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Caeserean Section Audit at the Niger Delta University Teaching Hospital, Yenagoa, Nigeria

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ABSTRACT

Background: Caesarean section (CS) is one of the most common surgical procedures in obstetrics, and it is indicated when delivery by the vaginal route is considered risky or dangerous to the fetus or the mother.

Objectives: The main objective of this study is to audit the pattern, trend and outcome of caesarean section at Niger Delta University Teaching Hospital (NDUTH) over the past 6 years.
Specifically, it would determine: the socio-demographic characteristics of the patients, the caesarean section rates, the indications, and the associated obstetrics features such as booking status, and the type of caesarean section. It would also determine the maternal complications, fetal and maternal vital statistics, and the factors associated with poor fetal outcome.

Methodology and subjects: A retrospective cross-sectional study of 599 pregnant women delivered by caesarean section at NDUTH. The study was carried out from January 2017 to December 2022, at the department of obstetrics and gynecology.

Data was collected at the antenatal clinic, antenatal ward, labour ward, labour ward theatre, and the neonatal care unit. Information retrieved include: bio-data, booking status, indication for caesarean section, gestational age at delivery, and the type of caesarean section (elective or emergency). Others were: duration of hospital stay, and maternal complications. Information retrieved on the fetus were: birth weight, 5 minutes APGAR score (for birth asphyxia), fetal outcome, and the factors associated with poor fetal outcome. Data was fed into SPSS version 25 spread sheet and analyzed.

Results: The CS rate during the study period was 31.6%, and 82.6% of the CS were emergencies. The increase in CS rate from 2017 to 2022 was very minimal (2.0%). The perinatal mortality rate for CS was 128.6/1000 births, and the maternal mortality ratio (from CS complications) was 482.3/100,000 live births.

The most common indication for CS was cephalopelvic disproportion (34.7%), followed by previous (repeat) CS (30.4%). The maternal complication rate was 19.9%, predominantly postpartum hemorrhage (PPH) 8.5%, and postpartum anemia (7.5%).

Being unbooked was strongly associated with maternal morbidity, $\chi 2 = 13.68$, $p = 0.001$, and perinatal mortality, $\chi 2 = 15.50$, $p = 0.001$. A great majority of the still births (76.5%) were from unbooked patients.
The 5 most significant factors associated with poor fetal outcome were: unbooked status ($p = 0.0001$), fetal distress ($p = 0.001$), prolonged obstructed labour, $p = 0.001$), low educational status ($p = 0.02$), CS done as emergency $p = 0.03$.

Conclusion: Our CS rate is quite high, and this is largely attributed to too many emergencies. Though our maternal mortality ratio and perinatal mortality rate are comparable to those from other centers in Nigeria, they are too high going by international standards. There is no justification for our pregnant women to die during childbirth or lose her babies. Advocacy to encourage our women to register for antenatal care, women empowerment, and early referral to hospital would improve our morbidity and mortality indices.

INTRODUCTION

Caesarean section (CS) is an incision on the pregnant uterus to deliver a baby via the abdominal route, at the age of fetal viability. [1] Its a life saving operative procedure usually employed when delivery by the vaginal route is judged unsafe. [1, 2]

Caesarean section is one of the most common surgical procedures in obstetrics, and various rates have been reported. Analysis of a pool of data on CS from 154 countries, covering 94.5% of world live births (from 2010 – 2018) revealed an overall CS rate of 21.1%. [3] In the UK, reported rates were 34.5% in Scotland, 31% in England, and 28% in Wales. [4] A systematic review and meta-analysis in Nigeria involving 45 articles, reported an overall prevalence of 17.6%. [5] At Ngora district in Eastern Uganda, a rate of 14% was reported. [6]

As a result of increased awareness and acceptance, coupled with the increasing rate of litigations, the CS rate has been on the increase. In the US, the rate was reported to increase by 60%; from 20.7% in 1996 to 32.1% in 2021. [7] A study has published the rise in CS rates according to sub-regions globally (from 2010 to 2018). The highest was in Eastern Asia (44.9%), followed by Western Asia (34.7%), and Northern Africa (31.5%). [3] The sub-regions with the least rise were Northern America 9.5% and Sub-Saharan Africa 3.6%. [3]

Aversion to caesarean section may explain why Sub-Saharan Africa had the least rise over the years. This may be attributed to traditional, cultural and religious beliefs, and safety concerns. A study in Nigeria reported an aversion rate of 20.9%. [8] Another study in Nigeria (at Federal Teaching Hospital Abakaliki) reported that 20.3% of pregnant women refused CS for no reason, [9] and the major barriers to accepting CS were stigma of not being able to deliver vaginally, cultural beliefs, and high cost. [9] Another study at Agbor in Delta State, Nigeria, reported the acceptance rate as 54%. [10]

The indications for caesarean section in Sub-Saharan Africa seem to follow a similar trend. In Eritrea, the 6 most common indications in Dekemhare Hospital were malposition (26.3%), prolonged and obstructed labour (21.2%), mal-presentation (14.4%), repeat cesarean section (10.2%), amniotic fluid disorders (9.3%), and fetal distress (5.9%). [11] A similar study at Ngora district in Uganda reported that the major indications were obstructed labour 17.9%, fetal distress 15.3%, big baby 11.6%, and cephalopelvic disproportion (CPD) 11%. [6] In Nigeria, at University of Abuja Teaching Hospital, CPD (30.8%) was the most common indication, followed by fetal distress (23.6%) and severe pre-eclampsia/eclampsia (10.9%). [12]

Evidence from hospital based studies in Nigeria indicates that a great majority of caesarean sections were done as emergencies. Some reported rates were: 93.7% at University of Nigeria Teaching Hospital, [13] 80.2% at University of Abuja Teaching Hospital, [12] and 83.28% in Calabar. [14]

Maternal complications from CS are quite common and primary postpartum hemorrhage (PPH) seems to predominate in Nigeria. A study at University of Calabar Teaching Hospital reported PPH as the most common complication in 12.3% of the cases. [14] A collaborative study involving two tertiary institutions at Abakaliki in Ebonyi State, implicated PPH (44.2%) as the most common complication, followed by wound sepsis (12.3%). [15] Other complications commonly encountered are postpartum anemia, soft tissue injuries (like bladder or bowel injury), and anesthetic complications. [1, 2]

Fetal complications are also quite common, a study at King Abdulaziz Medical City, Jeddah in Saudi Arabia reported low APGAR score (prenatal asphyxia) and intensive care unit (ICU) admission as the most common complications of CS. [16] A systematic review and meta-analysis in Iran reported transient tachypnea as the most common fetal complication. [I7] At Ayder Specialized Comprehensive Hospital, Tigray in Ethiopia, the most common complications were low birth weight (17.2%), stillbirth (2.6%), and early neonatal death (2.4%). [18]

We found it necessary to take an indebt look into our caesarean sections in NDUTH over the past 6 years, to critically evaluate: our prevalence, indications, and the outcome, with special emphasis on maternal and fetal complications, and vital statistics. Our findings may be of paramount importance to the women; it has the potential to change the dynamics of our management plans, protocols and decisions.

OBJECTIVES

The main objective of this study is to audit the pattern, trend and outcome of caesarean section at NDUTH over the past 6 years.

Specifically, it would determine: the socio-demographic characteristics of the patients, the caesarean section rates, the indications, and the associated obstetrics features such as booking status, and the type of caesarean section.

It would also determine the maternal complications, fetal and maternal vital statistics, and the factors associated with poor fetal outcome.

METHODOLOGY

Study site

The study was carried out at the department of obstetrics and gynaecology, Niger Delta University Teaching Hospital, Yenagoa, Nigeria.

Subjects

Pregnant women (both booked and unbooked) who were delivered by emergency caesarean section.

Study design

A retrospective cross-sectional study of 599 pregnant women delivered by caesarean section at NDUTH. The study was carried out from January 2017 to December 2022.

Inclusion criteria

Included in this study were pregnant women delivered by caesarean section at NDUTH during the study period. These include women who registered for antenatal care in NDUTH, those referred from other health institutions for CS, and those that came on self referral.

Exclusion criteria

Excluded from this study were women who were admitted in labour, and had spontaneous or instrumental vaginal delivery.

Data collection:

Data was collected at the antenatal clinic, antenatal ward, labour ward, labour ward theatre, and the neonatal care unit. Information retrieved include: bio-data, booking status, indication for caesarean section, gestational age at delivery, and the type of caesarean section (elective or emergency). Others were: duration of hospital stay, and maternal complications, including mortalities related to caesarean section.

Information retrieved on the fetus were: birth weight, APGAR score (at 5 minutes) for birth asphyxia, fetal status (alive or dead), type of the fetal demise (macerated or fresh still birth), and the factors associated with poor fetal outcome.

The criteria for poor fetal outcome

For the purpose of this study, poor fetal outcome was based on the following criteria:

1. Moderate birth asphyxia (APGAR score of 4 – 6)
2. Severe birth asphyxia (APGAR score of 0 – 3)
3. Fetal demise - APGAR score of 0, if there is no sign of life after resuscitation by the pediatrician for a period of 20 minutes
4. Admission into neonatal care unit (immediately after birth).
5. Fetal macrosomia (birth weight of ≥ 4.5kg)
6. Prematurity babies delivered < 34 weeks gestation, or low birth weight (birth weight < 2500 grams).

Data analysis

Data collected from each subject was entered into SPSS version 25 spread sheath, and EPI info version 7 software, and analyzed. Results were presented in tables as rates, proportions, and mean, with standard deviation. Test of significance was by odds ratio, and chi square ($\chi 2$). Confidence interval was set at 95%, and statistical significance was set a p values ≤ 0.05.

Ethical Approval

Ethical approval for this study was granted by the NDUTH ethical committee, with registration number NDUTH/REC/0032/2024

RESULTS

Table 1: Sociodemographic Charactaristics, and Obstetrics Factors

BIO-DATA	Frequency N = 559	Percentage N = 100
Maternal age		
<20years	15	1.9%
20 - 24 years	69	8.6%
25 - 29 years	156	19.5%
30 - 34 years	204	25.4%
35 - 39 years	121	15.1%
>40 years	34	4.2%
Marital Status		
Single	38	6.3%
Married	520	86.8%
Cohabiting	41	6.8%
Educational level		
No formal education	8	1.0%
Primary	64	10.7%
Secondary	303	50.6%
Tertiary	226	37.7%
Occupation		
Civil servant	94	15.7%
Petty trader/farmer	190	40.0%
Private enterprise	124	20.7%
House wife	129	21.5%
Students	62	10.4%
Religion		
Christian	556	99.5%
Others	3	0.5%
OBSTETRIC FACTORS		
Parity		
0	181	30.2%
1	131	21.9%
2	124	20.7%
3	70	11.7%
4	36	6.0%
≥ 5	57	9.5%
Booking status		
Booked	332	55.4%
Unbooked	267	44.6%
Type of caesarean section		
Elective	104	17.4%
Emergency	495	82.6%
Duration of hospital stay		
≤ 5 days	185	30.9%
5 - 8 days	307	51.3%
>8 days	107	17.9%

The mean maternal age was 30.8 ± 5.7 years, the median parity was para 1, and the mean duration of hospital stay was 5.3 ± 3.9 days.

Majority of the women 156(19.5%) were middle age women (25 - 29 years), and were predominantly married 520(86.8%). Regarding educational level, secondary education (50.6%) predominates, and majority of the

women 150 (40.0%) were petty traders and farmers. A great majority of the women (95%) were Christians; Bayelsa State where the study was carried out mainly practiced Christianity. Most of the women 332(55.4%) were booked (registered for antenatal care), and were predominantly nulliparous 332(30.2%). A great majority of the caesarean sections 495(82.6%) were done as emergencies, and only 17.4% were elective surgeries.

Table 2: Caesarean Section Rates, and Maternal and Fetal Vital Statistics

Variable	2017	2018	2019	2020	2021	2022	Total
Overall CS rate							
Total number of deliveries	416	380	385	277	207	230	1895
Total Number of Caesarean sections	138	150	97	64	69	81	599
Caesarean section rates	33.2%	39.5%	25.2%	23.1%	33.3%	35.2%	31.6%
Type of caesarean section							
Elective caesarean section	35	27	8	7	20	8	105
Elective caesarean section rates	8.4%	7.1%	2.1%	2.5%	9.7%	3.5%	17.5%
Emergency caesarean section	103	123	89	57	49	73	494
Emergency caesarean section rates	24.8%	32.3%	23.1%	20.6%	23.65%	31.7%	82.4%
Fetal outcome							
Admission (in-born) into NDUTH neonatal unit	27	14	34	40	11	36	162(26, 0%)
Perinatal death in neonatal unit (in-born)	4	2	3	0	1	1	13(2.1%)
Still births (in-born) in NDUTH	23	16	17	19	11	14	100\ (16.1%)
NDUTH perinatal mortality rate	43.4/1000	28.9/1000	32.2/100	30.5/1000	19.3/1000	24.1/1000	160.7/1000 births
Admission secondary to CS in neonatal unit	10	18	15	17	8	15	83(13.3%)
Perinatal death in neonatal unit, secondary to CS	1	2	2	0	1	1	7(1.1%)
Still births at CS	19	13	14	15	8	11	80(12.9%)
Perinatal mortality rate from CS	32.2/1000	24.1/1000	25.7/1000	24.1/1000	14.5/1000	19.3/1000	128.6/1000 births
Maternal mortality							
Maternal mortalities in NDUTH during the study period	0	2	2	1	0	2	7(1.3%)
Maternal mortality ratio in NDUTH	0/100,000	321.5/100,000	321.5/100,000	160.8/100,000	0/100,000	321.5/100,000	1125.4/100,000 live births
Mortality from CS complications	0	2	0	1	0	0	3(0.5%)
Maternal mortality ratio from CS	0/100,000	321.5/100,000	0/100,000	160.8/100,000	0/100,000	0/100,000	482.3/100,000 live births

The overall caesarean section rate during the study period was 31.6% (599 out of 1895), of which 26.1% were emergencies, and 5.5% were electives. Majority of the CS (495 out of 599) 82.6% were emergencies, and 17.5% (105 out of 599) were elective surgeries.

With respect to the trend in the CS rates: it was 33.2% in 2017, it increased to 39.5% in 2018, and

dropped to 23.1% in 2020 (the peak of the COVID 19 pandemic), it then increased to 35.2% in 2022. The increase in CS rate from 2017 to 2022 was very minimal (2%).

During the study period, the total number of babies delivered in NDUTH was 1895, this comprised both in-born (babies delivered in NDUTH), and out-born (babies delivered elsewhere but referred for treatment). Among the in-born babies, the still birth rate was 100(16.1%), and 162(26. 0%) were admitted into the neonatal unit for intensive care. Among the admitted babies, 13(2.1%) died within 7 days, giving a perinatal mortality rate of 160.7/1000 births.

Among the 622 babies delivered by CS, 80(12.9%) were still births, 83(13.3%) were admitted into the neonatal unit for intensive care, out of which 7(1.1%) died. Therefore the perinatal mortality rate for CS was 128.6/1000 births.

There were 3(0.5%) maternal mortalities secondary to CS complications during the study period, giving a maternal mortality ratio of 482.3/100,000 live births.

TABLE 3: Indication for Caesarean Section, Maternal Complications, and Fetal Demographic Charactaristics

VARIABLE	Frequency N = 599	Percentage N = 100
Indication for caesarean section		
Cephalopelvic disproportion (CPD)	208	34.7%
Previous caesarean section	182	30.4%
Severe preeclampsia/Eclampsia	138	23.0%
Abnormal lie and presentation	114	19.0%
Prolonged/obstructed labour	71	11.9%
Poor progress in labour	110	18.4%
Fetal Distress	106	17.7%
Abruptio placenta/ Placenta previa	51	8.5%
Complicated multiple gestation	22	3.7%
Other indications	112	18.7%
Maternal Complications	**N = 119**	**19.9%**
Postpartum hemorrhage (PPH)	51	8.5%
Postpartum anaemia	45	7.5%
Puerperal Sepsis	10	1.7%
Wound dehiscence	6	1.0%
Wound sepsis	41	6.8%
Post-dural headache	11	1.8%
Acute renal failure	5	0.8%
Bladder injury	3	0.5%
Others	4	0.7%
Fetal demographic characteristics	**N = 622**	
Gestational age at delivery		
Preterm (< 37 weeks gestation)	100	16.1%
Term (37 - 41 weeks gestation)	502	80.7%
Post term (≥ 42 weeks gestation)	20	3.2%
Birth weight		
Extremely low birth weight (< 1.00kg)	1	0.2%
Very low birth weight (1.00 – 1.49kg)	26	4.2%
low birth weight (1.50 – 2.49kg)	74	11.9%
Normal birth weight (≥ 2.50kg)	521	83.8%
Birth asphyxia	**N = 588**	
No Asphyxia (APGAR score of (7 -10)	497	84.5%
Moderate (APGAR score of (4 - 6)	83	14.1%
Severe (APGAR score of (0 - 3)	8	1.4%
Fetal outcome	**N = 622**	
Alive	588	94.5%
Died (Mortality)	34	5.5%
Perinatal mortality pattern	**N = 34**	
Fresh still birth	22	64.7%
Macerated still birth	12	35.3%

The most common indication for caesarean section in NDUTH was cephalopelvic disproportion (34.7%), followed by previous (repeat) CS (30.4%). The maternal complication rate was 19.9%, predominantly postpartum hemorrhage (PPH) 8.5%, closely followed by postpartum anaemia (7.5%).

The mean gestational age at deliver was 39.4 ± 9.1 weeks, a great majority of the women (80.7%) delivered at term, and only a handful (3.2%) delivered postterm. A total of 622 babies were delivered because 23 women had twin gestation.

With respect to birth weight, a great majority (83.8%) was of normal birth weight, and low birth weight was 11.9%. 14.1% of the babies had moderate, and 1.4% has severe birth asphyxia. There were 34 perinatal mortalities (5.5%), and among these, most 22(64.7%) were fresh still births.

Table 4: Effects of Type of Caeserean Section and Booking Status on Maternal Morbidity, and Fetal Demographic Charactaristics

Characteristics	**Total**	**Maternal Morbidity**		**Chi square (χ2)**	**P value**
		Present	**Absent**		
Type of caesarean section	**N = 599**				
Elective Caesarean section	104	12 (2.0%)	92 (15.4%)	5.48	0.019*
Emergency Caesarean section	495	107 (17.9%)	388 (64.8%)		
Booking Status	**N = 599**				
Booked	332	48 (8.0%)	284 (47.4%)	13.68	0.001*
Unbooked	267	71 (11.9%)	196 (32.7%)		
		Perinatal mortality			
		Alive	**Died**		
Booking Status	**N = 622**				
Booked	349	341 (54.8%)	8 (1.3%)	15.50	0.0001*
Unbooked	273	247 (39.7%)	26 (4.2%)		
		Booking Status			
Still birth	**N = 34**	Booked	unbooked		
		26(76.5%)	8 (23. %)	5.71	0.017*
		Caesarean Section			
Birth asphyxia	**N = 588**	**Elective**	**Emergency**		
No Asphyxia	497 (84.5%)	77 (13.1%)	420 (71.4%)	3.17	0.1
Birth Asphyxia	91(15.5%)	21(3.6%)	70(11.9%)		
	N = 34				
Fresh Still birth	22 (64.7%)	4 (11.8%)	18 (52.9%)	0.99	0.320
Macerated Still birth	12 (35.3%)	4 (11.8%)	8 (23.5%)		

The rate of maternal complications (morbidity) was significantly higher in emergency caesarean than elective CS, $\chi2 = 5.48$, P = 0.01.

Being unbooked was strongly associated with maternal morbidity, $\chi2 = 13.68$, p = 0.001, and perinatal mortality, $\chi2 = 15.50$, p = 0.001. A great majority of the still births (76.5%) were from unbooked patients

Table 5: Factors Associated with Poor Fetal Outcome

Variable	Odds Ratio	Confidence Interval (95%)	P value
Maternal age			
20 - 29years	3.58	0.47, 27.44	0.22
30 - 39 years	1.16	0.15, 9.24	0.89
Marital status			
Married	0.45	[0.15, 1.35]	0.15
Single	0.92	[0.21, 3.96]	0.91
Level of Education			
Secondary	6.46	[3.03, 18.60]	0.02*
Tertiary	1.91	[0.73, 5.00]	0.18
Occupation			
Employed	2.31	[0.24, 22.53]	0.47
Unemployed	5.93	[1.03, 16.94]	0.04*
Parity			
Nulliparous	0.48	[0.15, 1.53]	0.21
Primiparous	1.05	[0.35, 3.13]	0.93
Multiparous	0.42	[0.14, 1.32]	0.13
Obstetrics factors			
Unbooked status	4.37	[3.94, 21.82]	0.001*
Emergency caesarean section	6.36	[2.21, 19.41]	0.03*
Cephalopelvic disproportion	0.36	[0.11, 1.20]	0.09
Prolonged bstructed labour	7.44	[3.47, 19.04]	0.001*
Repeat caesarean section	0.71	[0.30, 1.67]	0.43
Severe preeclampsia/Eclampsia	1.99	[0.57, 6.93]	0.28
Fetal distress	7.61	[4.22, 20.82]	0.001*
Abruptio placenta	4.38	[0.87, 21.97]	0.04*
Cord prolapsed	5.13	[1.02, 25.75]	0.04*
Poor progress in labour	3.29	[1.19, 17.16]	0.04*
Abnormal lie and presentation	0.58	[0.49, 4.0]	0.64

The 5 most significant factors associated with poor fetal outcome were: unbooked status (p = 0.0001), fetal distress (p = 0.001), prolonged obstructed labour, p = 0.001), low educational status (p = 0.02), CS done as emergency p = 0.03.

Other significant factors are: unemployment p = 0.04, abruptio placenta p = 0.04, and poor progress in labour p = 0.04.

DISCUSSION

Among the procedures in medical practice, caesarean section is distinct, as it saves the lives of both mother and fetus. Without this procedure, the cost to humanity (the maternal and fetal morbidity and mortality) would have been tremendous.

As stated earlier, a study ranked Sub-Saharan Africa as the sub-region (globally) with the least rise in CS rate over the years. [3] In our study, out prevalence increased marginally (by just 2%) over the past 6 years, which is in agreement with the above findings, and also at par with the 1.1%. reported at Ebonyi State in Nigeria. [15]

Very low CS rates have been reported in centers across Nigeria; 3.11% from analysis of 2018 Nigeria National demographic Survey, [19] and 2.1% from another study in Nigeria. [20] A similar study in Nigeria got a rate of 1.0% for low risk pregnancies, and 7.1% for high risk. [21] and an overall rate of 17.6% was obtained from a mata-analysis in Nigeria. [22]

The low CS rate in West Africa may be attributed to multiple factors such as: safety concerns, cultural and religious beliefs, high illiteracy rate, and aversion to CS. [8. 23] A study in Port Harcourt in Nigeria identified the reasons for aversion as: stigma of not being able to deliver vaginally (52.7%), high cost (63.7%), and the risk of dying from the procedure (51.0%). [24] Another study in Abakaliki reported that 20% of women rejected CS because of stigma of not being able to deliver naturally

(29.22%), high cost of CS (20.8%), and religious beliefs (12.5%). [9]

In addition, many caesareans sections in Nigeria are done in private clinics, especially in rural settings, where records may not be properly incorporated into the national health records. This as a matter of fact has the potential to negatively affect the CS indices in the country.

In West Africa (including Nigeria), there is a very high tendency for our pregnant women to deliver outside the hospital setting, especially with traditional birth attendants (TBA), and this could reduce our CS rates. A study reported that in rural parts of Africa, 60% to 90% of pregnant women deliver with TBA. [25] Poverty and the high cost of CS are believed to be strong catalysts that rapidly propagate this practice.

Wrong financial perception about CS is another factor; a study in Nigeria reported that in hospitals, 25% of doctors recommend caesarean section for their financial advantage, but not for medical reasons. [24]

On literature search, the CS rate of 31% we got from our study was the third highest in Nigeria; 35.5% at Oshobo, [26] and 41.4% in Port Harcourt. [27] However, much lower results were obtained in other centers. A systemic review and meta-analysis on CS involving 45 articles, reported an overall prevalence of 17.6% in Nigeria. [22] Other reported rates are: 7.22% in Enugu, [28] 23.2% at Abakaliki, [15], 25.6% in Calabar, [14] and 21.4% in Abuja. [12] The reason for the high rate we got in NDUTH is not very clear, but it may be due to our low utilization of alternative mode of delivery, like obstetric forceps.

Among the indications for CS globally, some are more peculiar to poor resource setting, like Sub-Saharan Africa. Prolonged obstructed labour, eclampsia, and severe preeclampsia or imminent eclampsia are examples, [6, 11, 12] and they featured prominently in the top 5 indications in our study. These are absolute indications for CS, and often due to complications from mismanaged labour or antenatal care.

The high rate of the absolute indications stated above, plus cephalopelvic disproportion might have contributed immensely to our high rate of emergency CS of 82.6%. However, NDUTH is not in isolation, and the problem seems to cut across various regions in Nigeria. A very high rate of 93.7% was obtained in Enugu [13], in Calabar it was 83.3%, [14] and 80.2%. in Abuja. [12]

Experience from our obstetrics units indicates that the patients with the above complications are predominantly unbooked, and managed in labour for several hours, (and even days) before they are referred to hospital. Undue delay often results in life threatening complications like: fulminant sepsis, eclampsia, obstructed labour, and ruptured uterus. While some present with fetal distress, and intra-uterine fetal death. The usual culprits in Nigeria are TBA, health centers and private clinics. Unfortunately, we have not done a study to objectively access the impact of late patients' referral for CS in our facility, and this is a wake-up call.

Excessive bleeding during caesarean section (PPH) is about the commonest maternal complication during CS, and it has been reported in various studies in West Africa. A study in Ethiopia identified PPH as a very common complication of CS, with an incidence of severe PPH of 4.6%. [29] In Nigeria, PPH was reported as the commonest maternal complication in Calabar (12.3%), [14] and 44.2% at Abakaliki in Ebonyi State. [15]

PPH as a dominant complication of caesarean in Nigeria was clearly demonstrated in this study, as PPH was the most common complication in NDUTH. However, our rate of 8.5% was lower than the results from some other centers in Nigeria, as stated above. The low rate was most probable because our resident doctors were trained to be very careful during surgery, and to strictly follow the existing CS protocols. As a rule in NDUTH, a senior colleague is always on standby (in theatre) waiting to intervene when complications arise. Among the top 5 complications of CS we observed in our study were postpartum anemia, puerperal Sepsis, and wound dehiscence.

Puerperal sepsis and wound breakdown (dehiscence) are very common in Nigeria, especially among the unbooked patients. As earlier stated, most of these patient were badly managed (in labour) by TBA and health centers, and they often present with sepsis secondary to prolonged rupture of fetal membranes. Some have actually ruptured membranes for several days, prior to presentation. A study in Enugu reported that 79.4% of term pregnancies had prolonged rupture of fetal membranes, [30] and the rate of chorioamnionitis was 16.2% (using clinical indicators of infection), and 50% using histological diagnosis. [30]

It's therefore not surprising that our rate of puerperal sepsis, and wound infection was high (among the top 5 complications) in this study, because of our high rate of prolonged rupture of membranes (18.4%), and un-booked patients (44.6%). Similar high rates of wound sepsis have been reported in other centers in Nigeria; 25% in Kano [31] and 16.0% in Ekiti [32]

Though we acknowledge the fact that under no circumstance should a woman die in labour or from labour complications, it's almost impossible to achieve this gold standard in developing countries, like Nigeria. There are too many bottle-neck obstacles, and the issues are complex. They include: lack of health facilities (especially in rural areas), lack of political will, poor implementation of health policies, high level of illiteracy, poverty, and the influence of religion, and socio-cultural practices.

However, we had only 3 maternal deaths (from CS complication) during the study period, with a maternal mortality ratio of 482.3/100,000 live births. This did not deviate widely from other centers in Southern Nigeria; 646/100000 in Calabar, [14] and the 139/1000 in Enugu. [33] However a Multicentre study conducted predominantly in Northern Nigeria (about 80% of the data was from Kano and Kaduna) had a very high ratio of 1,315/100,000. [34] This is because in Nigeria, the mortality indices are worse in some parts of Northern

Nigeria. [35] South Africa, (though an African country) is more developed than Nigeria, and their mortality records are better, 3.2 deaths per 10 000. [36]

Regarding fetal complications, birth asphyxia was the most common complication we got from our study, and it seems to be the most common fetal complication in many centers in Nigeria. A study in Enugu reported that more than half (57.7%) of the babies delivered by CS had birth asphyxia, [12] at Asaba, the rate was 27.6%. [37] From our study, birth asphyxia was the most common cause of perinatal mortality in babies delivered by CS in NDUTH.

With respect to perinatal mortality from CS, our perinatal mortality rate of 128.6/1000 births is at par with findings from Abakaliki, Ebonyi State in Southern Nigerian (134.7/1,000 births), [15] but lower than what was reported in Jigawa State in Northern Nigeria (165.6 per 1000 births). [38]

CONCLUSION

Our CS rate is quite high, and this is largely attributed to too many emergencies. Though our maternal mortality ratio and perinatal mortality rate are comparable to those from other centers in Nigeria, they are too high going by international standards. There is no justification for our pregnant women to die during childbirth or lose her babies. Advocacy to encourage our women to register for antenatal care, women empowerment, and early referral (of women with labour complications) to hospital would improve our morbidity and mortality indices.

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