Original Article

Inter-Pregnancy Interval: A Clincher for Obstetric Outcome

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Abstract

Objective: To examine the association between interpregnancy interval (IPI) and obstetric outcomes among women delivering at a tertiary care hospital.

Methodology: This prospective observational study was conducted at the Department of Obstetrics and Gynecology, Jinnah Hospital Lahore, from January to June 2025. A total of 176 booked pregnant women with parity 1–4 and interpregnancy intervals of <18 months and 18–24 months were enrolled. Women with chronic illnesses, multiple pregnancies, or grand multiparity were excluded. Participants were followed throughout the antenatal period until delivery to record maternal and perinatal outcomes. Data were analyzed using SPSS version 28. The Chi-square test and t-test were applied, with $p < 0.05$ considered significant.

Results: Most mothers (55.7%) were aged 20–30 years, and 58.5% belonged to the lower socioeconomic class. The majority (75.6%) delivered by caesarean section. Fetal outcomes showed 25.0% of babies had low birth weight and 13.6% were preterm. Maternal complications included anemia (17.0%) and gestational diabetes (8.0%). A statistically significant relationship ($p = 0.000$) was found between short interpregnancy interval and adverse maternal and fetal outcomes. No significant association was observed between interpregnancy interval and sociodemographic variables.

Conclusion: Short interpregnancy intervals (<18 months) are significantly associated with adverse obstetric outcomes, including anemia, preterm birth, and low birth weight. Promoting optimal spacing between pregnancies (18–24 months) through postpartum counseling and family planning can improve maternal and neonatal health outcomes.

Keywords: Interpregnancy interval, Maternal outcome, Fetal outcome, Birth spacing, Obstetric complications.

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Introduction

Birth spacing is important for healthy mother as well as for the child, Interpregnancy intervals is defined as the time period between child birth and next conception. If the interval is less than 18 months it is labelled as short interpregnancy interval and if the interval lasts between 18-24 months it is called optimum interval between two consecutive pregnancies.[1,2]

Short period between two successive pregnancies is associated with poor maternal and perinatal outcome i.e. early pregnancy loss, premature rupture of membranes, preterm labor, small for gestational age fetuses, still birth, maternal anemia, postpartum hemorrhage and uterine rupture resulting increased feto-maternal morbidity and notably maternal death.[3,4,5,6]

World Health Organization recommends IPI of 24 months and 33 months before next birth for better maternal and fetal outcomes. [7]

A short IPI is related to adverse obstetric outcomes which poses a great challenge for low resource countries like ours, already facing other health related problems.

Effective postnatal contraception can prevent short IPIs, thereby reducing the risk of unintended pregnancies.[8] Carolyn R, Woods N. observed in a study that less than 30% of mothers reported to have

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information about IPI from any source. IPI knowledge of expected mothers is less than ideal which could be improved by healthcare providers through prenatal counselling. Birth spacing interventions should be included to reduce the short IPIs eventually improving the health of mother and child.[9] Family planning services for new mothers can help increase the interval between two successive pregnancies. [10]

Methodology

This cross-sectional study was conducted in the Department of Obstetrics and Gynecology, Jinnah Hospital Lahore, from January to June 2025. Booked pregnant women presenting to the outpatient department and labor room were enrolled. Women aged 18–45 years with parity 1–4 and an interpregnancy interval of less than 18 months or between 18–24 months, irrespective of previous pregnancy outcome, were included. Women in their first pregnancy, those with grand multiparity, multiple pregnancies, or pre-existing chronic medical conditions (such as hypertension, diabetes, or heart disease) were excluded.

The sample size was calculated using Win-Pepi software (Ver 11.19) to estimate a proportion with a 95% confidence level and an acceptable difference of 0.05. Assuming that 12.8% of women with short interpregnancy intervals have preterm births (Henley et al.)[11], the required sample size was determined to be 172. A cross-sectional random sampling technique was applied.

After obtaining approval from the Ethical Review Board (ERB No. 178/9/03-12-2024/S1 ERB) and informed consent from participants, a detailed history and physical examination were performed. Data were recorded on a predesigned structured proforma. Participants were categorized into four groups according to interpregnancy interval: <6 months (Group A), 6–12 months (Group B), 12–18 months (Group C), and 18–24 months (Group D). All participants were followed throughout the antenatal period until delivery to record maternal and perinatal outcomes.

Data were entered in Microsoft Excel and analyzed using SPSS version 28. Quantitative variables were expressed as mean ± standard deviation, and group differences were assessed using the t-test. Categorical variables were analyzed using the Chi-square test to determine associations between interpregnancy interval and obstetric outcomes. A p-value of <0.05 was considered statistically significant.

Results

The majority of mothers 98(55.7%) were between 20-30 years. About 75(42.6%) of mothers were illiterate, and 48.3% of husbands were also illiterate. Most families 114(64.8%) were from joint families, and the majority of husbands 100(56.8%) were skilled workers. The socioeconomic status of most families 103(58.5%) was found lower. (Table I)

Table I: Socio-demographic profile of subjects. (n=176)

Variable		N	%
Age of Mother	< 20 years	13	7.4%
	20 -30 years	98	55.7%
	> 30 years	65	36.9%
Education of Mother	Illiterate	75	42.6%
	Primary	29	16.5%
	Secondary	57	32.4%
	Higher Secondary	15	8.5%
Education of Husband	Illiterate	85	48.3
	Primary	29	16.5
	Secondary	47	26.7
	Higher Secondary	15	8.5
Family Status	Nuclear	62	35.2
	Joint	114	64.8
Occupation of Husband	Service	10	5.7
	Business	21	11.9
	Clerical / Farmer / Shop owner	45	25.6
	Skilled Worker	100	56.8
Socioeconomic Status	Lower	103	58.5
	Middle	73	41.5
	Upper	0	0

Most mothers 138(78.4%) had a BMI between 25-30 Kg/m2. The majority of mothers 61(34.7%) had a parity of 3. The most common mode of delivery was Caesarean section 133(75.6%). (Table II)

Table II: Clinical profile of subjects. (n =176)

Variables		N	%
Body Mass Index	< 25 Kg/m2	21	11.9
	25 -30 Kg/m2	138	78.4
	> 30 Kg/m2	17	9.7
Parity	1 - 2	47	26.7
	3	61	34.7
	3 - 4	39	22.2
	> 4	29	16.5
Mode of Delivery	Vaginal delivery	30	17.0
	Instrumental	9	5.1
	Caesarean section	133	75.6
	4.00	4	2.3
Pregnancy Interval	< 6 months	62	35.2
	6 - 12 months	38	21.6
	13 - 18 months	19	10.8
	> 18 months	57	32.4

Table III: Feto-maternal Outcome of subjects. (n =176)			
Variables		**N**	**%**
Fetal Outcome	Miscarriage	4	2.3
	Low Birth Weight	44	25.0
	Preterm	24	13.6
	Anomalous	1	0.6
	Low APGAR Score	13	7.4
	Admission in NICU	13	7.4
	RDS / TTN	9	5.1
	Alive & Healthy	68	38.6
Maternal Outcome	Anemia	30	17.0
	Gestational Diabetes	14	8.0
	PIH / PE	16	9.1
	APH / PPH	3	1.7
	PROM	4	2.3
	Healthy	109	61.9

The fetal outcomes show that 25.0% of babies had low birth weight, and 24(13.6%) were preterm. The maternal outcomes show that 17.0% of mothers had anemia, and 8.0% had gestational diabetes. The study shows a significant percentage of low birth weight (25.0%) and preterm births 24(13.6%), which may be related to the interpregnancy interval. (Table III)

The p-value is reported as ".000" for both fetal and maternal outcomes, which indicates a highly statistically significant relationship between pregnancy interval and these outcomes. (Table IV)

The high percentage of illiterate mothers and lower socioeconomic status may contribute to the adverse outcomes. The high rate of Caesarean sections (75.6%) may be related to various factors, including previous pregnancy outcomes, maternal health, or fetal distress. The majority of mothers with a pregnancy interval < 6 months are > 30 years old (38.5%). However, the p-value (.371) indicates no significant association between age and pregnancy interval.

There is no significant association between education level and pregnancy interval (p-values .752 and .477, respectively). The majority of mothers with a pregnancy interval < 6 months live in joint families (36.8%). However, the p-value (.659) indicates no significant association between family status and pregnancy interval. The majority of husbands with a pregnancy interval > 18 months are in service (70.0%). However, the p-value (.252) indicates no significant association between occupation and pregnancy interval. The majority of mothers with a pregnancy interval < 6 months belong to the lower socioeconomic status (38.8%). However, the p-value (.252) indicates no significant association between socioeconomic status and pregnancy interval. (Table V)

Discussion

This study highlights the critical role of the interpregnancy interval (IPI) in determining fetal outcomes, supporting the hypothesis that optimal spacing between pregnancies significantly contributes to improved obstetric results. Our findings reveal a clear positive relationship between longer interpregnancy intervals and favorable fetal outcomes (Table IV) in terms of reduced low birth weight, decreased need for NICU admissions, and lower rates of maternal anemia, diabetes, and hypertensive disorders. These findings are consistent with existing literature emphasizing the importance of adequate maternal recovery time between pregnancies.[11,12]

Short interpregnancy intervals have been associated with adverse fetal outcomes, including preterm birth, small-for-gestational-age infants, and low birth weight neonates.[13] In contrast, our results indicate that as

Table IV: Pregnancy interval and Feto- maternal outcome cross tabulation. (n=176)

Variables		Pregnancy Interval								P value
		< 6 months		6 - 12 months		13 - 18 months		> 18 months		
		N	%	N	%	N	%	N	%	
Fetal Outcome	Miscarriage	0	0	3	75	1	25	0	0	.000*
	Low Birth Weight	22	50	17	38.6	3	6.8	2	4.5	
	Preterm	11	45.8	6	25	5	20.8	2	8.3	
	Anomalous	0	0	1	100	0	0	0	0	
	Low APGAR Score	8	61.5	3	23.1	1	7.7	1	7.7	
	Admission in NICU	9	69.2	3	23.1	1	7.7	0	0	
	RDS / TTN	4	44.4	4	44.4	1	11.1	0	0	
	Alive & Healthy	8	11.8	1	1.5	7	10.3	52	76.5	
Maternal Outcome	Anemia	26	86.7	2	6.7	1	3.3	1	3.3	.000*
	Gestational Diabetes	5	35.7	6	42.9	1	7.1	2	14.3	
	PIH / PE	12	75.0	2	12.5	1	6.3	1	6.3	
	APH / PPH	3	100	0	0	0	0	0	0	
	PROM	2	50	1	25	1	25	0	0	
	Healthy	14	12.8	27	24.8	15	13.8	53	48.6	

Table V: Pregnancy interval and Socio-demographic. (n=176)

Variables N = 176		Inter Pregnancy Interval				
		< 6 months	6 – 12 months	13 - 18 months	> 18 months	P-value
		%	%	%	%	
Age of Mother	< 20 years	53.8	7.7	15.4	23.1	.371
	20-30 years	30.6	24.5	8.2	36.7	
	> 30 years	38.5	20.0	13.8	27.7	
Education of Mother	Illiterate	30.7	28.0	10.7	30.7	.752
	Primary	48.3	13.8	6.9	31.0	
	Secondary	36.8	17.5	12.3	33.3	
	Higher Secondary	26.7	20.0	13.3	40.0	
Education of Husband	Illiterate	29.4	20.0	12.9	37.6	.477
	Primary	44.8	27.6	6.9	20.7	
	Secondary	44.7	17.0	8.5	29.8	
	Higher	20.0	33.3	13.3	33.3	
Family Status	Nuclear	32.3	22.6	8.1	37.1	.659
	Joint	36.8	21.1	12.3	29.8	
Occupation of Husband	Service	30.0	0.0	0.0	70.0	.252
	Business	28.6	28.6	9.5	33.3	
	Unskilled	31.1	22.2	8.9	37.8	
	Skilled Worker	39.0	22.0	13.0	26.0	
Socioeconomic Status	Lower	38.8	24.3	8.7	28.2	.252
	Middle	30.1	17.8	13.7	38.4	
	Upper	0.0	0.0	0.0	0.0	

the IPI increases within an optimal range—typically 18 to 24 months—there is a notable improvement in fetal health indicators such as Apgar scores, birth weight, and gestational age at delivery. This relationship may be attributed to the restoration of maternal nutritional reserves, uterine recovery, and psychosocial readiness, all of which contribute to healthier pregnancies and neonatal outcomes.[14,15,16]

Furthermore, our study reinforces recommendations from global health organizations advocating adequate spacing between pregnancies to reduce perinatal morbidity and mortality. The observed trend underscores the clinical importance of counseling women on family planning and postpartum contraceptive options to achieve optimal IPIs.[17,18]

However, it is also crucial to recognize that excessively long IPIs may pose risks such as hypertensive disorders and labor dystocia. Although these outcomes were not observed in our population, further studies including women with intervals beyond 24 months are warranted. Thus, while longer IPIs generally favor fetal outcomes, individualized care remains essential.

The incidence of low birth weight (25.0%) and preterm birth (13.6%) in our study is consistent with previous research. A study published in the *Journal of Maternal-Fetal & Neonatal Medicine* found that short IPI was associated with increased risks of premature labor, low birth weight, and neonatal intensive care unit (NICU) admission. Similarly, a systematic review and meta-analysis published in *BMC Pregnancy and Childbirth* reported that short IPI increases the risk of a complicated perinatal course.[19,20]

Our study also demonstrated a significant association between short IPIs and maternal anemia, aligning with findings from previous research. For instance, a study published in the *Journal of Women's Health* reported that short IPIs are linked to an increased risk of maternal anemia and other morbidities.[21,22,23]

In contrast, our study did not reveal a significant relationship between socio-demographic factors—including age, education, marital status, occupation, and socioeconomic status—and interpregnancy interval. This finding differs from earlier studies that identified socio-demographic variables as influential factors affecting both IPI and feto-maternal outcomes.[24,25]

Conclusion

Study concludes that short IPI is associated with low birth weight, preterm babies and need for nursery admissions and poor maternal outcomes like anemia, hypertensive disorders. This study highlights the importance of optimal spacing between pregnancies for better maternal and fetal outcomes, emphasizing the need for prenatal counseling and reproductive health policies to support this.

Strengths and Limitations: The strengths of our study include its prospective design and comprehensive data collection. However, it is a single center study with small sample size.

Recommendations: These findings reinforce the importance of maintaining an optimal interpregnancy interval and considering socio-demographic factors in improving obstetric outcomes. Healthcare providers should counsel women on the importance of birth spacing and provide access to family planning services to reduce the potential adverse consequences. Further research is warranted to better understand the relationship between interpregnancy interval and obstetric outcomes within our population.

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