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Original Research Article

Contraceptive trends and fetal outcome in women with short and long interpregnancy interval: a prospective observational study

Shreya S. Mor[1]*, Preeti F. Lewis[2], Nitin Bavdekar[3]

[1]Department of Obstetrics and Gynecology, Mahatma Gandhi Institute of Medical Sciences, Sevgaram, Maharashtra, India
[2]Department of Obstetrics and Gynecology, Grant Govt. Medical College and Sir J. J. Group of Hospitals, Mumbai, Maharashtra, India
[3]Taluka Health Officer, Directorate of Health Services, Maharashtra, India

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***Correspondence:**
Dr. Shreya S. Mor,
E-mail: shreyamor74@gmail.com

ABSTRACT

Background: The present study was conducted at our tertiary health centre with the objective of analyzing contraceptive trends and fetal outcome in women with various interpregnancy interval (IPI).
Methods: The present study was a prospective observational study. Women were segregated into three categories as per their IPI (short, normal and long) and contraceptive trends and fetal outcome were deliberated. All women attending ANC clinic with previous pregnancy, regardless of outcome and registration status were included in our study.
Results: We found that 21.1% of women with short IPI were unaware about contraception and this difference was statistically significant. It was seen that among women not using any method of contraception, majority had short ICP, almost 31.1% cases. This difference was also statistically significant. Amidst those with adverse outcomes of previous pregnancy, i.e. 169 cases, 87 cases i.e. 51.5% of the women conceived within 2 years. Short IPI is linked with an escalated risk of low birth weight, preterm birth and congenital anomaly whereas long IPI caused large for gestational age babies.
Conclusions: Contraception and previous pregnancy outcome have a significant effect on interpregnancy interval which in turn affects the maternal and fetal outcome. So it is essential to maintain an optimum interpregnancy interval as most of these complications are avoidable. Short interpregnancy interval is associated with low birth weight, preterm and congenital anomaly whereas long interpregnancy interval is associated with large for gestational age babies.

Keywords: Chi square test, Contraception, Interpregnancy interval, Large for gestational age, Low birth weight, preterm

INTRODUCTION

Pregnancy spacing refers to the practice of maintaining an interval between births of two or more years. There are three important definitions in relation to pregnancy spacing. Interpregnancy interval is defined as the period between delivery of previous infant and conception of current pregnancy.[1] Birth Interval is the time elapsed between the woman's last delivery and birth of index child. Recuperative interval is the amount of time the woman is neither lactating nor pregnant.[2]

Researchers found that infants born to women who conceived less than six months after giving birth had a 40% increased risk for being born prematurely and a 61% increased risk of low birth weight, compared with infants born to mothers who waited 18 months to two years between pregnancies. Babies whose mothers had their previous child at least five years earlier had a 20% to 43% greater risk for

being born prematurely, having a low birth weight or being small for their gestational age.[3] The risk for preterm birth, low birth weight, and small size for gestational age increased by 1.9%, 3.3%, and 1.5%, respectively, each month that the time between pregnancies was shortened from 18 months. For each month between pregnancies longer than five years, the risk for these adverse outcomes increased by 0.6% to 0.9%. Very short birth interval (<15months) are associated with a very substantial increase in the risk of abortion and miscarriage.[4]

Family planning in India

In emerging nations, 222 million women of reproductive age who do not desire pregnancy are not using any modern contraceptive method. Family planning and contraception services by preventing unintended pregnancy reduce the need for unsafe abortion and hence prevent deaths of mother and child.[5] In absolute numbers, the number of women using modern contraceptive methods has doubled, from 58 million in 1990, to 124 million in 2015.[6] The unmet need for modern methods has decreased from 25.4% in 1990 to 20.4% in 2015, while the requisition for family planning satisfied with modern methods has surged from 58.6% to 71.8% during the same period.[6]

Knowledge of contraception is almost ubiquitous among married women in India.[7] However, a large proportion of this population (almost three fourth) reported issues in accessing a choice of contraceptive method. In 2009, 48.4% of married women were predicted to be using a contraceptive method. Among these, three-fourth were using female sterilization which is by far the most accepted birth control method in India. This shows that contraception is practised mainly for birth limitation rather than birth spacing or planning. Condoms, at a sheer 11%, were the next most used method, followed by oral pills and IUD.[8] The Government of India has taken enormous measures to increase use and awareness about contraception. These include home delivery of contraceptives by ASHA worker, fixed day services for IUCD and sterilization and training programs to increase provider base.[9]

METHODS

This was prospective, observational study.

Inclusion criteria

Inclusion criteria were the all pregnant women with previous pregnancy, irrespective of outcome of pregnancy who attended the ANC clinic-booked, unbooked and referred at our Institute.

Exclusion criteria

Exclusion criteria was Primigravidas.

This was a prospective observational study carried out at our tertiary care centre. Women were divided into three groups based on their interpregnancy interval (short, normal and long) and fetal outcome and contraceptive trends were studied in these groups. All women attending ANC clinic with previous pregnancy, irrespective of pregnancy outcome and booking status were included in this study.

Informed consent was taken from the study population. All data was retrieved and entered in a preformed, structured proforma. The data was analysed using statistical measures like percentage and proportion and Chi square test was applied to analyse the statistical significance of interpregnancy interval on fetal outcome.

RESULTS

The total number of women with short, normal and long interpregnancy interval were 431,429 and 140 respectively.

Table 1: Distribution of cases with respect to awareness of contraception.

Awareness of contraception	ICP ≤ 2 Years		ICP 3-5 Years		ICP > 5 Years	
	Frequency (N)	Percentage (%)	Frequency (N)	Percentage (%)	Frequency (N)	Percentage (%)
Present	340	78.8	384	89.5	134	95.7
Absent	91	21.1	45	10.5	6	4.3

Awareness regarding contraception

Although awareness regarding contraception is almost universal in India, as seen in Table 1, among my study population, about 14 % of the subjects were not aware regarding any contraceptive method. 21.1% of women with short ICP i.e. 91 cases were unaware of contraception whereas only 6 cases with long ICP i.e. 4.3% had no awareness about contraception. This difference was statistically significant with p value of <0.00001 and Chi square statistic of 21.2205.

Contraceptive use during previous pregnancy

As seen in Figure 1, barrier method (33.6%) was the most widely used method of contraception among the study

population followed by copper-T insertion (10.8%). 48.5% of the study population did not use any method of contraception for pregnancy spacing.

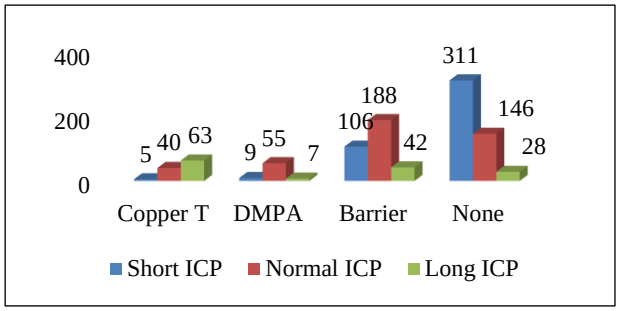


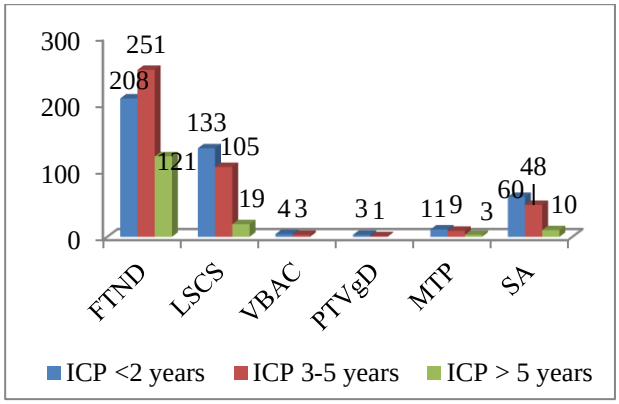
Figure 1: Distribution of cases as per contraceptive use during previous.

Majority of women with short ICP, i.e. 311 cases did not use any contraception after previous pregnancy and barrier method was the most frequently used method amongst them. Among women with normal ICP, barrier was the most common method of contraception followed by DMPA. Among women with long ICP, copper-T was the most commonly used.

Among women not using any method of contraception, majority had short ICP, almost 31.1% cases. Only 14.6% and 2.8% of cases with normal and long ICP respectively did not use any method of contraception after the previous pregnancy. This difference was statistically significant with a p value of <0.00001 and Chi square statistic of 117.0244.

Previous pregnancy outcome

Figure 2 demonstrates the previous pregnancy outcome. Out of these 1000 cases, 591 cases (59.1%) have previously delivered vaginally and 257 cases have previously delivered by LSCS (25.7%).



FTND: Full term normal delivery, LSCS: Lower segment cesarean section, VBAC: Vaginal birth after cesarean section, PTVgD: Preterm vaginal delivery, MTP: Medical termination of pregnancy, SA: Spontaneous abortion

Figure 2: Distribution of cases as per previous pregnancy outcome.

It was seen that women who had an adverse outcome in previous pregnancy i.e. spontaneous abortion, ectopic pregnancy, neonatal death or death of the child had a short interpregnancy interval. In my study around 20% of the women with short ICP i.e. 87 cases had an adverse outcome in previous pregnancy. Adverse outcome in previous pregnancy was seen in only 9% cases with long interpregnancy interval. Among the adverse outcomes of previous pregnancy, i.e. 169 cases, 87 cases i.e. 51.5% of the women conceived within 2 years.

Demographic factors

Age: Majority of the cases were in the age group of 26-30 years i.e. 396 cases (39.6%). Least number of cases were seen in the age group of 41-45 years i.e. only 7 cases (0.7%). Among cases with short ICP, most common age group was 20-25 years i.e. 197 cases (45.7%).

Parity: Most of the cases were either G2 i.e. 532 cases (53%) or G3 i.e. 323 cases (32%). It was seen that almost 50% (68 cases) of the cases with parity of G4 or above had short interpregnancy interval, this could be due to adverse outcome of the previous pregnancy.

Socioeconomic status: Being a government tertiary care centre, majority of the patients i.e. 840 (84%) belonged to lower and upper lower socioeconomic status as per the Kuppuswamy scale. In our study, 431 patients had a short interpregnancy interval whereas only 140 had a long interpregnancy interval.

Education status: Around 58% of the patients, i.e. 580 cases had no education or were educated below 10th standard and only about 5% had completed graduation or higher. However no significant relation was seen between education status and interpregnancy interval.

Fetal outcome

As seen in Table 2, majority of the cases resulted in a term baby, i.e. 874 cases (87.4%) whereas preterm was seen in 116 cases i.e. 11.6%. Total number of intrauterine fetal death was 10 (1%). Maximum prevalence of preterm was seen among women with short ICP with 57 cases (13.2%). Maximum prevalence of term cases were seen among women with normal ICP i.e. 379 cases i.e. 88.3%.

Ours is a tertiary care centre with high number of referred cases for both maternal and fetal indications. About 40% of the preterm deliveries i.e. 46 cases were induced due to numerous reasons such as hypertensive disorders of pregnancy, eclampsia, HELLP syndrome, abruption, acute fatty liver of pregnancy and prolonged PROM.

Reasons for NICU admission

Table 3 illustrates the reasons for NICU admissions among women with different interpregnancy intervals. It was observed that respiratory distress, large for gestational age

and low birth weight were the most common indications for NICU admission. Congenital anomaly was the least common indication for admission to NICU among all cases.

Table 2: Distribution as per fetal outcome.

Fetal outcome	ICP ≤ 2 Years		ICP 3-5 Years		ICP > 5 Years	
	Frequency (N)	Percentage (%)	Frequency (N)	Percentage (%)	Frequency (N)	Percentage (%)
Term	372	86.3	379	88.3	123	87.8
Preterm	57	13.2	45	10.5	14	10
Macerated still birth	1	0.2	2	0.4	2	1.4
Fresh still birth	1	0.2	3	0.6	1	0.7

Table 3: Distribution of cases as per reason for NICU admission.

Reasons for NICU admission	ICP ≤ 2 Years		ICP 3-5 Years		ICP > 5 Years	
	Frequency (N)	Percentage (%)	Frequency (N)	Percentage (%)	Frequency (N)	Percentage (%)
Low birth weight (LBW)	17	3.9	13	3	2	1.4
Large for gestational age (LGA)	12	2.7	14	3.2	6	4.2
Premature rupture of membrane (PROM)	13	3	8	1.8	-	-
Respiratory distress (RD)	15	3.4	15	3.4	2	1.4
Congenital anomaly	2	0.4	1	0.2	-	-
Hyperbilirubinemia	2	0.4	4	0.9	1	0.7
Meconium stained amniotic fluid	2	0.4	3	0.6	-	-
Preterm	9	2	8	1.8	-	-

Among women with short ICP, LBW and RD were the most common indications for NICU admission whereas for women with normal ICP, these were LGA and RD. For women with long ICP, LGA was the most common indication for admission.

Fetal complications

As seen in Table 4, low birth weight (19%) was the most common fetal complications seen. It was found that the percentage prevalence of LBW was the highest in women with short interpregnancy interval (22%) followed by those with normal interpregnancy interval (19.11%). However, this difference was not found to be statistically significant (Chi square value- 4.327, p value- 0.1149) (Table 5).

In this study out of the six anomalous babies, 5 were seen in cases with short IPI (<2 years). Out of these 5, 3 had neurological defects.

Table 4: Distribution as per fetal complications.

Fetal complications	ICP ≤ 2 Years		ICP 3-5 Years		ICP > 5 Years	
	Frequency (N)	Percentage (%)	Frequency (N)	Percentage (%)	Frequency (N)	Percentage (%)
LBW	95	22	82	19.11	15	10.7
Large Baby	17	3.9	17	3.9	10	7.1
Anomalous	5	1.1	1	2.3	-	-

Table 5: Distribution as per complications.

Complication	ICP < 2 Years (%)	ICP 3-5 Years (%)	ICP > 5 Years (%)	Chi Sq. value	P value
LBW	95 (22)	82 (19.11)	15 (10.7)	4.327	0.1149

Among 44 large for gestational age babies, maximum prevalence i.e. 7.1% was seen among those women with long interpregnancy interval (10 cases) followed by those with normal interpregnancy interval i.e. 4.1% (17 cases). Least prevalence was seen among women with short interpregnancy interval. However, this difference was not statistically significant.

DISCUSSION

Contraceptive trends

In this study it was seen that 21.1% of women with short ICP i.e. 91 cases were unaware of contraception whereas only 6 cases with long ICP i.e. 4.3% had no awareness about contraception. This difference was statistically significant with p value of <0.00001 and Chi square statistic of 21.2205. Overall, 14% of the women did not have awareness about contraception. This is similar to a study carried out at Tanzania which showed that only a third of the women had adequate knowledge of contraceptives and 75% did not use a method of contraception prior to index conception.[10]

In our study it was seen that barrier method (33.6%) was the most widely used method of contraception among the followed by copper-T insertion (10.8%). 48.5% of the study population did not use any method of contraception for pregnancy spacing. The findings are similar to a study conducted at Kerela which showed that only 58% of the women were using a method of contraception. Also, the most common method of contraception was female sterilization followed by barrier method and Copper-T which is similar to the trend seen in our study.[11] This is also similar to the analysis carried out by Ewerling et al which showed that the majority (71.8%; 95% CI 71.4-72.2) of women in need of contraception were using a modern method, most (76.1%) in the form of female sterilization. Condom and contraceptive pill were the second and third most frequently used methods (11.8% and 8.5%, respectively); only 3.2% reported IUD.[12]

Effect of previous pregnancy outcome

It was seen that women who had an adverse outcome in previous pregnancy (pregnancy ending in outcome other than live birth) i.e. spontaneous abortion, ectopic pregnancy, neonatal death or death of the child had a short interpregnancy interval. This was similar to studies carried out by Setty-Venugopal V, Upadhyay UD. On birth spacing and another study carried out by Chuks J in Ghana.[13,14] According to study carried out by Singh SN, Singh SN, Narendra RK at Manipur, the death of previous child is associated with the short duration of birth interval.[15]

Demographic factors

In our study, majority of women with short interpregnancy interval were aged between 20-25 years. Also, increased parity was associated with short interpregnancy interval. Similar results were seen in studies carried out at a tertiary care centre in Lucknow and in North-west Ethiopia.[16,17] In our study, it was seen that majority of women had low socioeconomic status and short interpregnancy interval. No significant association was seen between maternal education and interpregnancy interval. Both the above findings are similar to a study carried out at a tertiary care centre in Lucknow.[16]

Fetal complications

Among women with short ICP, LBW and RD were the most common indications for NICU admission whereas for women with normal ICP, these were LGA and RD. For women with long ICP, LGA was the most common indication for admission. This is similar to study carried out at Kashmir which showed Respiratory distress syndrome, birth asphyxia and low birth weight as the most common indications for NICU admission.[18]

Low birth weight

The prevalence of low birth weight in developing countries (16.5%) is twice than in developed regions (7%).[19] In a study carried out by Hanley, Hutcheon, Kinniburgh, Lee in Cananda, it was found that short interpregnancy intervals appeared protective for low birth weight for women in the two shortest interpregnancy interval categories.[20] Long interpregnancy intervals of 60 months or greater remained significantly associated with increased risk of neonatal intensive care use.

In this study, it was found that the percentage prevalence of LBW was the highest in women with short interpregnancy interval (22.14%) followed by those with normal interpregnancy interval (19.57%). However, this difference was not found to be statistically significant. (Chi square value- 4.327, p value- 0.1149). Similar results were found in the study carried out by Lilungulu et al in Tanzania which showed that prevalence of LBW was 26.7% (p <0.01).[21]

Large for gestational age

In a study carried out by Zhang, Dang, Bai, Mi, Wang and Yan at China, it was found that both short (<12 months) and long (>36 months) IPIs are independently associated with higher risks of low birth weight (LBW) and macrosomia.[22] In this study, among 44 large for gestational age babies, maximum prevalence i.e. 7.1% was seen among those women with long interpregnancy interval (10 cases) followed by those with normal interpregnancy interval i.e. 4.1% (17 cases). Least prevalence was seen among women with short interpregnancy interval.

Congenital anomaly

In a study carried out by Coo, Brownell, Ruth, Flavin, Au, Day in Canada, it was found that IPI is not significantly

associated with congenital anomalies overall or with chromosomal anomalies.[23] However, short IPIs were associated with significantly increased odds of CNS anomalies relative to IPIs 18-23 months (aOR- 2.15).

In this study out of the six anomalous babies, 5 were seen in cases with short IPI (<2 years). Out of these 5, 3 had neurological defects.

CONCLUSION

In our study it was seen that lack of contraception use and awareness was significantly associated with short interpregnancy interval. Adverse outcome of previous pregnancy also resulted in shorter interpregnancy interval. Short interpregnancy interval was associated with low birth weight, preterm and increased risk of congenital anomalies whereas long interpregnancy interval was associated with large for gestational age babies. An optimal interpregnancy interval can be maintained by optimal use of contraception and result in better fetal outcomes.

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