Caesarean Section in a Tertiary Hospital in South-South, Nigeria: A 3-year Review

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ABSTRACT

Background: Caesarean section is the delivery of the foetus, placenta, and foetal membranes through an incision on the abdominal and uterine walls after the age of foetal viability. It is a life-saving surgical procedure, which has helped reduce maternal and perinatal morbidity and mortality over the years.

Objective: To determine the rates, indications, outcomes, and complications of Caesarean section at the Federal Medical Centre, Yenagoa, Bayelsa State, Nigeria.

Materials and Methods: This research was carried out at the Department of Obstetrics and Gynaecology, Federal Medical Centre (FMC), Yenagoa, Bayelsa State, South-South, Nigeria between 1st January 2018 and 31st December 2020. It was a retrospective study.

Data was retrieved from the labour ward records, delivery register, theatre records, and patients' folders during the period under review, and entered into a pre-designed proforma.

Data were analysed with IBM SPSS version 23.0. Results were presented in frequencies and percentages for categorical variables and mean and standard deviation for continuous variables.

Results: About 959 women had Caesarean section (CS) out of 2,263 deliveries, giving a Caesarean section rate of 42.4%. The commonest indication for emergency Caesarean section was cephalopelvic disproportion (36.0%), while that for elective Caesarean section was repeat Caesarean section (19.6%).

Conclusion: The Caesarean section rate in our Centre is extremely high, almost three times the acceptable upper limit set by the WHO. Encouraging vaginal birth after Caesarean section as a means to reduce this high rate is recommended as it was noted that previous Caesarean section was a leading indication for surgeries.

Keywords: Caesarean section, Outcomes, Maternal and perinatal morbidity and mortality, South-South, Nigeria.

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I. INTRODUCTION

The natural route for childbirth is vaginal. However, some women are unable to have their deliveries through this route due to a number of reasons, and the obstetrician is left with the option of carrying out Caesarean section, which is the delivery of the foetus, placenta and foetal membranes through an incision on the abdominal and uterine walls after

the age of foetal viability [1]. It is a life-saving surgical procedure, which has helped reduce maternal and perinatal morbidity and mortality over the years.

The first recorded Caesarean section in history was carried out by Jacob Nufer in the year 1500. Since then, the rates of Caesarean section all over the world have steadily increased to what we have today [2], [3]. The Caesarean section performed then was classical, until 1926 when Kerr

introduced the lower segment Caesarean section [4]. This type of Caesarean section has become very popular now.

In Fortaleza, Brazil in 1985, the World Health Organization (WHO) recommended a Caesarean section rate of 10 – 15% [5]. Since then, Caesarean section rates have increased in both developed and developing countries for a number of reasons [3], [4]. In Nigeria, Caesarean section rates range from 11.3% in Sokoto [6], 19.9% in Ado-Ekiti [7], 21.4% in Abuja [8], 27.6% in Enugu [9], 28.6% in a previous study in Yenagoa [10], 30.3% in Port Harcourt [11], to 35.9% in Osogbo [12].

Globally, the rates are 51.8% in Egypt, 32.3% in Australia, 31.1% in Oceania, 32.3% in North America, 40.5% in Latin America, 25% in Europe, 19.2% in Asia, 56.4% in Dominican Republic, 24.1% in the United Kingdom and 32.8% in the United States of America [13].

Indications for Caesarean section could be broadly classified into elective or emergency and relative or absolute indications. Recently, scheduled, and urgent Caesarean sections have been added to the classification.

Increasing rates of Caesarean section are of great concern; and to achieve reduction, efforts should be geared towards reducing primary Caesarean section rates. These efforts will include:

1. The most senior obstetrician on ground should evaluate a patient before decision for primary Caesarean section is taken, to be certain that the surgery is merited.
2. External cephalic version should be considered for women with breech presentation.
3. Protocols for Induction of labour should be written out in our centres, and every doctor in the department should be abreast with this protocol in order to prevent failed induction of labour.
4. Women should be encouraged to book antenatal care, as complications that lead to Caesarean sections are usually present in unbooked patients. These complications can be found out early and prevented/controlled early.
5. Tracings from continuous electronic foetal monitoring should be well interpreted, as misinterpretation may increase the rate of Caesarean section.
6. Symphysiotomy and destructive vaginal operations should be considered in cases of obstructed labour with live baby and obstructed labour with dead baby respectively, instead of carrying out Caesarean sections.
7. Vaginal birth after a previous Caesarean section should be considered in carefully selected patients.
8. Instrumental vaginal deliveries should be considered in carefully selected patients in labour in order to prevent undesired Caesarean sections.
9. Women should be educated, as this will help them quickly identify when there is a problem, and then seek medical attention on time.

The objective of this study was to determine the rates, indications, outcomes, and complications of Caesarean section at the Federal Medical Centre, Yenagoa, Bayelsa State, Nigeria over a 3-year period.

II. MATERIALS AND METHOD

This research was carried out at the Department of Obstetrics and Gynaecology, Federal Medical Centre (FMC),

Yenagoa, Bayelsa State, South-South, Nigeria between 1st January 2018 and 31st December 2020. It was a retrospective study.

All the patients that had Caesarean section during the period under review at the Federal Medical Centre, Yenagoa were included in this study. All the patients who did not have Caesarean section in this facility were excluded from the study.

Data was retrieved from the labour ward records, delivery register, theatre records, and patients' folders during the period under review. These records were entered into a pre-designed proforma. These records included age, marital status, level of education, state of residence, occupation, parity, booking status, gestational age at delivery, type of Caesarean section (emergency or elective), indications for Caesarean section, type of anaesthesia, maternal outcome, foetal outcome, duration of stay in hospital after surgery and total number of deliveries during the period under review.

A. Data Analysis

Data were analysed using IBM SPSS version 23.0. Results were presented in frequencies and percentages for categorical variables and mean and standard deviation for continuous variables.

III. RESULTS

In the 3-year period under review, 959 women had Caesarean section (CS) out of 2,263 deliveries giving a Caesarean section rate of 42.4% in the hospital. The highest Caesarean section rate was 47.5% in 2020 and least in 2019 with 39.7% (Table I).

TABLE I: CAESAREAN SECTION RATE IN THE PERIOD UNDER REVIEW

Year Under Review	Number of CS	Number of Deliveries	Caesarean section Rate
2018	284	704	40.3%
2019	333	839	39.7%
2020	342	720	47.5%
Total (2018–2020)	959	2,263	42.4%

A. Sociodemographic Characteristics of Parturients

Table 2 revealed that most of the women were in their fourth decade of life (59.3%), married (83.3%) and had secondary education as the highest educational attainment (46.3%). About 2 in every 5 of the women were traders/farmers (38.5%), while 4.1% were resident outside Bayelsa.

As shown in Table II, majority of the women who had Caesarean section in the period under review were multiparous (44.1%), with a modal parity of 1, ranging between 0 and 7. A third of the women were unbooked for antenatal care (33.6%), while as high as 80% had emergency section (Table III).

Table III further revealed that 16.1% and 1% of foetuses were preterm and post-term respectively. Mean gestational age was 264.5±13.5 days (Table III).

TABLE II: SOCIODEMOGRAPHIC CHARACTERISTICS OF PARTURIENT

Characteristics	Year – Frequency (%)			Total N = 959 (%)
	2018	2019	2020	
	(N = 284)	(N = 333)	(N = 342)	
<i>Age of Participants</i>				
< 20 years	6 (2.1)	7 (2.1)	8 (2.3)	21 (2.2)
20 – 29 years	86 (30.3)	110 (33.0)	116 (33.9)	312 (32.5)
30 – 39 years	177 (62.3)	196 (58.9)	196 (57.3)	569 (59.3)
≥ 40 years	15 (5.3)	20 (6.0)	22 (6.4)	57 (5.9)
Mean age (SD) in years	31.5 (5.2)	31.2 (5.2)	31.2 (5.3)	31.2 (5.2)
<i>Marital Status</i>				
Single	46 (16.2)	55 (16.5)	59 (17.3)	160 (16.7)
Married	238 (83.8)	278 (83.5)	283 (82.7)	799 (83.3)
<i>Highest educational attainment</i>				
Primary	25 (8.8)	30 (9.0)	30 (9.0)	85 (8.9)
Secondary	133 (46.8)	153 (45.9)	158 (46.2)	444 (46.3)
Tertiary	126 (44.4)	150 (45.0)	154 (45.0)	430 (44.8)
<i>Occupation</i>				
Civil servant	82 (28.9)	97 (29.1)	99 (28.9)	278 (29.0)
Trader/farmer	114 (40.1)	127 (38.1)	128 (37.4)	369 (38.5)
Professional/HCW	46 (16.2)	58 (17.4)	61 (17.5)	165 (17.1)
Artisan/Security	19 (6.7)	23 (6.9)	22 (6.9)	64 (6.8)
Unemployed	23 (8.1)	28 (8.4)	32 (9.4)	83 (8.7)
<i>Residential location</i>				
Bayelsa	273 (96.1)	319 (95.8)	327 (95.9)	919 (95.9)
Outside Bavelsa	11 (3.9)	14 (4.2)	15 (4.1)	40 (4.1)

TABLE III: OBSTETRIC FEATURES, TYPE OF CAESAREAN SECTION AND FOETAL MATURITY

Characteristics	FOETAL MATURITY			Total N = 959 (%)
	Year – Frequency (%)			
	2018 (N = 284)	2019 (N = 333)	2020 (N = 342)	
<i>Parity</i>				
Nulliparous women	57 (20.1)	72 (21.6)	77 (22.5)	206 (21.5)
Primiparous	86 (30.3)	98 (29.4)	100 (29.2)	284 (29.6)
Multiparous	128 (45.1)	147 (44.1)	148 (43.3)	423 (44.1)
Grand multiparous	13 (4.6)	16 (4.8)	17 (5.0)	46 (4.8)
Modal parity (Range)	1 (0 – 6)	1 (0 – 6)	1 (0 – 7)	1 (0 – 7)
<i>Booking status</i>				
Booked	189 (66.5)	222 (66.7)	226 (66.1)	637 (66.4)
Unbooked	95 (33.5)	111 (33.3)	116 (33.9)	322 (33.6)
<i>Type of CS</i>				
Elective	59 (20.8)	66 (19.8)	67 (19.6)	192 (20.0)
Emergency	225 (79.2)	267 (80.2)	275 (80.4)	767 (80.0)
<i>Foetal maturity</i>				
Preterm	46 (16.2)	53 (15.9)	55 (16.1)	154 (16.1)
Term	234 (82.4)	277 (83.2)	284 (83.0)	795 (82.9)
Post Term	4 (1.4)	3 (0.9)	3 (0.9)	10 (1.0)
Mean GA (SD) in weeks	37.4 (2.0)	37.4 (1.9)	37.3 (1.9)	37.4 (2.0)
Mean GA (SD) in Days	264.6 (13.6)	264.5 (13.4)	264.5 (13.4)	264.6 (13.5)

A. Indications for Caesarean Section

The leading indications for Caesarean section in the Centre were cephalopelvic disproportion (36.0%), Foetal distress (27.6%), repeat Caesarean section (19.6%), abnormal lie (17.5%) and hypertensive disorders in pregnancy (12.9%) in the period under review (Table IV). The commonest indication for emergency Caesarean section was cephalopelvic disproportion, while that for elective Caesarean section was repeat Caesarean section.

TABLE IV: INDICATIONS FOR CAESAREAN SECTION

Characteristics	Year – Frequency (%)			Total N = 959 (%)
	2018	2019	2020	
	(N = 284)	(N = 333)	(N = 342)	
<i>More than one indication applied for some women</i>				
Cephalopelvic Disproportion	96 (33.8)	122 (36.6)	127 (37.1)	345 (36.0)
Foetal Distress	75 (26.4)	94 (28.2)	96 (28.1)	265 (27.6)
Repeat Caesarean section	60 (21.1)	64 (19.2)	64 (18.7)	188 (19.6)
Abnormal lie	51 (18.0)	57 (17.1)	60 (17.5)	168 (17.5)
Hypertensive disorders	38 (13.4)	43 (12.9)	44 (12.6)	125 (12.9)
Abruptio placentae	15 (5.3)	18 (5.4)	17 (5.3)	50 (5.3)
Cord prolapse	11 (3.5)	10 (3.0)	11 (3.2)	32 (3.3)
Failed Induction of labour	8 (2.8)	7 (2.1)	8 (2.3)	23 (2.4)
Obstructed Labour	7 (2.8)	9 (2.3)	8 (2.3)	24 (2.5)
Uterine rupture	8 (2.8)	5 (1.9)	6 (1.6)	19 (2.0)
Placenta previa	6 (2.1)	4 (1.5)	6 (1.8)	16 (1.7)
Twin Pregnancy	4 (1.4)	6 (1.5)	5 (1.5)	15 (1.6)
Bad Obstetric history	2 (0.7)	4 (0.8)	3 (0.8)	9 (0.8)

B. Maternal and Foetal Outcome of Caesarean Section

As presented in Table V, 56 women (5.8%) had a poor outcome. Two of these were cases of maternal mortality (3.6%).

Other complications reported were anaemia (57.1%), pyrexia (44.6%) and wound infection (21.4%). Of the 987 babies (including twins), 35 died (3.6%) while 31.6% had varying degree of asphyxia (Table V). Mean hospital duration after surgery was 5.3±1.4 days.

TABLE V: MATERNAL AND FOETAL OUTCOMES OF CAESAREAN SECTION

Characteristics	Year – Frequency (%)			Total N = 959 (%)
	2018 (N = 284)	2019 (N = 333)	2020 (N = 342)	
<i>Maternal Outcome</i>				
Good outcome	265 (93.3)	315 (94.6)	323 (94.4)	903 (94.2)
Poor outcome	19 (6.7)	18 (5.4)	19 (5.6)	56 (5.8)
Maternal Complications	N = 19	N = 18	N = 19	N = 56
<i>More than one complication applied for some women</i>				
Anaemia	12 (63.1)	10 (55.6)	10 (52.6)	32 (57.1)
Pyrexia	9 (47.4)	8 (44.4)	8 (42.1)	25 (44.6)
Wound infection	5 (21.0)	3 (22.2)	4 (21.0)	12 (21.4)
Maternal death	1 (5.2)	0 (0.0)	1 (5.2)	2 (3.6)
Puerperal sepsis	7 (31.6)	5 (33.3)	6 (31.6)	18 (32.1)
<i>Foetal Outcome</i>				
Good outcome	188 (66.2)	217 (65.2)	227 (66.4)	632 (65.9)
Poor outcome (asphyxiated and death)	96 (33.8)	116 (34.8)	115 (33.6)	327 (34.1)
<i>Foetal viability</i>				
Alive	209 (73.6)	242 (72.7)	252 (73.7)	703 (73.3)
Admitted 2 SCBU	62 (21.8)	78 (23.4)	81 (23.7)	221 (23.0)
Died	13 (4.6)	13 (3.9)	9 (2.6)	35 (3.7)
APGAR Score	N = 271	N = 320	N = 333	N = 924
No Asphyxia	188 (69.4)	217 (67.8)	227 (68.2)	632 (68.4)
Mild Asphyxia	25 (9.2)	30 (9.4)	30 (9.0)	85 (9.2)
Moderate Asphyxia	56 (20.7)	70 (21.9)	73 (21.9)	199 (21.5)
Severe Asphyxia	2 (0.7)	3 (0.9)	3 (0.9)	8 (0.9)
<i>Hospital Stay Duration</i>				
3-5 days	227 (79.9)	277 (83.2)	285 (83.3)	789 (82.3)
6-8 days	45 (16.2)	46 (13.5)	46 (13.5)	137 (14.3)
>8 days	12 (3.9)	10 (3.3)	11 (3.2)	33 (3.4)
Mean Hospital Stay (SD) in days	5.3 (1.4)	5.2 (1.3)	5.3 (1.3)	5.3 (1.4)

B. Factors Associated with Poor Maternal Outcome

The marital status of women (OR = 11.98; $p = 0.014$), residential location (OR = 3.16; $p = 0.014$) and booking status (OR = 2.82; $p = 0.001$) were observed to be associated with poor maternal outcome (Table VI). This study revealed that the lower the level of educational attainment, the more likely the pregnancy was associated with a poor outcome. Women with secondary education (OR = 2.71; $p = 0.004$) are 2 times more likely, while those with primary education (OR = 5.73; $p = 0.001$) are 5 times more likely to end up with a poor outcome when compared to their counterpart with tertiary education (Table VI).

Table VII revealed that indications for Caesarean section associated with poor maternal outcome were obstructed labour (OR = 12.16; $p = 0.001$), hypertensive disorders in pregnancy (OR = 2.94; $p = 0.001$), umbilical cord prolapse (OR = 4.21; $p = 0.003$) and uterine rupture (OR = 38.69; $p = 0.001$).

TABLE VI: SOCIODEMOGRAPHIC FACTORS ASSOCIATED WITH POOR MATERNAL OUTCOMES

Characteristics	OR	95%CI		p-value
		Min	Max	
<i>Age group (>40 years)</i>				
Teenagers	2.80	0.17	46.90	0.474
20-29 years	3.63	0.48	27.68	0.213
30-39 years	3.78	0.51	28.12	0.194
<i>Marital status (Single)</i>				
Married	11.98	1.65	87.21	0.014
<i>Level of Education (Tertiary)</i>				
Primary	5.73	2.48	13.24	0.001
Secondary	2.71	1.37	5.33	0.004
<i>Residential location (Bayelsa)</i>				
Outside Bayelsa	3.16	1.27	7.90	0.014
<i>Occupation (Civil Servants)</i>				
Trader/farmer	4.31	1.77	10.45	0.001
Professional/HCW	1.72	0.55	5.43	0.354
Artisan/Security	11.33	4.12	31.17	0.000
Unemployed	0.55	0.07	4.66	0.586
<i>Parity (Grand multiparity)</i>				
Nulliparous	2.78	0.35	21.96	0.331
Primiparous	2.16	0.28	16.91	0.464
Multiparous	3.44	0.46	25.79	0.230
<i>Booking Status (Booked)</i>				
Unbooked	2.82	1.63	4.87	0.001
<i>Type of CS (Elective)</i>				
Emergency	2.16	0.91	5.11	0.080

TABLE VII: INDICATIONS FOR CS ASSOCIATED WITH POOR MATERNAL OUTCOMES

Characteristics	OR	95%CI		p-value
		Min	Max	
<i>CPD (No)</i>				
Yes	0.47	0.24	0.89	0.022
<i>Obstructed Labour (No)</i>				
Yes	12.16	5.01	29.53	0.001
<i>Repeat CS (No)</i>				
Yes	0.57	0.25	1.28	0.173
<i>Hypertensive disorders in Pregnancy (No)</i>				
Yes	2.94	1.59	5.44	0.001
<i>Foetal distress (No)</i>				
Yes	0.70	0.36	1.35	0.287
<i>Abnormal lie (No)</i>				
Yes	1.31	0.67	2.53	0.429
<i>Cord Prolapse (No)</i>				
Yes	4.21	1.65	10.74	0.003
<i>Uterine rupture (No)</i>				
Yes	38.69	14.69	101.92	0.001
<i>Anaesthesia (SAB)</i>				
TIVA	2.29	1.29	4.06	0.004

C. Factors Associated with Poor Foetal Outcome

Table VIII shows that marital status, level of education, residential location, parity, and the booking status of the

women are all significantly associated ($p < 0.05$) with poor foetal outcome.

In Table VIII, obstructed labour (OR = 45.73; $p = 0.001$), uterine rupture (OR = 38.93; $p = 0.001$), prematurity (OR = 3.09; $p = 0.001$), post maturity (OR = 21.97; $p = 0.003$), foetal distress (OR = 5.55; $p = 0.001$), and hypertensive disorders in pregnancy (OR = 6.38; $p = 0.001$) were indications for Caesarean section that increased the chance of poor foetal outcome. Meanwhile cephalopelvic disproportion (OR = 0.40; $p = 0.001$), Abnormal lie (OR = 0.11; $p = 0.001$), failed induction of labour (OR = 0.09; $p = 0.016$) and abruptio placenta (OR = 0.14; $p = 0.001$) were less associated with poor foetal outcome.

TABLE VIII: MATERNAL SOCIODEMOGRAPHIC FEATURES ASSOCIATED WITH POOR FOETAL OUTCOMES

Characteristics	OR	95%CI		p-value
		Min	Max	
<i>Age group (>40 years)</i>				
Teenagers	0.31	0.04	2.61	0.279
20-29 years	6.79	3.11	14.80	0.000
30-39 years	2.29	1.06	4.95	0.035
<i>Marital status (Single)</i>				
Married	1.89	1.28	2.81	0.002
<i>Level of Education (Tertiary)</i>				
Primary	5.26	3.21	8.61	0.001
Secondary	1.80	1.35	2.41	0.001
<i>Residential location (Bayelsa)</i>				
Outside Bayelsa	82.96	11.34	607.24	0.001
<i>Occupation (Unemployed)</i>				
Civil servant	0.71	0.41	1.22	0.212
Trader/farmer	1.30	0.78	2.16	0.321
Professional/Healthcare worker	0.68	0.38	1.23	0.205
Artisan/security	15.62	6.52	37.41	0.001
<i>Parity (Grand multiparity)</i>				
Nulliparous	0.34	0.18	0.67	0.002
Primiparous	0.11	0.05	0.21	0.001
Multiparous	0.43	0.23	0.80	0.008
<i>Booking Status (Booked)</i>				
Unbooked	2.72	2.05	3.61	0.001
<i>Type of Caesarean section (Elective)</i>				
Emergency	11.53	6.17	21.55	0.001

TABLE IX: INDICATIONS FOR CAESAREAN SECTION ASSOCIATED WITH POOR FOETAL OUTCOMES

Characteristics	OR	95%CI		p-value
		Min	Max	
<i>CPD (No)</i>				
Yes	0.40	0.29	0.54	0.001
<i>Obstructed Labour (No)</i>				
Yes	45.73	6.13	340.89	0.001
<i>Repeat Caesarean section (No)</i>				
Yes	3.45	2.26	5.26	0.001
<i>Hypertensive disorders in Pregnancy (No)</i>				
Yes	6.38	4.19	9.69	0.001
<i>Foetal distress (No)</i>				
Yes	5.55	4.09	7.53	0.001
<i>Abnormal lie (No)</i>				
Yes	0.11	0.06	0.20	0.001
<i>Failed Induction of labour (No)</i>				
Yes	0.09	0.01	0.63	0.016
<i>Abruptio placenta (No)</i>				
Yes	0.14	0.07	0.28	0.001
<i>Cord prolapse (No)</i>				
Yes	1.85	0.90	3.79	0.093
<i>Uterine rupture (No)</i>				
Yes	38.93	5.18	292.11	0.001
<i>Anaesthesia (SAB)</i>				
TIVA	10.41	7.21	15.06	0.001
<i>Foetal Maturity (Term)</i>				
Preterm	3.09	2.17	4.40	0.001
Post term	21.97	2.77	174.43	0.003

IV. DISCUSSION

The acceptable Caesarean section rate suggested by the World Health Organization (WHO) is 10–15% [5]. The overall Caesarean section rate in this study was 42.4% which is extremely high when compared with other studies from the southern part of Nigeria with rates of 34.6% in Lagos [14], 27.4% in Enugu [15], 30.3% in Port Harcourt [11] and 28.6% in a previous study from Yenagoa [10]. Noteworthy is the rate of 28.6% in a previous study in our Centre compared to our study in the same locality with a massive increase in the Caesarean section rate. A study done in Sokoto had a Caesarean section rate of 11.3% which is well within the acceptable level suggested by the WHO [6], and much lower than ours. Even with this low Caesarean section rate in Sokoto, they recorded an increase from previous studies with rates of 9.9% and 10.3%. This is indicative of a rising trend in the Caesarean section rate.

This high Caesarean section rate may be due to the fact that as a tertiary Centre, there is a high rate of referral of difficult and complicated cases, with more of the low-risk cases being taken care of in the primary health centres and general hospitals. Other factors associated with rising Caesarean section rates worldwide such as previous Caesarean section and breech presentation at term with elective Caesarean section as the main option of management due to reducing skills on conducting assisted vaginal breech deliveries also may have contributed to this unacceptably high Caesarean section rate recorded.

Emergency Caesarean sections by far exceeded elective surgeries (80% versus 20%). This is similar to the previous study done in our Centre with emergency/urgent Caesarean sections accounting for 81.3% of the Caesarean sections done and 18.7% for elective surgeries [10]. Other studies done across Nigeria had similar findings of greater numbers of emergency Caesarean sections than elective Caesarean sections; 93.7% in Nnewi [16], 91.5% in Ilorin [17], 72.8% in Enugu [9].

Multiparity was associated with a higher chance of Caesarean section than the primigravidae. This is probably due to the higher rates of bigger babies and abnormal lies and presentations seen in multiparous women which probably translated to the high rate of cephalopelvic disproportion seen in this study. As with the previous study done in our Centre, cephalopelvic disproportion was reported as the most common indication for Caesarean section. Similar findings were reported in Abuja, Port Harcourt, Calabar and Maiduguri [8], [11], [18], [19]. Other indications for Caesarean section noted in this study and in various studies done across Nigeria include foetal distress, previous Caesarean section, hypertensive disorders in pregnancy and abnormal lie/presentation [6], [8], [11], [16], [18]. Similarly, previous Caesarean section was reported as the leading indication for elective Caesarean as with the previous study done in our Centre.

Unbooked status was noted to be associated with a higher risk of maternal complications following Caesarean section such as anaemia, pyrexia, wound infections, and mortality. In the study period there were two maternal deaths recorded (one in 2018 and another in 2020). Both were unbooked women who presented late to our facility with obstructed labour and uterine rupture, respectively. Other factors noted

to be of significance include being resident outside Bayelsa (and this can be due to the longer travel time to the health facility with late presentation and deteriorating clinical state), lower level of education and the lockdown due to the COVID-19 pandemic. The least likely to have complications were those with tertiary level of education, and those with only primary level of education were at a higher risk of complication than those with secondary level of education.

It was also noted that the foetal outcome was surprisingly better (based on APGAR score) when the indication for surgery was cephalopelvic disproportion or suspected foetal distress when compared with foetal outcomes from other indications. This is probably due to the early recognition of the condition and prompt intervention before irreversible foetal damage occurs.

V. CONCLUSION

The current rate of Caesarean section in our Centre is extremely high, almost three times the acceptable upper limit set by the WHO, and almost double the previous rate from our facility. Encouraging vaginal birth after Caesarean section as a means to reduce this high rate is recommended as it was noted that previous Caesarean section was the leading indication for elective surgeries and overall Caesarean section as a whole.

Most of the complications associated with Caesarean section were seen in the unbooked population, measures to increase antenatal care uptake such as reduction in the registration fees will be of great benefit. Health talks and health education to traditional birth attendants and health care attendants in primary health centres should be done so as to improve and encourage early referral to a tertiary Centre in a bid to reduce the Caesarean section rate and the morbidities associated with late presentation. Empathy from health care providers in the course of caregiving must be encouraged.

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CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest.

AUTHORS' CONTRIBUTIONS

DOA wrote the protocol of the study and supervised the entire research. PCO conceptualised and designed the study, managed literature searches and wrote the first draft of the manuscript. EST participated in literature searches and wrote the discussion. LO participated in literature searches and

wrote the results. OSO and KMM participated in literature searches and writing of the results and discussion. CI and TJW supervised the data collection. NCN and GA collected and collated data. All authors read and approved the final manuscript.

ETHICAL APPROVAL

The research work was examined and approved by the hospital research and ethics committee.

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