

## Inter-Pregnancy Interval (IPI): What Is The Ideal?

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### INTRODUCTION

Inter-pregnancy interval (IPI) is defined as the period between delivery of the previous infant and conception of the current pregnancy.<sup>1, 2</sup> This definition excludes miscarriage as a preceding pregnancy event.<sup>1, 2</sup> Often the IPI is calculated as the interval between live births, ignoring miscarriages or fetal deaths in between them.<sup>1</sup> The interval is estimated as the difference between the date of delivery of the subsequent pregnancy and that of the previous pregnancy minus the gestational age of the subsequent pregnancy.<sup>3</sup> Gestational age is estimated as the interval in completed weeks from the last normal menstrual period (LNMP) to the child's date of birth.

In clinical practice, women frequently want to know the optimal interval after which they can conceive especially if the previous birth was by caesarean section or had some bad outcomes. The proper advice has remained controversial since there is no consensus as to what the ideal is. For instance, if a mother has worries about her fertility or had to wait a long time before she conceived her existing child or children, or she is above 35 years of age, the mother might feel that time is not on her side and reasons that she needs to give birth to another child. On the other hand, if a mother is in her twenties and has toddler twins, it might be plausible for her to delay conception. However, whatever is the case, the ideal IPI should be addressed scientifically.

### SHORT AND LONG IPI

However, an IPI is said to be short when it is <6 months and long when it is > 5 years.<sup>1-4</sup> Inter-pregnancy interval of <6 months was significantly associated with an increased risk of adverse subsequent pregnancy outcomes. Mothers 35 years or older at start of childbearing have the highest risk compared to mothers aged 20 to 29 years, even after controlling for potential confounders.<sup>3</sup> There is robust evidence from many studies including a meta-analysis that after full term or pre-term delivery, IPIs of <12 months and >5 years are associated with increased risk of poor perinatal and maternal outcome.<sup>1,2</sup>

### THE IMPORTANCE OF IPI

Several studies have demonstrated associations between both short and long inter-pregnancy intervals and increased rates of adverse outcomes including fetal death, preterm delivery, low birth weight, neonatal mortality as well as maternal morbidity and mortality.<sup>5</sup> However, few of these studies specifically examined the association between pregnancy spacing and subsequent pregnancy outcomes, with regard to the timing of the first pregnancy. Research findings indicate that when there is a short pregnancy interval of less than 12 months there is an increased risk of adverse perinatal outcomes.<sup>5</sup> Given the increasing number of women delaying childbearing, the effect of pregnancy spacing on the subsequent pregnancy outcomes for these women have both clinical and population health implications. Avoiding pregnancy till the perceived ideal IPI can be dependent on the knowledge of the onset of ovulation post delivery/puerperium and the use of effective contraception.

### ONSET OF OVULATION POST DELIVERY AND IMPLICATION ON IPI

The time of appearance of the first ovulation post delivery is variable and it is often delayed by breastfeeding. Approximately, 10-15% of non-lactating mothers ovulate by the end of puerperium, and approximately 30% ovulate within 90 days postpartum.<sup>6</sup> The earliest reported time of ovulation is 33 days postpartum.<sup>6</sup> In almost all women, there is therefore a physiological six weeks postpartum infertility.<sup>7</sup> In lactating women, provided the breastfeeding is in progress and that menstruation has not returned, ovulation before the tenth week postpartum is rare.<sup>6</sup>

Moreover, women who have had a first-trimester abortion or ectopic pregnancy generally ovulate sooner after termination of pregnancy (as early as 14 days) than do women who deliver at term.<sup>6</sup> Majority of these women ovulate before the first episode of post-abortion menstrual bleeding in contrast to women who have had a term pregnancy.<sup>6</sup> Since there is variability in the resumption of menstruation and ovulation, some form of contraception must be employed if pregnancy is to be prevented so as to ensure optimum IPI.

The ovum lives approximately 72 hours after it is extruded from the follicle but probably is fertilizable for less than half this time.<sup>6</sup> In a study of the relationship of isolated intercourse to pregnancy, 36% of women had a detected pregnancy following intercourse on the day of ovulation, but with intercourse on days after ovulation,

the percentage was zero.<sup>6</sup> Isolated intercourse on the first and second days before ovulation led to pregnancy in about 36% of the women. A few pregnancies resulted from isolated intercourse on day 3, 4, or 5 before ovulation, although the percentage was much lower, that is, 8% on day 5 before ovulation. Thus, some sperms can survive in the female genital tract and produce fertilization for up to 120 hours before ovulation, but the most fertile period is clearly the 48 hours before ovulation.<sup>6</sup>

### **IPI FOLLOWING LIVE BIRTH OR STILL BIRTH**

In developed countries, including the United Kingdom, most obstetricians do not advise women to get pregnant within a year of having a baby. If there was a pre-term delivery, neonatal death or a stillbirth, the same advice would generally apply but other factors like mother's age, history of subfertility, mother's general health and presence of any medical disorders would be more important in counselling about the appropriate inter-pregnancy interval. Long IPI (>5 years) is independently associated with increased risk of pre-eclampsia and labour dystocia.<sup>2</sup> A parous woman whose IPI is greater than 5-8 years is said to return to pre-parous state when she goes into labour.<sup>2</sup> Interestingly, it has been noted that rates of stillbirth were highest following preceding stillbirths but did not vary much with different IPIs. Short IPI has been associated with anaemia in pregnancy which is a common cause of maternal mortality in Nigeria.

### **IPI FOLLOWING CAESAREAN SECTION**

Short IPIs were associated with increased risk of uterine rupture in women attempting a vaginal birth after previous caesarean delivery and utero-placental bleeding disorders (placental abruption and placenta praevia).<sup>2</sup> In a study to evaluate the association between long or short inter-pregnancy interval and three maternal outcomes: uterine rupture, composite major morbidity (including rupture, bladder or bowel injury, and uterine artery laceration), and blood transfusion<sup>8</sup> in women who had trial of vaginal birth after caesarean delivery (VBAC), it was concluded that an interval less than 6 months was associated with increased risk of uterine rupture, major morbidity, and blood transfusion. Long inter-pregnancy interval was not associated with such an increase in major morbidity.<sup>8</sup>

Apart from generally recovering from the stress of child birth and coping with motherhood, patients should be managed and counseled based on their specificities. These include the type of caesarean section, post operative course, intra-operative findings such as

dense adhesions, and silent uterine rupture especially in our environment where there is little or no tool for adequate intra-partum fetal monitoring.

### **IPI FOLLOWING MISCARRIAGE**

There is very limited data available on the effect of length of IPI after miscarriage on subsequent pregnancies. This is because meta-analysis as well as most other studies in the literature exclude 'miscarriages' as the preceding pregnancy, while studying the effect of birth spacing on pregnancy outcome.<sup>1,2</sup> In a study comparing the effects of post-abortion IPI of 1823 months versus less than 6 months, it was observed that inter-pregnancy intervals shorter than 6 months were significantly associated with increased risks of maternal anaemia, premature rupture of membranes (PROM), low birth weight, very low birth weight, pre-term delivery and very pre-term delivery.<sup>2</sup> However, the incidences of preeclampsia/eclampsia, antepartum and postpartum haemorrhage, puerperal endometritis, gestational diabetes and intrauterine growth restriction (IUGR) were not different with different IPIs.<sup>1,2</sup> It was postulated that reproductive tract infections after abortions, mainly induced, could increase the risk of infection-associated incidence of pre-term birth and premature rupture of membranes.<sup>2</sup>

Another study has revealed that the majority of women conceiving in less than 6 months after miscarriage had up to 56% chance of a non-live birth compared with 8% chance in those conceiving at 1526 months post miscarriage.<sup>9</sup> Also, compared with IPIs of 2750 months, IPIs of less than 6 months are 31 times more likely to begin with a miscarriage.<sup>9</sup>

### **IPI AND PRETERM BIRTH**

There has been fear that short IPI increases the risk for preterm birth and its recurrence. For instance, in one population-based cohort study of 156,330 women who had 2 births, it was hypothesized that short inter-pregnancy intervals (IPIs) increase the risk for preterm birth (PTB), recurrence of PTB, and delivery at early extremes of gestational age.<sup>10</sup> The association between IPI and subsequent pregnancy outcome was assessed and the results showed that shortest IPIs (<6 months) increased the risk of extreme PTB. IPIs of <6 months and 6-12 months increased the overall risk of PTB and PTB recurrence. It was concluded that the risk of PTB and its recurrence increases with short IPIs, even after adjustment for coexisting risk factors. This highlights the importance of counseling women with either an initial term or preterm birth to wait at least 12 months between delivery and subsequent conception.<sup>10</sup>

## IPI AND CONTRACEPTION

Contraception is central to achieving whatever IPI that is desired. There are various options available for postpartum contraception. The consideration is usually with the effect of steroid hormones on breast milk. Therefore, infant feeding option adopted by the mother is to be considered before a proper advice on postpartum contraceptives is given. Combined Oral Contraceptive Pills (COCPs) are commenced at 6 months post partum in a breast feeding mother because the oestrogen content affects the quality and quantity of breast milk. On the other hand, progestogen only contraceptives can be commenced at 6 weeks postpartum. Intrauterine contraceptive device can be inserted in the immediate postpartum period and has the advantage of long term contraception. It is understandable that the choice of contraceptive methods for postpartum contraception depends on whether the patient would breastfeed for up to 6 months postpartum or if the patient is not breastfeeding at all. Breastfeeding plays a major role in prolonging birth intervals.

## CONCLUSION

The foregoing discussions carry weighty implications for preconception care. The ideal inter-pregnancy interval remains controversial. There is no absolute right gap for conception although there may be circumstances in which it is plausible to wait less or more time before conceiving. It is therefore important to discuss issues of IPI during the antenatal and post partum periods. Also, with growing focus on preconception care, there is need to integrate these issues raised as part of preconception counseling, to enable women make informed decisions about their reproductive choices as to the timing of subsequent pregnancies. Health care providers should encourage women to space pregnancies adequately through the use of an effective family planning methods to minimize some of the potential effects of closely spaced pregnancies.

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