Maternal complications and perinatal outcomes in booked and unbooked Nigerian mothers

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ABSTRACT

Introduction: The study aimed to compare the sociodemographical characteristics, obstetrical complications and foetal outcome in delivered booked mothers and delivered unbooked mothers and to determine the correlation of maternal and perinatal outcomes.

Methods: In a prospective study over a 22-month period, outcomes of pregnancies of women booked for antenatal care were compared with that of unbooked women, who delivered in our unit at the Wesley Guild Hospital, Nigeria.

Results: 29 percent of the 1,154 deliveries in the study period comprised unbooked mothers. Compared with booked mothers, unbooked mothers had a higher tendency to be younger (29.3 +/- 6.08 vs. 31.12 +/- 4.80; p-value is less than 0.001), unmarried (9.2 percent vs. 1.8 percent; p-value is less than 0.01), with lower educational status (25.8 percent with post-secondary education vs. 58.7 percent; p-value is less than 0.01), lower social class (25.0 percent in upper class vs. 52.3 percent; p-value is less than 0.001) and with higher proportion of multipara (12.5 percent vs. 5.5 percent; p-value is less than 0.02), higher incidence of antepartum haemorrhage (odds-ratio[OR]5.96, 95 percent confidence interval [CI] 2.53–14.29, p-value is less than 0.001), anaemia (OR 2.75, 95 percent CI 1.09–4.47, p-value is less than 0.001) and preeclampsia/eclampsia. Unbooked mothers were half as likely as booked mothers to deliver by spontaneous vaginal delivery (OR 0.45, 95 percent CI 0.29–0.71, p-value is less than 0.001) but were twice as likely to deliver preterm babies (OR 2.03, 95 percent CI 1.14–3.59, p-value is less than 0.009) and three times more likely to have babies with birth asphyxia. Perinatal and maternal mortalities were higher in unbooked mothers.

Conclusions: The study showed a positive correlation between unbooked mothers and an increased risk of maternal and foetal adverse outcomes.

Keywords: booked pregnancies, maternal complications, perinatal outcome, pregnancy complications, unbooked pregnancies

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INTRODUCTION

Maternal mortality has become a public health problem requiring urgent, concerted and effective intervention at the various levels of the society.[1,2] In Nigeria, estimates of maternal mortality exceeds 1,000 per 100,000 live births, with evidence of a rising trend over the last decade.[3,4] The high maternal and perinatal mortality rates in Nigeria continue to be issues of concern as they are indicators of the poor state of health services with the implication that relevant health-related millennium development goals may not be achieved in the country. Maternal complications and poor perinatal outcome are highly associated with non-utilisation of antenatal and delivery care services and poor socioeconomic conditions of the patient, with poorer outcomes in unbooked than booked patients.[5-8] Various studies have confirmed the positive influence of antenatal care on maternal and perinatal outcomes irrespective of other maternal characteristics, such as age and parity.[9] Ekwempu, in a study on the influence of antenatal care on pregnancy, found that antenatal care was associated with a three-fold reduction in perinatal loss and virtual elimination of foetal loss from stillbirth.[6]

Health-seeking behaviour, as evidenced from the literature, may be related to health knowledge and consciousness of the individuals, and may have implications for health status and outcomes. In the light of the current maternal mortality situation in Nigeria, it is pertinent to determine and contextualise the relationship between the booking status of mothers and maternal health outcomes. The findings from such studies have implications for planning and implementing interventions that are relevant for maternal mortality reduction. Our study aimed at comparing the sociodemographical characteristics, obstetrical complications and foetal outcomes in booked and unbooked mothers (i.e. antenatal care attendees and non-attendees) who delivered at the Wesley Guild Hospital, Ilesa, Nigeria, with a view to determine the correlation of maternal and perinatal outcomes.

METHODS

Women, who had prenatal care and delivery (booked mothers – "exposed group") at the Wesley Guild Hospital Unit, Ilesa, Nigeria, a component unit of Obafemi

Table I. Sociodemographical characteristics of booked and unbooked mothers.

Variable	Unbooked mothers (%) (n = 240)	Booked mothers (%) (n = 654)	p-value
Age group (years)			
< 20	12 (5.0)	6 (0.9)	
20–39	166 (69.2)	484 (74.0)	
≥ 40	62 (25.8)	164 (25.1)	< 0.008
Educational level			
None & primary	78 (32.5)	60 (9.2)	
Secondary	100 (41.7)	210 (32.1)	
Post-secondary	62 (25.8)	384 (58.7)	< 0.01
Marital status			
Ever married	218 (90.8)	642 (98.2)	
Never married	22 (9.2)	12 (1.8)	< 0.01
Social class			
Upper	60 (25.0)	342 (52.3)	
Middle	92 (38.3)	238 (36.4)	
Lower	88 (36.7)	74 (11.3)	< 0.001
Parity			
0	32 (13.3)	70 (10.7)	
1–4	178 (74.2)	548 (83.8)	
≥ 5	30 (12.5)	36 (5.5)	< 0.02

Awolowo University Teaching Hospitals Complex, between August 2004 and May 2006, were prospectively studied. Their data was compared with that of women who never had antenatal care but delivered, in the same health facility during the same period of time (unbooked mothers—comparison group). The approval of the hospital's ethics and research committee was obtained prior to the commencement of the study. Informed consent was obtained from each woman recruited into the study. All patients were managed according to the departmental protocol. All singleton births during the study period were included in the study. All the mothers who delivered during the study and who freely consented to participation, were interviewed on admission into the labour ward using a standardised questionnaire. They were thereafter followed-up clinically until they were discharged.

Technically, booked mothers were defined as those who have had at least two antenatal care visits at our centre, while the unbooked mothers encompassed those who have had no prenatal care at all throughout the index pregnancy, those who registered at our unit but had less than two antenatal clinic visits, and patients referred as emergencies from other facilities or traditional birth attendants or mission faith clinics. Socioeconomic measures obtained included age, marital status, educational qualifications, and type of employment of the patients and their spouses. The socioeconomic status was computed using the methods reported by Oyedeji; this classification was based on the education and occupation of both partners.[10] Relevant obstetrical history was obtained and this included parity and significant clinical events in previous pregnancies. Medical history of illnesses that have implications for maternal outcomes, such as diabetes mellitus, was also obtained. Outcome maternal measures of interest included the mode of delivery, occurrence of anaemia and antepartum haemorrhage, and the occurrence of maternal death. Neonatal outcome measures, such as gestational age, birth weight, Apgar scores, neonatal intensive care admission and perinatal mortality, were also documented. The gestational age was ascertained using the first day of the mother's last menstruation and Dubowitz score at birth. The rate of prematurity and incidence of intrauterine growth retardation, occurrence of macrosomic babies as well as rates of antenatal and intrapartum complications, such as anaemia, antepartum haemorrhage and obstructed labour, were statistically derived.

Data analysis was carried out using the Statistical Package for Social Sciences version 11.0 (SPSS Inc, Chicogo, IL, USA). Frequencies of relevant perinatal outcome indicators were determined. Chi-square test and Student's *t*-test were used to test for association between variables of interests, such as sociodemographical characteristics of mothers and pregnancy outcomes. Binary logistic regression was carried out to assess the relationship between the outcomes of the pregnancy—for both mother and baby—and the booking status, while controlling for possible confounders. The strength of associations was determined through odds-ratio (OR) with 95% confidence interval (CI). Associations were considered statistically significant at the $p < 0.05$ level (two-tailed).

RESULTS

During the 22-month study period, there were 1,154

Table II. Maternal and perinatal complications and outcomes in booked and unbooked mothers.

Variable	Unbooked mothers (%) (n = 240)	Booked mothers (%) (n = 654)	OR	95% CI	p-value
Pregnancy complications					
Antepartum haemorrhage	38 (15.8)	20 (3.1)	5.96	2.53–14.29	< 0.001
Anaemia	94 (39.2)	124 (19.0)	2.75	1.09–4.47	< 0.001
Preeclampsia/eclampsia	19 (7.9)	14 (2.1)	1.71	1.15–2.55	< 0.001
Mode of delivery					
Spontaneous vaginal delivery	90 (38.8)	374 (57.7)	0.45	0.29–0.71	< 0.001
Pregnancy outcomes					
Preterm labour (< 37 weeks)	54 (22.5)	82 (12.5)	2.03	1.14–3.59	< 0.009
Maternal mortality	9 (3.8)	3 (0.5)	2.92	1.10–7.80	< 0.001
Apgar score (< 7)					
1 min	84 (56.8)	108 (18.2)	2.72	1.65–4.80	< 0.001
5 min	48 (32.4)	54 (9.1)	2.78	1.47–5.25	< 0.001
Perinatal mortality					
Intrauterine foetal death	46 (19.2)	20 (3.1)	7.52	3.27–17.60	< 0.001
Early neonatal death	32 (13.3)	20 (3.1)	4.88	2.01–11.97	< 0.001

deliveries out of which 336 (29%) were unbooked mothers. A total of 894 singleton pregnancies were recruited into the study. There were 240 unbooked mothers who served as the study cases and 654 booked mothers served as controls. The demographical parameters of the study and control groups (i.e. unbooked and booked mothers) are shown in Table I. Maternal characteristics of the unbooked mothers were significantly different from that of the booked mothers. Compared to booked mothers, unbooked mothers were younger in age (29.3 ± 6.08 vs. 31.12 ± 4.80 years; $p < 0.001$), had a higher tendency of being unmarried (9.2% vs. 1.8%; $p < 0.01$), and had a lower educational status ($p < 0.01$). Overall, unbooked mothers were of lower social class (25.0% in upper class vs. 52.3%; $p < 0.001$) and had a higher proportion of multipara (12.5% vs. 5.5%; $p < 0.02$).

The occurrence of maternal complications and perinatal outcomes at the bivariate level among booked and unbooked mothers are shown in Table II. Compared with booked patients, unbooked patients had a statistically significant higher incidence of antepartum haemorrhage (odds-ratio [OR] 5.96, 95% confidence interval [CI] 2.53–14.29, $p < 0.001$), anaemia (OR 2.75, 95% CI 1.09–4.47, $p < 0.001$) and preeclampsia/eclampsia (OR 1.71, 95% CI 1.15–2.55, $p < 0.001$). In terms of mode of delivery, unbooked mothers were half as likely to deliver by spontaneous vaginal delivery compared with booked mothers (OR 0.45, 95% CI 0.29–0.71, $p < 0.001$). On the other hand, unbooked mothers were twice as likely as booked mothers to deliver preterm babies (OR 2.03, 95% CI 1.14–3.59, $p < 0.009$). Babies of unbooked mothers were three times more likely to have asphyxia as indicated by an Apgar score of < 7 at one minute (OR 2.72, 95% CI 1.65–4.80) and five minutes (OR 2.78, 95% CI 1.47–5.25). The relationship between Apgar score and booking status was highly statistically significant ($p < 0.001$). There was also a statistically significant difference between booked and unbooked mothers in terms of intrauterine death (OR 7.52, 95% CI 3.27–17.60, $p < 0.001$) and early neonatal death (OR 4.88, 95% CI 2.01–11.97, $p < 0.001$).

As shown in Tables III and IV, booking status remained a significant factor for the occurrence of maternal complications (OR 4.303, 95% CI 2.441–7.588, $p < 0.001$) and perinatal outcomes (OR 8.197, 95% CI 3.582–18,757, $p < 0.001$), respectively, when the effects of age, social class, and packed cell volume (PCV) level were controlled for in the binary logistic regression analysis. Table III shows that mothers who previously had 2–4 children were significantly less likely to have maternal complications compared to those who were multiparous (≥ 5 births) (OR 0.455, 95% CI 0.229–0.902, $p < 0.024$). The results of the logistic regression also showed that PCV level was significantly associated with maternal complications (OR 0.633, 95% CI 0.567–0.964, $p < 0.026$) (Table III) but not with perinatal outcomes (OR 0.696, 95% CI 0.474–1.021, $p = 0.064$) (Table IV). In unbooked mothers, two deaths each were caused by antepartum haemorrhage, postpartum haemorrhage, eclampsia and ruptured uterus; while sepsis was responsible for the remaining death. The three deaths in the control group were caused respectively by severe preeclampsia, amniotic fluid embolism and anaesthetic complications.

DISCUSSION

Maternal mortality remains an issue of high research and programmatic interest in Nigeria and many parts of the

Table III. Correlates of maternal complications among delivered women.

	Adjusted OR	95% CI	p-value
Booking status			
Booked mothers*	1.000		
Unbooked mothers	4.303	2.441–7.588	< 0.001
Social class			
Lower*	1.000		
Middle	1.953	0.883–4.317	0.098
Upper	2.388	1.132–5.037	<0.022
Age (years)			
< 20	1.000	0.150–6.643	1.000
20–39	1.298	0.678–2.487	0.431
≥ 40*	1.000		
Parity			
1	0.544	0.215–1.376	0.198
2–4	0.455	0.229–0.902	<0.024
≥ 5*	1.000		
PCV level	0.633	0.567–0.964	<0.026

*Base group

Table IV. Correlates of perinatal mortality among babies of delivered women.

	Adjusted OR	95% CI	p-value
Booking status			
Booked mothers*	1.000		
Unbooked mothers	8.197	3.582–18.757	< 0.001
Social class			
Lower*	1.000		
Middle	2.356	0.813–6.832	0.115
Upper	1.087	0.393–3.006	0.872
Mode of delivery			
Spontaneous vaginal delivery*	1.000		
Operative and caesaream section	1.379	0.648–2.933	0.404
Age (years)			
< 20	1.325	0.173–10.151	1.000
20–39	0.737	0.310–1.752	0.409
≥ 40*	1.000		
Parity			
1	0.814	0.210–3.149	0.765
2–4	0.671	0.261–1.729	< 0.024
≥ 5*	1.000		
PCV level	0.696	0.474–1.021	0.064

*Base group

developing world because of its high incidence. In this study, the sociodemographical characteristics, obstetrical complications, and foetal and maternal outcomes in pregnant women booked for antenatal care and delivery in our centre were compared with that of women unbooked for antenatal care in our centre but who were referred or brought in during the course of labour because of onset of complications. The results clearly showed a positive correlation between unbooked mothers and increased risk of maternal and foetal adverse outcomes. Of the sociodemographical characteristics analysed in relation to booking status, the results indicated that unbooked mothers were significantly younger in age than booked mothers, more likely to be unmarried, and a higher proportion belong to a lower socioeconomic class and are of higher parity.

The negative association between age and booking status as recorded in our study agreed with the observation of Adelusi et al in a study carried out in Saudi Arabia.[11] The research findings in other studies, such as that conducted in South Africa as reported by de Jong et al,[12] did not show the same pattern of negative association between age and booking status. Younger people in a developing economy may likely be poorer on the account of inadequate skills and experience in the face of high national unemployment rates. The situation may be worse for those with a lower educational status. Harrison, for example, had showed in his study of 22,774 consecutive births in Zaria, northern Nigeria, that education was a strong determinant of maternal morbidity and mortality in our environment.[5]

Unmarried mothers are largely associated with unwanted and unplanned pregnancies with an associated high incidence of efforts to conceal the pregnancy and, thus, a tendency to avoid prenatal care. Unmarried pregnant women may also be poorer, as they may lack the social support of partners and others in a conservative culture like that of Nigeria, where teenage pregnancy and single motherhood are still largely considered a social stigma.

Poor economic status may make it difficult for women to make informed decisions about using health preventive and promotive services, such as antenatal care, particularly in an environment where the national poverty level is as high as 70%, as in the case in Nigeria. Women may also choose, under those unfavourable economic conditions, to seek for care in substandard facilities because of the perceived cost of treatment in centres with higher standards of care. Several studies in Nigeria have actually shown a trend of decline in antenatal attendance and hospital delivery rates, as hospital costs have been rising due to macroeconomic policies, which had also not significantly improved the economic situation of the population.[8,13,14] Also in agreement with findings in other studies,[5,12] a significantly higher percentage of the grand multiparous patients were unbooked in this study, most likely because these mothers had previous successful deliveries and therefore felt overconfident and refused to seek antenatal care and delivery in the hospital. This had led to an attendant increase in perinatal and maternal mortalities and morbidities in this group of mothers.

Pregnancy outcomes in the unbooked mothers were significantly poorer than in the booked mothers, due to high preterm delivery rates, low birth weight babies, and a very high incidence of caesarean section rates. Unbooked patients present late with complications making surgical intervention inevitable because of foetal distress and prolonged obstructed labour with attendant high perinatal mortality. The higher incidence of antenatal complications such as antepartum haemorrhage and anaemia in this study among the unbooked patients are factors that lead to poor outcomes in the infant and the mother. Some of the unbooked patients may have been admitted in labour in substandard facilities within the community only to be referred to the university hospital after a prolonged delay and onset of complications.

Several studies in our environment had elucidated various factors, such as aversion for caesarean sections, high hospital bills, religious beliefs, illiteracy, poverty, and environmental and cultural prejudices, as barriers hindering women from utilising prenatal care and hospital delivery.[13,15-17] Adequate antenatal care and hospital deliveries enable obstetricians to diagnose complications at an early stage when intervention will bring about better results.[18] Several studies have documented the positive influence of proper antenatal care and hospital delivery.[5,12,14] In this study, the overall maternal and perinatal mortalities for the period of review were 1,420/100,000 live births and 87/1,000 births, respectively. Maternal mortality was about three times more common in unbooked patients than in booked patients, while perinatal mortality was 5.3 times more commoner in unbooked patients than in booked patients.

The causes of maternal mortality in this study, such as antepartum and postpartum haemorrhage, severe preeclampsia/eclampsia, ruptured uterus and sepsis are highly preventable, if the patient was booked for antenatal care. Thus, the noticeable trend of a decreasing rate of booked antenatal/hospital delivery with concomitant increase in the number of unbooked emergency patients in Nigeria which suggests that a high proportion of women may be abandoning expert care for cheaper nonprofessional ones, has significant negative implications for maternal and child health status in the country. Reversing the present trend in maternal health-seeking behaviour is therefore an issue that needs to be effectively addressed if significant improvement in maternal health is to be achieved, in line with the ambitious and lofty targets of the health-related Millennium Development Goals.

Improvement in the proportion of booked mothers would need effective action at the policy as well as programme and service levels, and on a sustainable basis, such actions would involve not only the health sectors but also other major development sectors such as education, economic development, and labour and employment. Among others, women empowerment efforts involving poverty alleviation activities, improved access to productive resources, and effective literacy and educational development programmes have much to offer in terms of increasing the number of pregnant women to use antenatal services, particularly those in the lower socioeconomic groups. Health and hospital policies aimed at overcoming financial barriers to service utilisation, such as enactment of subsidised or free maternal care services, as recently witnessed in some Nigerian states, are also steps in the right direction in this context. The expansion of the recently-introduced health insurance scheme in the country to cover those of the informal sector and rural population also offers the possibility of improving the availability and accessibility of good quality antenatal care. Behaviour change communication, partnership with local community and religious leaders, greater involvement in household and health decision-making, and male involvement in maternal healthcare are all important in this regard.

In conclusion, the study showed a positive

correlation between unbooked mothers and increased risks of maternal and foetal adverse outcomes. There is an urgent need to promote antenatal care utilisation, ensure supervised delivery by trained attendants and eliminate deliveries under substandard conditions. Improvement in the socioeconomic conditions of the populace and the removal of fee for service in maternal care services will go a long way to improve the availability and accessibility of good quality antenatal care and delivery services that are urgently needed. Proper utilisation of the recently-introduced health insurance scheme will ensure adequate funding of the health sector.

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