*Asian Pac. J. Health Sci.*, 2017; 4(2):162-167 e-ISSN: 2349-0659, p-ISSN: 2350-0964

**Document heading** **doi: 10.21276/apjhs.2017.4.2.27** **Research Article**

# Rate, indications and fetal outcome of emergency caesarean section- A retrospective study at Ndola teaching hospital, Ndola, Zambia

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## ABSTRACT

**Background:**A caesarean section is the delivery of a baby through a surgical incision in the mother's abdomen and the uterus. In most of the circumstances, a C-section is planned in advance. However, in others, it's done in response to unforeseen circumstances. The objectives of the study were to determine the rate, indications and fetal outcome of Emergency C-Section at Ndola Teaching Hospital.**Methods:**A retrospective study was undertaken at Ndola Teaching Hospital, Ndola, Zambia for January to December 2016. Data was extracted from maternity in-patient case files, delivery books and theatre register records. Altogether, 262 clients were randomly selected and this data was collected in April and May 2017. Data was entered and analyzed using SPSS v20. Statistical associations were established using the Chi-square test and results yielding $p< 0.05$ were considered to be of statistical significance.**Results:**The Emergency C-Section rate was 79(30.2%) from 262 study sample. The indications for Emergency C-Section were fetal distress (20.6%), maternal distress (5%) and cord prolapse (4.6%). Emergency C-Section had a poor fetal outcome of 11.4% while Elective C-Section had a poor fetal outcome of 9.8% ($p= 0.704$). None of the characteristics were significantly associated with Caesarean Section ($p >0.05$).**Conclusion:**Fetal distress was the most common indication for Emergency C-Section and it recorded a high fetal complications. Early recognition through good intra-partum monitoring and early referral of mothers who are likely to undergo cesarean section may reduce the incidence of poor fetal outcome in emergency cesarean sections and thus decrease its complications.

**Key Words:** Rate, Indications, fetal outcome, Emergency Caesarean Section, Caesarean section, Ndola, Zambia.

## Introduction

Caesarean Section (CS) is defined as "the delivery of a fetus through an abdominal incision (laparotomy) followed by incision of the uterine wall (hysterotomy) [1]. This definition however was argued against saying that it does not include operation involving abdominal incision that aims to take out the fetus from the abdomen during abdominal pregnancy or dislodgement of the fetus in the abdominal cavity when there is rupture of the uterus [2]. Caesarean Section was further divided into two sub-types as far as the urgency of operation is concerned.

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These are Elective and Emergency C-Section. Elective C-Section refers to "those occasions where a caesarean is conducted as a result of advanced planning". And Smith [3] adds that, "it also refers to a decision made more than 24 hours before delivery". Smith and his colleagues also defined Emergency caesarean section (ECS) as any caesarean delivery that is not planned or scheduled, they further stated that a caesarean operation is considered an emergency if decision are made during the 24 hours before the delivery because of deteriorating fetal or maternal health before onset of labor.

Thomas and Jane [4]pointed out that indications for Emergency C-Section are usually evident only after the onset of labor, either in the early stage or after a woman has been in labor for a while. The indications for one to have an emergency C-section include those that pose dangerous problems on the continuing or

inducing labor to the mother or the baby. These may include the following: The cervix stops dilating or the baby stops moving down the birth canal and attempts to stimulate contractions to get things moving again haven't worked. The umbilical cord slips through the cervix (a prolapsed cord). If that happens, the baby needs to be delivered immediately because a prolapsed cord can cut off the oxygen supply to the baby. The baby's heart rate gives the surgeon cause for concern, like in a case of intrauterine fetal restriction, and the decision is made that the baby can't withstand continued labor or induction. The other indications could be that the placenta starts to separate from the uterine wall (placental abruption), which means that the baby won't get enough oxygen unless delivered right away.

The number of deliveries by Caesarean section has been increasing steadily worldwide in recent decades. In 2012, about 23 million C-sections were done globally [5]. The average global rate of C-Section is 18.6% [6]. The highest rates were found in Latin America and the Caribbean with 40.5% each, followed by Oceania with 31.1% and Europe with 25%. The lowest rates were found in Africa with 7.3%, followed by Asia with 19.2%. With the increase in the rate of C-Section, it is expected that Emergency C-Section will be on the raise as well. However, there is paucity of data on Emergency C-Section because most of these patients are not booked in labor ward.This accounts for the high rate of unbooked patients seen in labor at the referral hospitals [7-9].

The overall C-section rate for Zambia is 4.4% of 13,383 sampled between 2013 and 2014 [10]. A study done by Nkata at Ndola Teaching Hospital in 2016 to ascertain the prevalence of Cesarean Section and its indications for both low and high cost at the hospital revealed the prevalence rate to be 20.7% [11]. Another prevalence study was done in 2012 by Musonda [12], at the University Teaching Hospital, the biggest hospital in Zambia. The prevalence rate was noted to be 18.5%. However, no study has been conducted to deduce the rate of Emergency C-Section in Zambia, hence the need to determine the rate, indications and the fetal outcome of Emergency C-Section at Ndola Teaching Hospital.

## Materials and methods

**Study area**:The study was conducted at Ndola Teaching Hospital, located in the Copperbelt province of Zambia. It was chosen because it is the largest referral Hospital in the Country apart from University Teaching Hospital (UTH).
**Study design:** The study was a retrospective study, to determine the rate, indications and fetal outcome of Emergency Caesarean Section.
**Sample size:** All the 262 cases of C-section from January to December 2016 were considered in the analysis
**Data collection:** Data was extracted from maternity in-patient case files, delivery books and theatre register records.
**Data entry and analysis:** Data was entered and analysed using SPSS v20. Chi square test was used to establish associations and only results yielding $p< 0.05$ were considered to be of statistical significance.
**Ethical consideration:** Ethical approval to conduct the study was obtained from Tropical Diseases Research Centre (TDRC) Research Ethics Committee and permission was obtained from Ndola Teaching Hospital management.

## Results

In 2016, Ndola Teaching Hospital recorded 6324 admission in Maternity ward, of which deliveries were 5174. Of those deliveries, 1383 delivered by C-Section [13]. The Emergency C-Section rate was 79/262 (30.2%). **Table 1** below shows demographic characteristics of the patient which included the age, residence, gravidity and parity of the patients. The highest group of patients in this study was 20-24 (25.6%). The lowest group was above the age of 35 (14.1%).Most patients came from low social economic status (89.7%) **(Table 1)** and patients in their 1st Pregnancy were the highest (43.1%) while patients in their 3rd pregnancy and above (12.2%) were the least represented. Patients with no children also dominated in this study (46.2%).

**Table 1: Showing demographic characteristics of the Patient**

| Characteristics | N=262 n(%) |
|---|---|
| **Age** | |
| <20 | 59(22.5) |
| 20-24 | 67(25.6) |
| 25-29 | 63(24.0) |
| >35 | 37(14.1) |
| **Residence** | |
| Low social economic status | 235(89.7) |
| High social economic status | 27(10.3) |
| **Gravidity** | |
| Primegravida | 113(43.1) |
| 2nd Pregnancy | 58(22.1) |
| 3rd Pregnancy | 32(12.2) |
| >4th Pregnancy | 59(22.5) |
| **Parity** | |
| No child | 121(46.2) |
| One child | 57(21.8) |
| 2-3 Children | 58(22.1) |
| >4 Children | 26(9.9) |

Emergency C-Section was done based on the following indications; maternal distress, fetal distress and Cord prolapse **(Table 2)** while Elective C-Section was done based on Cephalopelvic disproportion (CPD), Prevention from Mother to Child Transmission (PMTCT), Ante-partum Hemorrhage (APH), Pregnancy Induced Hypertension (PIH), Mal presentation, Multiple gestation, Maternal request and prolonged labor. The highest group of patients amongst those who had Emergency C-Section had fetal distress (20.6%) while the lowest group had Cord prolapse (4.6%).

**Table 2: Showing indications of Emergency C-Section and Frequencies of Elective and Emergency CS**

| | N=79 n(%) |
|---|---|
| **Indications** | |
| Fetal distress | 54(20.6) |
| Maternal distress | 13(5) |
| Cord Prolapse | 12(4.6) |
| **Proportionality** | **N=262** |
| Elective CS | 183(69.8) |
| Emergency CS | 79(30.2) |

From 262 patients, 235(89.7%) had a good fetal outcome **(Table 3)**. While 27(10.3%) had a poor fetal outcome. Mother's outcome was 100% in this study. Most of the patients (90.8%) spent between 4-6 days in the Hospital after a C-Section was done.

**Table 3: Showing the outcome of C-Section and the number of days spent in the Hospital**

| Outcome | N=262 n (%) |
|---|---|
| **Mother's outcome** | 262(100) |
| **Fetal outcome** | |
| Good outcome | 235(89.7) |
| Poor outcome | 27(10.3) |
| **Hospital stay** | |
| <3 Days | 6(2.3) |
| 4-6 Days | 238(90.8) |
| >7 Days | 18(6.9) |

Most of the decisions to send a patient for a C-Section were made by the junior doctors (60.7%) and they performed most of these procedures (50.8%). **(Table 4)**

**Table 4: Showing level of Medical Practitioner deciding for a C-Section and Performing a C-Section**

| | N=262 n(%) |
|---|---|
| **Deciding** | |
| 1st On call/GRMO | 159(60.7) |
| 2nd On call/GMO/Registrar | 101(38.5) |
| 3rd On call/SR/Consultant | 2(0.8) |
| **Performing** | |
| 1st On call/GRMO | 133(50.8) |
| 2nd On call/GMO/Registrar | 127(48.5) |
| 3rd On call/SR/Consultant | 2(0.8) |

Emergency C-Section was high in women between the age of 20 and 24 (29.1%) **(Table 5)**, It also had a high poor fetal outcome (11.4%), as compared to Elective C-Section which had a poor fetal outcome of 9.8%. Most of the women who underwent Emergency CS were in their 1st pregnancy (50.6%). None of the characteristics were significantly associated with C-section (p> 0.05). However, there may be some significance with previous C-Section (p=0.071).

**Table 5: Showing Characteristics associated with C-Section**

| Characteristics | Cesarean section | | Total N=262 n(%) | P-Value |
|---|---|---|---|---|
| | Elective CS | Emergency CS | | |
| **Age** | | | | |
| <20 | 40(21.9) | 19(24.1) | 59(22.5) | 0.659 |
| 20-24 | 44(24.0) | 23(29.1) | 67(25.6) | |
| 25-29 | 43(23.5) | 20(25.3) | 63(24.0) | |
| 30-34 | 28(15.3) | 8(10.1) | 36(13.7) | |
| >34 | 28(15.3) | 9(11.4) | 37(14.1) | |
| **Previous CS** | | | | |
| Had | 35(19.1) | 8(10.1) | 43(16.4) | 0.071 |
| Never had | 148(80.9) | 71(89.9) | 219(83.6) | |
| **Residence** | | | | |
| Low social economic status | 163(89.1) | 72(91.1) | 235(89.7) | 0.613 |
| High social economic status | 20(10.9) | 7(8.9) | 27(10.3%) | |
| **Gravidity** | | | | |
| Primegravida | 73(39.9) | 40(50.6) | 113(43.1) | 0.260 |
| 2nd Pregnancy | 46(25.1) | 12(15.2) | 58(22.1) | |
| 3rd Pregnancy | 22(12.0) | 10(12.7) | 32(12.2) | |
| >4th Pregnancy | 42(23.0) | 17(21.5) | 59(22.5) | |
| **Parity** | | | | |
| No child | 79(43.2) | 42(53.2) | 121(46.2) | 0.326 |
| One child | 45(24.6) | 12(15.2) | 57(21.8) | |
| 2-3 Children | 41(22.4) | 17(21.5) | 58(22.1) | |
| >4 Children | 18(9.8) | 8(10.1) | 26(9.9) | |
| **Fetal outcome** | | | | |
| Good outcome | 165(90.2) | 70(88.6) | 235(89.7) | 0.704 |
| Poor outcome | 18(9.8) | 9(11.4) | 27(10.3) | |
| **Hospital stay** | | | | |
| <3 Days | 4(2.2) | 2(2.5) | 6(2.3) | 0.431 |
| 4-6 Days | 164(89.6) | 74(93.7) | 238(90.8) | |
| >7 Days | 15(8.2) | 3(3.8) | 18(6.9) | |
| **Medical Practitioner performing a CS** | | | | |
| 1st On call/GRMO | 91(49.7) | 42(53.2) | 133(50.8) | 0.705 |
| 2nd On call/GMO/Registrar | 91(49.7) | 36(45.6) | 127(48.5) | |
| 3rd On call/SR/Consultant | 1(0.5) | 1(0.5) | 2(0.8) | |

## Discussion

The Emergency C-Section rate was 79/262 (30.2%) while that of Elective C-Section rate was 183/262 (69.8%). Elective C-Section rate was high at Ndola Teaching Hospital, as compared to other studies that showed Emergency C-Section rate to be higher than that of Elective C-Section[14-17]. The higher rate of Emergency C-Section in these studies might be explained by the prevalence of such factors as Cephalopelvic disproportion and prolonged obstructed labor which are diagnosed in labor.Fetal distress was the most common indication for Emergency caesarean section (20.6%); this was followed by maternal distress (5%). The least common cause was cord prolapse (4.6%). This is similar to other studies that showed fetal distress to be the most common indication for Emergency C-Section [18-19]. However, in another study [14], it was reported that shoulder dystocia was the most common indication for Emergency C-Section. Another study reported that fetal distress, previous CS in labor, non-progress of labor, and prolonged second stage of labor are the usual indications of emergency C-Section [20].Emergency C-Section had a high poor fetal outcome (11.4%) and only (9.8%) of Elective C-Section. This is similar to a study that was done in Rabat, Morocco [19] which reported that more than 90% of fetal complications were contributed by the Emergency C-Section group. Other studies also gave similar results that showed that Emergency C-Section was the major contributor of fetal complications [18, 24]. In the present study, fetal complications were due to respiratory morbidity, birth asphyxia, prematurity and meconium aspiration syndrome. Other studies have reported similar findings [25-27]. This poor outcome may also be explained by late recognition and late referral of mothers who are likely to undergo cesarean section.

### Study limitations

The study biases encountered might have arisen due to the luck of complete diagnoses in the patients' files. Hence, the rate of Emergency C-section might have been underestimated. Missing data in records might have lowered the statistical power of the study.

## Conclusion

The Emergency C-Section rate was low in this study. Indications of Emergency C-Section include fetal distress, maternal distress and Cord prolapse.Emergency cesarean sections showed more fetal complications than elective cesarean sections. Documentation of all cases with their complete diagnosis for completeness of data should be improved to avoid missing information. The high incidence of poor fetal outcome in emergency caesarean section found emerges from insufficient prenatal care and delay in the referring of the patients to theatre. Therefore, early recognition through good intra-partum monitoring by the use of apartogram and early referral of mothers who are likely to undergo cesarean section may reduce the incidence of poor fetal outcome in emergency caesarean sections and thus decrease its complications.

## Acknowledgment

Heartfelt and sincere gratitude goes to the management and staff of Ndola Teaching Hospital for their support and permission to undertake the study. I thank Dr. Kwangu Mwenya for his support during the preparation of the proposal and the clients whose details made the study a reality. Lastly but certainly not the list, I would like to thank God for his guidance and my family especially Mr. and Mrs. Hebert Sichundu for their tireless support.

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**Conflict of Interest: None**
**Source of support:The Ministry of Education through the students Bursaries Committee**