Original Article

COMPARATIVE STUDY OF INTERPREGNANCY INTERVAL AND FETOMATERNAL OUTCOME IN A TERTIARY HEALTH FACILITY

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ABSTRACT

Background: Ensuring adequate interpregnancy interval enhances optimal maternal and fetal wellbeing while short interpregnancy interval which is interpregnancy interval less than 24 months is associated with adverse maternal and fetal outcomes.

Objectives: To compare pregnancy outcome between short and normal interpregnancy interval at the University of Port Harcourt Teaching Hospital (UPTH).

Methods: This was a prospective cross-sectional study involving 410 parturients (268 with short interpregnancy interval and 142 with normal interpregnancy interval) who consented and delivered at the UPTH. A structured proforma was used to obtain relevant information from the parturients. The data was analyzed using SPSS version 21.0. Pregnancy outcomes which include maternal anaemia, caesarean section rate, uterine rupture, abruption placenta, fetal distress, perinatal mortality between normal interpregnancy interval (NIPI) and short interpregnancy interval (SIPI) were compared using Chi square test and *P* value less than 0.05 was regarded as significant.

Results: The mean age and parity of the study population were 32.59±0.38 and 2.69±0.44 respectively. One hundred and forty-two parturients had NIPI while 268 (65.4%) had SIPI. Parturients with SIPI were 1.4 times more likely to have caesarean delivery (OR=1.36, 95% CI= 0.88-2.11). Maternal anaemia (*P* = 0.026), abruptio placentae (*P* = 0.03) and ruptured uterus (*P* = 0.005) were significantly associated with SIPI. Low birth weight (P=0.1) and fetal demise (P=0.4) were not significantly associated with SIPI.

Conclusion: Short interpregnancy interval was associated with significant adverse pregnancy outcome in this study. Ensuring adequate interpregnancy interval will improve outcomes.

Keywords: Normal interpregnancy interval, Short interpregnancy interval,maternal outcome, fetal outcome.

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INTRODUCTION

Interpregnancy interval (IPI) is defined as the period between delivery of the previous infant and conception of the current pregnancy.[1] Adequate interpregnancy interval has been shown to be associated with good fetomaternal outcome whereas short interpregnancy interval (SIPI) has been linked to poor obstetric outcome particularly infant mortality in developing countries.[2,3]

Studies have demonstrated the harmful effects of SIPI both on the mother and the fetus. Fetal complications associated SIPI include intrauterine growth restriction, prematurity, low birthweight, and neonatal jaundice. Maternal complications associated with SIPI include increased risk of operative deliveries, anaemia, uterine rupture, placenta abruptio, placenta praevia and puerperal sepsis.[4-7]The impact of SIPI is greater in very young women because the immature adolescent who is yet to complete her growth may compete with her fetus for nutrients, leading to depletion of maternal micronutrients particularly folic acid and, if a new conception occurs before this reserve is sufficiently restored, growth and development of the conceptus may be compromised.[4]

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There are direct and indirect factors that have been noted to contribute to high prevalence of SIPI especially in developing countries. These factors include desires for male child due to certain cultural recognition like land allocation and the believe that it is only the male child that immortalizes the family lineage. Another cultural factor is the believe that the more children an individual has, the more the individual is regarded and respected.[5,8]Other factors that contribute to SIPI include poor educational background, poverty, advance maternal age and poor utilization of family planning services.[8-12]

Several studies have postulated different interpregnancy interval (IPI) considered adequate for good obstetric outcome but for the purpose of this study the world health organization (WHO) recommendation of an interval of at least 24 months shall be regarded as adequate or normal interpregnancy interval (NIPI)[8,13-15] A previous study in Port Harcourt, Nigeria revealed an incidence of SIPI of 65.9% using the recommendation of the world health organization technical groupbut the study did not consider the obstetric implications of SIPI.[8] This study, therefore, was conducted to determine and compare adverse fetomaternal outcomes between short and normal interpregnancy interval and to make appropriate recommendations.

MATERIALS AND METHODS

This was a prospective cross-sectional study comparing obstetric outcomes between women that had short interpregnancy interval with those of normal interpregnancy interval at the University of Port Harcourt Teaching Hospital. Ethical approval was obtained for the conduct of the study with informed consent from the participants. The study was conducted over a six-month period from February – August 2018. It was cross sectional study involving all parturientsin labour who consented and met the eligibility criteria. Parturients who were nulliparous, those whose preceding pregnancy ended in a miscarriage or could not recall the dates of their last menstrual period and last childbirth were excluded from the study. Four hundred and ten parturients made up of 268 parturients with SIPI and 142parturients with NIPI were selected. A structured proforma was used to collect both sociodemographic and obstetric characteristics. Information obtained and outcomes determined include parity, the interpregnancy interval, packed cell volume (PCV) at booking(anaemia = PCV < 30%), APGAR scores, low birth weight, prematurity, fetal demise, operative deliveries, placenta praevia, postpartum haemorrhage and uterine rupture. The data was analyzed using SPSS version 21.0 (IBM, Armonk, USA).WHO technical report recommendation of normal interpregnancy interval (NIPI) of 24 months and short interpregnancy interval (SIPI) of less than 24 months was used in this study.[14] Chi square test (X^2) and Fishers exact test were used to compare variables between short and normal interpregnancy interval and a *P* value less than 0.05 was regarded as significant.

Sample size: The sample size was calculated from the formula[16] $n=Z^2P(1-P)/d^2$using the prevalence of SIPI of 65.9% from a previous study by Bassey et al[8]. The minimum sample size calculated was 369. Allowing an attrition rate of 10% gave a minimum sample size of405. Four hundred and ten parturients were enrolled in the study.

RESULTS

The mean age of the study population was 32.59 ± 0.38 and ranged from 20 to 51 years. The mean parity was 2.69 ± 0.44 and ranged from 1-7. One hundred and ninety-six (47.8%)parturients were business women while one hundred and thirty-eight were

housewives. One hundred and ninety (46.3%) women had tertiary education and 160 (39.0%) had secondary education. Two hundred and eighty parturients had antenatal care (booked) in the study facility and 104 (37.1%) had normal interpregnancy interval while one hundred and thirty parturients were referred (unbooked) of which 38 (29.2%) had NIPI.The commonestinterpregnancy interval as shown in table 1 was 24 months and above which accounted for 34.6% (142) representing NIPI. Two hundred and sixty-eight (65,4%) parturients had IPI less than 24 months representing SIPI.

Table 2 shows the interpregnancy interval and the mode of delivery. Caesarean section rate of 45,5% (n=122) in the SIPI group was higher than the caesarean section rate of 38.0% (n=44) in the NIPI group but the difference was not statistically significant *(P*=0.14). However, parturients with short interpregnancy interval were 1.4 times more likely to have a caesarean delivery (OR= 1.4). As high as 58% of those with IPI of less than 6 months had caesarean section. More parturients 57.7% with NIPI had vaginal delivery compared to 48.5% that had SIPI, the difference was however not significant (x^2=3.17, p = 0.07, OR=0.7). In terms of maternal complications and interpregnancy interval as shown in table 3, it was observed that 50% of parturients withuterine rupture had interpregnancy less than 6 months whereas uterine rupture did not occur in any parturient with interpregnancy interval of at least 18 months. Most cases of uterine rupture occurred amongst the unbooked patients with previously scarred uterus. Table 4 shows thatanaemia, abruptio placentae and uterine rupture were significantly associated with SIPI when compared with NIPI as evident by their respective *P* values whereas the occurrence of placentae praevia, primary postpartumhaemorrhage and puerperal sepsis did not reveal any statistical difference between SIPI and NIPI. Parturients with SIPI were abouttwice likely to have anaemia as shown by the odds ratio (OR=1.9, CI= 1.04-3.52) in table 4.

TABLE 1: Socio-demographic characteristics and other variables

VARIABLES	FREQUENCY (N= 410)	PERCENTAGE
AGE (Years)		
21-30	133	32.4
31-40	224	54.6
41- 50	48	11.7
51 and above	5	1.2
OCCUPATION		
House wife	138	33.7
Farming	14	3.4
Business entrepreneur	196	47.8
Civil servant	52	12.7
Public servant	10	2.4
LEVEL OF EDUCATION		
None	14	3.4
Primary	46	11.2
Secondary	160	39.0
Tertiary	190	46.3
PARITY		
1-2	166	40.5
3-4	206	50.2
5 and above	38	9.3
INTERPREGNANCY INTERVAL (MONTHS)		
< 6	38	9.3
6 - < 12	58	14.1
12 - < 18	106	25.9
18 - < 24	66	16.1
24 and above	142	34.6

Table 2: **Comparing the mode of delivery between the two groups**

IPI	Mode of delivery (%)				
	CS	SVD	AVBD	DO	Total
SIPI	122 (45.5)	130 (48.5)	14 (5.2)	2 (0.7)	268
NIPI	54 (38.0)	82 (57.7)	6 (4.2)	0 (0.0)	142

IPI – Interpregnancy interval
CS- Caesarean section
SVD – Spontaneous vaginal delivery
AVBD - Assisted vaginal breech delivery
DO –Destructive operation

Table 3: Interpregnancy interval and fetomaternal complications

Complications	Interpregnancy interval (%)				
	< 6 months	6- <12 months	12 - <18 months	18 -< 24 months	≥ 24 months
Anaemia	14 (18.4)	10 (13.2)	22 (28.9)	12 (15.8)	18 (23.7)
Abruptio Placenta	2 (25)	2 (25)	2 (25)	2 (25)	0 (0)
Placenta praevia	2 (14.3)	2 (14.3)	2 (14.3)	2 (14.3)	6 (42.9)
Uterine rupture	6 (50)	4 (33.3)	2 (16.7)	0 (12.5)	0 (25.0)
Primary PPH	10 (27.8)	6 (16.7)	2 (5.6)	6 (16.7)	12 (33.3)
Puerperal sepsis	2 (12.5)	8 (50.0)	0 (0)	2 (12.5)	4 (25.0)
Prematurity	8 (13.3)	16(26.7)	16 (26.7)	4 (6.7)	16 (26.7)
Low birthweight	4 (28.6)	6(42,9)	2 (14.3)	0 (0)	2 (14.3)
Perinatal death	0 (0)	4 (50)	2 (25)	0 (0)	2 (25)

PPH – Post Partum Haemorrhage

Table 4: Comparison of fetomaternal complications between normal and short interpregnancy interval

Complications	SIP n = 268I (%)	NIPI n= 142 (%)	Total n=410 (%)	*P* value	Odds ratio
Anaemia	58 (21.6)	18 (12.7)	76 (18.5)	0.026	1.90
Abruptio placentae	8 (3.0)	0 (0)	8 (1.95)	0.03	Undefined
Placenta praevia	8 (3.0)	6 (4.2)	14 (3.41)	0.50	0.79
Uterine rupture	12 (4.5)	0 (0)	12 (2.92)	0.005	Undefined
Post-partum haemorrhage	24 (8.9)	12(8.4)	36 (8.8)	0.86	1.07
Puerperal sepsis	12 (4.5)	4(2.8)	16 (3.9)	0.40	1.62
Prematurity	44 (16.4)	16 (11.3)	60 (14.6)	0.16	1.55
Low birth weight	12 (4.5)	2 (1.4)	14 (3,41)	0.10	3.28
Fetal demise	6 (2.2)	2 (1.4)	8 (1.95)	0.43	1.60

DISCUSSION

The mean age of the study population was 32.59 ± 0.38 with as high as 67.3% of the parturients conceiving after 30 years of age. This finding as shown in table 1 can explain the contribution of advancing maternal age in short interpregnancy interval as these women have concerns about difficulties in conceiving at advanced age, and are thus likely to aim for another pregnancy soon after delivery.[10-12]

Thirty-eight (9.3%)parturients of the study population conceived within 6 months of their last birth which is slightly higher than the 6.7% [17]reported by Gemmill et al and as high as 65.4 % of the study population had SIPI based on the recommendation of the WHO technical committee.[13,14] This high prevalence of SIPI maybe linked to the high percentage of parturients with low parity and advanced maternal age as evident in this study.

This study demonstrated that IPI somewhat influenced the mode of delivery as parturients with SIPI were likely to have caesarean delivery compared with those with NIPI (45.5% vs 38.0%) and as high as 57% of those with IPI less than 6 months had caesarean delivery. This high repeat caesarean section rate was observed mostlyin parturients with IPI less than one year and failed attempt as vaginal birth as similarly reported by Lilungulu et al in Tanzania.[5]Parturients with previous uterine scar and very short interpregnancy interval were likely to have elective caesarean delivery due to the increased risk of uterine rupture from inadequate scar integrity.

Regarding the complications of SIPI, this study demonstrated a significant increase in both maternal and neonatal complications compared to normal interpregnancy interval (NIPI). This study demonstrated that maternal anaemia, uterine rupture and abruptio placentae were significantly associated with SIPI. Maternal anaemia was observed in as much as 18 (23.7%) of those with IPI of less than 6 months, while as few as 6 (15.8%), 6 (15.8%) where seen in those with IPI between 18 - <24 and 24 months and above respectively. This was similarly reportedin theUruguay study.[18] Maternal anaemia could be attributed to the inability of the parturient to recover from the blood loss in the previous confinements as well as in adequate nutrition that herald the study population and environment. The incidence of uterine rupture was noted to be increasing

with decreasing IPI. It was observed that 50% (6) of those with IPI of < 6 months had uterine rupture, while 33.3% (4) occurred in those of 6- < 12months and 16.7% (2) in those of 12 - < 18 months while none occurred in those with IPI of 18 months and above. Matthew et al reported similar findings in their study.[19]Uterine rupture is heightened in cases of previously scarred uterus and multiparity in that due to deficient healing and recovery the weakened uterus may give way easily during labour. Uterine rupturewas recorded mostly in the unbooked patients with poorly or unsupervised labour, who were referred to the study facility with ruptured uterus. Due to the association between increased operative deliveries, uterine rupture and abruptio placentae with SIPI, there was expectedly an increased incidence of postpartum haemorrhage as noted in this study where 66.7% of parurients that had PPH had SIPI compared with 33.3% with NIPI. The difference which was not statistically significant is at variance with reports fromLilungulu et al who reported significant association between SIPI and post-partum haemorrhage.[5]

Prematurity was also observed to be higher amongst parturients with SIPI than NIPI (16.4% vs 11.26%) but the difference was not statistically significant. The higher prevalence of prematurity may be explained by the high prevalence of fetomaternal complications associated with SIPI necessitating preterm interventions and deliveries.Preterm delivery almost always results in the delivery of low birth weight babies. Several studies have similarly reported association of SIPI with prematurity and low birth weight.[5,7,17,20-22]

Despite the above-mentioned complications associated with SIPI, this study did not demonstrate any significant association between short interpregnancy interval and perinatal mortality. This finding in this study slightly differs with those noted in some other studies.[3,5,7.17,23]Most cases of intrauterine fetal death occurred amongst the unbookedparturients before referral to the study centre.

CONCLUSION

Short interpregnancy interval is associated with adverse fetal/neonatal and maternal outcomes with attendant burden on the family, health care providers and the society at large. Hence it is recommended that provision of family planning services for adequate child spacing will help mitigate against the consequences of SIPI.

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