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Original Research Article

Pregnancy outcome of preterm caesarean delivery at two university teaching hospitals in Southern Nigeria

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ABSTRACT

Background: Preterm birth has been associated with poor neonatal outcomes, particularly in resource-limited countries where managing extreme preterm newborns remains a herculean task. The objective was to determine the pattern, maternal and perinatal outcome of preterm caesarean sections.
Methods: A retrospective cross-sectional study of preterm caesarean deliveries between January 1, 2010, and December 31, 2019, at the obstetric units of the University of Port Harcourt Teaching Hospital and the Rivers State University Teaching Hospital, Nigeria. SPSS 25 was used to analyze data obtained from the theatre records and case notes of the patients.
Results: Most, 377 (45.92%) of the caesarean sections were performed between 35 weeks and 36 weeks and 6 days. The preterm caesarean delivery rate was 1.62%. Majority, 708 (85.92%) were done as emergencies, mostly in booked patients 452 (59.4%). Severe pre-eclampsia was the most common 265 (24.02%) indication for preterm caesarean delivery. The average hospital stay was 6.15±2.34 days, with a maternal mortality ratio of 20.6/1,000 live births. Many 771 (93.34%) of the babies were live births, with most 515 (62.35%) weighing 1.5-2.49 kg at birth. The most common neonatal complications were low birth weight 316 (21.32%) and birth asphyxia 141 (11.56%), with a perinatal mortality ratio of 66.2/1000 live births.
Conclusions: Concerted efforts should be made to minimize complications associated with preterm births, through antenatal care and early identification of women at risk.

Keywords: Preterm caesarean section, Pattern, Indications, Outcome, Nigeria

INTRODUCTION

Pregnancy and childbirth, both significant events in a woman's life, can also pose significant challenges, resulting in injuries, disabilities, and even death due to unanticipated complications.[1] Severe complications during pregnancy can be life-threatening for either the mother, the baby, or both, necessitating delivery before 37 weeks to prevent morbidity or mortality. This is known as preterm delivery. It has been defined as the birth of an infant at less than 37 completed weeks of gestation.[2,3] The WHO estimates that over 15 million babies are born prematurely each year, with the rate of preterm birth ranging from 5% to 18% of annual births in 184 countries.[4,5] It is, however,

more common in low-income countries, with a prevalence rate of 12%.[5] According to a survey, Nigeria ranks third among countries with the highest prevalence of preterm births, trailing only India and China.[6] Preterm birth is the second leading cause of under-five mortality globally, and it is the single most important direct cause of death in the critical first month of life.[7-11] Every year, it causes approximately one million deaths worldwide, with over 90% of those deaths occurring in low- and middle-income countries.[6,12] The survival of the preterm infant is known to be related to birth weight and gestational age. Although not always accurate, gestational age is a better predictor of maturation and chance of survival than birth weight.[13]

Many of the babies who survive will have significant disabilities for the rest of their lives.[14] Preterm birth accounts for 3.1% of all Disability Adjusted Life Years (DALYs) in the global burden of disease, which is higher than HIV and malaria combined.[15] The implications of being born too soon extend beyond the neonatal period and throughout the life cycle. Babies who are born before they are physically ready to face the world frequently require special care and are at a higher risk of serious health problems such as cerebral palsy, intellectual impairment, chronic lung disease, and vision and hearing loss. This additional lifelong disability exerts a heavy toll on preterm babies, their families, and the communities in which they live.[16] Preterm caesarean section is a caesarean delivery performed between the age of viability, (which is 28 weeks in our subregion), and 36 weeks and 6 days of gestation. In modern obstetrics, mode of delivery is a major concern in preterm birth. The mode of delivery is determined by the obstetric indications, severity of maternal diseases, and hospital facility. The recommendation on mode of delivery in preterm birth has remained controversial and not yet clearly established.[17]

Several studies have reported that caesarean section is the preferred mode of delivery in such cases because it gives a vulnerable preterm baby the best chance of survival.[5,18-21] Previous research has also found that caesarean delivery has a significant beneficial effect on neonatal mortality. Other studies concluded that the mode of delivery had little effect on adverse neonatal outcomes, such as mortality or psychomotor outcomes. [17,22-24] While caesarean delivery may have a positive effect on the foetus, maternal morbidity is increased after caesarean delivery. Primary postpartum haemorrhage, postoperative discomfort, sepsis, blood transfusions, and infectious morbidity were the most common.[17,22-24]

METHODS

Study place

A ten-year retrospective institution-based cross-sectional study was conducted at the obstetric units of the University of Port Harcourt Teaching Hospital (UPTH) and the Rivers State University Teaching Hospital (RSUTH) in Rivers state, Southern Nigeria. They serve as referral centres for all levels of health care in Rivers and neighbouring states. Consultant obstetricians, specialist senior registrars, and registrars lead teams of experienced nurses and midwives in the obstetric units.

Selection criteria

The study included 826 preterm (less than 37 weeks) caesarean sections performed at the University of Port Harcourt Teaching Hospital (UPTH) and the Rivers State University Teaching Hospital (RSUTH) between 1 January 2010 and 31 December 2019. The study records were selected by convenience sampling technique using the gestational age, which was calculated from the last normal menstrual period and a first trimester ultrasound scan. Patients who did not have a preterm caesarean section at one of the study sites, and those with incomplete records, were excluded.

Procedure

Data was extracted from theatre records, delivery registers, and case notes and entered into a proforma. The folders of the selected patients were retrieved from the hospital's Records department. Record review included information on age, parity, gestational age, booking status, type of caesarean section, indication for caesarean section, feto-maternal outcome, estimated intra operative blood loss, and length of hospital stay after surgery. To ensure anonymity and easy identification, each proforma was given a unique identity. Each patient's proforma was scrutinized daily for accuracy and completeness before entry into a spreadsheet and analyzed. The proforma was labeled with unique identifiers and did not include hospital numbers. There was no direct interaction with the women as the study simply analyzed their case records, hence informed consent from the women was not necessary. However, the study was conducted in compliance with the Helsinki Declaration.

Statistical analysis

Before importing data into SPSS, Microsoft Excel 2019 was used to clean, edit, sort, and code the data. For data analysis, SPSS version 25 was used. All categorical variables were summarized in tables using descriptive statistics such as mean with standard deviation (SD), frequencies, and percentages.

RESULTS

Socio-demographic characteristics

During the study period, there were 50,888 deliveries, with 826 preterm caesarean sections, giving a preterm caesarean delivery rate of 1.62%. Almost half of the women, 357 (43.22%), were aged 30 and 34, with a mean age of 31.87±5.47 years. Many of the women 442 (53.51%) had secondary education, and 512 (61.99%) of the preterm caesarean sections were performed at RSUTH,

while 314 (38.01%) were performed at UPTH. Table 1 demonstrates this.

Table 1: Socio-demographic characteristics of the women (n=826).

Variables	N	%
Age (years)		
<20	7	0.85
20-24	76	9.20
25-29	168	20.34
30-34	357	43.22
35-39	161	19.49
≥ 40	57	6.90
Mean age	31.87±5.47 years	
Marital status		
Married	757	91.65
Single	37	4.48
Cohabiting	30	3.63
Divorced	2	0.24
Educational status		
Primary	23	2.78
Secondary	442	53.51
Tertiary	361	43.70
Location		
RUSTH	512	61.99
UPTH	314	38.01

Table 2: Obstetrics characteristics of the women (n=826).

Variables	N	%
Parity		
P0	154	18.64
P1	270	32.69
P2-4	357	43.22
≥ P5	45	5.45
Gestational age at delivery (weeks) (N=821)γ		
<32	162	19.73
32-34	282	34.35
35-<37	377	45.92
Type of C/S		
Emergency	710	85.96
Elective	116	14.04
Booking Status (N=761)γ		
Booked	452	59.40
Unbooked	165	21.68
Booked elsewhere	142	18.66
Booked defaulter	2	0.26

γ=Some folders had no record

Obstetric characteristics

Table 2 showed that most of the women 357 (43.22%) were multiparas. About two-fourth 377 (45.92%) of the preterm caesarean section were done between 35 weeks and 36 weeks and 6 days, 452 (59.40%) of the women were booked, 165 (21.68%) were unbooked, while 142 (18.66%) were booked elsewhere. Booked elsewhere refers to women who received antenatal care in other approved hospitals and clinics other than UPTH and RSUTH. Emergency caesarean section was done in 710 (85.96%) women.

Table 3: Indications for preterm caesarean delivery (n=826).

Variables	N	%
Severe pre-eclampsia with unfavourable cervix	265	24.02
Eclampsia	95	8.61
Major degree placenta praevia	88	7.98
Preterm PROM	72	6.53
Breech / Compound presentation	43	3.90
Foetal distress	37	3.35
Antepartum haemorrhage (APH)	31	2.81
Severe oligohydramnios	27	2.45
Placenta abruption	24	2.18
Cord prolapse	21	1.90
Transverse lie in labour	19	1.73
Preterm labour	13	1.18
Intrauterine growth restriction	11	1.00
Intrauterine foetal death (IUFD)	9	0.81
Severe PIH	8	0.72
Gestational diabetes mellitus	7	0.63
Retained 2nd twin	3	0.27
Uterine rupture	2	0.18
Sickle cell disease crisis	2	0.18
Liver cancer	1	0.09
Advanced breast cancer	1	0.09
Anencephaly	1	0.09

*Multiple responses

Indications for preterm caesarean delivery

Most of the preterm caesarean sections were due to hypertensive disorders in pregnancy, as shown in Table 3, with severe pre-eclampsia with an unfavourable cervix and eclampsia accounting for 373 (33.81%) and 95 (8.61%), respectively.

Maternal outcome of preterm caesarean delivery

Intraoperative complications occurred in 83 (10.05%) of the women. Of these, 81 (97.59%) had primary postpartum haemorrhage due to major degree placenta praevia. Postoperative complications occurred in one-third 230 (27.85%) of the women, with postpartum hypertension accounting for 122 (51.91%). Approximately half of the women, 429 (51.93%), lost more than 500mls of blood, with a mean blood loss of 606.80±258.44mls. All patients with severe anaemia and a packed-cell volume of less than 21% received blood transfusions, while 371 (47.63%) of the women spent more than 5 days in the hospital, with a mean duration of 6.15±2.34 days. This is shown in Table 4.

Table 4: Maternal outcome of preterm caesarean delivery (n=826).

Variables	N	%
Maternal outcome		
Alive	809	97.94
Dead	17	2.06
Intraoperative complications		
Yes	83	10.05
No	743	89.95
Types of intraoperative complications (N=83)		
Primary postpartum haemorrhage	81	97.59
Bladder injury	1	1.20
Bowel injury	1	1.20
Postoperative complications		
Yes	230	27.85
No	596	72.15
Types of postoperative complications (N=235)*		
Postpartum hypertension	122	51.91
Anaemia	80	34.04
Perineal or abdominal pain	19	8.09
Breastfeeding complication	5	2.13
Postpartum anaemia	4	1.70
Breast engorgement	3	1.28
GDM	2	0.85
Estimated blood loss (ml)		
≤500	397	48.07
>500	429	51.93
Mean: 606.80±258.44		
Duration of hospital stay (days) (N=799) γ		
≤5	408	52.37
>5	371	47.63
Mean: 6.15±2.34		

*Multiple responses, γ=Some folders had no record

Perinatal outcome of preterm caesarean delivery

Majority 771 (93.34%) of the babies were live births. There were 55 perinatal deaths, giving a perinatal mortality ratio of 66.2/1000 livebirths, and 712 (86.20%) of the babies were of low birth weight (<2.5 kg) (Table 5).

Outcome of admissions into the special care baby unit

Of the 826 babies delivered, 513 were admitted into the Special Care Baby Unit, giving an admission rate of 62.12%. Preterm low birth weight was the most common indication 316 (61.60%). Regarding outcome of SCBU admission, 21 (4.09%) of the babies died during their first week of life (Table 6).

DISCUSSION

The decision to undertake a preterm delivery, carries some risks due to the poorly formed lower uterine segment, particularly for deliveries less than 32 weeks gestation.[22]

Table 5: Perinatal outcome of preterm caesarean delivery (n=826).

Variables	N	%
Foetal outcome		
Alive	771	93.34
Dead	55	6.66
Type of death (N=55)		
Neonatal death	3	5.45
Perinatal	52	94.55
Sex		
Male	391	47.34
Female	435	52.66
Birth weight (kg)		
<1	20	2.42
1.1-1.49	177	21.43
1.5-2.49	515	62.35
2.5-3.99	114	13.80
Birth weight (kg)		
Underweight (<2.5)	712	86.20
Normal (2.5-3.9)	114	13.80
APGAR score (1 min)		
Abnormal (≤6)	240	29.06
Normal (7-10)	586	70.94
Mean: 6.40±2.40		
APGAR score (5 mins)		
Abnormal (≤6)	123	14.89
Normal (7-10)	703	85.11
Mean: 7.64±2.53		
Admission into SCBU		
No	313	37.89
Yes	513	62.11

Table 6: Indications for special care baby unit (SCBU) admissions (n=513).

Indications	N	%
ELBW/VLBW/LBW	316	61.60
Birth asphyxia	141	27.49
Neonatal jaundice	34	6.63
Risk for sepsis	9	1.76
HIV exposed infant	5	0.97
Infant of diabetic mother	2	0.39
Meconium aspiration	2	0.39
Rhesus incompatibility	2	0.39
Hydrocephaly	1	0.19
Transient tachypnoea of the newborn	1	0.19
Outcome of SCBU admission (N=513)		
Alive	492	95.91
Dead	21	4.09

*ELBW= Extremely low birth weight; VLBW= Very low birth weight; LBW= Low birth weight

Preterm delivery refers to childbirth occurring before 37 completed weeks of gestation. It accounts for about 11% of global annual birth.[1] It contributes a significant proportion of deliveries worldwide, and it is a leading cause of perinatal morbidity and mortality, as well as the

second most common cause of under-five mortality worldwide.[2,3]

Many of the women in this study were married and aged 30-34 years. In contrast, a previous study by Butali et al observed that most of their respondents were 35 years old.[2] They recognized an association between maternal age over 35 years and preterm births. Furthermore, Newburn-Cook et al found a correlation between extremes of maternal age (20 or 35 years) and preterm births.[25] The study observed a preterm caesarean section rate of 1.62%. This is significantly lower than the 15% and 23% reported in previous Nigerian studies.[26-28] In addition, other researchers reported higher prevalence rates of 11.3% and 16.8%, respectively.[2,29] The National Demographic Health Survey (NDHS) of 2018 reported a preterm caesarean section rate of 3%.[30] The WHO Global Survey (GS) and Multi-country Survey (MCS) databases showed higher rates of preterm caesarean delivery of 31.0% and 36.7%, respectively.[31]

Most of the women were booked nulliparous women and were delivered by emergency CS at 34 weeks' gestation. This corroborates the findings from other studies in Nigeria.[32] However, it contradicts previous reports that observed that emergency preterm CS was more common in unbooked women and concluded that being unbooked was strongly corelated with preterm births, whereas other researchers reported that unbooked women are five times more likely to have preterm birth.[2,29,33] The study identified that severe pre-eclampsia with an unfavourable cervix and eclampsia were the most common indications for preterm caesarean deliveries. Pre-eclampsia and eclampsia have been reported as the most common indication for preterm emergency CS.[29] Hypertension reduces uteroplacental blood flow, causing intrauterine growth restriction and preterm birth. Other research has identified foetal distress, obstetric haemorrhage, intrauterine growth restriction, and severe oligohydramnios as common indications for preterm CS.[17,34-36] Our findings revealed that the most common intraoperative and postoperative complications were primary postpartum haemorrhage and postpartum hypertension, respectively. This supports the findings from a previous report which found that the most common complication was primary postpartum haemorrhage.[29] In addition, more than half of the women in our study lost more than 500 mls of blood and stayed in the hospital for more than 5 days. Early emergency caesarean section increases the risk of infection and bleeding in a preterm delivery.[24]

The maternal mortality ratio (MMR) was 20.6 per 100,000 live births. This is consistent with previous findings that reported a maternal mortality ratio of 19.8/100,000 live births, but higher than the (7.8/100,000 live births) reported in Sokoto.[29,37] The difference in the MMR may be due to the severity of the obstetric complications, the patients' condition upon arrival, and the decision-delivery interval. In terms of perinatal outcome, 62.35% of preterm babies had birth weights ranging from 1.5 to 2.5 kg. This is like previous reports, which stated that most preterm neonates had birth weights ranging from 1.5 to 2.5 kg.[17] In the current study, the PMR was 66.2/1000 live births. The most common causes of these perinatal deaths were extreme prematurity, severe pre-eclampsia, eclampsia, and antepartum haemorrhages. Similar causes of perinatal deaths were reported in previous research.[17] However, the PMR was found to be lower than the 119.1/1000 live births reported in Bangladesh.[17] Low birth weight babies, birth asphyxia, neonatal jaundice, and SCBU admission were all associated with preterm CS. One possible explanation is that some neonates were delivered by CS due to fetal distress. As a result, they were more likely to be admitted to the SCBU for additional specialized care. This finding agrees with reports from Pakistan and Thailand.[31,38,39]

Limitations

The strength of our research lies in the fact that it was conducted at two public tertiary care health facilities, and it was the first study on preterm caesarean deliveries at both study sites. However, it was limited by its retrospective nature; thus, the results of the study could not be compared with preterm vaginal deliveries.

CONCLUSION

Most cases of preterm CS were performed as an emergency procedure. As a result, community-based interventions should be implemented to educate women and families about the importance of antenatal care, follow-up, birth preparedness, and institutional delivery.

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