.

**Conclusion:** Short inter-pregnancy interval of less than 6 months is associated with increased risk of adverse maternal and fetal outcomes.

**Keyword:** Short Inter Pregnancy Interval, Maternal Outcomes, Fetal Outcomes

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## INTRODUCTION

The interval of time is observed like a modifiable and important risk factor between pregnancies for hostile birth outcomes. The preterm birth incidences, small gestational age birth and LBW (low birth weight) have showed a J shaped strong relation to the interval in between pregnancies. Classically, short intervals < 6 months and long intervals > 23 months both have higher risks as compared to intermediate intervals of 18-23 months<sup>1</sup>.

The effect of IPI (interpregnancy interval) on outcomes of birth debated vigorously.<sup>2-3</sup> With the support of IPI having a role of casual, the hypothesis of maternal depletion proposed mothers with short IPI recover not properly from stresses of pregnancy and lactation subsequently. A method proposed that the long IPI effects gradually lost previous birth physiological adaptation and mother returns to equivalent position of primigravida also known as hypothesis of physiological regression<sup>4</sup>.

Especially short IPI is connected with risks of infant, perinatal and child mortality, LBW, preterm birth and restriction growth of fetal.<sup>5</sup> In addition to above short IPI linked with maternal anemia, congenital malformation, membrane rupture, previa placenta, abruption placenta and rupture of uterine specially in women that previously cesarean section attempting delivery vaginal.<sup>6</sup> Some bad perinatal outcome like low birth weight and preterm birth are linked with mortality and morbidity for infant and newborn<sup>7</sup>.

In a study by Love ER and his colleagues has found that frequency of low birth weight was 7.15% in women with short inter pregnancy interval.<sup>8</sup> In a study by DeFranco EA and his colleagues has found that frequency of vaginal

delivery was 74.3% in women with short inter pregnancy interval.<sup>9</sup> In a study by DaVanzo J et al. has found that frequency of miscarriage was 8.2%, in women with short inter pregnancy interval.<sup>10</sup> In a study by Dedecker F. has found that frequency of preterm birth was 19% in women with short inter pregnancy interval.<sup>11</sup> Shree R, et al has found the frequency of preterm premature rupture of membranes by 24% in women with short inter pregnancy interval.<sup>12</sup> Al-Mukhtar SH, et al has showed in a study that frequency of maternal anemia was 42% in women with short inter pregnancy interval<sup>13</sup>.

Few studies suggest that short IPI still an predictor of risk of bad birth outcomes [8-13] but other studies suggest bad birth outcomes not due to short IPI in themselves and this one is due to the risk factor of correlated maternal. Moreover no local study has studied PPROM in study variables. These factors prompt me to determine the frequency of maternal and fetal outcomes in women with short inter pregnancy interval in our local population. My study will not only provide the local evidence in this subject but also pave the way for counseling of family planning use to reduces short IPI. So that maternal and fetal outcome could be better in our local population.

The objective of the study was to determine the frequency of anemia, miscarriage and fetal low birth weight babies in women with short inter pregnancy interval

## MATERIALS AND METHODS

This study was conducted from 10<sup>th</sup> October 2018 to 10<sup>th</sup> April 2019 at Department of Obstetrics and Gynaecology, Mian Mola Bakhsh Hospital Sargodha. The inclusion criteria was; Women Age from 20 to 35 years, Singleton pregnancy on ultrasound, Gestational age < 20 weeks on LMP, Parity 1-4 on medical record and Short Inter-pregnancy interval. While exclusion criteria was; History of

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Diabetes, History of Hypertension, History of abortion, History of liver diseases and Lost to follow up.

Base line demographic information of patients (age, parity, gestational age, inter pregnancy interval, weight on weighing machine, height on height scale and BMI (BMI was calculated by using the formula: weight (in kilogram) divided by height (in meters) squared (Kg/m<sup>2</sup>)) was taken. Informed consent was taken from husband/guardian, ensuring confidentiality and fact that there was no risk involved to the patient while taking part in this study. Patients were booked and followed up until the delivery. Patients who did not come back were contacted through their phone numbers, if still they did not come back then they were excluded from study. Pregnancy outcomes (miscarriage, anemia and low birth weight) were noted. Data was analyzed with statistical analysis program SPSS v25.0. Mean±S.D was presented for quantitative variables like age, gestational age, parity, weight, height, BMI and inter-pregnancy interval. Frequency and percentage was computed for age groups, education level of women, miscarriage, anemia and low birth weight. Effect modifiers like age, gestational age, education level of women, parity, BMI and inter-pregnancy interval were controlled by stratification. Post stratification, Chi-Square test was applied and p ≤0.05 was considered statistically significant.

**RESULTS**

Age range in this study was from 20 to 35 years with mean age as 30.02±2.24 years, mean gestational age as 13.80±3.36, mean parity as 1.76±0.92, mean weight as 62.63±5.58 kg, mean height as 1.59±0.06 meters, mean BMI as 24.83±3.26 kg/m<sup>2</sup> and mean inter-pregnancy interval was 4.22±0.90 months. Miscarriage was seen in 9.2% followed by Anemia as 75.7%, and Low Birth Weight as 7.7%.

Table-I: %age and Frequency of patients according to age group

Age (years)	n	%age
20-30	168	59.2
>30	116	40.8
Total	284	100

Table- II: %age and frequency of patients according to education level

Education Level	n	%age
Uneducated	79	27.8
Primary	169	59.5
Secondary	29	10.2
Tertiary	7	2.5
Total	284	100%

Table-III: %age and frequency of patients according to Miscarriage

Miscarriage	n	%age
Yes	26	9.2%
No	258	90.8%
Total	284	100%

Table-IV: %age and Frequency of patients according to Anemia

Anemia	n	%age
Yes	215	75.7
No	69	24.3
Total	284	100

Table-V: %age and frequency of patients according to low birth weight

Low Birth Weight	n	%age
Yes	22	7.7
No	262	92.3
Total	284	100

**DISCUSSION**

The intervals between pregnancies; both long and short linked with risks of many bad maternal and perinatal outcomes like LBW, SGA and death of perinatal. This problem is relevant with clinical and public practices as if long and short IPI independently linked with increased bad risks of maternal and perinatal outcomes<sup>14</sup>. The duration of short IPI is variable in different countries. This may be due to different fertility patterns, population policies, and health services. For example, studies conducted in the United States considered short IPI to be less than 18 months<sup>15</sup>. On the other hand, studies conducted in Africa considered short IPI to be less than 36 months<sup>16</sup>. this is in line with the WHO recommendations<sup>17</sup>.

In this study, short IPI was considered to be less than 6 months. Many studies have found an association between short IPI and adverse neonatal outcomes like still birth, prematurity, LBW, SGA, and early neonatal or even infant mortality<sup>18-21</sup>. The present study, miscarriage was seen in 9.2%, anemia in 75.7% and low birth weight babies were 7.7%.

In a study of Wendt et al<sup>20</sup> meta-analysis divided the prematurity into three categories; extreme prematurity (<33 weeks), moderate prematurity (between 32 and 37 weeks), and all prematurity (<37 weeks). For an IPI of <6 months and extreme preterm birth, the odds ratio (OR) was 1.58 (1.40, 1.78). The meta-analysis for <6 months IPI and all or moderate prematurity had an OR of 1.41 (1.20, 1.65). For an IPI >6 months and extreme prematurity, the OR was 1.23 (1.03, 1.46) whereas for an IPI of >6 months and all or moderate preterm birth, the OR was 1.09 (1.01, 1.18).

Conde-Agudelo et al<sup>18</sup> reported similar results in their meta-analysis of preterm birth. Hogue et al.<sup>21</sup> found that risk of preterm birth was increased by approximately 40% for IPIs of <6 months. Low birth weight is similar to what was found by Van Eijsden et al<sup>22</sup> that stated that each increase in the IPI was associated with an increase in the mean birth weight. Similar findings were also described in studies conducted in Brazil and Iran<sup>23-24</sup> Zhu et al<sup>25</sup> estimated that the population attributed to the risk of LBW associated with IPIs less than 18–23 months was 9.4%.

Conde-Agudelo et al<sup>18</sup> found an increased risk of very LBW (<1,500 g) associated with an IPI of <6 months [OR of 2.01 (1.73, 2.31)] and even with an IPI of 6–11 months [OR of 1.23 (1.12, 1.35)]. Short IPI may give insufficient time to recover from the nutritional burden of pregnancy. Van Eijsden et al<sup>22</sup> suggested that folate depletion contributes to the risk of LBW. As regarded to still birth, the findings of this study revealed an association between long IPI and stillbirth (P = 0.031).

This may agree with what was found by Defranco et al<sup>26</sup> that the lowest frequency of adverse neonatal outcomes occurred at 40–41 weeks for all IPI groups. Moderate evidence was found that an IPI of <12 months increases the risk of still birth, early neonatal death,

preterm birth, and LBW.<sup>27</sup> Overall, the evidence did not present a clear picture of any outcome that was included<sup>27</sup>. Also, a study conducted in Cairo revealed that the higher adverse effects on maternal health were associated with IPI of less than 6 months<sup>28</sup>.

Conde-Agudelo et al<sup>29</sup> reported an increase in the risk of anemia for IPIs < 6 months. The quality of evidence assessing the relationship between IPI and anemia is low.<sup>27</sup> The only significant maternal outcome revealed from this study is the association between IPI and the occurrence of PIH. This study revealed significant association between long IPI and PIH ( $P = 0.031$ ) as 16.7% of the study women with long IPI developed PIH compared to those with short or optimal IPI (7.4% and 5.0%, respectively). Some studies reported an increase in the risk of preeclampsia with increasing IPI between 3 and 7 years. The study done by Shahi and Kamjou<sup>30</sup> identified that the rates of preeclampsia and eclampsia were highest in the pregnant women with an interval of >60 months.

## CONCLUSION

Short IPI of less than 6 months is associated with increased risk of adverse maternal and fetal outcomes. Reducing the risk of adverse perinatal outcomes requires a multidisciplinary approach. Increasing the prevalence of optimal birth spacing through increasing the prevalence of the contraceptive utilization and increasing women awareness may represent an incremental improvement both in maternal and child health as well as community and national welfare.

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