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## FACTORS INFLUENCING THE INCIDENCE OF PRE-TERM BIRTH IN CALABAR, NIGERIA

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**Summary:** Women who had pre-term birth in the University of Calabar Teaching Hospital, Calabar, over a 2½ year period were studied. The aim was to establish the factors influencing the incidence of pre-term birth in Calabar. Factors which significantly increase the incidence of pre-term delivery included: previous induced abortion ( $P < 0.0001$ ), nulliparity ( $P < 0.001$ ), out of wedlock birth ( $P < 0.05$ ) and lack of antenatal care ( $P < 0.01$ ). Women with multiple pregnancy ( $P < 0.001$ ) or previous pre-term delivery ( $P < 0.01$ ), have a significantly high risk for pre-term birth. Antenatal complications ( $P < 0.0001$ ) particularly anaemia ( $P < 0.001$ ) or malaria ( $P < 0.05$ ) in the index pregnancy constitute risk factors for pre-term delivery. However, educational status, social class and previous spontaneous abortion did not seem to significantly influence the incidence of pre-term birth in this study ( $P > 0.05$ ). Wider use of family planning, less restrictive abortion laws and training of doctors and nurses on the use of manual vacuum aspiration in the management of post-abortion complications may help reduce the incidence of pre-term birth in Calabar. Replacing pyrimethamine chemoprophylaxis for malaria in pregnancy by intermittent treatment of malaria with sulphadoxine-pyrimethamine and deworming our women during antenatal care may also help reduce the incidence of pre-term birth in our community.

*Key Words: Pre-disposing factors, increased incidence, pre-term birth, Nigeria*

### Introduction

Pre-term birth is a major cause of perinatal morbidity and mortality worldwide (Main, 1988 and Donald, 1979). Severe morbidity such as respiratory distress syndrome, intraventricular haemorrhage, bronchopulmonary dysplasia and necrotising enterocolitis are far more common in pre-term than in term infants. Long-term impairment such as cerebral palsy, visual impairment and hearing loss are also more common in pre-term infants (Donald, 1979). Pre-term birth contributes about 38 to 52 per cent of all perinatal mortality worldwide (Arias and Tomich, 1982). Half of all neonatal deaths occur in pre-term infants (Arias and Tomich, 1982). The social and emotional cost of perinatal morbidity and mortality associated with prematurity is certainly enormous (Azikeh, 2003). A large proportion of these morbidity and mortality occur in the developing countries (Adinma and Agba, 1994; Omene *et al*, 1981).

In the developed world, the survival rates for premature babies have greatly improved over the past few decades (Keirse *et al*, 1978). This improved outcome is largely due to improved neonatal care (Azikeh, 2003).

Neonatal intensive care is expensive because of the cost of sophisticated equipment, constant use of laboratory facilities and high ratio of staff to babies. This is beyond the reach of most developing countries. In Nigeria, the few available neonatal care facilities and personnel are concentrated in the tertiary centres which take care of a very small proportion of our deliveries (Etuk *et al*, 1999). Ignorance, poverty and incessant power failure impact negatively on the care of these pre-term infants. The reduction in perinatal morbidity and mortality from pre-term births, in the short term, lies on the prevention of pre-term delivery. Hence, the aim of this study is to establish the factors influencing the incidence of pre-term birth in our community. It is hoped that the findings of this study will help us identify the women in our antenatal clinics, who are likely to have this complication.

### Subject and Methods

The delivery registers of the University of Calabar Teaching Hospital (UCTH), Calabar, over a 2½ year period (1<sup>st</sup> January 1996 to 30<sup>th</sup> June, 1999) were reviewed. The names and hospital numbers of all the women who had pre-term delivery were selected. Their

case notes were retrieved and reviewed. Information abstracted from the case notes included age, weight at booking, marital status, educational status and social class. Reproductive characteristics such as parity, booking status, previous history of induced abortion, previous history of pre-term delivery, history of antenatal complications, inter-pregnancy intervals, as well as multiple pregnancies were also noted. These women formed the study population.

Following each pre-term delivery, the next woman who had a term delivery was selected for the control population. Their case notes were also retrieved and the same information also abstracted. Seven of the case notes of the women who had pre-term delivery could not be traced and their corresponding controls were also discarded. The data obtained were analysed using simple proportion, rates and tables. Chi-square ( $\chi^2$ ) test was used to assess the statistical significance of association between the various factors investigated.

Calabar where UCTH is located is the capital of Cross River State in the south-eastern part of Nigeria. It has an estimated population of 320,862. The inhabitants are mainly civil servants, subsistent farmers, fishermen and traders. Most of them are Christians and only few Moslems and pagans

are found. Monogamous marriage is highly practised and only few families are polygamous. Although there is a general hospital and 12 private clinics taking care of pregnant women, most of the high risk pregnancies are referred to UCTH. UCTH also receives all pregnant women in Calabar and its environs as they present themselves for antenatal care and delivery.

The social classification in this study was based on the Registrar General's five-point occupational scale modified to suit our environment (Etuk *et al*, 1999). The social classes I and II were grouped as high social class while social classes III, IV and V, were grouped as low social class. For the purpose of this study, the following definitions were used:

*The Educated:* Women who had read up to Standard Six (after six years in elementary school) and above and they can read and write (Asuquo *et al*, 2000).

*The Uneducated:* Women who had no formal education (Asuquo *et al*, 2000).

*Booked Patients:* Pregnant women attended at least once during the pregnancy by trained personnel (WHO, 1993).

*Unmarried:* Women who were either single, divorced, separated or widowed at the time of delivery.

Table 1: Demographic and Socio-economic Variables Influencing the Incidence of Pre-term Delivery

Variables	Women with Pre-term Delivery	Control	$\chi^2$	P-value
Age (years)				
< 20	26	29	0.18	> 0.05
$\geq$ 20	191	188		
Weight at booking				
< 50 kg	16	20	0.22	> 0.05
$\geq$ 50 kg	182	192		
Unbooked	19	2		
Marital status				
Married	202	212	5.24	< 0.05
Not Married	15	5		
Educational status				
Educated	177	193		
Uneducated	26	16	2.98	> 0.05
Not stated	14	8		
Social class				
High	24	36		
Low	193	181	2.79	> 0.05

## Results

During the period of study, 2,640 women delivered in UCTH. Two hundred and twenty-four (224) of them had pre-term birth, giving a

pre-term delivery rate of 8.5 per cent in the hospital. The case notes of seven of them could not be traced leaving 217 women for the study.

Table I shows the demographic and socio-economic variables influencing the incidence of pre-term delivery. Unmarried women have a significantly higher tendency to have pre-term birth than the married ones ( $P < 0.05$ ). However, age, weight at booking, educational status and social class did not seem to significantly influence the incidence of pre-term delivery ( $P > 0.05$ ).

Table II shows the reproductive characteristics influencing the incidence of pre-term delivery. The incidence of pre-term birth was very highly significantly influenced by previous induced abortion ( $P < 0.0001$ ), parity ( $P < 0.0001$ ), presence of antenatal complications ( $P < 0.0001$ ) and multiple pregnancy ( $P < 0.01$ ). It was highly significantly influenced by the booking status

of the women ( $P < 0.01$ ), gestational age at booking ( $P < 0.01$ ), frequency of induced abortion ( $P < 0.01$ ) and previous pre-term delivery ( $P < 0.01$ ). Factors such as previous spontaneous abortion and inter-pregnancy intervals did not seem to influence the incidence of pre-term birth.

Antenatal complications influencing the incidence of pre-term delivery are shown in Table III. Anaemia in pregnancy ( $P < 0.001$ ) and malaria in pregnancy ( $P < 0.05$ ) significantly increase the incidence of pre-term birth. Although complications such as pre-eclampsia and premature rupture of membranes contributed to the incidence of pre-term birth, their influence was not statistically significant.

Table II: Reproductive Characteristics Influencing the Incidence of Pre-term Delivery

Variables	Women with Pre-term Delivery	Control	X <sup>2</sup>	P-value
Parity				
0	91	47		
≥ 1	126	170	20.52	> 0.0001
Booking status				
Booked	198	212		
Unbooked	19	5	8.64	< 0.01
Gestational age at birth				
≤ 13 weeks	11	28		
> 13 weeks	187	184		
Unbooked	19	5	7.01	< 0.01
Previous Induced Abortion				
Yes	67	30		
No	150	187	19.70	< 0.0001
Frequency of Induced Abortion				
1	18	17		
> 1	49	13	7.66	< 0.01
Previous Spontaneous Abortion				
Yes	14	12		
No	203	205	0.16	> 0.05
Frequency of Spontaneous Abortion				
1	9	9		
> 1	5	3	0.35	> 0.05
Previous Pre-term Delivery				
Yes	27	10		
No	190	207	8.58	< 0.01
Interpregnancy Interval				
< 2 years	23	18		
≥ 2 years	103	152	3.55	> 0.05
Primigravida	91	47		
Multiple Pregnancy				
Yes	19	2		
No	198	215	14.59	< 0.001
Antenatal Complications				
Yes	101	44		
No	116	173	33.64	< 0.0001

Table III: Antenatal Complications Influencing the Incidence of Pre-term Delivery

Complication	Study Population n = 101 (%)	Control n = 44 (%)	$\Pi_2$	P-value
Malaria	80 (79.2)	28 (63.6)	3.96	< 0.05
Anaemia	75 (74.3)	20 (45.5)	11.8	< 0.001
Pre-eclampsia	24 (23.8)	10 (22.7)	0.02	> 0.05
PROM	13 (12.9)	4 (9.1)	0.41	> 0.05
Others	5 (5.0)	2 (4.5)	0.01	> 0.05

### PROM: Premature Rupture of Membrane

#### Discussion

This study reveals an incidence of pre-term delivery of 8.5 per cent in Calabar. It falls in line with the incidence of 6-10 per cent quoted worldwide (Ikpeze, 2003), but higher than 4.5-5.5 per cent reported by other authors in Nigeria (Azikeh, 2003). This is significant in view of the paucity of neonatal care facilities and trained personnel to take care of pre-term babies in our community.

Out of wedlock birth significantly increase the incidence of pre-term delivery in this study ( $P < 0.05$ ). In a descriptive analysis of single births in the United States, Eisner *et al* (1979) concluded that when other factors were held constant, out of wedlock birth increased the risk of having an infant with low birth weight. This may follow the stress of physical labour and long hours of work these unmarried women expose themselves in order to make ends meet.

Age, weight at booking, educational status and social class do not significantly influence the incidence of pre-term delivery in this study ( $P > 0.05$ ). This is different from the findings of others (Oumachigui, 1996; Kaminski *et al*, 1973). The introduction of Structural Adjustment Programme (SAP) in Nigeria since the mid-1980s with its doctrine of workers retrenchment, removal of subsidies, currency devaluation, trade liberalisation and privatisation of public utilities promotes dangerous inequality, social upset and disintegration of all forms of infrastructure (Harrison, 1997). The result is misery all round. Most of the professionals in Nigeria who may be rated as being in high social class have in reality been collapsed into low social status. This leaves majority of the people in low social class. This may explain why social class and educational status do not seem to influence the incidence of pre-term birth in our environment.

Previous induced abortion very significantly increase the incidence of pre-term birth in this study ( $P < 0.0001$ ). The higher the frequency of induced abortion, the higher the risk of pre-term delivery ( $P < 0.01$ ). This is not the case in women with previous spontaneous abortion ( $P > 0.05$ ). This is probably due to the method of induced abortion in our environment. Abortion laws in Nigeria are restrictive. Most of the induced abortions in Nigeria are performed clandestinely by untrained personnel (Okonofua, 1997). During a study of knowledge, attitudes and practice of private medical practitioners in Calabar towards post-abortion care, Etuk *et al* (2003) found that the most common method used in the first trimester by abortion service providers in Calabar was dilation and curettage as against Manual Vacuum Aspiration advocated currently. In the second trimester of pregnancy, they use artificial rupture of membranes followed by uterine stimulation with a high dose of oxytocin or dilation and curettage. These are methods known to predispose to cervical incompetence (Okonofua, 1997). Hence, the high incidence of pre-term birth in these patients.

Low parity has been shown by some workers to have inverse relationship with pre-term birth (Wildschut *et al*, 1997). This study supports this finding as nulliparity highly significantly increases the incidence of pre-term delivery ( $P < 0.0001$ ). This is probably because young unmarried adolescents are the ones commonly involved in clandestine abortion in our community (Ladipo, 1999). They may be ashamed of their pregnancies and are ignorant of good antenatal care (Etuk and Ekanem, 2001). Where they register for antenatal care, they usually do so late. No doubt this study also shows lack of antenatal care as well as late registration for antenatal

care to significantly increase the risk of having pre-term birth ( $P < 0.01$ ).

Previous pre-term deliveries significantly increase the incidence of pre-term birth in this study ( $P < 0.01$ ). This is not surprising as some causes of pre-term births such as cervical incompetence, unless treated, can persist in the same patient to cause pre-term birth in subsequent pregnancies.

Unlike the findings of others (Eisner, 1979), inter-pregnancy interval does not seem to significantly increase the incidence of pre-term delivery in this study ( $P < 0.05$ ). It is possible that our women recover from the effect of previous pregnancy faster than others. This may follow our cultural practice of intensive nutritional care for women after delivery in preparation for "outing" ceremony (Ekanem *et al*, 1996).

Pre-term delivery is a well-known complication of multiple pregnancy. In a survey of twin pregnancies in Scotland, Patel *et al* as quoted by Whitfield (1986) found delivery occurring before 37 weeks of gestation in 44 per cent compared with 5.5 per cent of singletons. It is, therefore, not surprising that multiple pregnancy very highly significantly increases the incidence of pre-term delivery in this study.

Women with antenatal complications stand a very highly significant risk of having pre-term birth ( $P < 0.0001$ ). The complications here include mainly malaria ( $P < 0.05$ ) and anaemia ( $P < 0.001$ ). Pre-eclampsia and premature rupture of membranes also make some contributions. Malaria is probably the most common cause of fever in pregnancy in Nigeria. This fever may cause uterine stimulation and contractions resulting in pre-term delivery (Sowunmi, 2003). There is reduced oxygen carrying capacity of the maternal blood when there is anaemia in pregnancy (Ogunbode, 2003). This will translate into reduced oxygen perfusion of the placenta with consequent fetal hypoxia which may lead to pre-term labour and delivery or when chronic, may cause intrauterine restriction or even intrauterine death. Malaria infection is probably the most important factor responsible for anaemia in Nigeria (Ogunbode, 2003). Other causes of anaemia in our community include poor nutrition and intestinal parasites, particularly hookworm (Oyo-Ita *et al*, 1998).

In conclusion, previous induced abortion, nulliparity, out of wedlock birth and lack of antenatal care increase the risk of pre-term birth in Calabar. Women with multiple pregnancy or previous pre-term delivery should be termed high risk for pre-term birth.

When there are antenatal complications particularly, anaemia or malaria in the index pregnancy, pre-term birth should be anticipated. Hence, to reduce the perinatal morbidity and mortality associated with pre-term birth in our community: There is need to educate our women on the use of family planning and family planning commodities should be made available, accessible, affordable and also youth friendly in our community as this will reduce the incident of induced abortion.

All doctors and nurses should be trained on the use of manual vacuum aspiration in the management of abortion complications and on the appropriate methods for termination of pregnancy in the second trimester where indicated.

There is need to improve upon our antenatal care services to enable us identify the women at risk and give them health education, adequate rest and possible treatment of identifiable cause of pre-term birth. High risk patients identified in peripheral centres should be referred to tertiary health care facilities where neonatal care facilities are available.

Intermittent treatment of malaria with sulphadoxine-pyrimethamine in pregnancy should replace the current use of pyrimethamine for malaria chemoprophylaxis as resistance to pyrimethamine is widely reported (Sowunmi, 2003). This should be augmented with the use of insecticides, impregnated bed nets during pregnancy. Administration of iron and folate supplements to pregnant women as part of antenatal care should be encouraged. Deworming of women at booking for antenatal care should be considered a useful component of antenatal care in our community where parasitic infection is highly endemic.

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