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Inter pregnancy interval and obstetrical , maternal and neonatal complications

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بسم الله الرحمن الرحيم

قال تعالى: (يَرْفَعِ اللَّهُ الَّذِينَ آمَنُوا مِنْكُمْ وَ الَّذِينَ أُوتُوا الْعِلْمَ دَرَجَات)

صدق الله العظيم

الإهداء

أهدي هذا البحث

...الى روح والدي الطاهرة تغمده الله برحمته وادخله فسيح جناته

...الى والدتي الغظيمة حفظها الله ورعاها برعايته

الى من ساعدني بكل خطوة من بحثي استاذي الدكتورة سوسن طالب سلمان

Abstruct :

Background ; Both short and long interpregnancy intervals (IPI) have been associated with increased risk of adverse birth outcomes . Short birth to pregnancy interval is known to hurt perinatal, neonatal and child health .Be sides , it has also maternal health outcomes. women with a long IPI may have an increased risk for developing cardio- vascular disease , and a recent study reports an association between extremes in IPI and development of autism spectrum disorder in offspring .

Aim of the study : to identfy the association between length of inter pregnancy interval and obstetrical , maternal and neonatal complicatioms .

Patient and method : This retrospective study is include all pregnant women who attended the department of obstetrics and gynecology in AL Batool Teaching Hospital at Diyala Baquba from December 2021 to April 2022 samples of 102 pregnant women was divided in to three groups according to inter pregnancy interval .the first group consist of 36 pregnant with inter pregnancy interval less than 18 months .the second group consist of 36 pregnant with inter pregnancy interval (18_59) months .the third group consist of 30 pregnant with inter pregnancy interval more than 60 months . information from pregnant women were collected according to interveiwing questionnaire decided by researcher it was include maternal demographic like age ,gravida ,para,abortion,last menstrual peroid ,gestational age ,expected date of delivery ,date of admission ,date of delivery ,and medical and obstetrical complications in addition to neonatal morbidity .

Result ;Of 102 women who had more than pregnancy in the data set , all of them were included in the analysis . of 102 women ,36 (35.29%) had inter pregnancy

intervals of less than 18 months ,36(35.29%) had inter pregnancy interval IPI between 18-60 months, and 30 (29.41%) had inter pregnancy intervals more than 60 months . we found there was a highly significant relation between age , parity and inter pregnancy interval the p values for them were less than 0.01 .relation between obstetrical complications , maternal morbidity and IPI was not significant the p values found more than 0.05 . also we found the relation between neonatal morbidity , birth weight ,SGA , admission to NICU and IPI was not significant p values for them were more than 0.05 . also there was a not significant relation between mode of delivery and IPI that the p value found more than 0.05 .

Conclusion ;

- An inter pregnancy intervals don't effect on the obstetrical complication , incidence of preterm birth , SGA ,and low birth weight ,NICU admission ,neonatal morbidity and maternal morbidity .
- the length of birth spacing don't increase the risk of cesarean section .
- the age and parity are from determinants of the length of IPIs in our community .

Key words : short and long inter pregnancy interval , neonatal and maternal morbidity ,low birth weight , obstetrical complications .

Introduction ;

Both short and long interpregnancy intervals (IPI) have been associated with increased risk of adverse birth outcomes such as preterm birth (PTB, < 37 weeks of gestation) small-for- gestational age (SGA) and term low birth weight (LBW), among other adverse perinatal outcomes .Meta-analyses have reported that short (<6 months) and long (more than 60 months) IPIs are associated with increased risk of PTB, SGA, term LBW compared to an IPI of 18–23 months.(1,2,3,4,5).

The WHO recommends an IPI of approximately 2–3 years to reduce infant and child morbidity and mortality and these recommendations are informed by several studies which have reported a strong J- shaped relationship between various adverse birth outcomes and IPIs, with the lowest risk of adverse perinatal outcomes observed for IPIs of 18–23 months. (6,7)

Short Inter pregnancy Interval (IPI), formerly known as Closely Spaced Pregnancies, is defined as an inter pregnancy interval of less than 18 months from the date of a live birth to the conception of the subsequent pregnancy.(8)

An interval of 18 to 24 months has been associated with the lowest relative risk. Evidence associated with the lowest relative risk for an IPI following a miscarriage or abortion is still unclear therefore only health effects associated with a short IPI following a live birth were reviewed for this criterion.(9)

Short birth to pregnancy interval is known to hurt perinatal, neonatal and child health outcomes including: preterm birth, low birth weight, perinatal death, still birth, intellectual disability and developmental delay. Besides, it has also maternal health outcomes such as: nutritional depletion, anemia, cervical insufficiency,

antepartum hemorrhage, premature rupture of membrane, and eclampsia .(10,11,12)

Possible explanations for the association between a short IPI and maternal morbidity are threefold. The first, which is widely debated in association with pregnancy complications, is maternal (nutritional) depletion due to inadequate time to restore vital resources as folate, iron and vitamins. This counts for women in poor countries in particular, because many are undernourished.(13,14,15). The second explanation is stress, given that providing care for and breastfeeding a young child during a pre-term next pregnancy is both physically and emotionally demanding. The third is insufficient time for the healing of genital injuries or for the hormonal recovery from the previous pregnancy and birth which is likely to affect the mother and index pregnancy.(15)

women with a long IPI may have an increased risk for developing cardio- vascular disease , and a recent study reports an association between extremes in IPI and development of autism spectrum disorder in offspring .(16)

It hypothesized that pregnancy causes time limited physiologic adaptations of the reproductive system such as increased blood flow to the uterus .an animal study in mice showed that the uterine atery remodeling ,response after pregnancy gradually regressed during the postpartum peroid .with long inter pregnancy intervals ,those adaptation may regress ,and maternal physiologic characteristics may revert to those of primigravid women.(17,18)

this study was conducted to identify the complication of short and long IPI on mother and baby. Because Information about how the short and long IPIs negatively affects maternal and neonatal outcome can help medical practitioners as well as the nurse and midwife are better tailor the advice they give to women

about how long they should wait after one pregnancy before trying to become pregnant again.

Aim of the study :

to identfy the association between length of inter pregnancy interval and obstetrical , maternal and neonatal complications

Patient and method :

This retrospective study is include all pregnant women who attended the department of obstetrics and gynecology in AL Batool Teaching Hospital at Diyala Baquba from December 2021 to April 2022 samples of 102 pregnant women was divided in to three groups according to inter pregnancy interval . the first group consist of 36 pregnant with inter pregnancy interval less than 18 months .the second group consist of 36 pregnant with inter pregnancy interval (18_59) months .the third group consist of 30 pregnant with inter pregnancy interval more than 60 months .

Inclusion criteria :

1_ women with 2 or more cosecutive pregnancy .

2_age from 16 to 43 years .

3_willing to participate in the study

Exclusion criteria :

1. which primigravida
2. with unknown last menstrual peroid were excluded.

information from pregnant women were collected according to interveiwing questionnaire decided by researcher it was include maternal demographic like age ,gravida ,para,abortion,last menstrual peroid ,gestational age ,expected date of delivery ,date of admission ,date of delivery , medical and obstetrical complications in addition to neonatal morbidity .

Statistical analysis ;

The statistical analysis procedure performed according to chi-square test for independence using SPSS software version 26.

Result ;

Of 102 women who had more than pregnancy in the dataset , all of them were included in the analysis . of 102 women ,36 (35.29%) had inter pregnancy intervals of less than 18 months ,36(35.29%) had inter pregnancy intervals between 18-60 months, and 30 (29.41%) had inter pregnancy intervals more than 60 months .

Table 1 show there was a highly significant relation between age and inter pregnancy interval the p value for them less than 0.01 . women with age between 16-29 years have highest percentage in the inter pregnancy interval less than 18 months while women with age between 30-43 years have highest percentage in the inter pregnancy interval more than 60 months .regarding parity there is a highly significant relation between parity and inter pregnancy interval the p value less than 0.01 , women with one previous delivery have highest percentage in the inter pregnancy interval less than 18 months while women with two previous delivery have highest percentage in the inter pregnancy interval less than 18 months and women with three and more previous delivery have higher percentage in the inter pregnancy interval more than 60 months .

Table 1 ;Demographic Characteristics of pregnant women include in the study

	<18 months	18 -60months	>60 months	Total	P value
Age class ;					0.000**
16-29	26 (72.2%)	19 (52.8%)	3 (10.0%)	48 (47.1%)	
30-43	10 (27.8%)	17 (47.2%)	27 (90.0%)	54 (52.9%)	
Previous delivery ;					0.000**
One previous delivery ;	3 (8.8%)	1 (2.8%)	0 (0.0%)	4 (4.0%)	
Two previous delivery ;	20 (58.8%)	7 (19.4%)	4 (13.3%)	31 (31.0%)	
three and more previous delivery ;	11 (32.4%)	28 (77.8%)	26 (86.7%)	65 (65.0%)	

P value

More than 0.050 (not significance)

Less than 0.050 (significance)*

Less than 0.010 (highly significance) **

Table 2 show that the relation between obstetric complication (preterm labor ,placental abruption) and inter pregnancy interval is not significant the p value of of them was more than 0.05 .and we don't found PPROM in our cases .

Table 2 Obstetric complications according to inter pregnancy interval

	< 18 Months	18 - 60Months	>60Months	total	P value
Preterm labor;	1 (2.8%)	4 (11.1%)	2 (6.7%)	7 (6.9%)	0.376
PPROM	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Placental abruption ;	0 (0.0%)	1 (2.8 %)	2 (6.7%)	3 (2.9%)	0.279

PPROM *(preterm premature rupture of membrane)

we found there was a not significant relation between IPI and maternal morbidity (anemia , preeclampsia and diabetes mellitus) the p values were more than 0.05 as show in Table 3 .

Table 3 Maternal morbidity according to inter pregnancy interval

	<18 months	18 -60Months	>60Months	Total	P value
Anemia	17 (47.2%)	20 (55.6%)	15 (50.0%)	52 (51.0%)	0.772
PE	8 (22.2%)	9 (25.0%)	12 (40.0%)	29 (28.4%)	0.239
DM	0 (0.0%)	2 (5.6%)	2 (6.7 %)	4 (3.9%)	0.313

Preeclampsia (PE)

Diabetes mellitus(DM)

Table 4 show most of cases were have normal birth weight so there is no relation between birth weight and inter pregnancy interval and this proved also by the p

value more than 0.05 so it is not significant . also the table include neonatal morbidity (RDS , sepsis ,hypoglycemia and large for gestational age) ,SGA and admission to NICU and show there is no relation with IPI , p values about them were more than 0.05 so it not significant relation .

Table 4 neonatal complication with inter pregnancy interval

	<18months	18 - 60Months	>60Months	Total	P value
Birth weight ;					
Normal birth weight	34 (94.4%)	32 (88.9%)	27 (90.0%)	93 (91.2%)	0.675
Low birth weight	2 (5.6%)	3 (8.3%)	3 (10.0%)	8 (7.8%)	
High birth weight	0 (0.0%)	1 (2.8%)	0 (0.0%)	1 (1.0%)	
Neonatal morbidity;					0.253
No neonatal morbidity	33 (94.3 %)	31 (86.1%)	22 (73.3%)	86(85.1%)	
premature dyspnea- RDS	2 (5.7%)	4 (11.1 %)	6 (20.0%)	12 (11.9%)	
Hypoglycemia	0 (0%)	0 (0%)	1 (3.3%)	1 (1 %)	
Dyspnea [sepsis]	0 (0%)	0 (0%)	1 (3.3%)	1 (1 %)	
Diabetic mother and large for gestational age	0 (0%)	1 (2.8 %)	0 (0%)	1 (1 %)	
Admission to NICU:	2 (5.7%)	5 (13.9%)	8 (26.7%)	15 (14.9%)	0.059
SGA ;	0 (0.0%)	1 (2.8%)	0 (0.0%)	1 (1%)	0.402

RDS (respiratory distress syndrome)

SGA (Small for gestational age)

NICU(neonatal intensive care unit)

Low birth weight (less than 2.5 kg)
Normal birth weight (2.5 – 4 kg)
Large birth weight (more than 4 kg) (19) .

In table 5 found there was no relation between IPI and mode of delivery p value was found more than 0.05 so it not significant .

Table 5 mode of delivery according to inter pregnancy interval .

	< 18 months	18 -60months	> 60 months	Total	P value
Mode of delivery					0.800
Vaginal delivery	8 (22.9%)	8 (22.2%)	5 (16.7%)	21 (20.8%)	
Cesarean section	27 (77.1%)	28 (77.8%)	25 (83.3%)	80 (79.2%)	

Discussion ;

- The current study about inter pregnancy interval effects that performed in Baqhuba city show there was a highly significant relation between age and inter pregnancy interval and found that the highest percentage of less than 18 months inter pregnancy interval group was women with age group between 16-29 years while the highest percentage of more than 60 months inter pregnancy interval group was women with age group between 30-43 years .This could be due to customs and traditions of the community that are imposed on the women who newly married and young to don't leave large inter pregnancy interval to preserve fertility because they think use of contraception method after first or second child this will effect on the fertility and in order for the children to grow up together while women who older than 30 most of them when enter their thirties ,they have had many children and are about to complete their families so leave large inter pregnancy interval .
- Also found there is a highly significant relation between parity and inter pregnancy interval and that the highest percentage of group (<18 months) was have one or two previous delivery this could be due to social thought ,while the highest percentage of group (> 60 months) was have three or more previous delivery this may be due to they often become tired and wants to take rest from childbearing , and also for economic living reasons or could be develop obstetrical and gynecological complications that effect on their fertility .These finding not found in other studies .
- In our study we found there is no relation between obstetrical complications that include placental abruption and PPROM with inter pregnancy interval these findings do not agree with Agustin C. et.al (20) who found that the women with

short inter pregnancy interval are at increased risk of maternal death , third trimester bleeding ,PPROM , puerperal endometritis and anemia .

- According to our findings there is no effect of inter pregnancy interval on the maternal morbidity during pregnancy such anemia ,DM, PE this result is contrast to finding of Ignace H. et.al (15) they found a strong effect of long intervals on the maternal morbidity .but our result about PE consist with study of Jinmel

Z. et.al (21)who saied women of long inter pregnancy interval did not increase risk of pregnancy eclampsia. all of these findings in our study could be due to increase awareness and education level ,and women become more committed to pre pregnancy care and regular ante natal care during pregnancy.

- In our study we found there is no significant relation between inter pregnancy interval and birth weight.
- In our study we found there is no significant relation between inter pregnancy interval and birth weight.

And also found there is no relation between inter pregnancy interval with SGA , preterm labor and low birth weight ,this study agree with study done by Giliain E. et.al (22) who concluded that the associations between inter pregnancy interval and adverse neonatal outcomes (preterm labor ,SGA birth and low birth weight) was no longer significant but disagree with study of Agustin C. et.al (8) who found that inter pregnancy interval of less than 17 months or more than 59 months were associated with higher incidences of preterm labor , low birth weight infants and SGA infants.

- In our study we found the inter pregnancy interval length do not effect on the rate of NICU admission but this does not agree with the result of Emily A. et.al (4) study that found the short and long IPIs increase the risk of NICU admission .

- Also we found that the length of IPI not increase the risk of neonatal morbidity and this in contrast to conclusion of Mignini LE et.al (23) study they saied that short IPIs of less than 12 months are associated with a small risk of neonatal mortality and morbidity , but the longer interval of more than 24 months are safe for the baby . Our results could be due to small sample size and limited time that we have to complete our study .
- At the end we found that the length of inter pregnancy interval don't effect on the mode of delivery this disagree with Tetsuya K. et.al (17) that they found in there study the long IPIs of 60 months and greater compered to an inter pregnancy interval of 18 – 59 months was associated with higher odds of cesarean delivery , this could be also due to limited time and small size of sample so may be if we increase the size of sample and time we found relation .

Conclusion ;

- An inter pregnancy intervals don't effect on the obstetrical complication , incidence of preterm birth , SGA ,and low birth weight ,NICU admission ,neonatal morbidity and maternal morbidity .
- the length of birth spacing don't increase the risk of cesarean section .
- the age and parity are from determinants of the length of IPIs in our community .

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