Obstetric outcome of booked and unbooked deliveries at the University of Calabar Teaching Hospital, Calabar, Nigeria

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Abstract

Background: The final goal of antenatal care is safe delivery of a healthy baby to a healthy mother. Achieving livebirths with high Apgar scores is a desired expectation, as stillbirths constitute wastage of pregnancy and an index of poor obstetric care.

Objective: To determine the obstetric outcome in a cross-section of booked and unbooked parturients in our centre.

Methodology: Labour ward records of women who delivered in our facility within the months of August, September and October 2017 were analysed. Data included age, booking status, mode of delivery, fetal weight and Apgar scores. Primary data were inputted into EpiInfo version 7.2.3.1 for analysis while secondary data was analysed using select-statistics.co.uk calculator and GraphPad t-test calculator.

Results: There were 667 deliveries during the 3-month review. Six hundred (90.0%) were booked while 67 (10.0%) were unbooked maternities. Older women were more likely booked OR 1.13 (1.07, 1.19). Livebirths were 96.7% in booked parturients and 59.7% in the unbooked. Stillbirths, low Apgar scores, preterm births as well as PPH were significantly commoner in the unbooked parturients. There were two maternal deaths during the study period with a maternal mortality ratio of 300 per 100,000 livebirths.

Conclusion: The livebirth rates and five-minute Apgar scores of 7-10 were better in babies of booked parturients in contrast to unbooked parturients with a livebirth rate of 59.7% and 49.2% babies having Apgar scores of 7-10 in five minutes. Our results add to existing evidence advocating antenatal care and skilled delivery for pregnant women.

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Introduction

The field of obstetrics with the care of the mother, fetus and neonate is associated with diverse outcomes. These outcomes are affected by a number of factors which could be modifiable and non-modifiable [1][2][3][4]. These also vary depending on the characteristics of the patients and their booking status as adverse outcomes are usually associated with unbooked pregnancies. Ultimately, the indices used to assess the standards of care are an indirect and direct measure of the quality of care, which affects maternal morbidity and mortality. Outcomes affected by obstetric care include number of deliveries, mode of delivery, birthweight, Apgar score, live birth and stillbirth rate [4][5]. Most of these outcomes have been published individually as original articles and reviews [5][6][7][8]. Booking for antenatal care in a hospital was not a guarantee that delivery would take place there. In a study of the place of delivery among women who had antenatal care in a teaching hospital, only 68.5% of the women delivered in the hospital [9].

Preterm births have been defined by WHO as babies born alive before 37 weeks of pregnancy are completed[10]. Preterm births are reported only for liveborn infants [11], but they contribute significantly to perinatal morbidity and mortality.

Stillbirths may be the most agonizing exercise in futility for a pregnant woman[12]. The rate of stillbirths in a centre may also be a measure of the obstetric standard in the centre. In 2014 data from eight Nigerian hospitals, the stillbirth rate was 39.6 per 1000 while the estimated global stillbirth rate for 2015 was 18.4 per 1000 [6]. In a study in our centre[7], the stillbirth rate was 48.4 per 1000 total deliveries over the period between 2004 and 2013. Unbooked maternities were the greatest contributor to the stillbirth rate.

Postpartum haemorrhage is a live threatening obstetric outcome, which contributes significantly to maternal morbidity and mortality. It may be a measure of the standard of management of labour in a centre. The use of active management of the third stage of labour significantly reduces the incidence of postpartum haemorrhage [13].

It is already known that obstetric outcomes in unbooked pregnancies are worse than in booked pregnancies. What is not known is the statistical values of these obstetric outcomes in our centre.

The aim of this study was to determine the fetal and maternal outcomes of deliveries at the University of Calabar Teaching hospital. The objective was to compare these characteristics between booked and unbooked parturients. The

null hypothesis here was that there would be no significant difference in the delivery outcomes. This study may help to assess our obstetric performance in these characteristics with a view to improving our care.

Method

Study design

The study was a retrospective cross-sectional study of a group of parturients (booked and unbooked) who delivered in our facility within the study period.

We obtained institutional ethical exemption, as there were no ethical concerns for the patients and data used for this study.

Study setting

The study was conducted at the department of Obstetrics and Gynaecology of the University of Calabar Teaching Hospital in Calabar, South-South geopolitical zone of Nigeria. Calabar is the capital city of Cross River state with a population of 371,022 by 2016 projected from the 2006 census [9] and occupation of people predominantly civil service, trading and farming. University of Calabar Teaching Hospital is a tertiary health facility, which is a referral centre for both government and private hospitals within and outside the state.

The obstetric unit has fifty-six beds comprising twenty-eight in the postnatal ward, eight in the antenatal ward, and ten first stage of labour room. There are also four delivery beds for booked and unbooked cases. The obstetric theatre is adjourning the labour ward and has two operating tables.

Study participants

The study participants were women whose pregnancies were above the age of fetal viability (28 completed weeks of gestation in our setting) and delivered in our facility during the study period. They comprised; (booked) who had formal registration and antenatal care in our facility including those referred from hospitals with qualified attendants, and (unbooked) who had no formal antenatal care, mostly referred from traditional birth attendants' homes. Labour was monitored partographically. Fetal assessment was by intermittent auscultation with Pinard's stethoscope and hand-held Sonicaid. The cardiotocograph machine was faulty during the period.

Variables

Booking status; Age (of participant); Parity (number of deliveries of babies after age of fetal viability). Mode of delivery; Caesarean section (CS), Spontaneous Vaginal delivery (SVD), Breech (spontaneous, assisted or breech extraction), Forceps delivery or Destructive operative vaginal delivery. Type of delivery; Preterm, livebirth, stillbirth. Apgar scores at 1

and 5 minutes after birth; Birth weight of baby; Blood loss per mode of delivery; postpartum haemorrhage (PPH); and maternal death.

Data sources/measurement

The sources of data were patients' records and the labour ward and theatre registers and postnatal ward notes of the Department of Obstetrics and Gynaecology, University of Calabar Teaching Hospital (UCTH), Calabar.

Data collected included: demographic details such as age and parity. Obstetric data included booking status (exposure was antenatal care), and delivery details (outcome variables) included mode of delivery, type of delivery, Apgar scores in first and fifth minutes, birth weights, blood loss per mode of delivery, postpartum haemorrhage and maternal death. The frequencies of these characteristics were measured and compared between the subgroups (booked and unbooked).

Study size

We studied all deliveries above the age of fetal viability (28 completed weeks of gestation in our setting) during the study period. The year 2017 was divided into four segments. The period from August to October (study period) had the greatest number of deliveries and the period where there was uninterrupted service delivery. All patients who delivered within this period were recruited. Miscarriages were not included. Using the formula for sample size calculation z^2 x p(1-p)/d^2 where z is 95% probability (1.96) and p is the percentage of booked women who delivered in the place of booking (0.685) [9] while d (0.05) is 95% confidence, we had a sample size of 332.

Statistical methods

Primary data (continuous and categorical variables) were inputted into EpiInfo version 7.2.3.1, and analysed using descriptive statistics (frequency distribution, ranges, percentages, means and standard deviations as well as median). Unconditional logistic regression for all ages and parity was done using EpiInfo logistic regression model. In the secondary data analysis, the means of blood loss, their standard deviations and frequency were compared between booked and unbooked patients using GraphPad t test calculator. Odds ratio comparing two samples was done using select-statistics.co.uk calculator. P values <0.05 were statistically significant.

Results were presented in tables.

Result

Table 1. Age range and parity distribution of the parturients

Age range in years	All Parturients (%)	Booked	percent booked	unbooked	percent unbooked	Odds ratio (95% Confidence Interval)	P value	
10-19	21 (3.2)	12	2	9	13.4			
20 – 34	544 (81.6)	495	82.5	49	73.1			
35 – 39	93 (13.9)	84	14	9	13.4			
40 – 50	9 (1.3)	9	1.5	0	0			
Total	667 (100.0)	600		67		1.13 (1.07, 1.19)	0.0000	
Mean age	29.4±4.9	29.7±4.7		26.8±5.7				
Median age	30	30				27		
Parity								
1	213 (31.9)	185	30.8	28	41.8			
2 – 4	418 (62.7)	381	63.5	37	55.2			
5 – 12	36 (5.4)	34	5.7	2	3			
Total	667 (100.0)	600		67		1.12 (0.91, 1.38)	0.2673	
Median	2	2		2				

Table 1. Age and Parity. There were 667 parturients of which 600(90%) were booked, and 67(10%) unbooked. The minimum age was 14 years while the maximum age was 42 years. The frequency and percentage distribution as well as the mean and median ages represent each **group** in the column. Thus, the most common age group with 544 parturients (81.6%) was 20 – 34 years. The **booked** 82.5% and the **unbooked** 73.1% were of this age group.

The minimum parity at delivery was 1 (primiparity) and the maximum was 12. Multiparity (2 – 4) was the most common parity group. The median parity was 2, which was the same for **booked** and **unbooked** parturients.

The total number of deliveries during the study period was 667. There were 600 booked and 67 unbooked parturients.

The age of the parturients ranged from 14 – 42 years. Age range was used for simplicity of representation. The mean age of all parturients was 29.4±4.9 years. The mean age of booked parturients was 29.7±4.7 years with a median of 30 years. The mean age for unbooked parturients was 26.8±5.7 years, and a median of 27 years. The parturients were composed of 3.2% teenagers, 81.6% aged 20 – 34 years, 13.9% aged 35- 39 years, and 1.3% aged 40 – 50 years. In the subgroups: 2% of booked parturients were teenagers but 13.4% of unbooked parturients; 82.5% of booked parturients were aged 20 – 34 years but 73.1% of unbooked parturients. Booked parturients aged 35 – 39 years were 14% but 13.4% of the unbooked. All the women aged 40 – 50 years were booked.

The parity of the parturients after the index delivery was represented in ranges. The median parity for both groups was 2. The study was made up of 31.9% primiparous, 62.7% multiparous and 5.4% grandmultiparous women. The **booked** group was composed of 30.8% primiparous, 63.5% multiparous and 5.7% grandmultiparous women, whereas the **unbooked** group contained 41.8% primiparous, 55.2% multiparous and 3% grandmultiparous women.

Unconditional logistic regression of booking (for antenatal care) with maternal age showed OR 1.13 95% CI(1.07, 1.19) P

value 0.0000, however, with parity OR was 1.12 (0.91, 1.38) p-value 0.27

Table 2. Obstetric outcomes of booked and unbooked parturients

Characteristic	total	(percent of total deliveries)	Booked	(percent of total booked)	Unbooked	(percent of total unbooked)	Odds ratio (95% confidence interval)	P value
Number of total deliveries	667	100	600	100	67	100		
Mode of delivery								
CS	255(237)	38.2	225(217)	37.5	30(20)	44.8	0.66	
SVD	397	59.5	365	60.8	32	47.8	(0.39, 1.11)	
Breech (assisted, spontaneous, extraction)	13	1.9	10	1.7	3	4.5		
Forceps	1	0.2			1	1.5		
Destructive	1	0.2			1	1.5		
Birth weight								
ʿ1.5 kg	9	1.3	8	1.3	1	1.5		
1.5 - 2.49 kg	65	9.8	52	8.7	13	19.4		
2.5 - 3.99 kg	555	83.2	506	84.3	49	73.1		
4 -6 kg	38	5.7	34	5.7	4	6		
Mean birthweight (kg)	3.1±0.6		3.2±0.5		3.0±0.7		1.54 (1.03, 2.32}	0.0350
Apgar score in 1 minute								
0	48	7.2	20	3.3	28	41.8		
1 – 3	26	3.9	21	3.5	5	7.5		
4 – 6	70	10.5	61	10.2	9	13.4		
7 – 10	523	78.4	498	83	25	37.3	1.48 (1.36, 1.61)	0.0000
Apgar score in 5 minutes								
0	50	7.5	22	3.7	28	41.8		
1 – 3	7	1	4	0.7	3	4.5		
4 – 6	30	4.5	27	4.5	3	4.5		
7 – 10	580	87	547	91.2	33	49.2	1.42 (1.32, 1.53)	0.0000
Preterm birth	63	10.2*	53	9.1*	10	25.0*	0.3 (0.14, 0.65)	0.0085
Livebirth	620	93	580	96.7	40	59.7	19.58 (10.11, 37.91)	0.0000
Stillbirth	47	7	20	3.3	27	40.3	0.05 (0.03, 0.1)	0.0000
Postpartum haemorrhage	48	7.2	34	5.7	14	20.9	0.24 (0.12, 0.47)	0.0000
Maternal death/MMR	2	0.3	0	0	2	5		

Table 2: There were 667 deliveries. The characteristics are shown in rows while the frequency distribution for total, booked and unbooked parturients is shown in columns. Birthweights of babies ranged from 0.65 – 6kg with a mean of 3.1±0.6kg. In all 255 CS were done but 237 were livebirths, 225 CS in booked with 217 livebirths and 30 in unbooked with 20 livebirths. Apgar scores are given for the 1st and 5th minute of life. Stillbirth was identified as Apgar score of 0 at 1 minute. The denominator for the percent preterm birth* and maternal mortality ratio (MMR)* is livebirth for each group.

Table 2 shows the obstetric characteristics (mode of delivery, Birth weight, Apgar score in 1 and 5 minutes, premature birth, livebirth, stillbirth, and postpartum haemorrhage) for all the parturients, and between the booked and unbooked.

The Caesarean section rate was 38.2% (Wilson 95% Confidence Interval 34.2, 41.6) for all the deliveries (booked and unbooked). However, it was 37.5% (Wilson 95 % Confidence Interval 33.7, 41.4) in the booked group and 44.8% (Wilson 95% Confidence Interval 32.6, 57.4) in the unbooked group. The odds of having a Caesarean versus spontaneous vaginal delivery for **booked** compared with **unbooked** done using select-statistics.co.uk app, gave an OR 0.66 (0.39, 1.11). Thus, although the CS rate was lower in the booked group, the odds were not significantly lower.

Generally, 83.2% of babies weighed 2.5 – 3.99kg, 1.3% weighed less than 1.5kg, 9.8% weighed 1.5 – 2.49kg, and 5.7% weighed 4 – 6kg. In the subgroups, 84.3% of booked parturients had babies that weighed 2.5 – 3.99kg, 1.3% weighed less than 1.5kg, 8.7% weighed 1.5 – 2.49kg, and 5.7% weighed 4 – 6kg. Of the unbooked parturients, 73.1% had babies that weighed 2.5 – 3.99kg, 1.5% weighed less than 1.5kg, and 19.4% weighed 1.5 – 2.49kg while 6% weighed 4 – 6kg.

Booked women delivered babies with higher birthweights OR 1.54 (1.03, 2.32) p-value 0.035, similarly, Apgar scores in one minute and five minutes were very significantly higher in booked than in unbooked women with p values 0.0000

Apgar scores of zero at 1 minute represent stillbirths. The stillbirth rate for the **booked** parturients was 33/1000 deliveries, whereas for the **unbooked** it was 418/1000. In one minute of life, 83% of babies of booked parturients had Apgar scores of 7 – 10, whereas only 37.3% of unbooked parturients had Apgar scores of 7 – 10. Similarly, in 5 minutes of resuscitation, 91.2% of babies of booked parturients had Apgar scores of 7 – 10, but 49.2% of babies of unbooked parturients.

Two babies from the booked group with very low Apgar scores died within 5 minutes of resuscitation.

Preterm deliveries constituted 10.2% of all livebirths. It was 9.1% of **booked** livebirths, but 25.6% of **unbooked** livebirths.

Overall, there were 92.8% livebirths during the study period, 96.7% for the **booked** and 59.7% for the **unbooked**.

Postpartum haemorrhage occurred in 5.7% of **booked** deliveries but in 20.9% of **unbooked** deliveries.

There were two maternal deaths recorded during the period of study. This gave a maternal mortality ratio of 300 per 100,000 deliveries. However, all the deaths were unbooked parturients, and in this group with 40 livebirths, it meant a maternal mortality ratio of 5000 per 100,000 livebirths.

Table 3. Blood loss per mode of delivery

Mode of delivery	Number (n)	Range in ml	Mean loss (ml)	Median loss (ml)
SVD	397	100 - 1800	218.7±176.0	200
Booked	365	100 - 1800	214.7±166.3	200
Unbooked	32	100 - 1200	278.3±269.3	175
Caesarean Section (CS)	255	150 – 2500	611.2±330.3	500
Booked	225	150 - 2500	593.1±316.8	500
Unbooked	30	250 - 2000	751.7±399.2	700
Asst Breech Del	10	100-500	236.4±120.6	200
Spont Breech Del	2	200-500	350±212.1	350
Breech extraction	1	150	150	
Forceps Delivery	1	400		
Destructive Del	1	250		

Table 3: SVD is spontaneous vaginal delivery. Abbreviations; Asst (assisted), Del (delivery), spont (spontaneous).

The number (n) was the frequency of the characteristic; the range was minimum and maximum blood loss. The mean blood loss and standard deviation as well as the median blood loss are given in millilitres (ml).

Table 3 shows the blood loss per mode of delivery. It also compares blood loss from caesarean section (CS) and spontaneous vaginal delivery (SVD) in booked and unbooked parturients. Overall blood loss was significantly less in booked parturients p value 0.0017

The mean blood loss from all Caesarean sections was 611.2±330.3 millilitres with a median of 500ml. Booked parturients had a mean of 593.1±316.8 with a median of 500ml, while unbooked parturients had a mean of 751.7±399.2mls and a median of 700mls. A two-tailed t-test generated using GraphPad calculator was 2.4931, p-value 0.01, which significantly showed less blood loss from the booked parturients.

The mean blood loss from spontaneous vaginal delivery was 218.7±176.0 ml with a median of 200ml. Booked parturients had a mean of 214.7±166.3ml and a mean of 200ml, while the unbooked parturients had a mean of 278.3±269.3mls with a median of 175 ml. A two-tailed t-test similarly done was t = 1.9337, p-value 0.0514, which makes the difference between the groups not so significant.

Discussion

The outcome of pregnancy may be unpredictable, but supervised antenatal and delivery processes by skilled attendants are better and safer. A comparative study on the booked and unbooked pregnant patients at a Centre in our sub-region, had reported that pregnancy and labour complications such as preeclampsia and pregnancy induced hypertension, prolonged obstructed labour and uterine rupture, were more common in the unbooked group, which have adverse perinatal and maternal outcomes [14]. This study had advised that the new World Health Organisation recommendation of a minimum of eight antenatal care visits; one in first trimester, two in second trimester and five in the third trimester, would reduce complications due to poor antenatal coverage.

Although our study was not designed as a comparative study but as a descriptive study of the obstetric outcomes generally and in each group, when these outcomes were subjected to inferential statistics, there were some significant findings.

In Table 1, it was significant to note that older women came to book in our facility, as all nine parturients aged 40 years and above were booked. The age range of our parturients (14 – 42 years) captured the active reproductive age of women, which gives our study population a fair spread. Unconditional logistic regression, which showed increased booking with maternal age aligned with a study where maternal age was associated with more utilization of antenatal care [15]. In a study at a North London Hospital, unbooked mothers were younger (26.0±6.7 years) compared to booked mothers (29.2±6.1 years) [16]. This age difference was similar to our findings.

Table 1 also showed that most of the parturients were multiparous (63.7% of booked and 55.2% of unbooked). The primiparous were (30.8% of booked and 40.8% of unbooked). However, unconditional logistic regression showed that increasing parity was not associated with an increased tendency to book. This finding may support the assertion that high parity women may tend to rely on their experiences and may not feel the need to book for antenatal care [15].

Caesarean section rates have been increasing globally. In our centre, the caesarean section rate in 2009 was 25.8% (unpublished). The caesarean section rate for all the parturients in this study was 38.2%, however, it was 37.5% and 44.8% for the booked and unbooked groups respectively. Analysis of the ratios between the groups was not statistically significant. In Table 2, the odds of having a Caesarean section versus spontaneous vaginal delivery (SVD) were compared between booked and unbooked parturients. The odds ratio was 0.66 with a 95% confidence interval (0.39, 1.11). The difference was not consistently significant. The implication of this may be that the procedure of Caesarean section was unaffected by the booking status of the parturient.

The mean birth weight of all deliveries was 3.1±0.6kg but it was 3.2±0.5kg for the booked and 3.0±0.7kg for the unbooked group. The odds for higher birth weights were 1.5 times greater among booked parturients. This significant difference in the birth weights may be because the booked parturients were older, and had less of preterm births. The mean birth weight in a centre in Southwest Nigeria [17] was 3.2±0.5kg, and in another centre in Northern Nigeria[18], it was 3.1±1.9kg. The birth weights in our centre were within the range of other centres. Birth weights, however, are dependent on the gestational age of pregnancy and fetal chromosomal sex, as well as maternal age, parity, nutritional and social class of the women.

In table 2, The zero Apgar scores at one minute (stillbirths) constituted 41.8% of babies of unbooked parturients but only 3.3% of babies of booked parturients. Apgar scores showed that overall 96 Apgar 1-6 in 1 minute were reduced to 37 in 5 minutes resuscitation, a reduction by 61.5%. For the booked group, 82 Apgar 1 – 6 in 1 minute were reduced to 31 in 5 minute resuscitation, a reduction by 62.2% but in the unbooked group, 14 Apgar 1 – 6 were reduced to 6, a reduction by 57.1%.

The improvements in Apgar scores after five minutes resuscitation was accredited to our neonatal support team. It was our practice to have neonatologists at each delivery for improved outcomes of resuscitation.

Our study has confirmed several other studies, which have reported high prevalence of stillbirths[6], prematurity [19] and postpartum haemorrhage [16] among unbooked parturients. In fact, while live births were 93% of all the total deliveries; in the booked group it was 96.7% and 59.7% in the unbooked group. As shown in Table 2, there was a 19-fold increased likelihood of having live births when women booked in our centre. This gives credence to the benefits of antenatal care attendance and delivery by skilled attendants. A recent nationwide study of quality and outcomes of maternal and perinatal care for 76,563 pregnancies, which included our centre, reported 69,055 livebirths of 74,355 deliveries. This gave a livebirth of 92.8%, which is the same as our finding [20].

There were 63 preterm births in 620 livebirths, a rate of 10.2 per 100 livebirths. The booked group had 53 in 580 livebirths (9.1%) while the unbooked group had 10 in 40 livebirths (25%). In 2014, a global, regional and national systematic review of preterm births found that Nigeria had a preterm birth rate of 11.4% (8.0 – 15.7) of all livebirths, representing 5.3% of the global preterm birth burden [21]. It was, however, not stated what contribution the unbooked maternities affected the national preterm birth rate.

There were two deaths recorded during the study period, which gave a maternal mortality ratio of 300 per 100,000 livebirths. However, since all the deaths were from the **unbooked** group, it amounted to 5000 per 100,000 livebirths. Maternal mortality ratio in a five-year retrospective study (2010 – 2014) in our facility was 448 per 100,000 livebirths [22].

Table 3 showed the blood loss per mode of delivery. Overall blood loss was significantly less in the booked parturients. Our emphasis was on Caesarean section and spontaneous vaginal delivery. Blood loss at Caesarean section was significantly less for the booked parturients but it was not the case during spontaneous vaginal delivery. This may be so because active management of the third stage of labour was practised in all cases.

The study was strengthened by proper documentation and retrieval of information from the records. Our limitation was our study design which used a much smaller number of unbooked parturients compared with the booked.

Conclusion

Booking for antenatal care in our facility reduced the odds of stillbirth, preterm birth, low Apgar scores and postpartum haemorrhage. With 96.7% livebirths in the booked group compared with 59.7% in the unbooked group, all pregnant women should benefit from antenatal care and skilled delivery.

Recommendation

Pregnant women should be encouraged to book and deliver in facilities with skilled attendants.

Conflict of interest

None

Funding

Both authors contributed.

Author contributions

- First author: conceptualization, data collection and analysis, manuscript development and editing.
- Second author: literature search and review, manuscript development and editing.

Ethical statement

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LETTER OF EXEMPTION

Your request for ethical approval for a research study titled ``A RETROSPECTIVE STUDY ON THE OBSTETRIC OUTCOME OF DELIVERIES IN OUR HOSPITAL'' is hereby granted exemption from ethical approval because there are no ethical issues involved in your work.
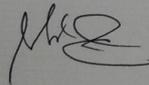
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