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Impact of Interpregnancy Interval on Maternal and Perinatal Outcomes in a Tertiary Care Hospital of Khyber Pakhtunkhwa

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ABSTRACT

Background: A short inter-pregnancy interval is the time interval of less than or equal to eighteen months between the previous baby's delivery and the next conception. **Objective:** To assess the influence of SIPI on maternal and perinatal outcomes. **Study Design:** Prospective comparative study. **Settings:** Obstetrics and Gynecology department of Khyber Teaching Hospital, Peshawar Pakistan. **Duration:** December 2023 and May 2024. **Methods:** This study included 150 pregnant women. 2 groups of expectant mothers fulfilling the inclusion and exclusion criteria were constituted. Women's pregnancy outcomes and perinatal problems were recorded. 75 pregnant women with SIPI (with an IPI of ≤6 months following a miscarriage and ≤18 months following a delivery) were included in the research. The study included 75 pregnant women with NIPI, I.e., an IPI between 19-59 months, as controls. **Results:** The age group of 25–30 years comprised the largest group of participants (47.3%). The participants' average age was 29±2.6 years old. Anemia was common with SIPI (60% versus 40%, p = 0.018), gestational hypertension (p value = 0.002, 22.5% versus 77.5%), and Gestational diabetes (p-value = 1.2). Obstetric cholestasis (71% versus 29%, p value = 0.005). Preterm delivery (p value = 0.33), premature rupture of membranes (p value = 0.54), admission in the NICU (p value was 0.133), and postpartum morbidity (p value was 0.411) did not significantly correlate with IPI. Caesarean section rates were higher in women with SIPI (67% versus 33%, p value = 0.018), low birth weights (95% versus 5%, p value = 0.016). **Conclusion:** Significant morbidity and unfavorable perinatal outcomes were experienced by women who had an IPI of ≤18 months.

Keywords: *Short interpregnancy interval, Caesarean section, Vaginal birth after cesarean, Perinatal mortality, Gestational hypertension, Gestational diabetes, Anemia.*

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INTRODUCTION

The time gap between the conception of the current pregnancy and the delivery of the prior child is known as the interpregnancy interval. The intervals between births significantly influence the socioeconomic circumstances of communities and the rates of population increase.[1] It has the potential to significantly improve the results of subsequent pregnancies and protect the mother's health. A short inter-pregnancy interval is the time interval of less than or equal to eighteen months between the previous baby's delivery and the next conception. This continues to be a significant issue for women in underdeveloped nations, where there is a higher chance of maternal and newborn mortality.[2] The period of time between the conception of the current pregnancy and the birth of a prior child, which ranges from 19 to 59 months, is known as the normal inter-pregnancy interval. Women with SIPI continue to have significant rates of unfavorable outcomes for both the mother and the fetus, despite initiatives to emphasize and improve women's healthcare. For a long time, experts in public health have observed that the inter-pregnancy interval, the time between a child's delivery and the subsequent pregnancy, affects the outcome of subsequent pregnancies.[3]

The time gap between the conception of the current pregnancy and the delivery of the prior child is known as the interpregnancy interval. The intervals between births significantly influence the socioeconomic circumstances of communities and the rates of population increase.[4] It has the potential to significantly improve the results of subsequent pregnancies and protect the mother's health. A short inter-pregnancy interval is the time interval of less than or equal to eighteen months between the previous baby's delivery and the next conception. This continues to be a significant issue for women in underdeveloped nations, where there is a higher chance of maternal and newborn mortality.[5] The period of time between the conception of the current pregnancy and the birth of a prior child, which ranges from 19 to 59 months, is known as the normal inter-pregnancy interval. Women with SIPI continue to have significant rates of unfavorable outcomes for both the mother and the fetus, despite initiatives to emphasize and improve women's healthcare. For a long time, experts in

public health have observed that the inter-pregnancy interval, the time between a child's delivery and the subsequent pregnancy, affects the outcome of subsequent pregnancies.[6]

However, variables like the age of first delivery and cultural attitudes might affect how long the inter-pregnancy gap is for women.[7] In our country, for example, where contraception has historically been used to achieve population control, even among families with two or three children, the average IPI is still quite low. Therefore, to maintain family planning and maternal and perinatal health in third world countries, it is essential to accept that repeated and short spaced pregnancies result in bad obstetric outcomes.

METHODS

The current investigation was conducted at the Obstetrics and Gynecology department of Khyber Teaching Hospital. Before the study commenced, the institute's ethics committee approved the project (106/EC/KTH dated 10th July 2023), and all study participants provided written informed consent before their inclusion.

The research population consisted of multigravida women attending the Outpatient Department at the study hospital, regardless of whether they were scheduled, unscheduled, or referred, and regardless of the outcome of their prior pregnancy. This prospective observational comparison study, involving 150 pregnant women, was conducted from December 2023 to May 2024. Research participants were selected using a non-probability convenience sampling technique from among all study population members who met the study's eligibility criteria. A sample size of 150 was determined to be the required sample size, considering an alpha error of 5% and a power of 80%, based on the percentage of low-birth-weight neonates reported in the Lewis *et al*. study.[8]

Pregnant women with a history of pre-eclampsia, chronic respiratory disorders, cardiovascular disorders, diabetic pregnancies, molar pregnancies, mothers with multiple gestation, and all primigravidae were excluded. Another group of expectant mothers who met the inclusion and exclusion criteria for the research was also considered. These two groups of women's pregnancy outcomes, as well as fetal and maternal problems, were examined. 75 pregnant women who were SIPI (with IPI of ≤6 months following an abortion and ≤18 months following a delivery) were included in the research. The study included 75 pregnant women who were NIPI and had an IPI of 19-59 months as controls. From the time of Antenatal Booking to the delivery time and the early postnatal phase, all research participants were monitored.

Data was analyzed using SPSS 23.0. Means and proportions employed for continuous and categorical data. The chi-square test was used to determine if the proportional differences were statistically significant. Following univariate analysis that identified and adjusted for possible variables, binary logistic regression analysis was performed. P values less than 0.05 were deemed statistically significant.

RESULTS

The 25–30 age group comprised the largest percentage of survey participants (47.3%). The research participants' average age was found to be 29 ± 2.6 years old. Compared to elderly multigravidas, a greater percentage of younger mothers had lower interpregnancy intervals. Furthermore, it was discovered that this link had a statistically significant p-value of 0.019. Table 1 indicates that there was no statistically significant correlation found between interpregnancy intervals and gravidity (p value was 0.421), antenatal visit (p value was 0.084), or booked/un-booked (p value was 0.283).

Anemia was present in a higher percentage of women with short IPI (60% versus 40%, p = 0.018). Mothers with short interpregnancy intervals were less likely to have gestational hypertension (p value = 0.002, 22.5% versus 77.5%). The presence of Gestational diabetes and interpregnancy interval did not significantly correlate (p-value = 1.2). Obstetric cholestasis is more common with a short interpregnancy interval (71% versus 29%, p value = 0.005). (Table I).

Preterm delivery (p value = 0.33), premature rupture of membranes (p value = 0.54), admission to the NICU (p value = 0.133), and post-partum morbidity (p value = 0.411) did not significantly correlate with the interpregnancy interval. Cesarean section rates were higher in women with shorter interpregnancy intervals (67% versus 33%, p value = 0.018). Table II shows that a greater percentage of newborns delivered with shorter interpregnancy intervals had lower weights (95% vs 5%, p value = 0.016).

Patients with a short interpregnancy gap had a decreased hypertensive risk (p value -0.002, odds ratio:0.176, 95% Confidence Interval =0.065-0.876) and a greater risk of cholestasis of pregnancy (p value -0.005, OR: 5.231, 95% Confidence Interval = 1.543-11.332), according to binary logistic regression analysis. (table no. III)

Table 1: Association of maternal characteristics with short interpregnancy interval (N=150)

Clinical features		Interpregnancy interval		Total	P-value
		Less than 1.5 year	More than 1.5 year		
Anemia	Yes	50 (60%)	33 (40%)	83(100%)	0.018
	No	26 (38%)	41(61.8%)	67 (100%)	
Gestational hypertension	Yes	7 (22.5%)	26 (78.5%)	33(100%)	0.002
	No	66 (56.2%)	51(43.8%)	117 (100%)	
Gestational diabetes	Yes	22 (51%)	21 (49%)	43 (100%)	1.2
	No	52 (49%)	55 (51%)	107 (100%)	
Cholestasis of pregnancy	Yes	13 (71%)	6 (29%)	19 (100%)	0.005
	No	48 (42.8%)	63 (57.2%)	111 (100%)	
Total		75(50%)	75(50%)	150(100%)	

Table 2: Association between short interpregnancy interval and fetal characteristics (n=150)

Fetal characteristic		Interpregnancy Interval		Total	P-value
		Less than 1.5 year	More than 1.5 year		
Preterm labor	Yes	14 (61%)	9 (39%)	23 (100%)	0.33
	No	62 (49%)	65 (51%)	127 (100%)	
Prom / PPROM	Yes	8 (70.3%)	4 (29.7%)	12 (100%)	0.54
	No	68 (49%)	70 (51%)	138 (100%)	
M.O.D	C/section	38 (67%)	18 (33%)	56 (100%)	0.018
	NVD	34 (43%)	46 (57%)	80 (100%)	
	VBAC	5 (35%)	9 (65%)	14 (100%)	
Birth weight	1.5-2.5kg	19 (95%)	1 (5%)	20(100%)	0.016
	2.6-3.5kg	53 (46%)	63 (54%)	116 (100%)	
	>3.5kg	5 (37%)	9 (63%)	14 (100%)	
Intrauterine growth restriction		7 (68%)	4 (32%)	11 (100%)	
Nicu admissions	Yes	19 (65%)	11 (35%)	30 (100%)	0.133
	No	58 (48%)	62 (52%)	120 (100%)	
Postnatal complication	Pph	10 (57%)	7 (43%)	17 (100%)	0.421
	Puerperal pyrexia	7 (46%)	8 (54%)	15 (100%)	
	Sepsis	9 (72%)	3 (28%)	12 (100%)	

Table 3: Binary logistic regression in short interpregnancy interval (N=150)

Variable	P-value	Or	95% ci of or
Age	0.21	1.067	0.852-1.32
M.O.D.			
C/section	0.018	1.043	0.224-4.312
TOLAC	0.065	0.873	0.145-5.231
Anemia	0.018	2.154	0.834-5.342
Gestational hypertension	0.002	0.176	0.065-0.876
Gestational diabetes	1.2	0.675	0.233-1.453
Cholestasis of pregnancy	0.005	5.231	1.543-11.332
Preterm labor	0.33	3.451	0.765-11.433
Prom	0.54	2.321	
Nicu admissions	0.133	1.754	0.164-3.656
Puerperal pyrexia	0.421	1.876	1.432-3.443
Postpartum hemorrhage	0.348	1.453	0.321-14.677
Sepsis	0.653	1.897	0.156-19.654

DISCUSSION

Using a prospective observational comparison analysis, the current study investigated how short interpregnancy intervals (≤18 months) affected maternal and perinatal outcomes. Anemia is the commonest outcome across all groups; however, it was statistically significantly more common in SIPI patients (p value = 0.018). A detrimental shift in the mother's nutritional status throughout a reproductive cycle, known as maternal nutrient depletion, may lead to biological competition between the developing fetus and the mother. Mothers who have a short interpregnancy period cannot recover the nutritional requirements of their previous pregnancy. 20% of mothers' folate levels are low at six months postpartum.[8]

These mothers are more likely to experience folate deficiency throughout their next pregnancy and at the time of conception if they get pregnant again during this time. Mothers who have this condition run the risk of becoming anemic, and their children are more likely to experience growth restriction, premature delivery, and birth abnormalities.[9] According to research by Gurmu L and colleagues, there was a significant risk of unfavorable pregnancy outcomes for women with SIPI and low nutritional status.[10] Ali MM *et al*, in their two studies, all produced comparable findings.[11,12] According to our research, gestational hypertension was a complication that was more common with NIPI (66%) than SIPI, and this difference was shown to be statistically significant (p value = 0.002). In their investigation, Akuze J *et al*. found similar outcomes.[13]

Long interpregnancy intervals were linked to a higher incidence of gestational hypertension and post-dated pregnancies in women, according to a study by Kasasa S *et al*. In our study, moms with NIPI showed this.[14] We found no evidence of a significant correlation between IPI and gestational diabetes mellitus (GDM) in our investigation. On the other hand, noteworthy results in this respect have been reported by other investigations. Women who become pregnant within a year of giving birth are probably going to weigh more when they get pregnant again. This increased weight raises the possibility of excessive weight gain and diabetes in the next pregnancy. In separate investigations, Mensah NA *et al*. found a strong correlation between SIPI and a higher risk of gestational diabetes.[15] SIPI and obstetric cholestasis were shown to be significantly associated in our study, with a frequency of 71% (p value: 0.005). We searched a wide range of platforms but were unable to locate any published papers examining the connection between interpregnancy interval and cholestasis in pregnancy.

Additionally, this was the most common reason for a cesarean birth among individuals with a short interpregnancy gap. Paleker M *et al*. observed the same.[16] We didn't find any indication of a relationship between interpregnancy gap and preterm delivery. A short interpregnancy period, on the other hand, is linked to higher risks of low birth weight, early delivery, fetal development restriction, and baby, neonatal, and child mortality.[17] This is also mentioned by Jena BH *et al*.[18] Other studies, including the one by Dhamrait G *et al*., did identify a significant link between PROM and IPI, but we did not. Patients with SIPI were shown to have considerably greater rates of intrauterine growth restriction (p value 0.009) and low birth weight (p value 0.015) in our research.[19]

The investigations conducted by Muhlrad *et al*. yielded comparable findings.[20] In our study, postnatal problems did not significantly affect women with a short interpregnancy interval.

According to a Sanga *et al*. study, the likelihood of postpartum hemorrhage drops as IPI rises.[16] In our analysis, sepsis and PPH were the two most prevalent postnatal problems overall, although no meaningful correlation was discovered between these postnatal complications and interpregnancy interval. Similar postnatal problems were also reported by Peiran C *et al*. in their investigation.[21]

CONCLUSION

Pregnant women with an IPI of less than eighteen months have bad obstetric outcomes. Nonetheless, there was a noticeably lower prevalence of PIH in these populations. It's critical to give the patient pertinent information on the significance and the necessity of gapping childbirths. Additionally, it is critical to offer information about the use of contraception since spacing out pregnancies gives mothers adequate time to replenish and recover. Consequently, attempting to lower the morbidity and unfavorable neonatal outcomes linked to SIPI.

LIMITATIONS

Among the study's potential limitations is the possibility that there are more potentially harmful prenatal outcomes than those covered in the current analysis. This was, however, constrained by the study's duration, breadth, and viability of long-term follow-up and studies. Not enough patients with extended interpregnancy intervals were gathered because of the short research duration. Therefore, patients with a short interpregnancy period were the focus of this investigation. Because the study was conducted in a hospital, its conclusions might not apply to other situations.

SUGGESTIONS / RECOMMENDATIONS

Our study recommends the need for enhanced preconception counseling, particularly focusing on maternal weight optimization and early identification of high-risk pregnancies. The high rates of NICU admissions and neonatal complications suggest the need for improved antenatal surveillance and coordinated perinatal care protocols.

CONFLICT OF INTEREST / DISCLOSURE

None.

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