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Factors Associated with Spontaneous Preterm Delivery in a Nigerian Teaching Hospital

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Abstract:

Objective (s): *To determine the aetiological factors of preterm deliveries at Aminu Kano Teaching Hospital, Kano, Nigeria..*

Materials and methods: *This case-control study was conducted between 1st June 2006 and 31st May 2007.One hundred and forty eight women with preterm deliveries (cases) were compared with seven hundred and forty women who delivered at term (control). Data analysis was done using Epi- Info software (6.0 CDC Atlanta Georgia, USA). Univariate and multivariate logistic regression analysis were performed and the results were expressed as odds ratio (OR) with 95% confidence interval (CI). The contribution of the risk factors were estimated using chi square test and a p-value of < 0.05 was taken as significant.*

Results: *The period incidence of preterm deliveries was 69 per 1000 births. Unbooked and low socioeconomic statuses, primigravidity, previous preterm deliveries, multiple pregnancies, pre-eclampsia, and malaria in pregnancy were significant risk factors that were associated with preterm delivery. These associations were still demonstrable after adjusting for confounding variables.*

Conclusion: *Early girl marriage and childbearing and spontaneous pre-labour rupture of membranes not to be independent risk factors in this study. Women with risk factors should be managed in specialist hospitals.*

Key Words: *Preterm deliveries, aetiological factors, term deliveries.*

Introduction:

Preterm birth is defined as birth between 28 and 37 completed weeks in developing countries like Nigeria[1-4], and 20 and 36 completed weeks in developed countries because of sophisticated neonatal support[5-9]. It is a major cause of neonatal morbidity and mortality worldwide and a major public health problem in terms of loss of life, long-term disabilities (cerebral palsy, blindness, deafness, chronic lung disease) and health care costs both in the developing and the developed world[10-12].

It occurs in 60 to 100 per 1000 births worldwide, and despite intensive efforts prematurity rates remain unchanged[5,6,10-15.]. Although different forms of therapy, such as tocolytic therapy and home uterine activity monitoring are being used to prevent prematurity, their true benefit and proper place for their application remain to be established, and their application is limited by side-effects and poor efficacy[5,12-17], which still calls for improved understanding of the physiological pathways that regulate uterine contractions and relaxation in term and preterm.

Despite tremendous improvements in maternal and neonatal care, preterm delivery remains the leading cause of infant mortality[4.5]. In Nigeria it accounts for over 50% of neonatal deaths[4], while in United States of America it accounts for 83% of perinatal deaths not caused by congenital anomalies, and 50% of long term neurological impairment in children[11]. Moreover, it accounts for 35% and 10% of healthcare spending for infants and children respectively in United States of America[11]. Many developing countries are unable to cope with the healthcare costs associated with

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managing neonates that are born preterm, resulting in higher and often unacceptable neonatal morbidity and mortality[1-6,9,18,19].

Prevention of preterm birth may be the most important problem that faced maternity care providers[11]. Continued efforts at risk identification, accurate and early diagnosis and proper intervention hold the most promise for prevention of premature delivery[10]. A number of strategies have been developed, which include identification of women who are at high risk for preterm labour and delivery, so that appropriate intervention strategies could be instituted early prior to significant cervical changes, in order to ensure the success of the prevention strategies[11,12]. In addition, when preterm birth is imminent, intensive intrapartum care and delivery, in a location where access to the appropriate level of neonatal intensive care is available, will optimize perinatal outcome[10-12,15].

It is against this background that this study was designed, to identify the significant risk factors of preterm delivery at Aminu Kano Teaching Hospital, Kano, Nigeria, and to make recommendations that will improve the prevention strategies and timing of intervention management in order to provide optimal care.

Materials and methods:

This case-control study was conducted between 1st June 2006 and 31st May 2007, to determine the aetiological factors of preterm deliveries at Aminu Kano Teaching Hospital, Kano, Nigeria. One hundred and forty-eight (148) women with preterm deliveries (cases) were compared with 740 women who delivered at term (control). The study variables of interest were the socio-demographic characteristics of the women viz: age, marital status, socioeconomic class, and maternal body mass index and obstetric factors like parity, booking status, gestational age at booking, history of previous induced/spontaneous abortion(s), previous preterm deliveries, multiple pregnancy, spontaneous prelabour rupture of membranes, interpregnancy interval and medical complications of malaria, anaemia and pre-eclampsia. The woman's level of education and the husband's occupation were used to determine the social class[21].

Data collection procedure

Data collection was done using a pre-tested questionnaire, and trained personnel in data collection using the questionnaire. The patients were given code numbers, with which their data were encoded in an electronic form and recorded in the central data base. Quality control was done by ensuring that data collection was carried out before the patients were discharged, so as to ensure that the case notes were available, and that one of the authors will cross check the data collected, to identify and correct possible inconsistencies of data. A duplicate copy of the recorded data was given to the principal researcher, to cross check and correct errors in the electronically recorded data.

The data were obtained prospectively and recorded in a database as frequencies and percentages. Data analysis was done using Epi- Info software (6.0 CDC Atlanta Georgia, USA). The contribution of the risk factors were estimated using chi square test and a p-value of < 0.05 was taken as significant. Univariate and multivariate logistic regression analysis were performed and the results were expressed as odds ratio (OR) with 95% confidence interval (CI).

Results:

There were 2154 births during the period of study, and 148 women had preterm births, giving a period incidence of 69 per 1000 births. All the women were married.

Table 1 shows a comparison of the socio-demographic characteristics of the women. Low socioeconomic class (OR = 3.51, CI = 1.99 – 6.28, $P < 0.05$), and unbooked status (OR = 1.73, CI = 1.05 – 2.83, $P < 0.05$) were found to be significant risk factors.

Table 2 shows a comparison of the obstetric variables of the women. Primigravidity (OR = 4.01, CI = 2.63 – 6.13, $P < 0.05$), previous preterm deliveries (OR = 33.86, CI = 10.86 – 117.63, $P < 0.05$), multiple pregnancy (OR = 7.99, CI = 3.82 – 16.81, $P < 0.05$), pre-eclampsia (OR = 2.14, CI = 1.15 – 3.94, $P < 0.05$) and malaria infection (OR = 15.89, CI = 8.52 – 29.90, $P < 0.05$) were found to be significant risk factors. Previous induced abortion(s) (OR = 3.81, CI = 0.67 – 20.32, $P > 0.05$), spontaneous pre-labour rupture of membranes (OR = 2.19, CI = 0.74 – 6.22, $P > 0.05$), and anaemia (OR = 2.11, CI = 0.78-5.48, $P > 0.05$), were found not to be significant risk factors.

These associations were still demonstrable after adjusting for confounding variables

Table-I

Socio-demographic Characteristics of the Women with Preterm delivery.

Variable	Number (%)		P-value	OR	CI
	Case n = 148	Control n = 740			
Age in years					
15-20	18 (12.2)	83(23.0)	>0.05	1.10	0.61-1.94
20-29	62 (41.9)	313(37.4)	>0.05	0.98	0.68-1.43
30-39	53(35.8)	251(34.4)	>0.05	1.09	0.74-1.60
>40	15(10.1)	93(5.2)	> 0.05	0.78	0.42-1.44
Social class					
Upper	16(10.8)	221(57.0)			
Lower	132(89.2)	519(15.2)	<0.05	3.51	1.99-6.28*
Booking status					
Booked	120(10.9)	652(81.7)			
Unbooked	28(89.1)	88(18.3)	<0.05	1.73	1.05-2.83*
Gestational age at					
booking					0.25-2.05
≤13weeks	5(3.4)	33(4.5)			
>13weeks	143(96.6)	707(45.7)	>0.05	0.75	
BMI	46(31.1)	243(54.7)			0.62-1.37
$<25kg/m^2$ $>25kg/m^2$	102(68/9)	497(48.7)	>0.05	0.92	

S= Significant NS= Not significant

Table-II

Obstetric factors of the Women with Preterm delivery.

Variable	Number (%)		P-value	OR	CI
	Case n = 148	Control n = 740			
Parity					
Primigravidae (o)	52 (35.1)	88 (11.9)	<0.05	4.01	2.63-6.13*
Multigravida (1-4)	63 (42.6)	489(66.1)	<0.05	0.38	0.26-0.55
Grandmultiparae (>4)	33(22.3)	163(22.0)	>0.05	1.02	0.65-1.58
Interpregnancy interval					
< 2years	35 (23.6)	162 (21.9)	>0.05	1.11	0.71-1.71
> 2years	113 (1.3)	578 (78.1)	>0.05	0.90	0.58-1.40
Previous induced abortions	3(2.0)	4(0.5)	>0.05	3.81	0.67-20.32
Previous spontaneous abortions	14(23.8)	85(11.5)	>0.05	0.81	
Previous preterm	23(15.5)	4(0.5)	<0.05	33.86	0.42-1.51
deliveries					10.86-117.63
Multiple pregnancy	21(14.2)	15(2.0)	<0.05	7.99	3.82-16.81*
SPROM	6(4.1)	14(1.9)	>0.05	2.19	0.74-6.22
Pre-eclampsia	18(12.2)	45(6.1)	<0.05	2.14	1.15-3.94*
Anaemia	7(4.7)	18(2.4)	>0.05	2.11	0.78-5.48
Malaria	42(28.4)	14(1.9)	<0.05	15.89	8.52-29.90*

* = Significant

Discussion:

The period incidence of preterm births of 69 per 1000 births in this study is similar to 85 per 1000 births that was reported from Calabar, Nigeria[4], 60 to 70 per 1000 births from developed countries[5-8], and within the world's average of 60 to 100 per 1000 births[15]. This study support that despite intensive efforts prematurity rates remain unchanged worldwide[5-7]. This global high incidence of preterm deliveries is more significant in developing countries, where facilities and manpower to cater for preterm babies as well as the prognosis are poor[1-5].

Ignorance, poverty and socioeconomic deprivation, and early girl marriage and childbearing which is common in developing countries[21], may explain why primigravidity, low socioeconomic class and unbooked status were significant risk factors in this study and other studies from developing countries[3,4,20-23]. The high prevalence of unbooked status and young maternal age, may explain why pre-eclampsia is an independent risk factor of preterm delivery in this study, and other studies from developing countries[5]. This may be because pre-eclampsia may require termination of the pregnancy at any gestational age, in order to terminate progression of the disorder and save the life of the mother and at times the baby as well[20]. It is an independent risk factor of preterm delivery in this study and other studies from developing countries.

Malaria is the commonest cause of fever in Nigeria and the tropics, and may stimulate premature uterine contractions and delivery[24].

Low socioeconomic status is associated with social and physical stress, especially where the women are either the bread winners or single parents[17]. This is made worse by the global economic recession, which is more severe in developing countries. Stress has been found to be associated with increased secretion of corticotrophin releasing hormone and premature activation of the fetal hypothalamic-pituitary-adrenal axis, which could trigger the prostaglandin cascade leading to preterm labour[18].

Age and unmarried status were found not to be significant risk factors in this study, which does not agree with the findings of other studies[4], All the women in this study were married, probably because of the stigma, which is associated with unmarried status in our predominantly Islamic community, and because early marriage is the norm in our society, many of our teenage and young adult mothers were multigravidae. Anaemia was also not found to be a significant risk factor, although some studies from developing countries found it to be a risk factor[4]. This may probably be because anaemia is usually associated with other risk factors like, primigravidity, low socioeconomic class, unbooked status and malaria in pregnancy, which are common in developing countries[1-4], but as an independent risk factor, the degree and duration of the anaemia may not be severe enough to cause fetal intrauterine hypoxia or intrauterine growth restriction, which may trigger preterm labour and delivery, or delivery by medical decision.

Multiple pregnancies which has been shown in many studies to be a risk factor of preterm delivery[23,25-27], agreed with the findings in this study. Multiple pregnancy causes over distension of the uterus, which may stimulate premature uterine contractions[1-5].

Previous preterm delivery was found to be a significant risk factor, which agrees with the findings of other studies[4]. This may be because recurrent causes of preterm deliveries, if untreated, may persist and cause preterm deliveries in subsequent pregnancies[4,12].

Inter pregnancy interval was not found to be a significant risk factor in this study, which is also the experience of other authors from Nigeria[4], probably because of our cultural practices of intensive physical and nutritional care for women after delivery, which may make our women to recover faster from the effects of previous pregnancies[4,28].

Low BMI and gestational age at booking did not show significant association with preterm births as it did in other studies from Nigeria[4]. However, it does not agree with the findings of authors from developed countries[10,12], which may be because of the high prevalence of late booking after the first trimester and under nutrition in developing countries like Nigeria[1-4].

Previous induced abortion(s) and spontaneous pre-labour rupture of membranes, were not found to be significant risk factors of preterm delivery. This does not agree with the findings of studies from communities where women delay marriage[4]. In our community where early marriage is common, the tradition is that

the woman's first menstruation should occur when she is in her husband's house[20], which may make unwanted pregnancy and criminal induced abortion an uncommon event. This may make dilatation of the cervix, which has been found to be the commonest cause of cervical incompetence[29], to be a rare event, and spontaneous pre-labour rupture of membranes not to be significant risk factors in this study.

Whatever may be the cause of preterm labour, strategies should be taken to prevent it. Improvement in socioeconomic status of the women should be encouraged in order to reduce maternal stress. Campaign for antenatal care and hospital delivery should be intensified. High-risk women should be identified and referred to the antenatal clinic. Those in peripheral health centres should be transferred to specialist hospitals where neonatal facilities are available. Where possible, treatment of identified cause(s) of preterm birth should be undertaken. As malaria is found to be a significant risk factor, roll back malaria programme, which involve the use of intermittent preventive therapy in pregnancy, insecticide treated bed nets, environmental sanitation to prevent breeding places for mosquitoes, and treatment of clinical malaria with Artemisinin combination therapy, should be incorporated in our antenatal programmes in malarial endemic areas of the world.

Conclusion:

The significant risk factors of preterm delivery that were found in this study were unbooked and low socioeconomic statuses, primigravidity, previous preterm deliveries, multiple pregnancies, pre-eclampsia and malaria in pregnancy. Early marriage and childbearing made spontaneous pre-labour rupture of membranes not to be a significant risk factor of preterm delivery in this study.

References:

1. Basket T.F, Calder A, Arulkumaran S. Preterm labour. In Munro Kerr's Operative Obstetrics. Saunders. London. 2007, pp. 81-99.
2. Orhue A.A,E. Preterm labour and premature rupture of membranes. In Textbook of Obstetrics and Gynaecology for Medical Students. Agboola A (eds). Heinemann Educational Books (Nigeria) Plc. Ibadan. 2006, pp. 423-29.
3. O.A. Mokuolu, I.F. Abdul, O. Adesiyun. Maternal Factors Associated with Early Spontaneous Preterm Delivery in Nigeria. Trop J Obstet Gynaecol. 2002; 19: 32-35.
4. S.J Etuk, I.S Etuk, A.E. Oyo-Ita. Factors influencing the incidence of preterm birth in Calabar, Nigeria. Nigerian journal of Physiological Sciences. 2005; 20(1-2): 63-8.
5. N.S.Wood, N. Marlow, K. Costeloe, A.T. Gibson, A.R Wilkinson. Neurologic and developmental disability after extreme preterm birth. EPICure study group. N. Engl. J. Med. 2000; 343378-84.
6. K. Gyetvai, M.E. Hannah, E.D. Hodnett, A. Ohisson. Tocolysis for preterm labour: a systematic review. Obstet Gynaecol. 1999; 94:869-77.
7. D. Papatsonis, V. Flenady, S. Cole, H. Liley. Oxytocin receptor antagonist for inhibiting preterm labour. Cochrane Database Syst. Rev.2005; 20(3): CD004452.
8. M Whitworth, S. Quenby. Prophylactic oral betamimetics for preventing preterm labour in singleton pregnancies. Cochrane Database Syst. Rev. 2008; 23(1): CD006395.
9. J.R. Challis. Molecular aspect of preterm labour. Bull. Med. Acad. R. Med. Belg. 1998; 163 (5-6): 263-73.
10. ACOG technical Bulletin. Preterm labour. Int J Gynaecol Obstet. 1995; 50(3):303-13.
11. J.A. Skeman, K.E. Rajab. Obstetric, neonatal and anaesthetic consideration for preterm labour and delivery. Saudi Med. J. 2003; 24(3):582-93.
12. F. Arias, P. Tomich. Aetiology and outcome of low birthweight and preterm infants. Obstetrics and Gynaecology.; 1982; 60: 277.
13. D.G. Wheeler. Preterm birth prevention. J. Nurse Midwivery. 1994; 39(2suppl):66s-80s.
14. M.M. Slattery, J.J. Morrison. Preterm delivery. Lancet. 2002; 360(9344):1489-97.
15. Katz V.L, Farmer R.M. Controversies in tocolytic therapy. 1999; 42(4): 809-19.
16. O.C Ikpeze. Preterm labour and delivery. In Contemporary Obstetrics and Gynaecology for Developing Countries. Okonofua F and Odunsi K (eds). First edition. Women Health and Action Research centre, Benin City, 2003; pp. 454-61.

17. A.E. Oyo-Ita, M.M. Meremikwu, E.E.J S,J. Asuquo, Etuk. Current status of low birthweight Deliveries and some Related Morbidity Factors in Calabar, Nigeria. Mary Slessor Journal of Medicine. 2010; 1(1):11-15.

18. W.C Hill, K.S Gookin. Home uterine activity monitoring. Clin. Perinatol. 1992; 19(2):333-43.

19. A. Omole-Ohonsi, R.A. Attah. Risk Factors of Pre-eclampsia in Aminu Kano Teaching Hospital, Kano, Nigeria. Mary Slessor Journal of Medicine. 2010; 10 (1): 82-87.

20. R. Rayamajhi, M. Thapa, S. Pande. The challenge of grandmultiparity in obstetric practice. Kathmandu University Medical Journal. 2006; 4(1): 70-4.

21. A. Omole-Ohonsi, O.A.Ashimi. Maternal mortality review in Aminu Kano Teaching Hospital, Kano, Northern Nigeria. Nigerian Journal of Basic and Clinical Sciences. 2006; 3 (1-2): 10-16.

22. A. Omole-Ohonsi, F. Belga. Outcome of obstructed labour in Kano, Nigeria. Nepal Journal of Obstetrics and Gynaecology. 2010; 5(2): 38-42.

23. D. Brian, J.I. Adinma, A.O. Agbai. Pattern of twin births in Nigerian Igbo women. West Afr. J. Med. 1994; 13(4): 234-6.

24. P.Y. Ancet. Preterm labour: Pathology, risk factors and outcomes. J. Gynaecol Obstet Biol Reprod.; 31(7suppl): 2002; 5510-21.

25. A.D. Ekanem, S.J. Etuk, U. Sampson-Akpan. Influence of cultural practice on puerperal anaemia. Int J. Gynaecol Obstet. 1996; 55:169-70.

26. N.E. Rehan, D.S. Tafida. Multiple births in Hausa women. Br. J. Obstet. Gynaecol. 1980; 87: 997-04.

27. Okonofua F. Preventing unsafe abortion in Nigeria. Afri. J. Reprod. Health. 1997; 1(1): 25-3.

28. E.I Nwobodo, D.N Boobzom, J. Obed. Twin birth at university of Maiduguri Teaching Hospital: incidence, pregnancy complications and outcome. Nig. J. Med. 2002; 11(2): 67-69.

29. A. Sowunmi. Malaria in pregnancy. In Contemporary Obstetrics and Gynaecology for Developing Countries. Okonofua F and Odunsi K (eds). First edition. Women Health and Action Research centre, Benin City, 2003; pp. 502-13 (2003).