

Short inter-pregnancy interval in multiparous females and impact on preterm delivery

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ABSTRACT

Background: Obstetricians are usually questioned regarding the ideal interpregnancy interval (IPI). Short IPI is reported to be highly correlated with adverse maternal and perinatal consequences, including severe morbidity & mortality. While, long IPI is correlated with high risk of preeclampsia and labor dystocia.

Aim: To determine the frequency of short inter-pregnancy interval in multiparous females of our population and to compare the frequency of preterm birth in females with and without short inter-pregnancy interval.

Methods: This Descriptive Case Series was done at Department of Obstetrics & Gynecology, Fatima Memorial Hospital Lahore from January 2016 to June 2016. Total 285 patients fulfilling the selection criteria were recruited and were assessed for IPI. Females with short IPI (<6 months) were identified and two groups were formed i.e. females with short and normal IPI. Then females were followed-up till delivery.

Results: Mean age of women was 30.15±5.72 years. There were 92(32.3%) women whose IPI was short (<6 months) and the remaining 193(67.7%) women's IPI was normal (>6 Months). 20% of patients delivered before 37 weeks of gestation (57/285). It was observed that women who had short IPI delivered preterm at a rate which was higher as compared to the women who had normal IPI i.e. Preterm Birth: Short IPI: 44.6% vs. Normal IPI: 8.3% (p-value=0.000).

Conclusion: As per findings of this study mothers with short inter-pregnancy interval had increased risk for preterm birth.

Keywords: Multiparous females, Short inter-pregnancy interval, Preterm birth

INTRODUCTION

Preterm delivery is defined as the delivery of fetus before completion of 37 weeks of gestational age. It increases risk of perinatal morbidity and mortality in both developing and developed countries. Short interpregnancy interval (IPI) is considered as one of risk factors for preterm birth.¹ Obstetricians are usually encountered with the question of optimal IPI. Short IPI has been found to be correlated with adverse fetal & maternal consequences, ranging from preterm birth & low birth weight to severe fetal & maternal morbidity & mortality. While Long IPI is correlated with higher chances of complications like preeclampsia and labor dystocia².

It is significant to evaluate whether the short IPI is the significant independent risk factor causing adverse obstetrical events as females can control the birth spacing between two consecutive pregnancies. Thus they can possibly decrease the hazards of such adverse outcomes. Prevention of short IPIs can be attained through provision of contraception after delivery. But averting long IPIs is more challenging since the desired pregnancy may be prohibited due to subfertility, economic issues, accessibility of the partner, or disease³.

Several trials proposed a significant relationship between short IPI and numerous adverse fetal / neonatal outcomes like preterm delivery, low birth weight & small for gestational age fetus^{4,5}. A study conducted by Smith et al., followed up a large cohort and found that there were about 4.8% females who had short interval of two consecutive

pregnancies. Among females with short IPI, there were 4.94% females who underwent preterm birth while among females who had >6 months of IPI, 2.73% females had preterm birth. A short IPI is an independent risk factor for preterm delivery and neonatal death in the second pregnancy⁶.

Rationale of this study is to determine the frequency of short IPI among females presenting for antenatal check during third trimester of pregnancy and its association with preterm birth. It is known and proved that short IPI is significantly associated with preterm birth but controversial literature also exists. On the basis of controversies, this study is aimed to be conducted to assess the trend of IPI among local population and risk of preterm birth among them. Moreover, there is no local evidence available. Through this study we will also be able to get local data on the basis of which, in future, we can recommend females to increase IPI when presenting for antenatal, postnatal checkup or delivery purpose.

The objectives of the study were to determine the frequency of short interpregnancy interval in multiparous females presenting during third trimester of pregnancy in a tertiary care hospital and to compare the frequency of preterm birth in females with and without short interpregnancy interval.

MATERIAL AND METHODS

This descriptive case series was conducted in the Department of Obstetrics & Gynecology, Fatima Memorial Hospital, Lahore for a period of six month from January to June 2016. Sample size of 285 cases was calculated with 95% confidence level, 2.5% margin of error and taking

Received on 26-06-2020

Accepted on 28-10-2020

expected percentage of short interpregnancy interval i.e. 4.8% in multiparous females presenting during third trimester of pregnancy. Non probability, consecutive sampling technique was used.

Sample Selection: Females of age 20-40 years with Parity>1, presenting with singleton pregnancy during third trimester (gestational age>24 weeks) were included. Females with medical conditions like gestational hypertension, preeclampsia or eclampsia, COPD or asthma, cardiac problem, gestational or chronic diabetes, deranged LFT and RFT, congenital anomaly or fetal complication like SGA, oligohydramnios (AFI<5cm) or polyhydramnios (AFI>11cm), placenta previa or placental abruption on ultrasound and low maternal BMI, genital tract infection and UTIs were excluded.

Data Collection Procedure: 285 patients fulfilling the selection criteria were included in this study. An informed consent and demographics were noted. Then females were assessed for IPI. Frequency of females with short IPI (<6 months) was calculated. Short Interpregnancy Interval was defined as if duration between immediate preceding delivery and conception of the index pregnancy is <6 months (conception date was estimated through LMP). Then two groups were formed i.e. females with short IPI and normal IPI (>6months interval). Then females were followed-up till delivery. On delivery, gestational age was observed and if delivery occurred before 37 weeks, then preterm birth was labeled (if female delivered before term <37 weeks of gestation as per LMP). All the data was collected on proforma.

Data Analysis: All the data was entered and analyzed through SPSS v.22. Frequency of short IPI and preterm birth were calculated. Frequency of preterm birth was compared in both with and without short IPI groups. P-value≤0.05 was considered as significant.

RESULTS

Mean age of women was 30.15±5.72 years. There were 48(16.8%) women whose parity was 1, 105(36.8%) women with parity 2, 59(20.7%) women with parity 3, 31(10.9%) women with parity 4 and 42(14.7%) women with parity 5. Mean gestational age was 29.48±2.92 weeks (Table 1). There were 92(32.3%) women whose IPI was short (<6 months) and 193(67.7%) women's IPI had normal (>6 Months). Mean gestational age of women at the time of delivery was 38.18±2.27 weeks. There were 57 (20%) females who delivered preterm (Table 2).

It was observed that women who had short IPI among them frequency of preterm birth was higher as compared to the women who had normal IPI i.e. Preterm Birth: Short IPI: 44.6% vs. Normal IPI: 8.3% (p-value=0.000) (Table 3).

Table 1: Demographics of females

n	285
Age (yeas)	30.15±5.72
1	48 (16.8%)
2	105 (36.8%)
3	59 (20.7%)
4	31 (10.9%)
5	42 (14.7%)
Gestational Age (weeks) at presentation	29.48±2.92

Table-2: Outcome of the study

Short IPI (< 6 Months)	92 (32.3%)
Normal IPI (>6 Months)	193 (67.7%)
Gestational Age (weeks) at delivery	38.18±2.27
Preterm Birth	57 (20%)

Table-3: Comparison of preterm birth in females with short versus normal IPI

Preterm Birth	Inter-pregnancy interval		Total
	Short	Normal	
Yes	41(44.6%)	16(8.3%)	57
No	51(55.4%)	177(91.7%)	228
Total	92	193	285

Chi-Square test= 51.23, p-value= 0.000

DISCUSSION

The interval between two consecutive pregnancies is found to be an important, however, modifiable risk factor for adverse obstetrical outcome. The incidences of adverse neonatal outcome are observed repeatedly to follow the strong J-shaped relation with IPI between two consecutive pregnancies. Naturally, short IPIs (<18months between two consecutive pregnancies) and long intervals (>23months) have higher chances of such obstetrical birth outcomes than intermediate IPIs of duration 18-23 months⁷⁻¹⁰.

In this study frequency of short IPI was seen in 92(32.2%) women. Frequency of PTB was 20% (57/285). However women who had short IPI, among them 41(44.6%) had preterm birth. Teresa Rodrigues in his study reported the significant association of short IPI with PTB (odds ratio = 3.9; 95% CI;1.91–8.10). Short IPI was noted in 22% of early preterm cases, 5.3% late preterm while 6.7% in term deliveries.¹¹ Yaara Bentolilla examined the effect of IPI on outcomes of pregnancy after recurrent pregnancy loss. As per his findings pre term birth was seen in 12% women with short IPI¹². In one meta-analysis, the IPI <6 months was found to raise the risk of preterm birth by 40%⁷. Afterwards, next published literature confirmed the above stated findings¹³⁻¹⁶. One study concluded that the IPIs <6 months & 6-12months were significantly associated with an higher risk of preterm birth (adjusted odds ratio:1.4)¹³.

Another study found that the odds ratio of preterm birth with IPI <6 months was =1.58¹⁴. When only spontaneous preterm births were measured, females having IPI <6months were at 3.6 fold higher risk of early spontaneous preterm birth (<34weeks)¹¹. Late spontaneous preterm birth (34-36weeks) was not associated with short IPI. Short IPI (<6 months) was associated positively with preterm delivery¹⁷. Later on, Rodrigues and Barros also described that the risk of preterm birth is three time more among females who had <6 months of IPI¹⁸. Stamilio et al., also found that the frequency of preterm birth was 9.1% with IPI<6 months while 7.8% with IPI>6 months¹⁹. But a recent study found that women with an IPI<6 months were less likely to have preterm delivery (before 36 weeks) i.e., 7.2% as compared to females having IPI>6 months i.e., 8.9% (P-value<0.01)²⁰.

Studies which have considered lower risk women as study population, have observed mainly modest to moderate rise in preterm birth risk for short IPI^{21,22}. Many studies proposed that the association of short IPI with preterm birth fluctuate between different populations,

relying on the socioeconomic & cultural growth. Mostly, the studies which were conducted in low-income countries or in black populations, reported the raised hazard of preterm delivery due to short IPI.²³ The underlying effects of short IPI on the delivery outcomes have been discussed dynamically^{24,25,26}.

Supporting the causal role of short IPI, “maternal depletion hypothesis” intends that females having short IPI recover inadequately from the physiological strains of previous gestation and following lactation^{24,27}. A phenomena proposed for the effect of long IPI is that the benefits of the previous delivery in terms of physiological adaptation are progressively lost, as though the female returns to an equivalent state of primigravida. This stage is called as “physiological regression hypothesis.”^{7,21}

Combination of these hypotheses, suggest the need of optimal IPI that gives enough period for retrieval from previous delivery but must not be so long that the profits of revision are vanished. The substitute opinion is that the IPI is not contributory, and that relation between IPI & delivery outcomes is totally because of maternal factors which are associated with IPI and delivery outcome in question²⁸. Another probable clarification of this association between short IPI & early preterm, but not late, would be hypothesized that short IPIs are more associated with preterm birth because of genital infections. But, this hypothesis requires further research regarding the association of short IPI with genital infections and also the effect and association of these genital infections with preterm birth¹¹.

CONCLUSION

As per findings of this study, mothers with short inter-pregnancy interval have risk of preterm birth. Educating the females about the risks and hazards of short IPI and perinatal & maternal outcomes can help in promotion of use of contraceptive methods and perinatal outcomes can be improved with adequate IPI in two consecutive pregnancies. We can develop our local guidelines for prenatal care for women with different IPIs. The specific risks of short as well as of long IPIs must be considered carefully when managing these pregnancies.

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