

Effect of inter-pregnancy interval on maternal and fetal outcome

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ABSTRACT

Aims: To explore the impact of inter-pregnancy interval on maternal and fetal health

Methods: Descriptive cross sectional study conducted at Department of Obstetrics and Gynaecology, Manipal Teaching hospital, Pokhara, Nepal. Inter-pregnancy interval (IPI) was calculated as the time elapsed between the woman's last delivery and the date of last menstrual period for the present second or higher order birth. Intervals were taken in weeks and then converted to months. IPI were categorized as <18months, 18-23, 24-59, >59 months.

Results: Among the 550 pregnancies studied, the majority (57%) of them had an IPI of more than 59 months. Long IPI of >59 months had increased risk of maternal complications like preeclampsia (12.4%), postdate pregnancy (10.8%), PROM (4.4%), oligohydramnios (3.8%), placenta previa (2.5%), gestational diabetes mellitus (2.2%), chronic hypertension (1.5%), abruptio placenta (0.3%), IUFD (0.6%) and overt DM (0.3%). Increased preterm birth was seen in IPI <18 months (25%). Short IPI had also increased risk of IUGR (8.3%) and anaemia. Adverse maternal outcome was least when IPI was between 18-23 months.

Conclusions: IPI shorter than 18 months and longer than 59 months were associated with increased risk of adverse maternal and perinatal outcomes.

Keywords: fetal, inter-pregnancy, interval

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INTRODUCTION

The optimal time to conceive another pregnancy is one of the frequently asked questions to an obstetrician. The time between the end of a pregnancy and the start of another is defined as inter-pregnancy interval (IPI).¹ As per WHO, after a live birth, the recommended interval before attempting the next pregnancy is at least 24 months in order to reduce the risk of adverse maternal, perinatal and infant outcomes.²

Studies showed that intervals of less than 18 and greater than 59 months were associated with higher risks of preterm, low-birth-weight and small for gestational age babies.³ Women in high resource nations are increasingly delaying childbearing which poses challenges for spacing of pregnancies.⁴ Short IPI increases the risk of premature rupture of membrane (PROM), placental abruption, placenta

praevia, uterine rupture (for women who previously delivered by caesarean section) and gestational diabetes (GDM).⁵⁻¹⁰ Similarly, long IPIs have been associated with increased risk of pre-eclampsia and labour dystocia.¹¹⁻¹³

The effect of IPI on maternal and fetal health has not received much attention in our settings. So this study may be helpful in counselling couples for planning an optimal time to conceive another pregnancy in order to have the best possible pregnancy outcomes.

METHODS

This is an observational cross sectional study conducted at department of Obstetrics and Gynaecology, Manipal Teaching Hospital, Pokhara, Nepal from August 2018 to February 2020 after IRC approval from the institution and consent from patients. Cases

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with two or more consecutive pregnancies, previous live baby and singleton pregnancy were included; and multifetal pregnancy and history of miscarriage prior to index pregnancy were excluded.

Inter-pregnancy interval was calculated as the time elapsed between the woman's last delivery and the date of last menstrual period; and categorized as shorter to longer intervals <18, 18-23, 24-59 and >59 months. Variables studied were age at conception of the index pregnancy, number of prior births and period of gestation, mode of delivery; preeclampsia, eclampsia, placenta previa, abruption placenta, PROM, GDM, post-dated pregnancy, anaemia, postpartum haemorrhage and postpartum psychosis; and preterm birth, low birth weight, Apgar score at five minute, neonatal intensive care unit (NICU) admission and neonatal mortality. The data were recorded in a predesigned proforma and entered in excel sheet. The analysis was done using statistical package for social sciences (SPSS) version 16.

RESULTS

There were 550 pregnancies in the study and the majority had inter-pregnancy interval of 5 years or more with less in less than 18 months; 18% (56) had preterm delivery in long spacing where as 25% in short interval [Table-1].

Table-1: Inter-pregnancy intervals (IPI) by age group, parity and period of gestation

IPI in months		<18 (n=12; 2%)	18-23 (n=37; 7%)	24-59 (n=187; 34%)	>59 (n=314; 57%)
Age in years	<19	2	0	2	0
	20-34	9	31	163	258
	>35	1	6	22	56
Previous birth	1	11	29	138	214
	2	1	5	40	80
	>3	0	3	9	20
Period of gestation in weeks	<32	1	0	4	15
	32-36	2	2	22	41
	37-40	7	23	129	172
	>40	2	12	32	86

Compared to mothers with Inter-pregnancy interval of 18-23 months, long IPI of >59 months had

increased risk of preeclampsia (OR=11.1; 95% CI= 0.6-185.3), chronic hypertension (OR=1.3; 95% CI=0.07-24.5) and third trimester bleeding (OR=2.3; 95% CI=0.1-40). GDM was more common in long spacing of more than 59 months (OR=1.82; 95% CI=0.1-32.6). Increased preterm birth was seen in IPI <18 months (OR=11.1; 95% CI=0.6-185.3). Short IPI had also increased risk of anaemia (OR=27.6; 95% CI=1.3-582) and IUGR (OR=9.7; 95% CI=0.3-256) [Table-2].

Table-2: Antepartum complications with Inter-pregnancy interval

IPI in months	<18 (n=12; 2%)	18-23 (n=37; 7%)	24-59 (n=187; 34%)	>59 (n=314; 57%)
Preeclampsia	0	0	12(6.4%)	39(12.4%)
Eclampsia	0	0	1(0.5%)	1(0.3%)
Chronic HTN	0	0	2(1.06%)	5(1.59%)
Placenta Previa	0	0	4(2.1%)	8(2.5%)
Abruptio placenta	0	0	0	1(0.3%)
Overt DM	0	0	0	1(0.3%)
GDM	0	0	1(0.5%)	7(2.2%)
Preterm labour	3(25%)	2(5.4%)	26(13.9%)	56(17.8%)
PROM	0	1(2.7%)	6(3.2%)	14(4.4%)
Oligohydramnios	0	0	5(2.6%)	12(3.8%)
Postdate	0	3(8.1%)	13(6.9%)	34(10.8%)
IUGR	1(8.3%)	1(2.7%)	7(3.7%)	7(2.2%)
Anaemia	3(25%)	0	0	0
IUFD	0	0	0	2(0.6%)
Ruptured uterus	0	0	1(0.5%)	0

Caesarean section rate was increasing with increasing birth spacing. Indications were non progress of labour, previous LSCS, severe preeclampsia and antepartum haemorrhage. [Table-3].

Table-3: Mode of delivery by IPI

IPI in months	<18 (n=12; 2%)	18-23 (n=37; 7%)	24-59 (n=187; 34%)	>59 (n=314; 57%)
Vaginal	10 (83.3%)	31 (83.7%)	112 (59.8%)	182 (57.9%)
LSCS	2 (16.6%)	6 (16.2%)	75 (40.2%)	132 (42.1%)

Postpartum Haemorrhage was more in women with short IPI (8.3%). Two women (0.6%) with long IPI had peripartum hysterectomy [Table-4].

Table-4: Postpartum complications by inter-pregnancy interval

IPI in months	<18 (n=12; 2%)	18-23 (n=37; 7%)	24-59 (n=187; 34%)	>59 (n=314; 57%)
PPH	1 (8.3%)	1(2.7%)	5(2.6%)	3(0.9%)
Hysterectomy	0	0	1(0.5%)	2(0.6%)
UTI	0	0	5(2.6%)	5(1.5%)
Psychosis	0	0	0	1(0.3%)

Risk of low birth weight (<2500 g) babies was higher in short inter-pregnancy interval of less than 18 months (OR=8.7; 95% CI=1.3-56.3) and lowest in 18– 23 months interval. NICU admission was also more in <18 months (OR=15; 95% CI=0.6-334) [Table-5].

Table-5: Neonatal outcomes by inter-pregnancy intervals

IPI in months	<18 (n=12; 2%)	18-23 (n=37; 7%)	24-59 (n=187; 34%)	>59 (n=314; 57%)
Morbidity	NICU	2 (16.6%)	0	16 (8.5%) 39 (12.4%)
	IUFD	0	0	0 6(1.9%)
	NND	0	0	1(0.5) 0
Apgar score (<7)	1-min	1 (8.3%)	1 (2.7%)	22 (11.7%) 34 (10.8%)
	5-min	1 (8.3%)	0	7 (3.7%) 17 (5.4%)
Anomaly	0	0	0	4(1.27%)
Fetal weight (kg)	<2.5	4 (33.3%)	2 (5.4%)	32 (17.1%) 56 (17.8%)
	2.5-4	7 (58.3%)	35 (94.5%)	149 (79.6%) 250 (79.6%)
	>4	1 (8.3%)	0	6 (3.2%) 8(2.5%)

DISCUSSION

In our study, the majority 314 (57%) of patients had an inter pregnancy interval of more than 59 months. Long IPI may be due to economic issues or unavailability of partner due to migration for foreign

employment. Long IPI of >59 months had increased risk of maternal complications like preeclampsia (12.4%), chronic hypertension(1.5%), placenta previa (2.5%), abruptio placenta(0.3%), PROM (4.4%), oligohydramnios (3.8%), postdate pregnancy (10.8%) and IUFD (0.6%). This may be possible due to the physiological regression hypothesis that perinatal outcomes for infants conceived after an excessively long inter-pregnancy interval are similar to infants born to primigravida women.¹⁴ The rates of pre-eclampsia, eclampsia and gestational diabetes mellitus were highest among women with intervals longer than 59 months. A slight increase in the rates of third trimester bleeding was also seen in women with this inter-pregnancy interval.¹⁵ Similar findings were seen in our study. Gestational diabetes mellitus was more common among mothers with IPI of more than 59 months (2.2%) similar to the findings of Gebremedhin AT et al.¹⁶

Increased preterm birth was seen in IPI <18 months (25%). Short IPI had also increased risk of IUGR (8.3%) and anaemia (25%) which may be explained by the folate depletion hypothesis. Woman who conceives before restoration of folate, erythrocytes has higher risks of preterm birth, IUGR and anaemia.¹⁷ Similar findings of increased preterm birth and IUGR were seen in the study done by Smith GC et al.¹⁸

Of the new-born babies the risk of low birth weight was higher among mothers who had short inter-pregnancy interval of less than 18 months (33.3%). NICU admissions were more when IPI was <18 months (16.6%) most probably due to preterm births and IUGR babies.

This is similar to the study done by Bener A et al that women with short birth intervals are at increased risk of low birth weight.¹⁹ The explanation is the maternal nutritional depletion hypotheses that close succession of pregnancies and lactation worsens the maternal nutritional status as there is lesser time to recover from the physiological stresses of the preceding pregnancy before she is subjected to the stress of the next.²⁰ In cases of low birth weight babies, mothers with a birth interval of 18-23 months had the lowest risk (5.4%). Zhu BP et al have revealed an apparent optimal inter-pregnancy interval of 18-23 months.²¹

Caesarean Section increased with inter-pregnancy interval in our study with 16.6% of women delivering

by LSCS with IPI <18 months which increased to >42.1% in IPI >59 months indications being non progress of labour, previous LSCS, severe preeclampsia and antepartum haemorrhage. Labour dystocia was increased with inter-pregnancy interval in the study done by Zhu BP et al.¹³ Adverse maternal and fetal outcome was least when IPI was between 18-23 months.^{15, 21-23}

CONCLUSIONS

Inter-pregnancy interval shorter than 18 months had higher risk of preterm, anemia, IUGR, low birth weight and NICU admission whereas longer than 59 months had higher risk of hypertension, GDM and APH. Increasing birth spacing had increased proportion of Cesarean Section.

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