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■ Original Research Article

Sociodemographic and Obstetric Determinants of Modes of Delivery among Women delivered in a Nigerian Tertiary Hospital.

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ABSTRACT:

Introduction: Maternal and perinatal morbidity and mortality are high in our environment. This can be prevented by skilled attendance at birth when decisions on the best mode of delivery may depend on the parturient's sociodemographic and obstetric factors at presentation. **Methodology:** This was a 5-year retrospective study of all women who delivered in the University of Uyo Teaching Hospital. The sociodemographic and obstetric characteristics and mode of delivery were extracted and analyzed. Descriptive statistics, Fischer`s exact test and multiple logistic regression were used to analyze relationships between variables and significance was set at P-value less than 0.05. **Results:** There were a total of 6758 deliveries:3939 (58.3%) had Spontaneous vaginal delivery, 2671(39.5%) had caesarean section while 2.2% had instrumental delivery. The majority, 5696 (84.0%) of the women were aged 18 to 34years (mean 29years±4.7S.D.) The fetal presentation, (P < 0.0001), booking status (P <0.0001), gestational age (P <0.0001), birthweight (P value<0.0001).and maternal age (P <0.0001).were significantly associated with mode of delivery; while their parity (P =0.313) and the sex of their babies (P =0.1000**)** had no significant association with the modes of delivery. Determinants of instrumental delivery were booking(OR=0.55, P value<0.0001), condition of the baby: live compared to still birth (OR=1.5, 1.13-1.97), High APGAR score (OR=0.56, 0.47-0.69) presentation Breech,Oblique, Transverse OR=9.71 CI=6.9-13.7), OR=9.21 CI 2.0-41.6, OR= 33.2 CI= 8.0-137.3 compared to cephalic. **Conclusions:** The mode of delivery is influenced significantly by obstetrics and socio-demographic factors which may exist singly or in combination. This can be exploited by the skilled birth attendant in decision making and patient counselling about the odds for and against a mode of delivery at presentation and during management in the delivery suite.

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INTRODUCTION

Maternal and perinatal mortality is still unacceptably high in sub-Saharan Africa.[1] This undesirable health index is obvious in Nigeria where comprehensive emergency obstetric care is still not readily available to many pregnant women.[2] This challenging situation is seen most especially in the intrapartum period where decisions on modes of delivery could become pertinent and of utmost importance in determining the outcome for mother and baby. In Nigeria, some studies have shown that women have a strong aversion to caesarean section with fetal and maternal consequences that are best imagined.[3-5]These have resulted in reluctance in having facility-based delivery with a delay in making timely decisions for lifesaving interventions such as emergency caesarean section even when they present in an emergency. The reasons for aversion to caesarean section in Nigeria include fear of death, fear of complications, high cost of caesarean section and perception of caesarean section as an abnormal form of delivery.[3,5]

A national survey in Nigeria revealed a population-based caesarean section rate of 2%, while a secondary analysis of that same 2013 nationally representative Nigeria Demographic and Health Survey (NDHS) data showed a caesarean section rate of 2.1%.[6,7] In 1985 the World Health Organisation (WHO) recommended a caesarean section rate of between 10-15%.[8] However more recently WHO has postulated that a caesarean section rate greater than 10% is not associated with a reduction in maternal or perinatal mortality rate.[9]A population-based caesarean section rate of less than 5% indicates an unmet need for caesarean section and greater than 15% shows no additional benefit for mother and baby.[10]However institution-based studies in Nigeria show higher caesarean section rates,[11-13]which may be because these facilities serve as referral centers for the management of obstetrics complications. A medically indicated caesarean section has the potential for reducing maternal and neonatal morbidities but otherwise, it offers no advantage.[14]The insistence on vaginal deliveries has been associated with significant delays in performing emergency caesarean sections hence increasing perinatal morbidities and mortalities. Caesarean section rates are higher in developed countries than in developing countries, with averages of 8.2%, 24.2% and 27.2% in the least, less and more developed regions, respectively.[15]On the other hand, sub-Saharan African countries with low caesarean section rates have alarming maternal and perinatal mortality.

Most studies focused on and established a relationship between Caesarean section and some sociodemographic and obstetric factors that may affect it.[7,11] The increased caesarean section rates in urban dwellers, women with more than 4 antenatal care visits and those in the higher socioeconomic class in a recent survey,[16] may imply that better socioeconomic status and proximity to health facilities improve health-seeking behaviour and detection of complications requiring caesarean section.

Therefore, with an unmet need for caesarean section and an unacceptably high maternal and perinatal mortality, it is important to understand from the onset those factors that may likely be associated with a particular mode of delivery. Skilled attendance at birth can reduce maternal and perinatal morbidities and mortalities, and requires decisions in the peripartum period to determine the best mode of delivery and timing of intervention for any parturient. These decisions can be influenced by the sociodemographic and obstetric characteristics of the individual patient which had not been previously studied in our center. This retrospective study is aimed at bridging this gap in knowledge.

MATERIALS AND METHODS

Study area

The University of Uyo Teaching Hospital is a referral hospital that offers specialized care for people within and around Akwa Ibom State in South-South, Nigeria. The Hospital is located on the outskirts of Uyo metropolis – the capital of Akwa Ibom State. The hospital runs four antenatal clinic sessions, a booking clinic and four post-natal clinics weekly. A family planning clinic operates daily in the hospital.

Labour ward

Admission into the labour ward is usually from the antenatal wards, antenatal clinic or via the Accident and Emergency Department, referrals from peripheral hospitals, clinics and maternity homes or direct presentation to the maternity complex.

They include booked patients and emergency cases referred from elsewhere needing immediate attention after 28weeks of gestation. On admission, the history of presenting complaints including the history of labour is taken.

Data collection and Analysis

A 5-year review of all pregnant women who presented in the labour ward of the University of Uyo Teaching Hospital, Uyo was carried out. A proforma for data collection was first designed purposely for the study.

The primary source of data was the Delivery register in the maternity unit of the University of Uyo Teaching hospital. Complementary information was obtained from Obstetric Theatre and the Special care and Sick babies units(SCBU & SBU) admissions records. The folders of those women with incomplete information from the main and other sources were retrieved for further complimentary details. Information extracted from all the sources includes, but is not limited to their age, parity, booking status, fetal presentation at assessment before delivery, mode of delivery, fetal outcome (birth weight, Sex and Apgar score); Placental weight and amniotic fluid volume. As well as the type of anesthesia employed for operative delivery if applicable. The data obtained were entered into the designed proforma and results were presented in frequency tables and percentages. Fischer's exactest was used to determine relationship, while multiple logistic regression were used to analyze relationships between variables with significance set at P-value less than 0.05

RESULTS

There were 6780 deliveries within the period of study. The majority, 5696(84.0%) of the women were aged 18 to 34years while 15% and 0.9% of them were 35years and above and less than 18years respectively. The mean age was 29years±4.7S.D. Most (66.0%) of the women were multiparous and booked(91.6%). (Table 1.)

Table 1. Sociodemographic characteristics of Women

S/N	Variable	Frequency	Percentage
1	**Age in years**		
	Less than 18years	46	0.9
	18-34 years	5696	84.0
	35years or more	1038	15.1
	Mean (SD)	**29.8(4.7)**	
2	**Parity**		
	Primiparity	2302	34.0
	Multiparity	4478	66.0
3	**Booking Status**		
	Unbooked	567	8.4
	Booked	6213	91.6

Table 2: Modes of delivery in UUTH from 2013 to 2017

Modes of delivery	**Frequency**	**Percentage**	**Year**
SVD	194	61.2	2013
CS	113	35.7	
Instrumental	10	3.1	
SVD	1.022	60.3	2014
CS	626	37.5	
Instrumental	37	2.2	
SVD	1194	58.4	2015
CS	810	39.6	
Instrumental	41	2.0	
SVD	790	55.9	2016
CS	604	42.6	
Instrumental	20	1.4	
SVD	739	57.4	2017
CS	508	39.5	
Instrumental	40	3.1	

SVD CS Instrumental	3939 2671 148	58.3 39.5 2.2	2013 - 2017

Table 3: ANC booking and some obstetrics and fetal factors associated with modes of deliveries in UUTH from 2013 - 2017.

Variables	Modes of delivery n (%)		Statistical indices
	Operative deliveries (CS/instrumental} (n=2841)	SVD (n=3939)	
Foetal Presentation Breech Cephalic Transverse Oblique Face to pubis	277 (88.5) 2504 (39.1) 45 (95.7) 11 (91.7) 4 (54.1)	36 (11.5) 3897 (60.9) 2 (4.3) 1 (8.3) 3 (42.9)	Df=4 χ^2=368.3704 P value< 0.0001
Condition of the baby Dead(IUFD) Alive	191 (52.6) 2650 (41.3)	172 (47.4) 3767 (58.7)	Df=1 χ^2=18.0861 P value<0.0001
Booking No Yes	347 (61.2) 2494 (40.1)	220 (38.8) 3719 (59.9)	Df=1 χ^2=94.6405 P value<0.0001+
Gestational age(weeks) 37 and below Above 37	404 (52.7) 2437 (40.5)	362 (47.3) 3577 (59.5)	Df=1 χ^2=41.6739 P value<0.0001+
Parity Primiparity Multiparity	984 (42.8) 1857 (41.5)	1318 (57.2) 2621 (58.5)	Df=1 χ^2=1.0169 P value=0.313
Apgar score at 5 min Less 7 7 and above	456 (57.1) 2385 (39.9)	342 (42.9) 3597 (60.1)	Df=1 χ^2=86.2919 P value<0.0001
Birth Weight (kg) 2.5 and below Above 2.5	558 (51.1) 2283 (40.1)	534 (48.9) 3405 (59.9)	Df=1 χ^2=45.2185 P value<0.0001
Sex of babies **Female** **Male**	1354 (40.9) 1487 (42.9)	1957 (59.1) 1982 (57.1)	Df=1 χ^2= 2.7045 P value=0.1000
Age of mothers (years) **Less than 18** **18-34** **35 and above** **Mean (SD)**	25 (54.3) 2311 (40.6) 505 (48.7) 30.2 (4.8)	21 (45.7) 3385 (59.4) 533 (51.3) 29.4 (4.6)	Df=2 χ^2= 26.4854 P value<0.0001 Df=6693 Tt=6.9375 P value>0.0001

Table 4: Multiple logistic regression of variables in response to Operative delivery (caesarean section /instrumental delivery) among women who delivered in UUTH 2013-2017.

Variables	Odd ratio	95%CI	P value
Weight less than 2.5 2.5 and above	 1 0.90	 0.77-1.05	 0.189
Gestation age Below 38 completed weeks Above 38 completed weeks	 1 0.90	 0.75-1.08	 0.160
Sex Female Male	 1 1.10	 1.00-1.23	 0.064
Maternal age (years) Less than 18 18-34 35 and above	 1 0.77 1.05	 0.42-1.43 0.56-1.97	 0.416 0.869
Booking No Yes	 1 0.55	 0.42-0.61	 <0.0001+
Presentation Cephalic Breech Oblique Transverse	 1 9.71 9.21 33.15	 6.90-13.68 2.04-41.63 8.00-137.31.	 <0.0001+ <0.0001+ <0.0001+
Condition of the baby Stillbirth Alive	 1 1.50	 1.13-1.97	 0.004+
APGAR Score **Less than 7** **7 and above**	 1 0.56	 0.47-0.69	 <0.0001+

R^2 =0.053; P value<0.0001

Over the years, spontaneous vertex delivery(SVD) was the most common mode of delivery (average 58.3%). The proportion of

mothers who had caesarean section (CS) ranged from 35.7% in 2013 to 42.6% in 2016, with the average rate of CS being 39.5%, while instrumental deliveries constituted an average of 2.2%. (Table 2)

The Fetal presentation was significantly associated with the mode of delivery(P value< 0.0001). The cephalic presentation was more among those who delivered by SVD, whereas other presentations were proportionally more among those who had CS and instrumental deliveries. The booking status of the parturient was significantly associated with the mode of delivery(P value<0.0001). Those who were unbooked were more likely to have caesarean section women while more of the booked delivered vaginally. The foetal condition(viability) at presentation significantly determines the mode of delivery(P value<0.0001). More of those who presented with intrauterine fetal demise(IUFD) stillbirth were more likely to be delivered by assisted delivery. Fetal weight significantly impacts the mode of delivery (P value<0.0001). Those with low birth weight were more likely to be delivered by assisted delivery. A higher proportion of those with a gestation age of above 37 completed weeks delivered by assisted delivery (P value<0.0001). The Birthweight (P value<0.0001) and Apgar scores(P value<0.0001) significantly determined the mode of delivery. Babies with low birth weight and Apgar score of less than 7 were more likely to be delivered by operative delivery There was a significant difference between the ages of those patients who had operative delivery compared to those who delivered by SVD(P value<0.0001). The parity of the mother (, P value=0.313) and the sex of their babies (P value=0.1000) were not significantly associated with the modes of delivery. (Table 3)

Women who were booked were 45% less likely to have operative delivery(P<0.0001), while breech and oblique presentations have a 9-fold likelihood of being assisted operatively compared to those with cephalic presentation(P<0.0001), (for transverse presentation the data interpretation has to be with caution because of the large 95% CI). Babies born alive were 50% more likely to be delivered by assisted delivery compared to those born as stillbirth(P=0.004) while, Babies with Apgar scores of 7 and above were 44% less likely to be delivered by assisted delivery. (Table 4)

DISCUSSION

This study revealed that, despite the considerably high caesarean section rate of 39.5%, vaginal delivery was the predominant mode of delivery. This was however comparable to a study in the Southwest, Nigeria.[11] On the other hand, a national survey,[6] revealed a cesarean section rate of 2.0% but unlike our study which was an institution-based study, this was a population-based study. The relatively high rate of caesarean section from the study was because the study was conducted in a tertiary hospital handling referrals and complicated cases for which emergency cesarean section and other operative vaginal procedures were important life-saving interventions. A significant proportion of women however will still prefer vaginal delivery to caesarean section especially because they feel it offered faster recovery postpartum.[17]

The foetal presentation was found to be a significant determinant of the mode of delivery as a disproportionately higher percentage of women with non-cephalic fetal presentations had caesarean section. A 10-year retrospective study from Finland also found that malpresentation, including persistent occipitoposterior position, being an important cause of dystocia results in a disproportionate risk for operative intervention (both caesarean section and instrumental delivery).[18] In the Chinese Province of Hunan where the caesarean section rate was 53.8%, age, findings on prenatal examination, and doctors' suggestions were significantly associated with women's mode of birth preference.[19] The predominance of caesarean section for delivery of women with breech presentation in this study is in contrast with findings from a southwest Nigerian study which revealed a much lower proportion of caesarean breech deliveries that was comparable to the rate of caesarean section in cephalic presentation.[20] Breech presentation is associated with high perinatal morbidity and mortality following vaginal delivery and this is even more significant in the first delivery.

The fetal condition at presentation was also noticed to significantly impact the mode of delivery in our study. The rate of cesarean section in stillbirth was 52.6% compared to 41.3% in a live birth. In

Bucharest, Romania and a Northern Indian tertiary hospital, the rate of cesarean section among women with stillbirth was 17.24% and 40.36% respectively.[21,22] The variations in caesarean section rate for cases of stillbirths may be a function of the obstetric indications and referral patterns to the hospitals studied which were not included in our study. Cesarean section for stillbirth is emotionally devastating and catastrophic both for the patient and clinician. While Antepartum haemorrhage is the leading cause of cesarean section in stillbirth,[23] other indications include ruptured uterus, obstructed labour and Preeclampsia and antepartum eclampsia. Cesarean sections for stillbirth on account of obstructed labour and antepartum eclampsia is still a plight in developing countries like Nigeria where a lot of women do not receive antenatal care and do not present in the hospital for delivery until overt complications develop. Operative vaginal deliveries may also be indicated by intrapartum preeclampsia and occasionally eclampsia.

Unbooked patients were more likely to have cesarean section compared to their booked counterparts in our study. This finding was contrary to findings from another study which showed a higher cesarean section rate among booked patients compared to the unbooked.[24] Another study however did not show any significant difference in cesarean section rates in the booked and unbooked pregnant women.[25] The increased caesarean section rate in unbooked patients in our study may be a result of late presentation with obstetric complications such as obstructed labour and antepartum eclampsia which will necessitate delivery through caesarean section. This is a common scenario in the tropics. The indications for the interventions were however not included in our study.

The gestational age at presentation in the labour ward for delivery was a significant determinant of the mode of delivery; thus women who deliver prior to 37weeks gestational age were more likely to have operative deliveries, especially cesarean sections compared to women presenting at term. This finding compared with those of another study which showed high cesarean sections at gestational ages less than 37 weeks.[26] Preterm delivery may be iatrogenic for cases where delivery will lead to improvement in maternal health such as antepartum eclampsia and severe antepartum haemorrhage and the fastest and safest route in such emergencies is usually cesarean section.[27]

There was no significant relationship between modes of delivery and the parity of the women. This was contrary to findings in another study which showed a much higher spontaneous vaginal delivery rate in nulliparous women.[27] A previous cesarean section increases the tendency for cesarean section in the subsequent pregnancy.

There was a significant difference in Apgar score at 5 minutes and routes of delivery. Cesarean section was most associated with Apgar scores of less than 7, however, findings from other studies did not corroborate but showed no significant association in route of delivery and Apgar score at 5 minutes.[28,29]A large proportion of cesarean sections done in our study may have been for obstetric emergencies possibly complicated by some fetal compromise which may account for the low Apgar scores.

There was a significant association between the route of delivery and birth weight in our study and caesarean section was commoner in birth weight less than 2.5kg. This was also corroborated by another study.[30] Cesarean section for birth weight less than 2500g may be due to iatrogenic preterm delivery where induction of labour is unlikely to be successful or in cases of severe fetal compromise associated with intrauterine growth restriction. Caesarean section was commoner at extremes of maternal age. Similar findings were reported in another study which showed a significant association between cesarean section and extremes of maternal age.[26] Extremes of maternal age is a risk factor for the hypertensive disorder of pregnancy including preeclampsia and eclampsia and in severe disease, the safest and fastest means of delivery is through cesarean section. Also, the incidence of cephalopelvic disproportion and obstructed labour is commoner in maternal age less than 18 years hence requiring the need for delivery through cesarean section.

In conclusion, the mode of delivery is influenced by obstetric and socio-demographic factors which may exist singly or in combination. In developing countries with overwhelming obstetric complications especially during the intrapartum period, a significant proportion of deliveries are by operative interventions especially caesarean section in a bid to reduce maternal and perinatal morbidity and mortality. This is more so in a tertiary hospital like

ours where high-risk pregnancies and complicated labours are referred, and the influence of these factors should be considered in the counselling of pregnant women by the skilled birth attendant.

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