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FETO-MATERNAL OUTCOME AND FACTORS ASSOCIATED WITH COMPLICATED DELIVERIES AT A TERTIARY CENTRE IN NORTHWESTERN NIGERIA

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ABSTRACT

Background: Complicated deliveries are associated with a higher risk of poor feto-maternal outcome. Availability of data on the magnitude and nature of conditions that complicate childbirth in our setting could guide proper design of interventions to improve these outcomes. **Methodology:** An analysis of records of women managed for complicated deliveries at Federal Medical Centre Birnin Kebbi, Nigeria, between January 2018 and December 2019 was done. There were 1,414 deliveries and 632 had complications, these latter formed the study population. Results are presented in proportions and means (standard deviation) for categorical and numerical data respectively. Chi square and t tests were used to test for significance where necessary. Level of significance was set at $p < 0.05$. **Results:** Total deliveries in the period were 1,414 out of which there were 29 maternal deaths and 192 perinatal deaths, giving an overall maternal mortality ratio of 2,051 per 100,000 live births and a perinatal death rate of 136 per 1000 deliveries. There was 1 complicated delivery for every 2 deliveries conducted in the center (632:1414 deliveries). The most common indication for admission was obstructed labour followed by obstetric haemorrhage. Majority (56.5%) had emergency caesarean section and the major indication for the caesarean section was previous caesarean section. The factors associated with maternal complications were maternal age, booking status and parity. **Conclusion:** There is a high admission rate for complications in labour and delivery at our facility. The factors associated with maternal and fetal complications were maternal age, booking status and parity.

KEYWORDS: Maternal mortality, maternal morbidity, labour complications.

INTRODUCTION

Most pregnancies and deliveries tend to be uneventful but about 15% of pregnant women are estimated to develop complications that could threaten their lives.[1] So when complications occur in the course of pregnancy, labour or delivery, the risk of poor outcome for both the mother and fetus rises significantly.[2] Such complications are also associated with higher cost of care arising from longer hospital stay and the need for surgical interventions to achieve delivery. Complications therefore pose a burden on the affected family and on the health facility.[3] Complicated deliveries could also add to the burden of maternal morbidity and mortality that is already high especially in low resource settings. World Health Organization (WHO) reported that in 2015 alone, there were an estimated 303,000 maternal deaths, and that most of these deaths occurred in developing countries like Nigeria.[3]

The risk of having a complicated delivery and its attendant risk of maternal and/or perinatal morbidity or mortality could be minimized by routine antenatal care (ANC) and supervised facility delivery.[4] ANC attendance could provide the opportunity to identify preventable risk factors such as preexisting maternal health conditions like cardiac disorders and diabetes; fetal conditions like fetal macrosomia and intra uterine growth restriction, and other obstetric complications like preeclampsia and placenta praevia. While supervised delivery will allow for timely recognition of danger signs of complication followed by timely institution of intervention.[1]

Availability of data on the magnitude of occurrence and nature of conditions that complicate childbirth especially in low-resource settings where prevalence of such is high could guide proper design of interventions to minimize the risk of occurrence of such. With the current unacceptably high maternal and perinatal morbidity and

mortality figures in our setting, this study was designed to assess the magnitude of the problem by assessing complicated deliveries and associated factors in a tertiary level centre in a low resource setting.

The specific objectives were to describe the demographic characteristics of mothers affected by such complications, to analyse the nature of the complications, and to describe the feto-maternal outcome and associated factors among the study participants.

METHODOLOGY

It was a secondary analysis of existing data at the post-natal unit of Federal Medical Centre Birnin Kebbi in North western Nigeria. The center is a tertiary level hospital that receives referrals from both within and outside Kebbi State, and sometimes even across the border from the neighboring towns in Niger Republic. The study period was 1st January 2018 to 31st December 2019. All maternity admissions for complications in labour or delivery that occurred within the specified study period were analysed. There were 1,414 deliveries and 632 of these had complications. Those with complications formed the study population. Relevant data for the study were obtained from the report book of admission details that was prospectively updated at the time of each patient discharge. Data analysis was done using statistical package for social sciences (SPSS) Version 22. Level of significance was set at $p < 0.05$.

RESULTS

A total of 632 women had complications during the study period. Out of these, two were readmissions and were therefore excluded from further analysis. Total deliveries in the period were 1,414 out of which there were 29 maternal deaths and 192 perinatal deaths, giving an overall maternal mortality ratio of 2,051 per 100,000 live births and a perinatal mortality rate of 136 per 1000 deliveries. There was 1 complicated delivery for every 2 deliveries conducted in the center (632:1414 deliveries).

There were a total of 661 babies from 630 admissions indicating that 599 were singleton and 31 were twin deliveries giving a twin pregnancy rate was 5.2%; there were no higher order deliveries during the study period. The sex distribution was 333 males and 328 females or 50.4% and 49.6% respectively for all deliveries.

The mean age of the participants was 27.1 ± 6.1 years. The youngest was 15 years and the oldest was 45 years. Majority of the participants (59.7%) were unbooked. The most common indication for admission was obstructed labour, followed by obstetric haemorrhage. Majority (56.5%) had emergency caesarean section and the major indication for the caesarean section was previous caesarean section. The demographic and clinical profile of the respondents are outlined in Table 1 and Figure 1.

Table 1: Demographic and Clinical parameters of study participants.

Variable	Number	Percentage
Age in years (mean)	*27.1 (sd. 6.1years)	
Parity		
Primapara	207	32.8
Multipara	287	45.6
Grand-multipara	136	21.6
Booking Status		
Booked	254	40.3
Unbooked	376	59.7
Indications for admission		
Obstructed labour	146	23.1
Fetal indications	116	18.4
Obstetric haemorrhage	93	14.8
Elective indications	78	12.4
Maternal medical conditions	77	12.2
Preeclampsia/eclampsia	50	7.9
Uterine rupture	49	7.8
Sepsis	6	1.0
Others	15	2.4
Mode of delivery		
Emergency caesarean section	356	56.5
Vaginal delivery	111	17.6
Elective caesarean section	102	16.2
Laparotomy	31	4.9
Postpartum admissions	29	4.6
Vacuum delivery	1	0.2

Note. *Mean age in years

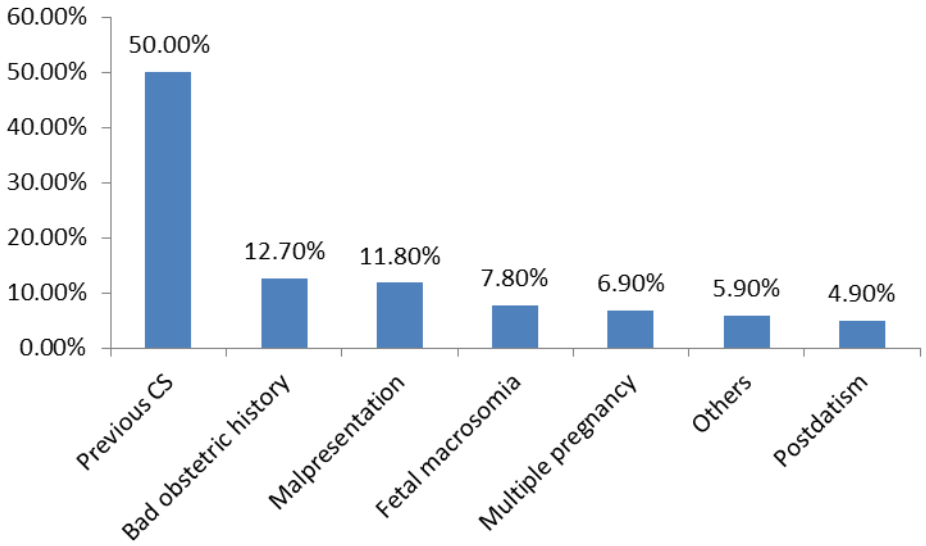

Figure 1: Indications for elective caesarean section.

Among the complicated deliveries, there were 6 maternal death (1%) and 91 (15%) fetal death. This is shown in Figure 2.

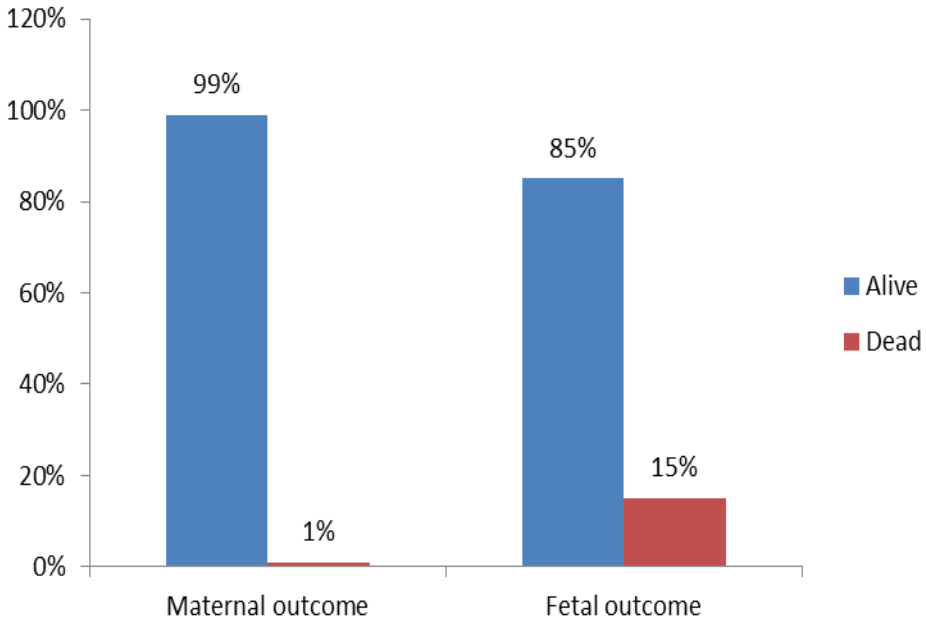

Figure 2: Feto-maternal outcome among the parturients.

The factors associated with maternal complications were age, booking status and parity. Maternal age and parity were significantly associated with all the five common complications ($p < 0.05$) except obstetric haemorrhage ($p = .9$) and puerperal sepsis ($p = .5$) while booking status was significantly associated with all ($p < 0.01$) except preeclampsia/eclampsia ($p = .21$) and puerperal sepsis ($p = .41$). This is shown in Table 2.

Table 2: Descriptive Statistics of Maternal Characteristics by Maternal Complications.

Maternal characteristics	Maternal complications (Number)									
	Obstetric haemorrhage		Ruptured uterus		PE/Eclampsia		Puerperal Sepsis		Obstructed labour	
	YES	NO	YES	NO	YES	NO	YES	NO	YES	NO
Age-group										
<20yrs (N = 63)	7	46	0	53	10	43	0	53	20	23
20 – 35 (N = 315)	76	439	23	492	40	475	6	509	104	411
>35 (N = 62)	10	52	8	54	53	9	0	62	19	43
X^2; *p*-value	194; .9		**9.6; .006**		**14.1; .002**		19; 051		**10.4; .001**	
Booking status										
Booked (N = 254)	24	230	3	251	16	238	1	253	42	212
Unbooked (N = 376)	69	307	28	348	34	342	5	371	101	275
X^2; *p*-value	**9.5; .003**		**12.7; .001**		1.5; .21		1.41; .41		**9.2; .003**	
Parity										
Primipara (N = 207)	21	106	0	207	35	172	1	206	75	132
Multipara (N = 287)	37	270	20	267	11	276	5	282	39	248
G/multipara (N = 136)	35	101	11	125	4	132	0	136	29	107
X^2; *p*-value	17.4; .17		**16.2; <.001**		**34.1; <.001**		2.71; .144		**35.3; <.001**	

There were significantly more fetal deaths among the unbooked cases compared to the booked ($p < 0.001$). However, there was no significant association between parity and fetal outcome. ($p = 0.194$). This is shown in Table 3.

Table 3: Bivariate Analysis of Maternal Clinical Characteristics by Fetal Outcome.

Maternal Characteristics	Fetal outcome		χ^2	*p*- value
	Alive n (%)	Dead n (%)		
Booking status				
Booked	238 (44.7)	14 (15.4)	27.8	<0.001
Unbooked	295 (55.5)	77 (84.6)		
Parity				
Primigravida	178 (33.4)	26 (28.6)	6.1	0.194
Multigravida	248(46.5)	37 (40.7)		
Grandmulti	107 (20.1)	28 (30.8)		

There was no significant association between maternal clinic-demographic factors and maternal outcome as shown in Table 4.

Table 4: Bivariate Analysis of Maternal Clinico-Demographic Characteristics by Maternal Outcome.

Maternal Characteristics	Maternal outcome		χ^2/Fisher's exact	*p*- value
	Alive n (%)	Dead n (%)		
Age				
Less than 20 years	53 (8.5)	0 (0)	1.35	0.508
20-35 years	509 (81.6)	6 (100)		
>35 years	62 (9.9)	0 (0)		
Booking status				
Booked	252 (40.4)	2 (33.3)	1.23	0.726
Unbooked	372 (59.6)	4 (66.7)		
Parity				
Primigravida	205 (32.9)	2 (33.3)	1.52	0.497
Multigravida	283(45.4)	4 (66.7)		
Grandmulti	136 (21.8))	0 (0)		

DISCUSSION

The proportion of complicated deliveries was high in the study area. Although this was expected because of the referral status of the facility, a ratio of about one complicated delivery to every two uncomplicated ones is a cause for concern as it indicates the need for adequate and appropriate facilities for intervention if a positive management outcome is to be achieved. This may be a challenge considering the low-resource setting of the facility. Many facilities in low-resource areas are rarely adequately equipped with all the material and human resources needed to efficiently manage complicated pregnancies and/or deliveries.[5] A recent study in Nigeria reported a low level of knowledge and skills on emergency obstetric care among health care providers, including referral facilities in North western Nigeria where our study was conducted.[6] This may help to explain the high level of complicated deliveries in the study centre.

The demographic profile of the respondents was similar to what was reported in a previous study in the study centre.[3] The low average maternal age and high percentage of multiparous women suggest that women start the reproductive career at a young age. The latest National Demographic and Health Survey (NDHS) in 2018 reported that up to 50% of women of reproductive age have had their first child by 21 years of age.[7] The high parity also suggest underutilization of family planning services; the overall national contraceptive prevalence rate among married women in Nigeria is just 12%, and even much lower values of 6.2% and 3.2% have been reported for North-West and Kebbi state (where our study is situated) respectively.[7] Considering the risk of complications associated with high parity, and the underutilization of antenatal services that could make it possible to identify those at high risk for preventable complications, the findings from our study points to the need to heighten the campaign on contraceptive use.

The complications that necessitated admission for women in this study included obstructed labour followed by obstetric haemorrhage; this finding is similar to what was previously reported in the same study area.[3] It differs from the finding in Ado-Ekiti where haemorrhage and hypertensive disorders were the major complications.[8] The finding also differs from that reported in Jos[9] and that of nationwide maternal near miss cross-sectional study that reported hypertensive disorders as the major complications.[10] Poor antenatal care attendance and poor health seeking behavior among pregnant women in the study area may have accounted for the finding of obstructed labour as a major complication in this study. Some of the complications are preventable; obstructed labour for example, could have been prevented if the affected mothers had accessed antenatal and supervised delivery services in a timely manner. Some risk factors for obstruction (fetal macrosomia, abnormal lie, abnormal presentation) could be identified in the antenatal period or in early intrapartum period and timely intervention could prevent more adverse maternal and fetal effects. However, majority of the cases were unbooked. Antenatal care attendance significantly improves pregnant women's care seeking practices when obstetric complication arise.[12] Obstructed labour contributes to both poor fetal outcome through perinatal asphyxia as well as poor maternal outcome such as uterine rupture, obstetric haemorrhage, puerperal sepsis and even maternal death. It also contributes to increased rates of emergency caesarean section and its attendant complications of increased risk of puerperal sepsis and birth asphyxia. However, more than half of the women managed had not received antenatal care and missed the opportunity to be assessed for risk factors for complications in a timely manner.

Caesarean section rate among the respondents was significantly higher than the general population but considering that it was a cohort of complicated deliveries this high rate should be expected. Caesarean section has been reported to reduce maternal and neonatal morbidity and mortality,[13] so even though WHO recommends a caesarean section rate 10-15%,[13] the high caesarean section rate could be explained by the high proportion of complicated deliveries relative to normal ones. In addition, many of the women who were delivered by CS in our study had been delivered by the same route in a previous pregnancy. Primary caesarean section is a major contributor to high caesarean section rates since it contributes to the risk of repeat caesarean section; a rising trend in repeat CS rate has been reported in the United States.[14]

Overall CS rates could be reduced by exploring other methods of delivery especially where the fetus is dead as is the usual case in obstructed labour. Some clinicians have recommended the revival of the art of destructive vaginal delivery in highly selected cases of neglected obstructed labour with death fetuses.[15] No case of destructive delivery was however registered in all the 630 deliveries in our study even though the fetuses were dead in 25 out of the 146 cases of obstructed labour managed.

Age was found to be significantly associated with maternal outcome and maternal complications were more in the age group of 20 to 35 years. Similar finding was also reported by Samuels and Ocheke in Jos[9] though Aduloju et al[8] in Ado-Ekiti reported differently as they found complications to be more in the advanced maternal age group. The findings in our study and in Jos (both geographical areas being located in the northern part of Nigeria) may be reflection of the younger age at onset of reproductive activity that is the usual finding in the Northern compared to the Southern parts of Nigeria[7] where Ado-Ekiti is located.

Antenatal booking status was found to be significantly associated with poor maternal and fetal outcomes in our

study. Previous studies have demonstrated the relevance of ANC attendance in positively modifying maternal care seeking behavior.[12] Women who received ANC are more likely to seek facility-based delivery services in a timely manner compared to those who did not.[12] Aduloju et al reported similar higher complications among the unbooked in a similar study in Ado-Ekiti.[8] Antenatal clinic serves as an important source of information to pregnant women on pregnancy and delivery danger signs. Hence, booked cases would identify life threatening complications and present earlier than unbooked cases.

Another factor that was significantly associated with higher proportion of complicated deliveries was parity. The finding that more complications occurred among the primigravida was similar to that reported by Naderi et al in Iran[17] but differed from findings by Aduloju et al in Ado-Ekiti[8] and Samuels & Ocheke in Jos[9] where complications were reportedly more among the multipara.[8] With their young age and still developing pelves at commencement of the reproductive career, obstructed labour as a complication tends to be commoner among the young age group.[18] Our study reported more cases of obstructed labour than either uterine rupture or postpartum haemorrhage and this may be explained by the significantly higher proportion of primigravida among the study population compared to the multiparous women. Obstructed labour occurs more commonly in primigravida who are of young age due to their underdeveloped pelvis. Obstructed labour was the most common complication in this study.

CONCLUSION

Our study reported a high incidence of complicated deliveries in this hospital-based study, a finding that complements the referral status of the study facility. The most common indications for admission were obstructed labour and obstetric haemorrhage. The factors associated with maternal complications were maternal age, booking status and parity.

RECOMMENDATION

We recommend that a large multicenter study be conducted in order to identify the rate of complicated deliveries and the contributing factors. There is also need to identify the sociocultural factors that contribute to the development of these complications. Regular maternity unit's audits should include review of complicated deliveries so as to improve the quality of maternal and perinatal care. There is need to educate the community on the importance of attending antenatal care.

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