

# Cesarean section at the Abubakar Tafawa Balewa University Teaching Hospital, Bauchi, northeast Nigeria: a 3-year retrospective review

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## Abstract

Cesarean section is the most common major surgical procedure in obstetrics, and its rate has increased globally in recent years. The aim of the study was to determine the incidence, indications, maternal/perinatal outcome, and complications of cesarean section in the Abubakar Tafawa Balewa University Teaching Hospital Bauchi (ATBUTH), Bauchi, Nigeria. The study reviewed all cesarean sections performed between July 1, 2016, and June 30, 2019. Case notes of patients and records from the labor ward, theater, and special care baby unit were used to obtain data, which included age, parity, booking status, type of cesarean section, maternal morbidity and mortality, and the perinatal outcome. Analysis was done using SPSS version 21, and data was presented

in tables and charts in addition to ratios, proportions, and percentages. A total of 10,705 deliveries were conducted during the review period, of which 3,380 were cesarean births, given a cesarean section rate of 31.57%. Emergency cesarean sections accounted for 67.72%, and 81.39% of all the sections were primary cesarean sections. Only 3,501 parturients (32.70%) were booked. Hypertensive Disorders of Pregnancy (HDP), 733 (29.17), were the most common indication for the operation, followed by repeat cesarean section, 373(25.37%). About 87.86% of the fetuses were delivered alive, while 12.14% were stillborn and had an early neonatal death. Anemia was the most common post-operative complication seen in 13% of the women who had a cesarean delivery. The most debilitating complication was vesico-vaginal fistula which occurred in eight patients (0.24%). The maternal mortality and perinatal mortality rates were 580/100,000 live births and 121.42/1000 babies, respectively, during the review period. The study showed a high rate of cesarean section in ATBUTH. The commonest indication was HDP, and anemia was the significant post-operative complication.

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## Introduction

Cesarean section is the most common major surgical procedure in obstetrics.<sup>1-3</sup> Globally, the rate of cesarean section has increased in recent years.<sup>4-7</sup> In our environment, the rate, which was reported as 2-3% 25 years ago,<sup>1,8</sup> has risen to over 10% in recent years.<sup>4,7</sup> This increase involves both the primary and repeat cesarean section rates.<sup>6</sup>

Primary cesarean section, which is a cesarean delivery to a woman without a previous cesarean, has been the major contributor to this increase in the overall cesarean section rates. Primary cesarean section has been reported to constitute between 65.5-91.5% of cesarean sections.<sup>1,4,7,9</sup> The reasons for the increase in the primary cesarean section rate are diverse. They include the safety of the procedure, obstetric considerations such as breech presentation, prematurity, and increase in the use of electronic monitoring, demographic factors such as a shift in the age, parity, and fertility status of the patients, medico-legal pressures leading to fear of litigations, change in obstetric training with increasing emphasis on early interventions, individual physician styles, the paying status of the patient and the preference of the pregnant patient.<sup>4,7,10-13</sup> Increased cesarean section rates have implications for the patients and the health system as a whole. More resources are expended in care compared to vaginal delivery, and this may put undue stress on the resource-limited healthcare system, hence the need to audit obstetric practice to ensure efficient and effective utilization of interventions to promote women's health.

The cesarean section also carries with it an increase in maternal mortality which is 10-20 times greater than vaginal delivery.<sup>2</sup> This greater mortality is contributed by hemorrhage, sepsis, pulmonary embolism, and anesthetic deaths.<sup>2,3,8</sup> An increase in morbidity is related to febrile illness, wound dehiscence, burst

abdomen, hemorrhagic anemia, aspiration pneumonitis, and atelectasis.<sup>2,3,6</sup> The morbidity associated with it varies from one setting to another based on the resources available, patients' characteristics, and health-seeking behavior.

Perinatal mortality and morbidity are also increased in cesarean section when compared with spontaneous vaginal delivery.<sup>1,3</sup> Once a woman undergoes a primary cesarean section, her subsequent pregnancies become high-risk pregnancies, with an increased risk of repeat cesarean section.<sup>3-5</sup> Any program aimed at reducing the overall cesarean section must take cognizance of the huge contribution of primary cesarean section to the rising rate of cesarean section.

This study aimed to determine the incidence of cesarean section in our facility, the major drivers of the rate, its perinatal outcome, and complications in Bauchi, northeast Nigeria.

## Materials and Methods

### Study area

Abubakar Tafawa Balewa University Teaching Hospital (ATBUTH), is located in Bauchi, northeast Nigeria. It is a 700-bed tertiary hospital that serves as a referral center for primary and secondary health facilities in the state and its neighbouring states of Plateau, Jigawa, and Yobe.

This was a retrospective study of caesarian sections performed at the ATBUTH Bauchi, Nigeria, over a 3-year period, between July 1, 2016, and June 30, 2019. Patients' case notes were obtained from the records department, and additional data were obtained from the labor ward and theater records. Information such as patient age, parity, booking status, type of cesarean section, the complications associated with the surgery, and the perinatal outcome were extracted. Statistical analysis was done with SPSS version 21. Data was presented in tables, charts, ratios, proportions, and percentages. The study's conduct received ethical approval from ATBUTH's Health Research and Ethics (HREC) Department.

## Results

Over the 3-year period, a total of 10,705 deliveries were conducted, of which 3,380 were *via* cesarean section. Ten thousand two hundred and thirty-two (10,232) folders were retrieved, giving a retrieval rate of 96.51%. The overall cesarean section rate was 31.57%, and most of the cesarean deliveries (81.39%) were primary. The women in the 20-29 year-age group had the majority of the operations (43.91%), while 2092 patients aged 40 and above (7.43%) had the least number of operations, as shown in Table 1.

Analysis of the main indications for the cesarean section showed that Hypertensive Disorders of Pregnancy (HDP) (29.17%) were the most common indication. This was closely followed by repeat cesarean section at 25.03%, as shown in Table 2. Three women each had elective cesarean delivery following successful previous vesico-vaginal fistula repair and advanced pregnancy with carcinoma of the cervix stage 1b (0.12% each)

The perinatal outcome showed that 8990 babies (87.86%) were delivered alive, while 1242 (12.14%) were stillborn and early neonatal death; this gives a perinatal mortality rate of 121.38/1000 babies.

Anaemia was the most common postoperative complication,

occurring in 439 patients (13.00%). This was followed by infective morbidity in 390 patients (11.54%), comprising of wound sepsis and genital sepsis. Eight patients had vesico-vaginal fistula (0.24%) despite prolonged catheterization, and all of them had prolonged obstructed labor and were unbooked. There were 54 maternal deaths (1.60%) from eclampsia, sepsis, and coexisting medical conditions who had cesarean section during the period under review (not primarily from cesarean section complications), and this gives a maternal mortality rate of 5.80 *per* 1000 (or 580 *per* 100,000 livebirths), the case fatality rate of 1.5%.

**Table 1.** Sociodemographic characteristics of the study subjects (N=10232).

Variable	Emergency (%)	Elective (%)	Total
Age (years)			
<20	649	0	649
20-29	1936	2557	4493
30-39	3551	779	4330
>40	292	468	760
Parity			
Nullipara	280	374	2036
Primipara	603	102	2197
Multipara	2129	2916	5045
Grandmultipara	384	570	954
Educational status			
None	2980	387	3367
Primary	2266	885	3151
Secondary	956	1203	2159
Tertiary	286	1269	1555
Booking status			
Booked	1327	3051	4378
Unbooked	5538	316	5854

**Table 2.** Indications for cesarean section in patients (N=3380).

Indication	Number (N)	Percentage (%)
Contracted pelvis	297	8.80
Hypertensive disorders	986	29.17
Placenta praevia	208	6.17
Fetal distress	79	2.35
Breech	162	4.78
Two or more cesarean sections	846	25.03
Obstructed labor	254	7.52
Failed Induction of Labor	47	1.39
Abnormal lie	172	5.09
Diabetes Mellitus in pregnancy	21	0.63
Higher order pregnancy	5	0.0016
Bad obstetric history	42	1.23
Cord prolapse	78	2.31
PMTCT	26	0.76
Abruptio placentae	126	3.74
Massive vulval warts	3	0.08
Previous Vesico-Vaginal Fistula repair	4	0.12
Carcinoma of the cervix	4	0.12
Congenital anomaly	12	0.36

PMTCT, Prevention of Mother-to-Child Transmission.

## Discussion

The overall cesarean section rate of 31.57% in this study is higher than the figures recorded in some parts of Nigeria;<sup>1,5,6</sup> the rate was higher than the 27.6% obtained in Enugu in 2011,<sup>6</sup> but lower than 35.5% in Osogbo.<sup>14</sup> This relatively high rate in our environment may be attributed to the unbooked status of most of our patients, who were referred from other facilities after spending some time there.

The rate of cesarean section, as found in a study conducted in Jigawa and Abuja, is higher among unbooked patients.<sup>1,7</sup> In the same way, a significant number of cesarean sections done in this study were for unbooked patients (57.21%), signifying low institutional delivery as many patients prefer to give birth at home, with the Traditional Birth Attendants (TBAs). They only resort to the hospital when there are complications during labor and delivery. This calls for the supervision of TBAs to ensure early referral to health institutions.<sup>10</sup>

The majority of the patients, 43.93% in this series, were aged between 20-29 years, which agrees with other reports.<sup>1,3,4,8-11,15</sup> The mean age of 28.87 years is close to the finding in a study from the same geopolitical region.<sup>9,10</sup> Though this has been noted to be the safest and the most common age of delivery, the majority of the primiparous women belong to this age group,<sup>1,3,4,9,15</sup> and cesarean section was most common in primiparous women (21.47%). This was followed by nulliparous (19.90%) and multiparous women. Implying that the majority of the cesarean deliveries were in low parity women, similar to the findings in other studies.<sup>1,3,4,8-10,12,14-15</sup> The proportion of cesarean sections increased with age over time in all age groups except women aged younger than 20 years.<sup>6</sup>

HDP (29.17%) was the most common indication for the cesarean section in this study, with pre-eclampsia and eclampsia accounting for more than half of the HDP (59%) in nulliparous women, and Pregnancy-Induced Hypertension (PIH) accounting for 41% in the multiparous women. Nulliparous and grandmultiparous women had been reported to be at increased risk of pre-eclampsia/eclampsia and PIH, respectively.<sup>16</sup> A significant number of these patients attended Antenatal Care (ANC) elsewhere, but were not well supervised and referred with complications of or HDP in labor. The findings in this series are in keeping with findings from a UK study.<sup>16</sup>

The second leading indication for the procedure in this study is a previous cesarean section (25.03%). This is in contrast to bad obstetric history and Human Immunodeficiency Virus (HIV) in pregnancy as reported by other studies.<sup>7,8</sup> Obstetricians still regard vaginal birth after a previous cesarean section as a high-risk option. Trial of labor under close monitoring in carefully selected patients is now increasingly being advocated, with a significant number of patients with a cesarean section who were allowed for trial of labor who delivered successfully without any complication.

Cephalopelvic Disproportion (CPD), 8.80%, accounted for a significant proportion of cesarean sections in this series as in other studies.<sup>1,11,14,15</sup> Nutritional factors have a dominant influence on pelvic growth and development, especially during childhood. Malnutrition may result in pelvic contraction and general growth stunting;<sup>11</sup> this high incidence of CPD may not be unrelated to the malnutrition that is still rampant in developing countries, including Nigeria. None of the booked patients with CPD were obstructed; however, 80 (42%) of the CPD cases that were obstructed were unbooked and had become obstructed at the time of presentation by the referring health facility. Though obstructed labor accounted for 189 (8.37%) cesarean sections, this was lower than the inci-

dence found in some studies;<sup>11-13</sup> This may likely be due to the increased use of partograph for active management of labor, leading to early diagnosis of CPD before they openly went into obstruction.

Fetal distress was the indication in 2.35% of cases. It is known to be a common indication for cesarean section all over the world.<sup>1,11,13</sup> Though early intervention in these patients is commendable, there is the need to improve the accuracy of the diagnosis, as the clinical diagnosis used in the patients often has a high false positive result,<sup>11</sup> leading to unjustified cesarean section. Fetal blood sampling for pH estimation is necessary, as any unjustified cesarean section carries higher risks of morbidity and mortality in the mother.

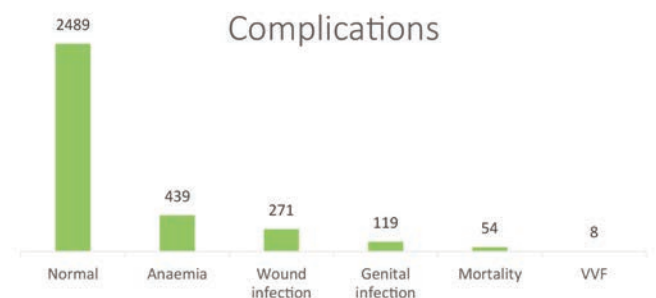
Breech presentation (4.78%) was a common indication for cesarean section in this study. This is in keeping with a study in Abuja and Maiduguri that reported 4.6% and 4.7%, respectively.<sup>7,9,10</sup> Breech presentation is a major contributor to the rise in primary cesarean section and cesarean section generally.<sup>1,3</sup> The likely contributors to this may be the practice of assisted breech delivery for some selected patients in our center.

Nineteen patients (0.76%) were delivered by cesarean section in this study in order to Prevent Mother-To-Child Transmission (PMTCT) of HIV. It is well documented that prenatal voluntary counseling and testing, antiretroviral therapy, cesarean delivery, and exclusive breastfeeding for the first six months reduce the incidence of mother-to-child transmission to <2%.

Identified factors resulting in complications from our study were; prolonged obstructed labor, prolonged rupture of fetal membranes, previous cesarean sections, antepartum hemorrhage, and HDP, as in a study at Maiduguri, a tertiary hospital in the same geopolitical zone.<sup>10</sup> It is also consistent with findings in North-Central and South-Eastern parts of the country: 20.3% and 32.5%, respectively.<sup>12,15</sup>

Anemia was the most common postoperative complication in this study (13.00%) (Figure 1). Though the value was lower than that of the quoted series above. This may be due to the use of potent antibiotics, either therapeutically or in prophylactic doses, vigorous asepsis during surgery, and meticulous surgical techniques. This varies from findings in Maiduguri.<sup>10</sup> The anemia was closely followed by infective morbidity (11.54%), which comprised genital sepsis, wound sepsis, and urinary tract infection. Eight patients (0.24%) had vesicovaginal fistula post-operatively. These patients were unbooked and had prolonged obstructed labor.

There is a strong inverse association between cesarean section rates and maternal, infant, and neonatal mortality,<sup>1,3</sup> but direct pos-



**Figure 1.** Maternal complications among the 3380 women who had a cesarean delivery.

itive associations at lower levels of mortality.<sup>3</sup> There were 54 maternal deaths (1.60%) from cesarean section during the period under review, and this gives a maternal mortality ratio of 580 *per* 100,000 live births. This gives a case fatality rate of 1.6%, which is lower than some findings (fatality 1.98%).<sup>10</sup> The lower rate may be attributed to safer anesthetic techniques (spinal), an increase in expertise in the use of general anesthesia, and more frequent use of regional anesthesia, thereby reducing anesthetic death. However, the rate is higher than the findings in Enugu and Abuja, with case fatality rates of 0.7% and 0.8%, respectively.<sup>6,7</sup> This could be a reflection of the different patients' characteristics and healthcare-seeking behavior among the studied populations. Assignment of cause of death was based on clinical findings, as there was no post-mortem examination performed on these patients due to the religious inclination of the study population. The leading causes of death were eclampsia (47.36%), sepsis (18.42%), anemia (7.89%), labor and complications (10.52%), coexisting medical conditions (5.26%), others (10.52%). This is similar to most findings in our region.<sup>9,10</sup> The perinatal outcome gives a perinatal mortality rate of 121.42/1000; this is lower than the findings from Sokoto,<sup>8</sup> but higher than the 72.7/1000 reported from Maiduguri.<sup>9</sup>

## Conclusions

The cesarean section rate is high. The most common indications were HDP and repeat cesarean section. Significant complications are anemia and infections resulting in maternal and neonatal mortalities, since most of the patients were unbooked. The importance of early antenatal booking, supervised delivery in a well-equipped health facility, and early referrals cannot be over-emphasized.

## Recommendations

Pregnant mothers need to be enlightened on the need to book pregnancies. Attention should be paid to achieving optimization before surgery, hemostasis during surgery, improvement in surgical techniques, and the use of diathermy where applicable, so as to reduce the incidence of anemia as a common complication.

Measures to reduce perinatal mortality, such as ensuring attendance at deliveries (especially high-risk) by neonatologists and continuous training of staff in neonatal resuscitation, should be adopted.

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