

## INTER PREGNANCY INTERVALS AND OBSTETRICAL , MATERNAL AND NEONATAL COMPLICATIONS IN PREGNANT WOMEN ATTENDING AL BATOOL MATERNITY TEACHING HOSPITAL IN DIYALA

Sawsan Talib Salman <sup>1\*</sup>, Afrah Hatam Marza <sup>2</sup>, and Huda Khaleel Ibrahim <sup>3</sup>

1. Department of Obstetrics and Gynecology- College of Medicine- University of Diyala-Diyala-Iraq.
  2. Baquba Teaching General Hospital- Diyala- Iraq
  3. Al Batool Maternity Teaching Hospital department of obstetrics and gynecology, Diyala- Iraq
- \*corresponding author [sawsan@uodiyala.edu.iq](mailto:sawsan@uodiyala.edu.iq)

### ABSTRACT

**Background :** Interpregnancy intervals (IPI) whether it was short or long do accompany with poor birth consequences. Short birth interval caused damage to perinatal, neonatal, child and maternal health. Needless to mention that women with IPI are more likely to develop cardio- vascular diseases; furthermore, recent research explain there is a correlation between extremes in IPI and autism spectrum disorder development in offspring.

**Aim of the study :** This study aimed to present the correlation between extremes in IPI and set of obstetrical , neonatal and maternal complications.

**Patient and method :** This retrospective study conducted by researchers in AL Batool Maternity Teaching Hospital – Diyala, Iraq targeted all pregnant women visited obstetrics and gynecology department from Dec,2021 to April, 2022.Indeed, inter pregnancy interval adopted as a criteria to split groups of 102 samples in to three categories. First category included 36 pregnant women with IPI less than 18 months. Second included 36 pregnant women with the range of (18-59) months and last category included IPI greater than 60 months. Hence, considerable information gathered by questionnaire to list maternal history in this study such as age, gravida, para, abortion , last menstrual period ,gestational age ,expected date of delivery ,date of admission ,date of delivery , medical and obstetrical complications, in addition to neonatal morbidity.

**Results:** Among 102 participants of more than one pregnancy subjected to this study . 36(35.29%) with < 18 months IPIs , 36 (35.29%) between (18-60) months IPIs and 30 (29.41%) >60 months IPIs. Table (1) illustrates concrete link between age , parity and IPI of P value less than 0.01. Inter pregnancy interval <18 months of age range from 16-29 yrs. Inclined to have the highest percentage. similarly groups of one or two deliveries reflect highest percentage of IPI <18 months. Additionally, groups of age from 30-43 yrs. tend to have highest percentage of IPIs >60 months and this comes close or similar to the percentage of women who have three or more deliveries.

### Conclusion :

- To conclude what is studied and observed in term of implications of interpregnancy intervals on series of complications such as weight, premature birth , admission to NICU, maternal or neonatal morbidity, SGA.
- Pregnancy intervals length has no relation to the potential of having surgical delivery.
- parity and age versus IPIs length of targeted cases in our research.

**Key words :** inter pregnancy interval length , maternal and obstetrical complications, infants morbidity, weight of birth

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## **INTRODUCTION**

Interpregnancy intervals (IPI) whether it was short or long do accompany with poor birth consequences like preterm birth (PTB <37 weeks of gestation), small for gestational age (SGA), low birth weight (LBW) and other perinatal impacts. What presented has supported by Meta-analysis report that showed short (<6 mon.) and long (>60 mon.) IPIs become vulnerable to the risk of PTB, SGA, LBW in comparison to (18-23 months) IPIs. (1,2,3,4,5).

Based on WHO recommendation, a range from 2-3 yrs. IPI suggests to decline Childs' morbidity and mortality. Indeed, great deal of research promoted non-linear relation between undesirable birth outcomes and IPIs along with minimum perinatal effects of 18-23 months IPIs.(6,7)

The definition of short inter pregnancy interval (IPI) or "closely spaced pregnancy" previously called is the interval of less than 18 months from the time of giving birth to the next pregnancy.(8)

Although potential risk of 18-24 months IPI is marginal, information on potential risk of IPI subsequent to abortion are not obvious. Accordingly , only health outcomes accompanied short IPI subsequent to birth presented in this criterion.(9)

There are groups of negative impacts engaged with short birth to pregnancy interval through which perinatal, neonatal and child health affected like low birth weight, perinatal death, still birth, intellectual disability and developmental delay. In addition to what is mentioned , some maternal health impact appeared such as nutritional depletion, anemia, cervical insufficiency, antepartum hemorrhage,premature rupture of membrane, and eclampsia.(10,11,12)

Three factors might interpret the correlation between short IPI and maternal complications. First and most common is lack of nutrition as of inadequate time to recover necessary elements and vitamins like (folate, iron) especially for women based in poor countries.(13,14,15)

Second aspect of potential outcomes is mental and bodily strain created by providing care and breastfeeding to newborn during a pre-term next pregnancy. Third point is constraint of time for genital injuries and hormones to recover from last pregnancy and birth. Also, it is worth mentioning that those factors do affect on maternal health and pregnancy index. (15)

With reference to recent studies conducted , there is a relation between extremes in IPI and autism spectrum disorder development in offspring ;furthermore, such length in IPI would increase the incidence of cardio-vascular diseases.(16)

Some physiologic adaptations occurred tentatively to reproductive system during pregnancy based on a hypothesis like increasing blood flow to the uterus. This is observed by an experience applied on mice that demonstrated a response in remodeling of uterine artery which constantly return to its nature after giving birth and during postpartum. Such adaptations represented by physiologic properties could recede in case of long IPIs and would be similar to primigravid women. (17,18)

This research substantially support physicians ,nurse, midwives and mothers to understand means of Complication and outcomes incorporated with short and long IPI and later consequences on newly born babies. Also, it can help women for precisely deciding the length after giving birth to the next pregnancy.

### **Aim of the study :**

This study aimed to present the correlation between extremes in IPI and set of obstetrical , neonatal and maternal complications.

### **PATIENT AND METHOD :**

This retrospective study conducted by researchers in AL Batool Maternity Teaching Hospital – Diyala, Iraq targeted all pregnant women visited obstetrics and gynecology department from Dec,2021 to April,2022.Indeed, Inter pregnancy interval adopted as a criteria to split groups of 102 samples in to three

categories. First category included 36 pregnant women with IPI less than 18 months. Second included 36 pregnant women with the range of (18-59) months and last category included IPI greater than 60 months.

Inclusion criteria :

- Women with 2 or more consecutive pregnancy.
- Age from 16 to 43 years .
- Willing to participate in this study .

Exclusion criteria :

- primigravida
- Unknown last menstrual period.

In this study, considerable information gathered by questionnaire to list maternal history such as age, gravida, para, abortion, last menstrual period, 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.

**RESULTS :**

Among 102 participants of more than one pregnancy subjected to this study. 36(35.29%) with < 18 months of IPIs, 36 (35.29%) between (18-60) months of IPIs and 30 (29.41%) >60 months of IPIs. Referring to the relation between length of IPI and age table (1) illustrates that long Interpregnancy interval > 60 months found among 30-43 age group 27(50%) while it was only 3(6.3%) among (16-29) age group. on the opposite short IPI < 18 months was higher among age group of 16-29 yrs. 26 (54.2%) while age group 30-43 yrs. show lower number 10 (18.5%). Those findings extremely represent p-value of 0.0001.

Additionally, number of previous deliveries directly correlated to the length of IPIs. For instance, previously three or more deliveries found with IPI of (18-60) months. IPI> 60 months 28 (43.1%), 26 (40.0%) respectively. Only 1(25%) of IPI (18-60) months had one previous delivery.

**Table 1 : Showing Demographic Characteristics of pregnant women included in this study**

	<18 months	18 - 60months	>60 months	Total	P value
<b>Age class ;</b>					<b>0.000**</b>
<b>16-29</b>	26 (54.2%)	19 (39.6%)	3 (6.3%)	48 (100.0%)	
<b>30-43</b>	10 (18.5%)	17 (31.5%)	27 (50.0%)	54 (100.0%)	
<b>Previous delivery ;</b>					<b>0.000**</b>
<b>Previous 1 delivery</b>	3 (75.0%)	1 (25.0%)	0 (0.0%)	4 (100.0%)	
<b>Previous 2 delivery</b>	20 (58.8%)	7 (22.6%)	4 (12.9%)	31 (100.0%)	
<b>Previous 3 and more delivery</b>	11 (16.9%)	28 (43.1%)	26 (40.0%)	65 (100.0%)	

P value > 0.050 (not significance) , < 0.050 (significance) \*

≤ 0.010 (highly significance) \*\*

In this study no substantial correlation found between obstetrical complications and length of IPI cause there were only seven cases out of 102 cases with preterm labour and 3 cases with abruption placenta .IPI from 18-60 implied higher percentage (57.1%) of preterm labour as shown in table 2.

**Table 2: Obstetric complications versus inter pregnancy interval**

	< 18 Months	18 - 60Months	>60Months	total	P value
Preterm labor;	1 (14.3%)	4 (57.1%)	2 (28.6%)	7 (100.0%)	<b>0.376</b>
Placental abruption ;	0 (0.0%)	1 (33.3%)	2 (66.7%)	3 (100.0%)	0.279

Maternal morbidity versus IPI stated in table 3 statistically clarified of non importance. Whereas, IPI of 18-60 showed higher incidence of anemia (38.5%). Also, PE among IPI of > 60 months shown higher (41.4%). Noted that DM was not reported with IPI of < 18 months.

**Table 3: showing Maternal morbidity versus inter pregnancy intervals**

	<18 months	18 -60Months	>60Months	Total	P value
Anemia	17 (32.7%)	20 (38.5%)	15 (28.8%)	52 (100.0%)	0.772
PE	8 (27.6%)	9 (31.0%)	12 (41.4%)	29 (100.0%)	0.239
DM	0 (0.0%)	2 (50.0%)	2 (50.0%)	4 (100.0%)	0.313

(PE) Preeclampsia, (DM) Diabetes mellitus

Table 4 demonstrated number of neonatal complication in accordance to IPI. Starting with birth weight, in all IPI was found approximately normal birth weight except one case of IPI from (18-60) months has shown high birth weight which statistically considered non-important ( p- value > 0.05). Also, neonatal morbidity including ( RDS, hypoglycaemia, sepsis, SGA and admission to NICU) statistically considered of non-importance ( p- value of > 0.05).

**Table 4: neonatal complication against inter pregnancy interval.**

	<18months	18- 60Months	>60Months	Total	P value
<b>Birth weight ;</b>					
<b>Normal birth weight</b>	34 (36.6%)	32 (34.4%)	27 (29.0%)	93 (100.0%)	0.675
<b>Low birth weight</b>	2 (25.0%)	3 (37.5%)	3 (37.5%)	8 (100.0%)	
<b>High birth weight</b>	0 (0.0%)	1 (100.0%)	0 (0.0%)	1 (100.0%)	
<b>Neonatal morbidity;</b>					
<b>No neonatal morbidity</b>	33 (38.4%)	31 (36.0%)	22 (25.6%)	86(100.0%)	0.253
<b>RDS</b>	2 (16.7%)	4 (33.3%)	6 (50.0%)	12 (100.0%)	
<b>Hypoglycemia</b>	0 (0%)	0 (0%)	1 (100.0%)	1 (100.0%)	
<b>sepsis</b>	0 (0%)	0 (0%)	1 (100.0%)	1 (100.0%)	
<b>Admission to NICU:</b>	2 (13.3%)	5 (33.3%)	8 (53.3%)	15 (100.0%)	0.059
<b>SGA ;</b>	0 (0.0%)	1 (100.0%)	0 (0.0%)	1 (100.0%)	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 ), high birth weight (more than 4 kg)  
 (19) .

Regarding method of childbirth and its correlation to IPI , caesarean section was the most common method in all IPI intervals ;however, small number delivered by normal vaginal delivery as shown in table 5.

**Table 5 mode of delivery against inter pregnancy interval .**

	< 18 months	18 -60months	> 60 months	Total	P value
<b>Mode of delivery</b>					<b>0.800</b>
<b>Vaginal delivery</b>	8 (38.1%)	8 (38.1%)	5 (23.8%)	21 (100.0%)	
<b>Cesarean section</b>	27 (33.8%)	28 (35.0%)	25 (31.3%)	80 (100.0%)	

## **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 were women with age group between 16-29 years while the highest percentage of more than 60 months inter pregnancy interval group were 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 preterm labor 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 .

Through our research no direct relation found between interpregnancy interval and maternal morbidity during period of pregnancy like (anemia, DM, PE ); however, what is implied totally varied with Ignace H. et.al (15) findings of strong association between maternal morbidity and long inter pregnancy interval. Truly our finding goes in accordance to Jinmel Z. et.al (21) study which stated long inter pregnancy interval has no effect on ascending pregnancy eclampsia risk. To put it in a nutshell, we reach to such finding because of academic and perception development which stimulates women to follow pre-pregnancy and antenatal care courses

Our conducted research clearly showed that direct correlation between birth weight and inter pregnancy intervals is almost inconsiderable.

Furthermore, our research conformed to Giliain E. et.al (22) conclusion that emphasized no impact of interpregnancy interval on neonatal bad outcomes like (preterm labor, SGA birth, low birth weight). On the contrary, research study carried by Agustin C. et al (8) showed that interpregnancy interval less than 17 months or more than 59 months substantially related to those negative outcomes such as preterm labor, low birth weight and SGA of infants.

Also, through our study we did not observe connection between admission rates to NICU and length of inter pregnancy intervals ; however, this conclusion would oppose the result of Emily A. et.al (4) finding through which clarified both short and long intervals heightened the chance of NICU admission.

Actually our research on pregnancy interval length showed no effect on neonatal morbidity whether short or long intervals and this claim is in opposition to the study of Mignini LE et.al (23) that clarified IPIs <12 months exposed mothers to a minimum risk of neonatal mortality and morbidity whereas IPIs >24 months considered secured. Also, we can admit that our results built on limited samples and timeline to complete it. Lastly, our study stated that interpregnancy intervals unrelated to methods of childbirth; in contrast to Tetsuya K. et.al (17) study that found IPIs >=60 months unlike IPIs (18-59) months was vulnerable to cesarean delivery.

## CONCLUSION :

- To conclude what is studied and observed in term of implications of interpregnancy intervals on series of complications such as weight, premature birth , admission to NICU, maternal or neonatal morbidity, SGA.
- Pregnancy intervals length has no relation to the potential of having surgical delivery.
- parity and age versus IPIs length of targeted cases in our research.

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