

Effect of inter-pregnancy interval on fetomaternal outcome in the current pregnancy- An observational analysis

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Abstract

Background: Interpregnancy interval (time between the date of a live birth and the commencement of the subsequent pregnancy) has been found to be of utmost importance in perinatal and maternal health outcomes. Both long (>5 years) and short (<18 months) interpregnancy intervals are associated with poor perinatal and maternal health outcomes. The present study was conducted with an aim to create awareness about the importance of interpregnancy interval and utilization of contraceptive services.

Material & Methods: The present prospective, observational study was conducted during a 6 months period. Multigravida women with post-interval pregnancies and abortions were included in the study. Awareness regarding interpregnancy interval and contraception was assessed. These women were counselled about the importance of interpregnancy interval and various methods of contraception. Pearson chi-square test was applied to find out the association

between two non-parametric variables. A P value of < 0.05 was taken as statistically significant.

Results: A total of 160 multigravida women with a mean age of 27.06 ± 5.08 years were enrolled. Majority of the women were in interpregnancy interval less than 18 months and >24-<60 months. Anemia, intrauterine growth restriction, post datism, preterm labour was associated with interpregnancy interval ($P<0.05$). Prevalence of low birth weight and NICU admission was higher in 6-12 months and >24-<60 months interpregnancy interval and was associated with interpregnancy interval ($P<0.05$). Except for anemia, no other complication was seen in the 19-24 months interpregnancy interval. Majority of the women underwent cesarean section delivery. Very few women were knowing about lactational amenorrhea and advantages of exclusive breastfeeding.

Conclusion: Short interpregnancy interval was associated with higher prevalence of anemia and its related fetal complications, while in >24-<60 months

interpregnancy interval higher prevalence of NICU admissions was seen. Interpregnancy interval of 19-24 months was found to be ideal with minimal complications and better maternal and fetal outcomes.

Keywords: Interpregnancy interval, maternal and fetal outcome, multigravida women with post-interval pregnancy, utilization of contraceptive services

Introduction

The time between the date of a live birth and the commencement of the subsequent pregnancy is referred to as the interpregnancy interval (IPI). According to research, both lengthy (>5 years) and short (<18 months) interpregnancy intervals are associated with an increased risk of unfavorable pregnancy and perinatal outcome.[1] Birth-to-pregnancy intervals of six months or less are linked to an increased risk of maternal death. Birth-to-pregnancy intervals of 18 months or less are linked to an increased risk of newborn, neonatal, and perinatal mortality, as well as low birth weight, small size for gestational age, and pre-term delivery. Trying to conceive after a live delivery for 24 months will help in avoiding the birth-to-pregnancy intervals linked with the highest risk of poor maternal, perinatal, neonatal, and baby health outcomes.[2]

According to WHO and the American College of Obstetrics & Gynaecology, in order to reduce the risk, an interval of at least 2 years and a minimum of 18 months following a live birth, respectively.[1]

Studies have shown an association between short interpregnancy interval and risk of premature rupture of membrane (PROM),[3] placental abruption, placenta previa,[4] uterine rupture for women who previously delivered by caesarean section.[5] Similarly, long interpregnancy interval have been associated with increased risk of pre-eclampsia [6] and labor dystocia.

Interpregnancy interval has been seen as a modifiable risk factor for adverse maternal and perinatal outcomes for planned pregnancies.[1]

Indian studies are lacking on this subject hence, the present research was undertaken with an aim to assess the relationship between interpregnancy interval and perinatal and maternal health outcomes in women of reproductive age group. By this study, we also aim to create awareness about the importance of interpregnancy interval and utilization of contraceptive services.

Material & methods

The present prospective, observational study was conducted in the Department of Obstetrics & Gynaecology, J.K. Hospital, Bhopal (M.P.) during a period of 6 months on all the multigravida patients admitted in the labor room of our institution.

The inclusion criterion was all admitted multigravida woman with post-interval pregnancies, abortions both spontaneous or induced. Those not willing to provide voluntary written informed consent to participate in the study were excluded from the study.

All the enrolled women, underwent thorough general and physical examination. A detailed history relevant to the current pregnancy was noted. History of previous childbirth, maternal and child condition, mode of delivery was noted. Method of contraception used was also inquired for.

These women were asked about their awareness regarding interpregnancy interval and contraception.

All the enrolled women were followed-up till their delivery. After the delivery, fetal complications like preterm birth, intrauterine growth restriction (IUGR), neonatal sepsis, low birth weight were noted. Maternal complications during labour like prolonged labor, precipitate labor, cervical dystocia and postpartum

complications like PPH, sepsis, urinary tract infection (UTI), fever, anemia were noted.

All these women were counselled about the importance of interpregnancy interval, and different methods of contraception and encouraged to adopt any. Women were made aware of lactational amenorrhea and advantages of exclusive breastfeeding both for mother and the baby.

A customized proforma was used for collecting the data. Data was analysed using online statistical software GraphPad and Epi Info. Descriptive statistics was presented in the form of numbers and percentages. Pearson Chi-square test was applied to find out the association between two non-parametric variables. A p value of <0.05 was taken as statistically significant.

The study was initiated after obtaining the permission from the institutional ethics committee. All the rights of the women were protected and they were informed about their rights during the study, including the right to withdraw from the study at any stage without being questioned for. No additional investigations / tests were performed for the specific requirement of the study. All the study related expenses were borne by the researcher.

Results

We had included 160 multigravida women in the present study. Majority of women were in the age group 21-25 years and 26-30 years. The mean age of the women was 27.06 ± 5.08 years (range: 18 to 38 years).

All the women were categorized into various interpregnancy intervals. 27 (16.9%) women were in the interpregnancy interval of 6-12 months, 27 (16.9%) were in 13-18 months interval, 12 (7.5%) were in the 19-24 months interval and 94 (58.8%) women in the interpregnancy interval of >24-<60 months.

Anemia was seen in 29 (18.1%) women, intrauterine growth restriction in 29 (18.1%), post-datism in 16 (10%), preterm labour in 16 (10%), gestational diabetes mellitus in 15 (9.4%), pregnancy induced hypertension in 15 (9.4%), premature rupture of membranes in 8 (5%), oligohydramnios in 5 (3.1%), polyhydramnios in 4 (2.5%), overt diabetes mellitus in 4 (2.5%), placenta previa in 3 (1.9%), threatened abortion in 3 (1.9%) and abruptio placenta in 1 (0.6%). In 53 (33.1%) women there were no complications.

Table 1: Complications seen in the study subjects

Complication	Number	Percentage
No complications	53	33.1
Anemia	29	18.1
Intrauterine growth restriction	29	18.1
Postdatism	16	10.0
Preterm labour	16	10.0
Gestational diabetes mellitus	15	9.4
Pregnancy Induced Hypertension	15	9.4
Premature rupture of membrane	8	5.0
Oligohydramnios	5	3.1
Polyhydramnios	4	2.5
Overt diabetes mellitus	4	2.5
Placenta previa	3	1.9
Threatened abortion	3	1.9
Abruptio placenta	1	0.6
Intrauterine fetal demise	0	0.0

Anemia, intrauterine growth restriction, oligohydramnios and preterm labour, premature rupture of membrane, placenta previa and threated abortion were more common in 6-12 months interpregnancy interval, while abruptio placenta, gestational diabetes mellitus,

polyhydramnios, overt diabetes mellitus, pregnancy induced hypertension, postdatism, were more common in >24-<60 months interpregnancy interval. We found a

statistically significant association between anemia, IUGR, postdatism, preterm labour and interpregnancy interval (P<0.05). (Table 2)

Table 2: Association between complications and interpregnancy interval

Complication	Interpregnancy Interval				χ ² value	P value
	6-12 months	13-18 months	19-24 months	>24-<60 months		
Abruptio placenta	0 0.0%	0 0.0%	0 0.0%	1 100%	0.707, df=3	0.872, NS
Anemia	17 58.6%	2 6.9%	1 3.4%	9 31%	44.075, df=3	0.001*
Gestational diabetes mellitus	1 6.7%	4 26.7%	0 0.0%	10 66.7%	3.380, df=3	0.337, NS
Intrauterine growth restriction	16 55.2%	1 3.4%	0 0.0%	12 41.4%	39.045, df=3	0.001*
Polyhydramnios	0 0.0%	1 25%	0 0.0%	3 75%	1.345, df=3	0.719, NS
Oligohydramnios	3 60%	0 0.0%	0 0.0%	2 40%	7.255, df=3	0.064, NS
Overt diabetes mellitus	0 0.0%	1 25%	0 0.0%	3 75%	1.345, df=3	0.719, NS
Pregnancy induced hypertension	5 33.3%	2 13.3%	0 0.0%	8 53.3%	4.104, df=3	0.250, NS
Postdatism	0 0.0%	1 6.3%	0 0.0%	15 93.8%	9.229, df=3	0.026*
Placenta previa	3 100.0%	0 0.0%	0 0.0%	0 0.0%	2.147, df=3	0.543, NS
Preterm labour	13 81.3%	2 12.5%	0 0.0%	1 6.3%	53.534, df=3	0.001*
Premature rupture of membrane	5 62.5%	3 37.5%	0 0.0%	0 0.0%	4.196, df=3	0.241, NS
Threatened abortion	3 100.0%	0 0.0%	0 0.0%	0 0.0%	2.147, df=3	0.543, NS

Pearson Chi-square test applied. P value <0.05 was taken as statistically significant

116 (72.5%) newborns had normal birth weight, while 44 (27.5%) newborns had a birth weight less than 2.5 kg. Low birth weight prevalence was higher in

Table 3: Association between birth weight and interpregnancy interval

Birth weight	Interpregnancy Interval				χ^2 value	P value
	6-12 months	13-18 months	19-24 months	>24-<60 months		
LBW	24 54.5%	5 11.4%	1 2.3%	14 31.8%	61.832, df=3	0.001*
Normal birth weight	3 2.6%	22 19%	11 9.5%	80 69%		

Pearson Chi-square test applied. P value <0.05 was taken as statistically significant

NICU admission was required in 56 (35%) neonates and 104 (65%) neonates were at mothers' side. The prevalence of NICU admission was highest in

Table 4: Association between NICU admission and interpregnancy interval

NICU Admission	Interpregnancy Interval				χ^2 value	P value
	6-12 months	13-18 months	19-24 months	>24-<60 months		
Required	15 26.8%	5 8.9%	2 3.6%	34 60.7%	10.068, df=3	0.018*
Not Required	12 11.5%	22 21.2%	10 9.6%	60 57.7%		

Pearson Chi-square test applied. P value <0.05 was taken as statistically significant

76 (47.5%) women underwent full term normal vaginal delivery and 84 (52.5%) women underwent lower segment caesarean section. We found no significant association between mode of delivery and interpregnancy interval (P=0.309).

Only 30% of women used contraceptive methods in the form of either barrier and hormonal. Few used IUCD's. These women had adequate birth spacing and few antenatal complications.

interpregnancy interval of 6-12 months, while normal birth weight was more prevalent in >24-<60 months interpregnancy interval (P=0.001), showing that birth weight is affected by interpregnancy interval. (Table 3)

interpregnancy interval of >24 months due to associated complications of postdatism and anemia and lowest in interpregnancy interval of 19-24 months. There was a significant association between NICU admission and interpregnancy interval (P=0.018). (Table 4)

Less than 10% of women knows about lactational amenorrhea and advantages of exclusive breast feeding.

Discussion

In the present study, from the analysis of 160 multigravida women, we found that both 6-12 months and >24-<60 months intervals have a negative impact on the maternal and fetal outcome.

We had included women of reproductive age group with a mean age of 27.06 ± 5.08 years and majority of these women were in the age group of 21-30 years.

16.9% women conceived in the interpregnancy interval of 6-12 months, 16.9% between 13-18 months, 7.5% between 19-24 months and 58.8% women in the interpregnancy interval of >24-<60 months. In the study done by Chandna et al. [7] 23.8% conceived within 6 months, 29% between 6-12 months, 13.9% between 13-18 months, 14.7% between 19-24 months and 18.6% after 24 months, which supports our findings.

The prevalence of gestational diabetes mellitus, polyhydramnios, overt diabetes mellitus, pregnancy induced hypertension, postdatism, placenta previa, abruptio placenta, premature rupture of membrane and threatened abortion was highest in >24-<60 months interpregnancy interval; while anemia, intrauterine growth restriction, oligohydramnios and preterm labour prevalence was highest in 6-12 months interpregnancy interval. Chandna et al. [7] in their study reported that threatened miscarriage, PROM, diabetes, preeclampsia, preterm delivery and placental abruption are more in late conception (>24 months), which is also seen in our study, except for preterm labour which was higher in 6-12 months interpregnancy interval in the present study. While the study done by Hanley et al. [8] reported higher prevalence of gestational diabetes mellitus in short interpregnancy interval, which is contradictory to our finding. Conde-Agudelo et al. [9] also found significantly higher risk of preeclampsia in interpregnancy interval of more than 59 months, which supports our findings.

In the interpregnancy interval of 19-24 months, we did not find any significant complications except anemia, which was seen in only one woman. The prevalence of these complications was little higher in interpregnancy interval of 13-18 months.

Preterm labour was most common in interpregnancy interval of 6-12 months, compared to other interpregnancy intervals.

The prevalence of low birth weight (< 2.5 kg) was highest in both 6-12 months and >24-<60 months interpregnancy intervals compared to other interpregnancy intervals, and was lowest in 19-24 months interpregnancy interval. Lewis et al. [10] in their study reported a higher prevalence of low birth weight in short interpregnancy interval, which is similar to our findings. They also reported a higher incidence of anemia in these women, which also corroborates with our study findings, while they found PROM prevalence higher in short interpregnancy interval, which is contradictory to our findings as we found a higher prevalence in >24-<60 months interpregnancy interval.

The similar trend was seen in NICU admissions where prevalence was highest in 6-12 months and >24-<60 months interpregnancy intervals and least in the interpregnancy interval of 19-24 months, which is also as per study of Chandna et al. [7], where higher NICU admissions was seen in >24 months interpregnancy interval.

The rate of caesarean section was highest in >24 months interpregnancy interval and lowest in 19-24 months interval. Although we did not find any association between interpregnancy interval and mode of delivery. Our study findings are supported by Chandna et al. [7] who also found a higher prevalence of caesarean section in interpregnancy interval of more than 24 months.

We found that both 6-12 months and >24-<60 months interpregnancy intervals have adverse maternal and fetal outcomes, and interpregnancy interval of 19-24 months is found to be the most appropriate time interval for conception with least adverse events. Study done by

DeFranco et al. [11] reported lowest frequency of neonatal morbidity in the interpregnancy interval of 12 to <24 months, compared to other intervals, which also supports our findings.

The limitation of the present study was that of limited data and inclusion of details of newborn like Apgar score.

Conclusion

Interpregnancy interval has a major role in the prediction of both maternal and fetal outcome. In short interpregnancy interval prevalence of anemia and its related complications on fetus, was highest; while in >24-<60 months interpregnancy interval prevalence of age-related complications and its effect on pregnancy is more which led to higher NICU admission.

In the present study, we found that ideal interpregnancy interval is 19-24 months with minimal complications and better maternal and fetal outcome.

It is imperative that all women should be made aware of the importance of optimal interpregnancy interval and different contraceptive methods and encourage to adopt appropriate contraceptive methods to postpone the conception till appropriate time.

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