ORIGINAL ARTICLE

BIRTH INTERVAL AND MATERNAL OUTCOME IN UNIVERSITY OF MAIDUGURI TEACHING HOSPITAL – A CROSS SECTIONAL STUDY

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ABSTRACT

Introduction: Although birth spacing is recognised as a major determinant of various infant health indicators, the effect of interpregnancy interval on maternal pregnancy outcomes has received less attention.

Aim: To determine the effect of interpregnancy interval on maternal outcome in our environment after controlling for confounding factors.

Method: A cross sectional study, conducted at the university of Maiduguri teaching hospital. The subjects were multiparous women carrying singleton pregnancy who come to deliver at the hospital Obstetrics and Gynaecology unit during the study period. A pretested questionnaire was used to obtain data which was analyse with SPSS. The effect of birth interval on maternal outcome was determined using multivariate analysis after controlling for confounding variables.

Result: Out of the 1334 participants that fulfilled the inclusion criteria and approached for the study, complete data was obtained in 1188 women; a response rate of 89%. The mean maternal age was 28.7±5.7 years, mean parity 4.3±2.2 and the mean birth interval was 32.9±18.4 months. Short birth interval was found to be associated with high parity OR (95%CI) =1.559(1.150-2.113), preterm delivery OR (95%CI)= 2.462(1.518-3.994) and development of anaemia in pregnancy OR (95%CI) =1.77(1.058-2.959) while long birth interval was associated with development of hypertension in pregnancy OR (95%CI) = 3.001(1.734-5.195) and delivery by caesarean section OR (95%CI) = 4.884(2.499-9.546)

Conclusion: Short birth interval was associated with higher parity, anaemia and preterm delivery while long birth interval was associated with hypertension and caesarean section.

KEYWORDS: Short birth interval, Long birth interval, Maternal outcome, UMTH

INTRODUCTION

Birth spacing is being increasingly recognised as a major determinant of various infant health indicators,[1] but the effect of interpregnancy interval on maternal morbidity and mortality has received less attention although both short and long birth intervals have been associate with adverse pregnancy outcomes.[1-3] Short Inter pregnancy interval has been associated with anaemia, preterm premature rupture of membranes, third-trimester bleeding, placental abruption, placenta previa and the postpartum complication of puerperal endometritis[4]. On the other hand long Interpregnancy interval has been associated with increased risk for preeclampsia[4] and labour dystocia[5].

The increased risk of adverse pregnancy outcomes related to short interpregnancy intervals has been attributed to maternal depletion hypothesis (nutritional stresses of successive pregnancies and lactations)[6] and possibly maternal folate deficiency[7]. Some adverse maternal outcome like risk of

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preeclampsia has been shown to be directly proportional to the time elapsed since the previous birth, with an adjusted OR of approximately 1.1 for every additional year[4,8]. This is more likely because the cardiovascular adaptations from previous pregnancies contributing to a reduced risk for preeclampsia are short lived and are lost with increasing duration.

However some studies showed no association between interpregnancy interval and maternal outcome [9-11] and it was also suggested that some maternal characteristics may confound the association between interpregnancy interval and risk of adverse pregnancy outcome[7,12]. The aim of this study is to determine the effect of interpregnancy interval on maternal outcome in our environment after controlling for possible confounding factors.

MATERIALS AND METHODS

This was a cross sectional study conducted at the Obstetrics and Gynaecological unit of University of Maiduguri Teaching Hospital, from 1st January, 2008 to 31st December 2010 to determine the effect of birth interval on maternal pregnancy outcome.

Pregnant women who deliver at the university of Maiduguri Teaching Hospital obstetrics and gynaecology unit during the study period were used for the study. The inclusion criteria are multiparity and singleton pregnancy. Primigravidae and women with multifetal gestation were excluded.

The sample size for the study was obtained according to WHO methodology using a prevalence rate of 50%, degree of confidence of 95% and an error margin of 3%. This yielded a sample size of 1067, which was increased to 1334 to account for 20% attritions and increases power. Convenient sampling was used to recruit the study population who were administered pretested questionnaire to obtain the relevant information after getting their informed consent. The study population were recruited after their delivery in the study centre. The data obtained includes age, parity, educational status and occupation. Pregnancy outcome variables like gestational age at delivery, mode of delivery, development of medical disorders such as anaemia, were also obtained. These outcome variables were predetermined base on their relevance as regard pregnancy management.

From the dates of the present birth and last termination of pregnancy (birth or otherwise), birth interval was calculate in weeks and then converted to months. Ethical clearance was obtained from the ethical committee of the hospital.

Gestational age was calculated using last menstrual period and Ultrasound scan and where there is discordance the USS date was use. Preterm delivery is defined as delivery before 37 completed weeks and anaemia packed cell volume (PCV) less than 30% while hypertension in pregnancy is development of gestational hypertension or preeclampsia. Education is defined as having completed at least primary school. Statistical analysis was done with SPSS version 18.0 (SPSS, Chicago, ILL, USA). The sociodemographic and obstetrics characteristics were presented as number and percentages. Multivariate logistic regression analysis was used to evaluate the effect of Birth interval on maternal pregnancy outcome controlling for possible confounding factors. $P<0.05$ is considered statistically significant.

RESULT

Out of the 1334 participants that fulfilled the inclusion criteria and approached for the study, complete data was obtained in 1188 women; a response rate of 89%. The mean maternal age was 28.7±5.7 years, mean parity 4.3±2.2 and the mean birth interval was 32.9±18.4 months.

Table 1 show the demographic and obstetrics characteristics of the study population.

Majority of the patients 95.3% were within the age group 20-39 years and 68% were educated. The birth interval was short (<36months) in 65% of the study subject. About 156(13.1%) had preterm delivery, 18(1.5%) developed anaemia and 27(2.3%) had APH.

Table 2 and 3 is a multivariate analysis showing the relationship between short and long birth interval and maternal pregnancy outcome after controlling for confounding factors. Short birth interval was found to be associated with high parity OR (95%CI) =1.559(1.150-2.113), preterm delivery OR (95%CI)= 2.462(1.518-3.994) and development of anaemia in pregnancy OR (95%CI) =1.77(1.058-2.959) while long birth interval was associated with development of hypertension in pregnancy OR (95%CI) = 3.001(1.734-5.195), APH OR (95%CI) = 1.75(1.063 – 2.871) and delivery by caesarean section OR (95%CI) = 4.884(2.499-9.546). Those with long birth interval were also found to be less likely to have been overweight (>90Kg) at booking OR (95%CI)= 0.323(0.124 – 0.838). Interestingly short interval was also found to be protective against caesarean section OR (95%CI) = 0.518(0.291 – 0.923).

Table 1. Demographic and Obstetrics characteristics of the study population

Characteristics	No. (%)
Age group	
<20	12(1.0)
20-39	1132(95.3)
⩾40	44(3.7)
Total	1188(100)
Parity	
⩾5	760(64.0)
<5	428(36.0)
Total	1188(100)
Education	
No formal education	380(32.0)
Educated	808(68.0)
Total	1188(100)
Occupation	
Unemployed	734(61.8)
Employed	454(38.2)
Total	1188(100)
Birth interval	
<36	772(65.0)
36-59	318(26.8)
⩾60	98(8.2)
Total	1188(100)
Gestational age at delivery	
<37	156(13.1)
37-40	876(76.8)
>40	156(13.1)
Total	1188(100)
Hypertension in Pregnancy	
Yes	99(8.3%)
No	1089(91.7)
Total	1188(100)
APH	
Yes	27(2.3%)
No	1161(97.7%)
Total	1188(100)
Anaemia	
Yes	18(1.5%)
No	1170 (98.5%)
Total	1188(100)
PROM	
Yes	10(0.8%)
No	1178(99.2%)
Total	1188(100)
Type of delivery	
Caesarean Section	146(12.3)
Vaginal	1042(87.7)
Total	1188(100)

Pregnancy outcome	Co-efficient	Odd Ratio(95%CI)	P-value
Age group			
<20	0.269	**1.308(0.225-7.611)**	**0.765**
20-39	ref	**ref**	**Ref**
⩾40	-0.320	**0.968(0.428-2.187)**	**0.938**
Parity			
⩾5	0.444	**1.559(1.150-2.113)**	**0.004**
<5	ref	**ref**	**Ref**
Education			
No formal education	0.259	**1.295(0.924-1.816)**	**0.134**
Educated	ref	**ref**	**Ref**
Occupation			
Unemployed	0.225	**1.290(0.950-1.752)**	**0.103**
Employed	ref	**ref**	**Ref**
Booking weight			
<45	-.0402	**0.669(0.185-2.419)**	**0.540**
45-89	ref	**ref**	**Ref**
⩾90	-0.062	**0.940(0.608-1.454)**	**0.782**
Gestational age at delivery			
<37	**0.901**	**2.462(1.518-3.994)**	**<0.001**
37-40	**ref**	**ref**	**Ref**
>40	**0.247**	**1.281(0.735-2.172)**	**0.358**
Hypertension in Pregnancy			
Yes	**-0.231**	**0.794(0.496-1.271)**	**0.337**
No	**Ref**	**Ref**	**Ref**
APH			
Yes	**-0.694**	**0.50(0.222-1.271)**	**0.093**
No	**Ref**	**Ref**	**Ref**
PROM			
Yes	**0.304**	**1.355(0.285-6.429)**	**0.702**
No	**Ref**	**Ref**	**Ref**
Anaemia			
Yes	**0.57**	**1.77(1.058-2.959)**	**0.03**
No	**Ref**	**Ref**	**Ref**
Type of delivery			
Caesarean Section	**-0.658**	**0.518(0.291-0.923)**	**0.026**
Vaginal	**ref**	**ref**	**Ref**

Table 3: Logistic regression analysis showing pregnancy outcomes of patients with long birth interval (>60weeks) in the study population

Pregnancy outcome	Co-efficient	Odd Ratio(95%CI)	P-value
Age group			
<20	0.269	**1.308(0.225-7.611)**	**0.765**
20-39	ref	**ref**	**Ref**
⩾40	-0.320	**0.968(0.428-2.187)**	**0.938**
Parity			
<5	0.356	**1.428(0.812-2.510)**	**0.216**
⩾5	ref	**ref**	**Ref**
Education			
No formal education	-0.560	**0.571(0.229-1.092)**	**0.090**
Educated	ref	**ref**	**Ref**
Occupation			
Unemployed	-0.098	**0.907(0.522-1.570)**	**0.728**
Employed	ref	**ref**	**Ref**
Booking weight			
<45	-.0402	**0.669(0.185-2.419)**	**0.540**
45-89	ref	**ref**	**Ref**
⩾90	-1.131	**0.323(0.124-0.838)**	**0.020**
Gestational age at delivery			
<37	**-1.607**	**0.200(0.043-0.943)**	**0.042**
37-40	**ref**	**ref**	**Ref**
>40	**-0.044**	**0.957(0.375-2.442)**	**0.926**
Hypertension in Pregnancy			
Yes	**1.099**	**3.001(1.734-5.195)**	**<0.001**
No	**ref**	**ref**	**Ref**
APH			
Yes	**0.558**	**1.75(1.063-2.871)**	**0.028**
No	**Ref**	**Ref**	**Ref**
PROM			
Yes	**-0.171**	**0.842(0.113-6.275)**	**0.867**
No	**Ref**	**Ref**	**ref**
Anaemia			
Yes	**-0.793**	**0.453(0.098-2.090)**	**0.31**
No	**Ref**	**Ref**	**Ref**
Type of delivery			
Caesarean Section	**1.586**	**4.884(2.499-9.546)**	**<0.001**
Vaginal	**ref**	**ref**	**Ref**

DISCUSSION

The finding of this study showed that short birth interval was associated with high parity, preterm delivery and anaemia in pregnancy while long birth interval was associated with development of hypertension in pregnancy and delivery by caesarean section. These associations were found after controlling for possible confounding factors which is the strength of this study although the cross-sectional approach might be a weakness.

The association of short Birth interval and high parity is self explanatory as there will be many pregnancies for a given duration when the interval between them is short. Our finding of an association between anaemia and short birth intervals agrees with findings of other studies[13,14]. This finding might be explained by the maternal depletion hypothesis,[6,15] which suggests that short intervals do not allow the mother to recover from the physiological stresses imposed by the previous pregnancy. This results in depletion of maternal nutrient stores and anaemia. However, Eastman[9] found no association between birth interval and anaemia in a cohort of 5185 women.

Preterm birth is a risk to both the mother and the infant and is a significant burden on the health system. Our study showed that short birth interval is associated with preterm delivery. This finding is in agreement with our earlier study[16] and also with a large meta-analysis performed by Conde-Agudelo et al[17] The metaanalysis included 67 studies and found that short interpregnancy interval was associated with a 40% increased risk for preterm birth. Also Rodrigues and Barros[18] found that women with short interpregancy interval were 3.6 times more likely to have a spontaneous early preterm birth. It was postulated that a short interval between pregnancies might interfere in normal processes of remodelling of endometrial blood vessels after delivery, with subsequent uteroplacental underperfusion[19] and therefore preterm birth.

On the other hand long birth interval was found to be associated with development of hypertension in pregnancy (defined as gestational hypertension or preeclampsia) in our study similar to the findings of other studies[9,20]. The "protective" effect for hypertension in pregnancy acquired by a woman through a previous birth is said to be lost after a long interval and it was suggested that a woman with an interpregnancy interval of more than 10 years is as likely to experience preeclampsia as a woman having her first Pregnancy.[21] The increase risk of APH associated with long birth interval can be explained by the association of long birth interval and hypertension which is a recognised risk factor for APH.

Similar to the finding of a study conducted by Miller etal[22] long birth interval was found to be associated with caesarean section in this study. The increase risk of hypertension in pregnancy associated with long birth interval found in this study can partially explain this finding. Also with long interval between births "experience" acquired by the uterus and the birth canal would have been lost and delivery mechanics is likely to be like that of a nillipara and Zhu et al[5] shows that long birth interval was associated with labour dystocia a panacea for caesarean delivery.

In conclusion short birth interval was associated with higher parity, anaemia and preterm delivery while long birth interval was associated with hypertension and caesarean section. It is recommended that whenever possible short birth interval should be avoided with appropriate use of family planning methods and also women of reproductive age should be appropriately counsel on the adverse effect of long birth interval.

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