**Napata College**
**Faculty of Medicine**


# *Proportion and Indications of Emergency Cesarean Sections at Khartoum Bahri teaching Hospital, 2021*

*Research Report Submitted in Partial Fulfillment for the Requirements of the MBBS Degree*

**Done by**

Dar Elnaeem Mustafa Altayeb Mohamed

Donia Nabawy Abd ElAleem Qwaider

Mai Mohammed Adam Abdullah

**Supervisor**

**Dr. Mawahib**

2022

**DEDICATION**

*To our families …*

*Who encouraged us at all stages of my life …*

*For their unlimited support …*

.

## ACKNOWLEDGEMENT

We would like to express our sincere gratitude and thankfulness to our supervisor, for her guidance, meticulous supervision, revising and discussing all aspects of this study. Our supervisor's valuable advices and comments are highly appreciated.

Our great thanks also extend to all who contributed in a way or another for the success of this study.

# TABLE OF CONTENTS

# LIST OF TABLES

# LIST OF FIGURE

# ABBREVIATIONS

| | |
|---|---|
| AMIs | Absolute Maternal Indications |
| CS | Cesarean section |
| CTG | Cardiotocography |
| HIV | Human immunodeficiency virus |
| SPSS | Statistical Package For Social Sciences |
| WHO | World Health Organization |

# ABSTRACT

**Background** Caesarian section is considered as a safer alternative to prolonged and difficult vaginal operative delivery and reduces maternal and perinatal morbidity and mortality. As a procedure it has related complication, whenever the decision made it should be evidence based.

**Objective** To estimate the proportion and Indication of Emergency Cesarean Section at Khartoum Bahri teaching Hospital, 2021

**Methods** Retrospective descriptive study was conducted in statistical unit of Khartoum Bahri teaching hospital from June to December 2021 covering caesarian section patients' records with in the years 2021. Data was collected, entered, presented using SPSS version 25.0.

**Results** This study covered 130 patients' records (women who had emergency caesarian sections). Most of them 101 (77.7%) were 18 / 39 years in age. The majority 103 (79.2%) were from urban residential areas, more than half of them were educated until secondary level of above, nearly half of them were housewives 64 (49.2%). More than third of them 48 (36.9%) were multiparous. Some of them had comorbidities such as hypertension 14 (6.9%). The majority of them were full term. The most common indications for emergency caesarian sections were abnormal presentation 47 (36.2%), pre-eclampsia 16 (12.3%), placenta Previa 15 (11.5%) and tubal ligation among only 10 (7.7%). Intraoperative complications were reported among 11 (8.5%) of them such as bladder injury 7 (5.4%) and bowel injury 1 (0.8%). Only 18 (13.8%) received blood transfusion, with no reactions. Most of the mothers were admitted to the general word after the caesarian section with no maternal death. In regards to the foetal outcome, the study found that 121 (93.1%) were delivered alive babies, 9 (6.6%) dead, 4 (3.1%) admitted for nursery.

**Conclusion:** the proportion of c/s was 18% and The majority of deliveries with no but the common complication are Anesthetic complications, Bladder injury, Bowel injury, Wound infection and Hematoma, we recommend Measures such as trial of labor in primigravidae and increase the rate of instrumental delivery have to take to reduce this high rate of cesarean delivery in Sudan hospitals

نبذة مختصرة

**المقدمه** تعتبر العملية القيصرية بديلاً أكثر أمانًا عن الولادة القيصرية الطويلة والصعبة (الولادة الجراحية المهبلية) وتقليل المراضة والوفيات النفاسية والفترة المحيطة بالولادة. كما ان الإجراء له تعقيدات ذات صلة .

**الهدف** لتقدير نسبة الولادة القيصرية في حالات الطوارئ في مستشفى الخرطوم بحري التعليمي ، 2021

**الطرق:** أجريت الدراسة الوصفية بأثر رجعي في الوحدة الإحصائية بالخرطوم مستشفى بحري التعليمي من يونيو إلى ديسمبر 2021 يغطي سجلات مرضى العمليات القيصرية في عام 2021. تم جمع البيانات وإدخالها وتقديمها باستخدام الإصدار 25.0 من SPSS.

**النتائج:** غطت هذه الدراسة سجلات 130 مريضًا (نساء خضعن لعملية قيصرية طارئه معظمهم 101 (77.7٪) كانوا 39/18 سنة. الأغلبية 103 (79.2٪) كانوا من المناطق السكنية الحضرية ، تلقى أكثر من نصفهم تعليمهم حتى المستوى الثانوي ما يقرب من نصفهن كن ربات بيوت 64 (49.2٪). كان لدى بعضهم أمراض مصاحبة مثل ارتفاع ضغط الدم 14 (6.9٪). أكثر المؤشرات شيوعًا للولادة القيصرية الطارئة كانت عرضًا غير طبيعي 47 (36.2٪) ، تسمم الحمل 16 (12.3٪) ، المشيمة المنزاحة 15 (11.5٪) وربط البوق بين 10 فقط (7.7٪). كانت المضاعفات أثناء الجراحة ذكرت بين 11 (8.5٪) منهم مثل إصابة المثانة 7 (5.4٪) وإصابة الأمعاء 1 (0.8٪).18 فقط (13.8٪) تلقوا نقل الدم دون أي ردود فعل. في ما يخص نتيجة الجنين ، وجدت الدراسة أن 121 (93.1٪) ولدوا أحياء ، 9 (6.6٪) ميت ، 4 (3.1٪) مقبولين للحضانة.

**الخلاصة:** كانت نسبة الولادة القيصرية الطارئه 18٪ وكانت غالبية الولادات مع عدم وجود سوى المضاعفات الشائعة هي مضاعفات التخدير ، إصابة المثانة ، إصابة الأمعاء ، الجرح العدوى والورم الدموي ، نوصي باتخاذ تدابير مثل تجربة المخاض في بريجرافيداي و يجب زيادة معدل الولادة بالأدوات لتقليل هذا المعدل المرتفع للولادة القيصرية لولادة في مستشفيات السودان

# Chapter I

## Introduction

# 1. INTRODUCTION

## 1.1 Background

Cesarean section refers to the delivery of a fetus, placenta and membrane through the abdominal and uterine incision after 28 weeks of gestation [1], Emergency cesarean section is a type of surgical procedure which is performed when there is an immediate threat to the life of the fetus or mother during delivery Introduction Cesarean delivery has played a major role in lowering both maternal and perinatal morbidity and mortality rates.

The WHO considers CS rates of 5–15% to be the optimal range for the targeted provision of this life saving intervention for mother and infant. [2]

Lower rates suggest the unmet need, while higher rates suggest an improper selection. However, access to safe CS in resource limited settings is much lower, estimated at 1–2% reported in sub-Saharan Africa. [3]

In the 1990s, it was about 12-13 %, and in 2011 it was 17% worldwide [4]. The increase in the amount of cesarean deliveries can partly be explained with increased use of technical, medical equipment. During the labour, it is now easier to discover risks concerning the mother and the baby earlier. The increase can also be explained with increasing age among mothers, maternal request, that more woman have had previous cesarean section, and because it has become more common with multiple babies. [4]

The indications for cesarean sections are usually maternal, fetal, physician related factors or a mixture of the three. The overall CS rates have increased progressively over many parts of the world. CS is a major surgical procedure with possibly serious consequences and should be performed in the presence of specific and clearly defined indications. [5].

Infection, thromboembolic disorders are the most common causes of morbidity and mortality among women who undergo CS. [5]. Approximately, 10% of deliveries are considered as high risk, some of which may require CS. Its prevalence ranges from 4% in Africa to 29% in Latin America and the Caribbean. In recent years the rate has risen to a record level of 46% in China and 25% or above in many Asian and European countries, Latin America and USA.5-7 Definite indications of CS are cephalopelvic disproportion, a major degree of placenta Previa and higher order multiple pregnancy. [6]

In 2012, about 23 million C-sections were done globally. The international healthcare community has previously considered the rate of 10% and 15% to be ideal for caesarean sections. Some evidence finds a higher rate of 19% may result in better outcomes. More than 45 countries globally have C-section rates less than 7.5%, while more than 50 have rates greater than 27%.

Efforts are being made to both improve access to and reduce the use of C-section. [7] The surgery has been performed at least as far back as 715 BC following the death of the mother, with the baby occasionally surviving. Descriptions of mothers surviving date back to 1500. With the introduction of antiseptics and anesthetics in the 19th century, survival of both the mother and baby became common. [7] The possible indications are a breech presentation, moderate to severe pre-eclampsia, a maternal condition that warrants the exclusion of maternal effort, diabetes mellitus, intrauterine growth restriction, antepartum hemorrhage and certain fetal abnormalities. Knowing the rate and indication of CS in Kurdistan will help to have an overview of this type of obstetrical procedure and to plan for the high level of care management. [8]

## 1.2 Problem Statement

In 1985, the World Health Organization stated: “There is no justification for any region to have CS rates higher than 10-15%”. Two decades later, however, the optimal rate of births by CS remains controversial and currently more cesarean sections are performed in both developed and developing countries and has been increasing remarkably than the world seem to be justified by established risk factors alone.

Emergency cesarean section carry different risks compared with scheduled cesareans, including increase chance of sever hemorrhage, complications from rabidly administered anesthesia, and an accidental injury to mother or the baby.

## 1.3 Justification

Emergency C-section is associated with increased perinatal morbidity and mortality; rates of caesarean section are rising. Take timely intervention can reduce perinatal morbidity and mortality. We need to conduct this study to figure out the proportion and evaluate the decision making process

## 1.4 Objectives

### 1.4.1 General objective

To estimate the proportion and indications of Emergency Cesarean Sections at Khartoum Bahri teaching Hospital, 2021

### 1.4.2 Specific objectives

1. To calculate the proportion of emergency cesarean section at Khartoum Bahri teaching Hospital, 2021
2. To identify the indications of emergency cesarean section at Khartoum Bahri teaching Hospital, 2021
3. To identify the outcomes of the procedure at Khartoum Bahri teaching Hospital, 2021

# Chapter II

## Literature Review

# 2. LITERATURE REVIEW

## 2.1 Indications of caesarian section

### 2.1.1 Maternal indications

**Prolonged/Obstructed labor**: Prolonged labor is when the duration of the labor exceeds 24 hours, This may be due to a prolonged latent phase, more than 20 hours in a prim gravid a or more than 14 hours in a multipara, or due to delayed or lacking cervical dilatation in the active phase of labor and protracted descent of the fetus [9].

**Previous cesarean delivery:** The risk of complications in the mother rises with increasing number of cesarean deliveries, especially the risk of placenta accrete, Although previous cesarean is not a condition that qualifies for repeat CS, it is normal practice to do it again. Previous CS increases the risk of placenta previa and uterine rupture. [9].

**Pelvic anatomy:** The pelvis consists of three bones that comes together and form the birth canal. The inner diameters of the birth canal and how these correlate with the head of the fetus is important in terms of weather a vaginal birth is possible [4].

**PIH- pregnancy induced hypertension**

Pregnancy induced hypertension is hypertension after 20 weeks of gestation without proteinuria that regress within 12 weeks postpartum. [4].

**Infection**

Many infections and diseases in the mother can affect the neonatal child. Infections lead to an increased risk of spontaneous abortion, preterm birth, intrauterine growth restriction and infection of the fetus.

We have chosen to focus on HIV and Herpes genitals since these where the diseases present in our material, In a mother with HIV infection, contamination to the fetus can happen throughout the pregnancy, but is most common during birth, Modern treatment reduces the risk of contamination to about two percent. [9]

**Placenta praevia and abruptio placenta**

In placenta praevia the placenta is situated partly over the exit for the fetus, This can lead to a severe bleeding with an extensive blood loss for both mother and child. The typical symptom of placenta praevia is a sudden bleeding without pain or contractions. [9]

### 2.1.2 Fetal indication

**Fetal distress:** The fetus reacts to the onset of asphyxia. This can lead to a series of responses , The most common reaction in the fetus is changes in fetal heart rate patterns with late deceleration, variable deceleration or prolonged bradycardia, Fetal distress is monitored by surveying the heart rate using a Pinard horn or CTG. In the hospital they used a Pinard horn. If hypoxia occurs during birth the fetal heart rate will fall below 100. [4].

**Cord prolapse:** happens in 0.5 % of all births. If one continue towards vaginal birth it must happen within minutes. If that is not possible an emergency section should be done. [4].

**Presentation of the baby:**

**Breech presentation:** The incidence of breech presentation decreases with increased gestational age, the prevalence of babies in breech position is 3-4% at term. Early in the pregnancy many babies are breech, but most turn before birth. If the baby has not turned, it is possible to try an external cephalic version. Some

studies show fewer complications for the baby with planned cesarean. [4] **Transverse presentation:** Transverse lie is present in about 2 out of 1000 births. The fetus can be in complete or partly transverse lie. This condition is more usual in multiparous women and in multiple baby pregnancies. [4], The condition usually passes as the birth start with the baby turning its head down due to contractions.

## 2.2 Complications of Cesarean Operation

### Hemorrhage

Hemorrhage is the most frequent complication of the cesarean section during or after the surgical event. However, there is no consensus on the actual incidence, worldwide; it is estimated that around 75% of obstetric hemorrhages occur in cesarean section. In developing countries, obstetric hemorrhage alternates the first and second position with preeclampsia as a cause of maternal death, and the World Health Organization accepts a rate of 10% worldwide in all births with live fetus [3]

### Urological injuries

Often the cesarean section involves careful dissections to reject the bladder, so that it can sometimes be injured. It is the most common lesion in urinary organs, although sometimes the ureter can be damaged by causing obstruction by ligature or angulation and partial or complete section. Bladder injury can occur when the peritoneum is opened if care is not taken to empty it adequately through a catheter or in cases of previous surgeries that firmly attach the bladder to the anterior side of the uterus where it is also common to find a large engorgement of the venous plexus that easily breaks, complicating the dissection by the hemorrhage provoked. When tears of the hysterotomy occur, they can be prolonged to the bladder damaging it.

## Anesthetic complications

They are very rare but when they occur, they are accompanied by high morbidity, becoming lethal. In regional anesthesia, the most frequent are hypotension caused by sympathetic nerve block aggravated by aorto-cava compression that produces the pregnant uterus in the supine position, and it is solved with intravenous fluids prior to the event, with change of position to lateral decubitus and the use of ephedrine that has a vasoconstrictor effect without affecting the placental flow. Another complication is headache by puncture of the arachnoid hard membranes that cause an escape of cerebrospinal fluid with loss of cushioning effect. It is solved with the application of a blood patch in the epidural space.

## Infection

The infection in most of the times is the result of a reciprocal action between the defenses of the host and the virulence of the germs, nevertheless in obstetrics unlike the other specialties, the immune state acts only in rare occasions as a factor of important selection. The increase in the number of leukocytes that occurs in pregnancy is maximum at the end of it, increasing the defenses and also has a higher bactericidal activity than in the non-pregnant women. Most patients become infected with their own microflora, which depends on factors such as duration of labor, time of rupture of the chorioamniotic membranes, multiple vaginal examinations, nutritional status of the patient, deficient aseptic techniques and surgical time. Infection during cesarean section is one of the most frequent complications, and the main reason for hospital re-admission, which consequently increasing costs [3–4].

## Thromboembolisms

Thromboembolisms are more frequent in the cesarean section than in the vaginal delivery and are favored by the triad relatively common to the gestational term of

venous stasis, hypercoagulability and endothelial injury. Symptoms at the site of thrombus formation are usually minimal or absent until detached and manifest as a pulmonary or pelvic embolism. The diagnosis is usually made by exclusion in those patients who have insidious fever accompanied by tachycardia and an inadequate response to treatment with antibiotics most of the time already established. In the cases of pulmonary thromboembolism, the picture manifests suddenly with tachypnea, dyspnea, general malaise, severe chest pain and hemoptysis, and in severe forms, it progresses to the state of shock with a high percentage of mortality

**2.3 Previous studies**

The 2004-2008 WHO Global Survey on Maternal and Perinatal Health state that Cesarean section without medical indications is associated with an increased risk of adverse short-term maternal outcomes. This was a multi country, facility-based survey, it included a sample of 24 countries and health institutions worldwide. Data collection took place during 2004 and 2005 in Africa, during 2007 in America and 2008 in Asia. A total of 286,565 deliveries were analyzed. The overall cesarean section rate was 25.7%. A total of 1 % of all deliveries were cesarean sections without medical indications, either due to maternal request or for unknown reasons.

Compared to spontaneous vaginal delivery, all other modes of delivery including antepartum CS without medical indications request or in the absence of other recorded indications, presented an association with increased risk of death, admission to ICU, blood transfusion and hysterectomy. This association is stronger in Africa, compared to Asia and Latin America. Cesarean sections were also associated with an intrinsic risk of increased severe maternal outcomes. The survey concluded that cesarean section should be performed when a clear benefit is anticipated, a benefit that might compensate for the higher costs and additional risks associated with this operation [4]

**In Norway** Previous study were done on Norway the Researchers have shown that some immigrant groups have an increased risk of emergency cesarean section. The authors' aim was to examine the differences in emergency cesarean section rates among immigrant women in Norway with low obstetric risks by using the Robson classification system.

They performed secondary analysis on a Norwegian cohort study, where 10,125 women were classified in Robson groups one and three. Women from East, Southeast, and Central Asia, and from Africa had a higher risk of emergency cesarean section. The Robson classification system was a useful tool in comparing cesarean section rates between immigrant groups and host country populations. [10]

**In India** a previous study were done on India on planned or emergency C-section in 1003 pregnant women at term with previous one CS and outcome of both neonatal and maternal were noted. Emergency CS done in failed VBAC women were excluded from the study. [9] Planned CS before onset of labor were done in 22.93% and emergency CS in 77.07% in the present study. Scar tenderness (20.18%), fetal distress (16.04%) and cephalo-pelvic disproportion (15.52%) were major indications for emergency CS. Maternal complications in the emergency CS group were pyrexia (P=0.000) and blood transfusion, required in 1.81% (P=0.000).

There were two maternal death and hysterectomy required in 0.38% in the emergency CS compared to 1.30% in the planned CS (P=0.274). Neonatal complications were significant (P=0.018) in the emergency CS group. Common complications were jaundice (2.84% versus 1.73%, P=0.489), sepsis (0.25% versus 0.86%, P=0.487) and early neonatal death (2.97% versus 0.86%, P=0.119) in emergency CS compared to planned CS. Neonatal morbidity and mortality were significant in the emergency CS, compared to planned CS. Pyrexia and blood transfusion were significant maternal morbidity in the emergency CS group.

**In Tanzania** another study aimed to investigate indications used for CS in St. Joseph Medical Hospital in Moshi, Tanzania. The study involves a review of the hospital records of women who previously had undergone CS in the period 2009-2011. All together 212 CS were reviewed. The prevalence of CS at St. Joseph Medical Hospital was 18%. The most common indication overall for CS was prolonged or obstructed labour, it counted for 30 %.
The indications were different for nulliparous and multiparous women, the most common indication among nulliparous was prolonged or obstructed labour, and the most common indication for multiparous women was previous CS. Malpresentation of the baby (20%), and fetal distress (11%), were also commonly used as indications. Similar studies have been, or are being, conducted in other countries worldwide. Thus, the results will not only elucidate possible indications for cesarean section in the Moshi region, but also contribute to an overall comparison of indications for cesarean section in these countries, Comparison of international differences in indications for cesarean section is of importance to explain the increased prevalence of the procedure. [11]

**In Sudan** A stratified, multistage, household survey was conducted in Kassala, eastern Sudan from December 2014 to March 2015under the title Epidemiology of Cesarean Delivery in Kassala, Eastern Sudan: A community-based study 2014-2015 ,Three hundred and three women had complete data and analyzed in the results. Their Results was as follow: Out of 303 women, 87 (28.7%), 100 (33%), 116 (38.3) were prim parous, multiparous, respectively, Mothers' ages ranged from 13 to 48 with mean (SD) 27.79 (5.94) years. In logistic regression, elder women (OR=1.1, 95 CI= 1.01-1.34, p = 0.005), primparae (OR= 6.4, 95% CI = 1.3-31.8, p = 0.001) and women who had medical disease (OR= 2.9,

95% CI= 1.16-7.6, p= 0.023) were at higher risk to deliver by caesarean delivery. [12]

Another study at **Khartoum** December 2011 under title of An Epidemic of Cesarean Deliveries at Khartoum Hospital in Sudan with Over Two-Fifths of Neonates Delivered through the Abdomen by using A cross-sectional hospitalbased study and their Results was as follow: There were 2128 singleton deliveries, of which 1209 (56.8%), 513 (24.1%), and 406 (19.1%) were vaginal, elective, and emergency cesarean deliveries, respectively.
The rate of cesarean delivery was 43.2% (919/2128). The indications for cesarean delivery were repeated previous cesareans (371, 40.4%), failure to progress (113, 12.3%), Breech presentation (77, 8.4%), hypertensive disorders (75, 8.2%), post term (34, 3.7%), antepartum hemorrhage (32, 3.5%), fetal conditions (32, 3.5%), diabetes mellitus (10, 1.1%), and combined/other indications (175, 19.0%). In logistic regression, while age, parity, education, inter-pregnancy interval, and antenatal care were not associated with cesarean delivery, obesity was a predictor for both elective cesarean (odds ratio [OR] =3.9, 95% confidence interval [CI] =1.6─9.4; P=0.003) and emergency cesarean (OR=4.5, 95% CI=1.5─13.0; P=0.005). Conclusions: Measures such as trial of labor in primigravidae and increase the rate of instrumental delivery have to take to reduce this high rate of cesarean delivery in this hospital. [13]

**In Bangladesh**, Tahmina Begum et al addressed the indications and determinants of caesarean section delivery. In this study, facility delivery rate was 84% and population based C-section rate was 35% of all deliveries in icddr,b service area. Of all C-sections, only 1.4% was conducted for Absolute Maternal Indications (AMIs). Major indications of C-sections included: repeat C-section (24%), foetal distress (21%), prolonged labour (16%), oligohydramnios (14%) and post-maturity (13%).

More than 80% C-sections were performed in for-profit private facilities. Probability of C-section delivery increased with improved socio-economic status, higher education, lower birth order, higher age, and with more number of Antenatal Care use and presence of bad obstetric history. Eight maternal deaths occurred, of which five were delivered by C-section. They concluded that c-section rate in this area was much higher than national average as well as global recommendations. Very few of C-sections were undertaken for AMIs. Routine monitoring of clinical indication of C-section in public and private facilities is needed to ensure rational use of the procedure [14].

In **Switzerland**, Ana P Betrán et al addressed the rates of caesarean section. They reported that 15% of births worldwide occur by CS. Latin America and the Caribbean show the highest rate (29.2%), and Africa shows the lowest (3.5%). In developed countries, the proportion of caesarean births is 21.1% whereas in least developed countries only 2% of deliveries are by CS. The analysis suggests a strong inverse association between CS rates and maternal, infant and neonatal mortality in countries with high mortality levels. There is some suggestion of a direct positive association at lower levels of mortality. CS levels may respond primarily to economic determinants [15].

Dumont et al studied the caesarean section rate for maternal indication in sub-Saharan **Africa**. They reported that three-quarters of women from hospitals of sub-Saharan Africa were delivered by caesarean section for maternal reasons. Such intervention was needed for six main reasons, protracted labour, abruptio placentae, previous caesarean section, eclampsia, placenta praevia, and malpresentation. Although the observed rate of caesarean section in west African women is 1.3%, our results, combined with those of published work suggest a range of 3.6-6.5% (median, 5.4%) [16].

In **Uruguay**, Fernando Althabe et al assessed the cesarean section rates and maternal and neonatal mortality in low-, medium-, and high-income countries. They found that median cesarean section rates were lower in low-income than in medium- and high-income countries. Seventy-six percent of the low-income countries, 16 percent of the medium-income countries, and 3 percent of high-income countries showed cesarean section rates between 0 and 10 percent. Three percent of low-income countries, 36 percent of medium-income countries, and 31 percent of high-income countries showed cesarean section rates above 20 percent. In low-income countries, a negative and statistically significant linear correlation was observed between cesarean section rates and neonatal mortality and between cesarean section rates and maternal mortality. No association was observed in medium- and high-income countries for either neonatal mortality or maternal mortality. They concluded that no association between cesarean section rates and maternal or neonatal mortality was shown in medium- and high-income countries. Thus, it becomes relevant for future good-quality research to assess the effect of the high figures of cesarean section rates on maternal and neonatal morbidity [17].

**Festin et al** assessed the caesarean section in four South East **Asian countries**: reasons for, rates, associated care practices and health outcomes. They found that Overall 27% of women had a caesarean section, with rates varying from 19% to 35% between countries and 12% to 39% between hospitals within countries. The most common indications for caesarean were previous caesarean (7.0%), cephalopelvic disproportion (6.3%), malpresentation (4.7%) and fetal distress (3.3%). Neonatal resuscitation rates ranged from 7% to 60% between countries. Prophylactic antibiotics were almost universally given but variations in timing occurred between countries and between hospitals within countries. They concluded that rates and

reasons for caesarean section and associated clinical care practices and health outcomes varied widely between the four South East Asian countries [18].

# Chapter III

## Materials and Methods

# 3. MATERIALS AND METHODS

## 3.1 Study design

It is a Retrospective descriptive cross sectional facility based study.

## 3.2 Study area

Khartoum Bahri teaching hospital, Khartoum Bahri teaching hospital was establish at 1950 without specialties, then the specialties were expand by establishing complex of operations , store ,and kitchen at 1980,then the hospital established the new emergency at 1995 and special wards at 1997 with 12 bed and about 6 staff work in Obs department

## 3.3 Study period

The study was conducted from June to December 2021 covering patients'

## 3.4 Study 3.4 population

All women who delivered at Khartoum north teaching hospital within 2021and prepared to delivery with Cesarean Sections

### 3.4.1 Inclusion criteria

Any women who delivered at Khartoum north teaching hospital

### 3.4.2Exclusion criteria

- Any incomplete information regarding the study variable

## 3.5 Sampling (size and method)

The size of the study was determined through the follow: [19]

$$\mathbf{N = (Z^2 \times (p \times q))/e^2}$$

- N;
- n: sample size required by the study

- Z: the determined area under the normal curve by the desired confidence interval (CI: 95%)
- P: the proportion of the main attribute of the study (the expected frequency of caesarian section in Sudan (8.1%) [20]).

Then, P = 0.081

- q=1-p = 1 – 0.081= 0.919
- e=the desired precision (e=0.05)

$$\mathbf{n} = \frac{(\mathbf{1.96})\times(\mathbf{1.96})\times(\mathbf{0.081})\times(\mathbf{0.919})}{(\mathbf{0.05})\times(\mathbf{0.05})} = 114.5 \text{ or } 115 \text{ study participants}$$

The sample was increased to additional 10 % to consider the possible missing data from the patients' records. So, the final number of participant records covered was 130 participants.

### 3.6 Data collection tools and methods

Data was collected by using a form which filled from patients' records

### 3.7 Study variables

- **Dependent** proportion and indications of Emergency Cesarean Sections
- **Independent variables:** Age, residence, post-operative complications, indication, parity, chronic illness, gestational age and education level

### 3.8 Data analysis

- Data was entered, cleaned, and analyzed using SPSS 25.0
- Descriptive statistics in term of frequency tables with percentages and graphs. Means and standard deviations were presented with relevant graphic representation for quantitative data.

- Bi-variable analysis to determine the associations between the outcome variables and the other relevant influencing factors with Chi square test (for categorical variables) and t-test for (quantitative variables) statistical tests.

### 3.9 Ethical consideration

- Approval from Napata College, Khartoum state, Ministry of Health, Research department and from Bahri teaching Hospital.
- Participant has right to no harm (privacy and confidentiality by using coded questionnaire).
- Questionnaire Sample will not be reused for other study.

# Chapter IV

## Results

## RESULTS

Our result there were 2128 singleton deliveries through 2021, of which 1205 (56.8%), 511 (24.1%), and 404 (18%) were vaginal, elective, and emergency cesarean deliveries, respectively as in figure 4.1.

This study covered 130 patients' records (women who had emergency caesarian sections). Most of them 101 (77.7%) were 18 - 39 years in age. The majority 103 (79.2%) were from urban residential areas, more than half of them were educated until secondary level of above, nearly half of them were housewives 64 (49.2%) as detailed in tables 1 – 4.

More than third of them 48 (36.9%) were multiparous. Some of them had comorbidities such as hypertension 14 (6.9%). The majority of them were full term as detailed in tables 5 – 7.

The most common indications for emergency caesarian sections were abnormal presentation 47 (36.2%), pre-eclampsia 16 (12.3%), placenta Previa 15 (11.5%) and tubal ligation among only 10 (7.7%) as showed in table 8.

Intraoperative complications were reported among 11 (8.5%) of them such as bladder injury 7 (5.4%) and bowel injury 1 (0.8%) as in table 9.

Only 18 (13.8%) received blood transfusion, with no reactions as detailed in tables 10 – 11.

Most of the mothers were admitted to the general word after the caesarian section with no maternal death as in tables 12 - 13.

In regards to the foetal outcome, the study found that 121 (93.1%) were delivered alive babies, 9 (6.6%) dead, 4 (3.1%) admitted for nursery as showed in table 14.

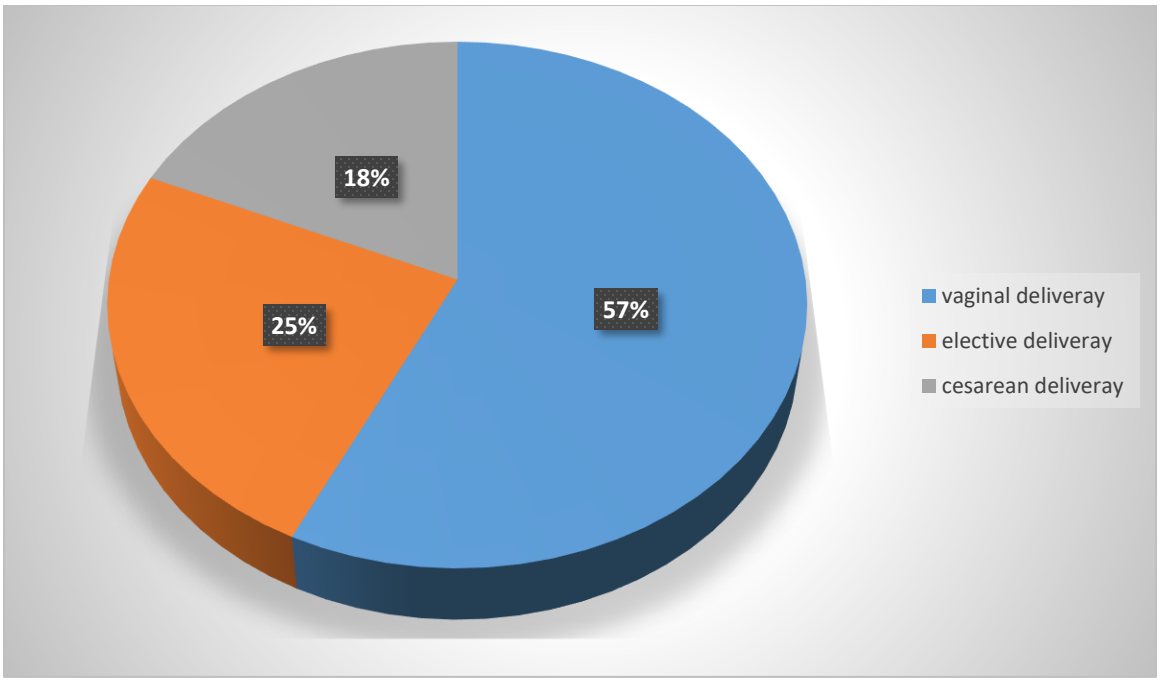


Figure (4.1) portion of emergency cesarean deliveries

## DEMOGRAPHICAL CHARACTERISTICS

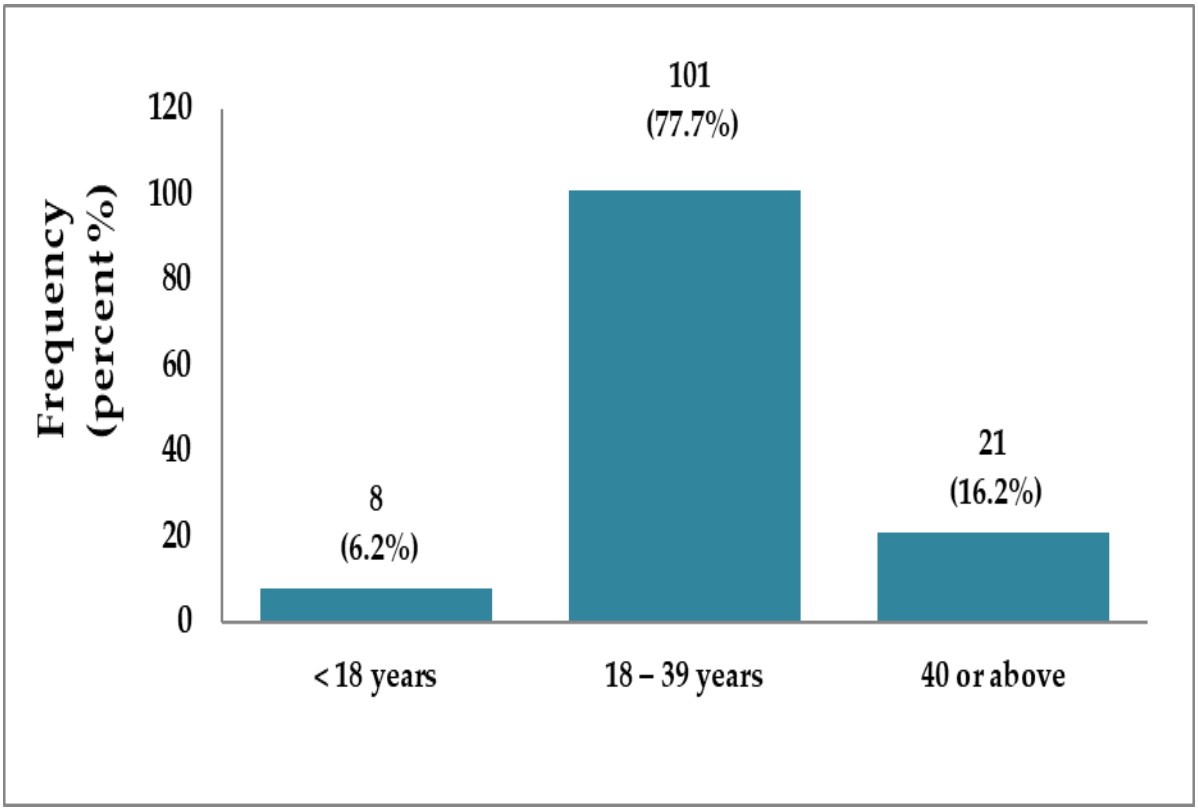


Figure (4.1) the distribution of the participants according to their age – years (n = 130 women underwent for emergency caesarian section)

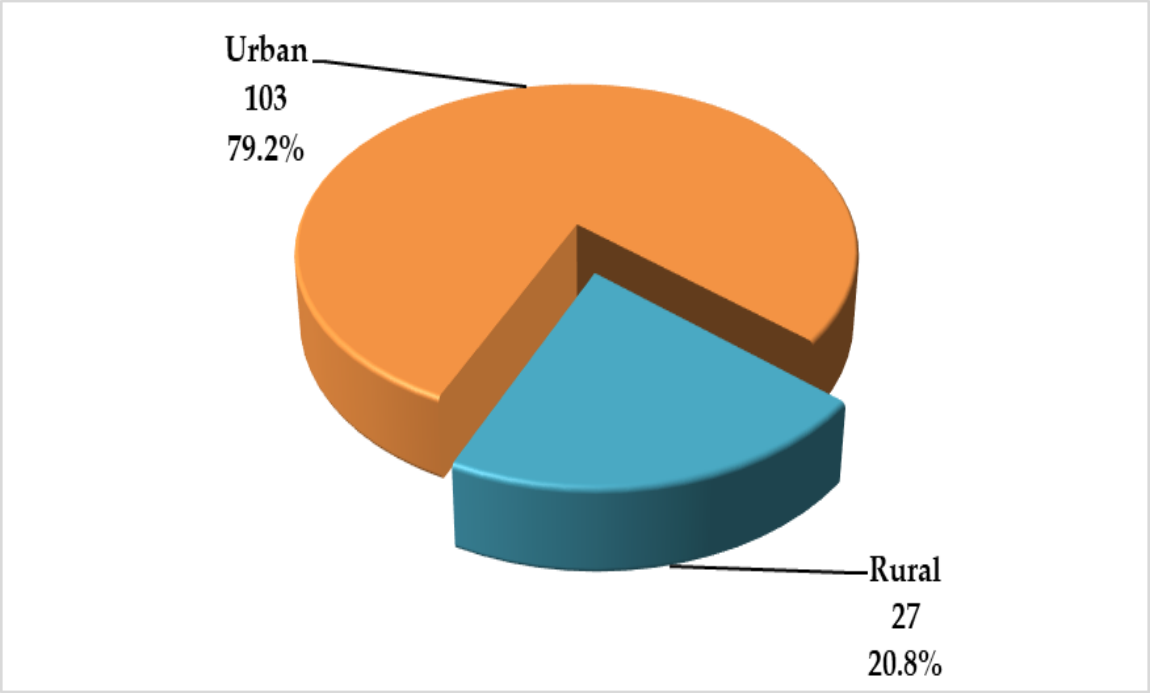


Figure (4.2) the distribution of the participants according to their residence (n = 130 women underwent for emergency caesarian section)

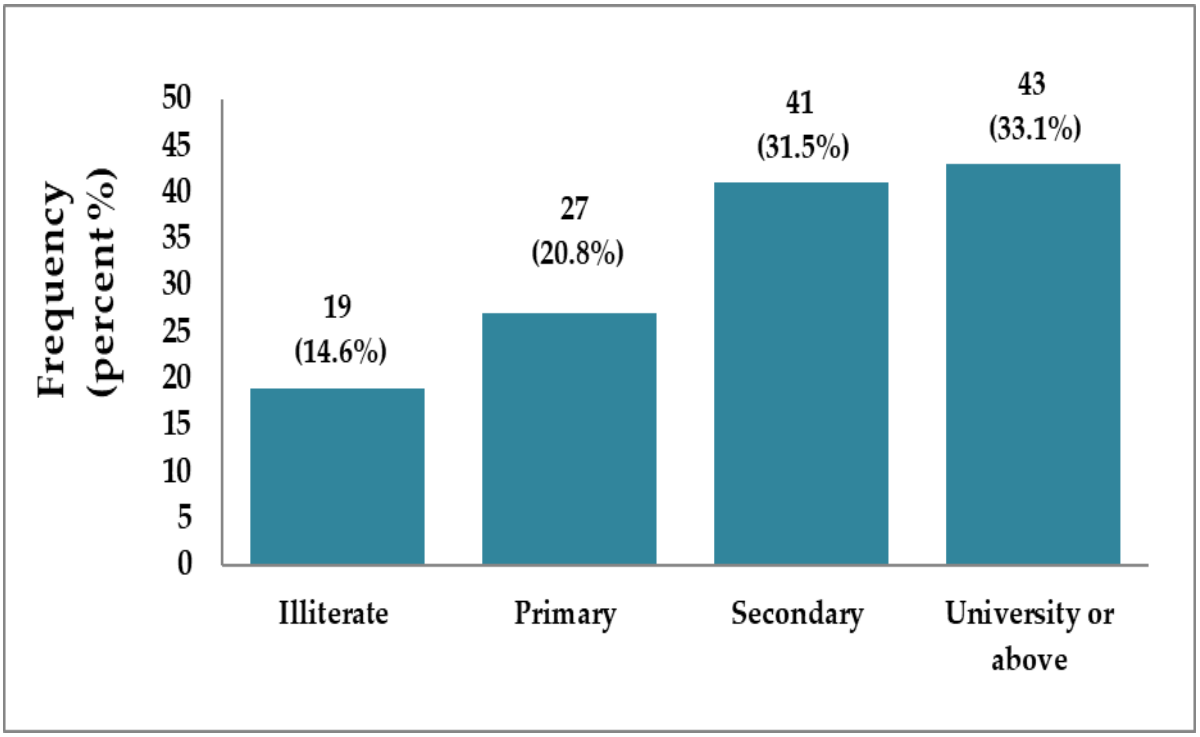


Figure (4.3) the distribution of the participants according to their education (n = 130 women underwent for emergency caesarian section)

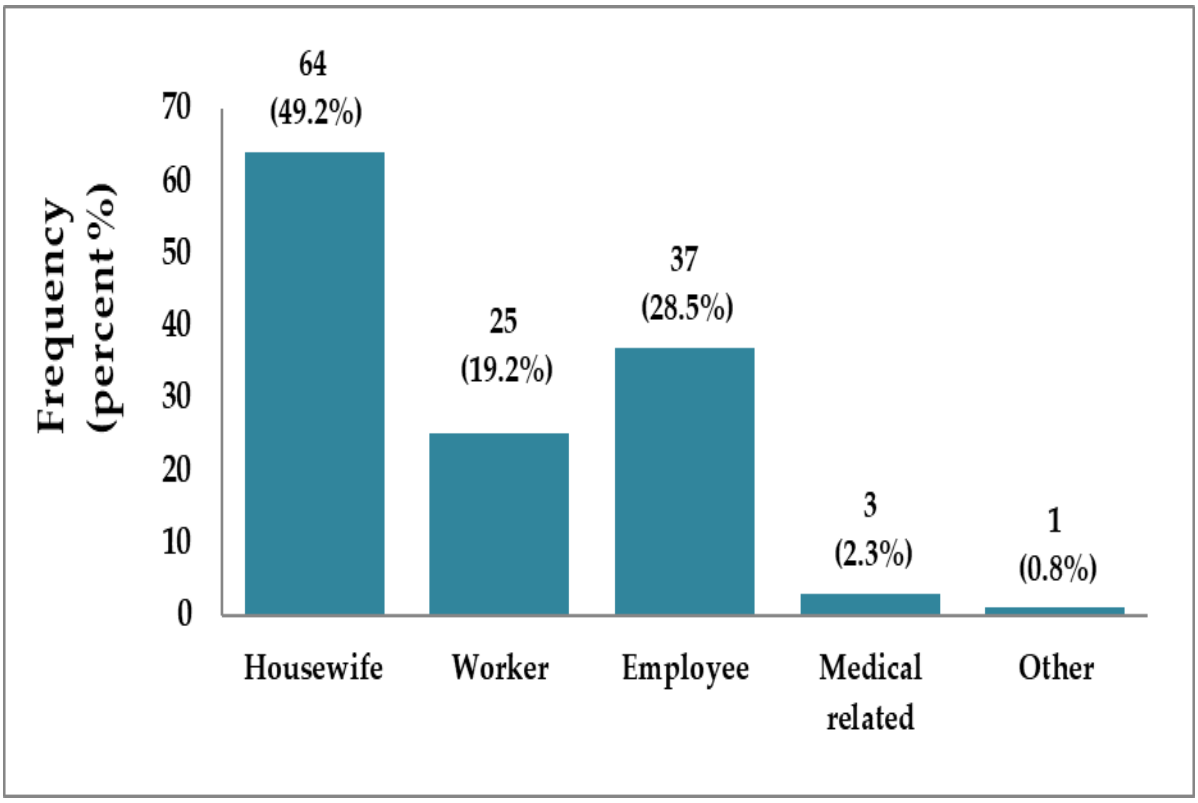


Figure (4.4) the distribution of the participants according to their residence (n = 130 women underwent for emergency caesarian section)

## CLINICAL CHARACTERISTICS

Table (4.1) the distribution of the participants according to their parity (n = 130 women underwent for emergency caesarian section)

| Parity | Frequency | Percent (%) |
|---|---|---|
| **Nulliparous** | 31 | 23.8 |
| **Primiparous** | 39 | 30.0 |
| **Multiparous** | 48 | 36.9 |
| **Grand multiparous** | 12 | 9.2 |
| **Total** | **130** | **100.0** |

Table (4.2) the distribution of the participants according to their chronic illness (n = 130 women underwent for emergency caesarian section)

| **Chronic illness** | **Frequency** | **Percent (%)** |
|---|---|---|
| **Hypertension** | 14 | 10.8 |
| **Diabetes mellitus** | 9 | 6.9 |
| **Asthma** | 6 | 4.6 |
| **Other** | 4 | 3.1 |
| **None** | 97 | 74.6 |
| **Total** | **130** | **100.0** |

Table (4.3) the distribution of the participants according to their gestational age (n = 130 women underwent for emergency caesarian section)

| **Gestational age** | **Frequency** | **Percent (%)** |
|---|---|---|
| **< 37 weeks** | 11 | 8.5 |
| **37 - 42 weeks** | 101 | 77.7 |
| **> 42 weeks** | 18 | 13.8 |
| **Total** | **130** | **100.0** |

Table (4.4) the distribution of the participants according to their indications for CS (n = 130 women underwent for emergency caesarian section)

| Indications | Frequency | Percent (%) |
|---|---|---|
| **Abnormal presentation** | 47 | 36.2 |
| **Pre-eclampsia** | 16 | 12.3 |
| **Placenta Previa** | 15 | 11.5 |
| **Tubal ligation** | 10 | 7.7 |
| **Maternal request** | 7 | 5.4 |
| **Sizable baby** | 7 | 5.4 |
| **Prolonged 2ed stage of labour** | 6 | 4.6 |
| **Fetal distress** | 5 | 3.8 |
| **Prolonged 1st stage of labour** | 5 | 3.8 |
| **Cord prolapse** | 4 | 3.1 |
| **Twins** | 3 | 2.3 |
| **Placenta abruption** | 3 | 2.3 |
| **Uncontrolled GDM** | 1 | 0.8 |
| **Uterine rupture** | 1 | 0.8 |
| **Total** | **130** | **100.0** |

## OUTCOME ASSESSMENT

Table (4.5) the distribution of the participants according to the intraoperative complications (n = 130 women underwent for emergency caesarian section)

| Intraoperative complications | Frequency | Percent (%) |
|---|---|---|
| **Anesthetic complications** | 1 | 0.8 |
| **Bladder injury** | 7 | 5.4 |
| **Bowel injury** | 1 | 0.8 |
| **Wound infection** | 1 | 0.8 |
| **Hematoma** | 1 | 0.8 |
| **No complication** | 119 | 91.5 |
| **Total** | **130** | **100.0** |

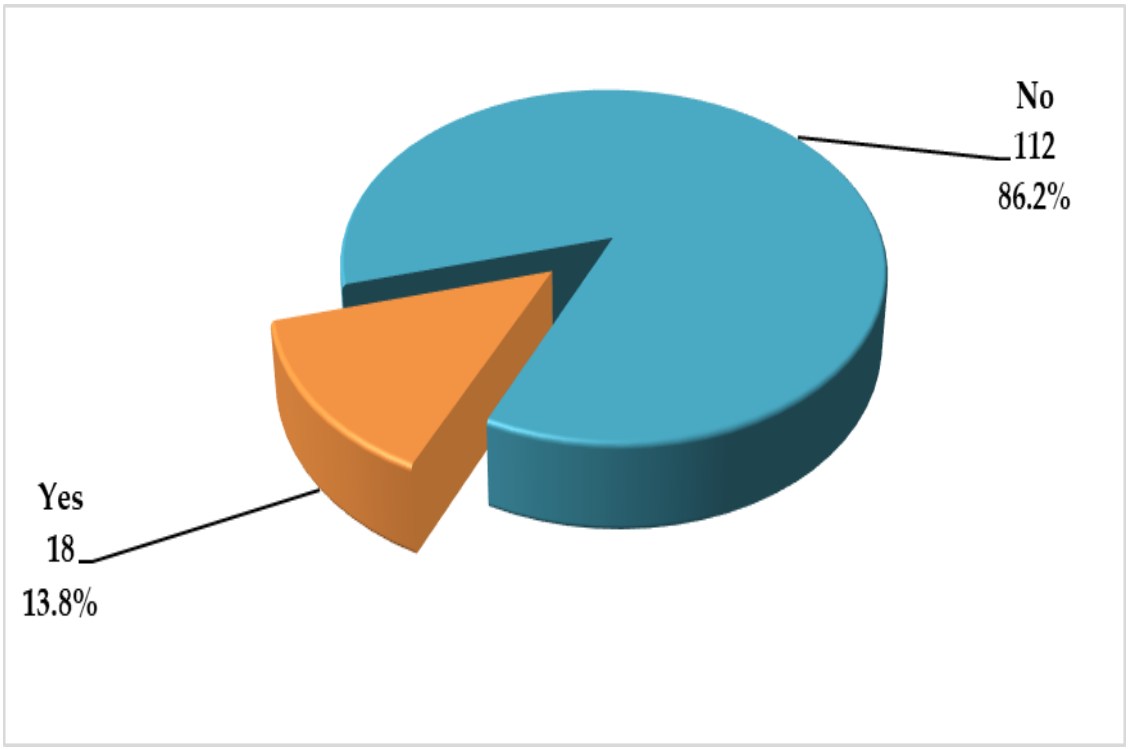


Figure (4.5) the distribution of the participants according to the need for blood transfusion (n = 130 women underwent for emergency caesarian section)

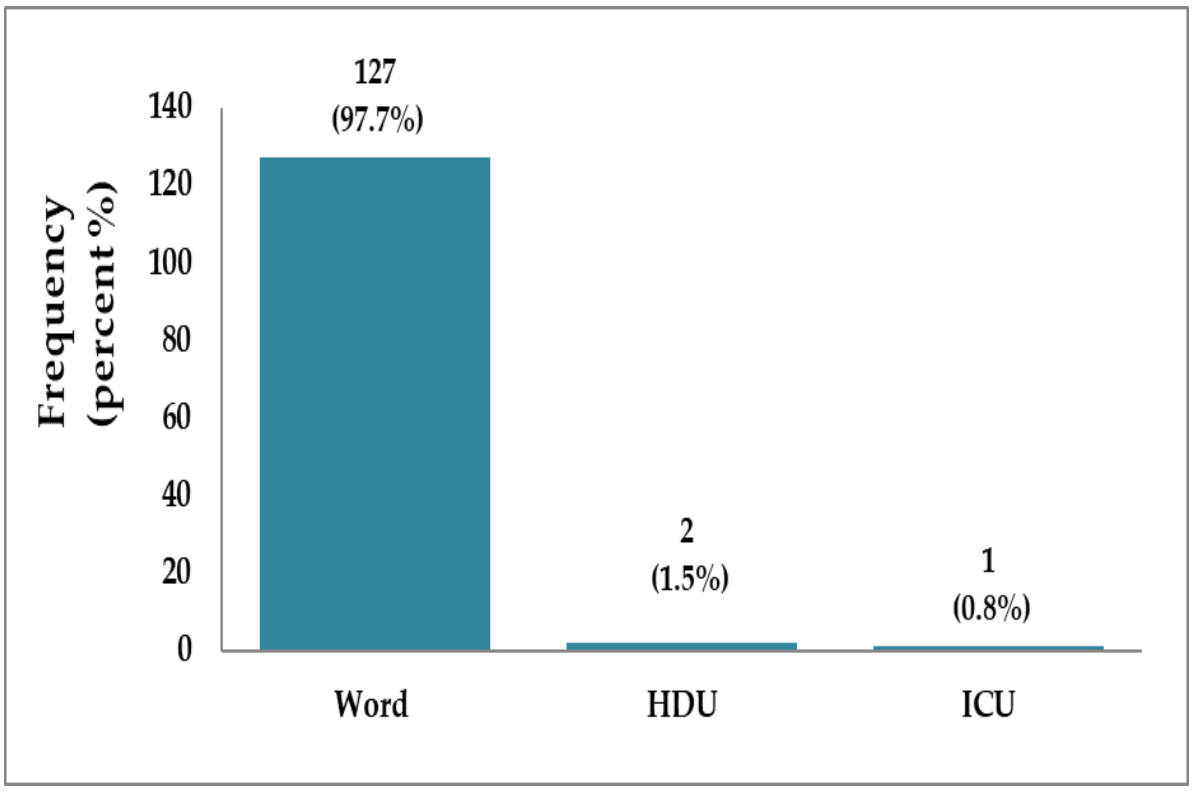


Figure (4.6) the distribution of the participants according to the place of admission after CS (n = 130 women underwent for emergency caesarian section)

Table (4.6) the distribution of the participants according to the maternal death (n = 130 women underwent for emergency caesarian section)

| **Maternal death** | **Frequency** | **Percent (%)** |
|---|---|---|
| **Yes** | 0 | 0.0 |
| **No** | 130 | 100.0 |
| **Total** | **130** | **100.0** |

Table (4.7) the distribution of the participants according to the foetal outcome (n = 130 women underwent for emergency caesarian section)

| **Foetal outcome** | | **Frequency** | **Percent (%)** |
|---|---|---|---|
| **Alive** | | 121 | 93.1 |
| **Dead** | | 9 | 6.9 |
| **Nursery** | | 4 | 3.1 |
| **Respiratory distress syndrome** | | 3 | 2.3 |
| **Preterm** | | 1 | 0.8 |
| **Stillbirth (n = 9)** | **Fresh** | 9 | 6.9 |

| | | | |
|---|---|---|---|
| | **Macerated** | 0 | 0.0 |

# Chapter V

## Discussions

## 5.1 Discussion

This study aimed to estimate the proportion and Indication of Emergency Cesarean Section at Khartoum Bahri teaching Hospital, 2021 and covered 130 patients' records (women who had emergency caesarian sections).

Our study found that most of them 101 (77.7%) were 18 - 39 years in age. Similar to the finding of this study, advance maternal age has been documented as influencing factor for high C-section rates in other studies [27]. Certain biological changes occur with the advancement of age during pregnancy, such as mal-position, increased risk of hypertension, eclampsia, and diabetes [28]. Maternal preference together with these risks might have increased the caesarean delivery among older mother [28].

Our study found that the most common indications for emergency caesarian sections were abnormal presentation 47 (36.2%), pre-eclampsia 16 (12.3%), placenta Previa 15 (11.5%) and tubal ligation among only 10 (7.7%). In other study in Sudan, Adam I. et al found that repeated previous cesareans (40.4%), failure to progress (12.3%), breech presentation (8.4%), and hypertensive disorders (8.2%), were the main indications of emergency cesarean delivery [13]. In neighboring Ethiopia, three-quarters of the cesarean deliveries were recorded as emergencies and maternal indications accounted for two thirds of the cesarean deliveries [21]. Prolonged/obstructed labor, cephalopelvic disproportion, previous cesarean deliveries, and fetal distress are the most frequent indications for cesareans in

SubSaharan Africa [22, 23]. There is no standard classification system for cesarean indications, and indications are not standardized, can be multiple or related or each setting [24,25]. Therefore, in most of SubSaharan Africa, many cesarean deliveries appear to be decided based on inappropriate indications or when the indications were unclear [23]. Moreover, in India, Erika, et al stated that amongst the various indications for caesarean section in grand multipara, fetal distress (25.58%) and antepartum hemorrhage (22.09%) were with the highest incidence [15]

Intraoperative complications were reported among 11 (8.5%) of them such as bladder injury 7 (5.4%) and bowel injury 1 (0.8%).Also, Surekha S. Mohan et al reported that among women, the commonest intraoperative complication was atonic PPH (6%) followed by extension of uterine incision (3.4%) and maternal morbidity was seen in 20 cases (13.3%). Febrile morbidity was the commonest postoperative morbidity followed by UTI [29]. Lastly, Kulas et al agreed that among women, the most common early postoperative complications are wound infection (in 3%-15% of patients),and very rarely necrotizing fasciitis, which is associated with a high maternal mortality, and pelvic vein thrombophlebitis [30]. It seems clear from our results and the results of relevant studies that there is a considerable proportion of maternal complications after the emergency caesarian section among women, and therefore this proportion should be taken into account to improve follow-up and the outcome of emergency caesarean sections

Our study reported that only 18 (13.8%) received blood transfusion, with no reactions. Likewise, in Saudi Arabia, Al Rowaily MA, et al reported that blood transfusion was the most frequent adverse maternal outcome (3.72%) [31]. Moreover, G Sharmil et al et al stated that 5% of them required blood transfusion before surgery [32]. Moreover, in Pakistan, Abbas et al agreed that women with increased parity were also found to have more likelihood of receiving blood

transfusion and this may be attributed to increased risk of uterine atony in this group of women [33].

In regards to the foetal outcome, our study found that 121 (93.1%) were delivered alive babies, 9 (6.6%) dead, 4 (3.1%) admitted for nursery. Similarly, in Saudi Arabia, Al Rowaily MA, et al reported that IUGR (3.25%) was the most frequent adverse fetal outcome, followed by IUFD and the need for NICU admission (0.58% each) [31]. In other study by Simm et al they reported that only two infants were admitted to the ICU (0.14%) following elective CS, whereas 0.80% of infants born after emergency CS were admitted to the ICU [34].

Our study had some limitation. The main limitation that the dependency of our study on the data extracted from the reports and patient files of caesarean sections. The functions of these files contain incomplete data, sometimes more than the accuracy of the results in our study.

# Chapter VI

## Conclusions and recommendations

## 6.1 Conclusion

This study covered 130 patients' records (women who had emergency caesarian sections). Most of them were 18 - 39 years in age. The majority were from urban residential areas, more than half of them were educated until secondary level of above, and nearly half of them were housewives. More than third of them were multiparous. Some of them had comorbidities such as hypertension and the majority of them were full term. The most common indications for emergency caesarian sections were abnormal presentation, pre-eclampsia, and placenta previa. Intraoperative complications were reported such as bladder injury and bowel injury. Most of the mothers were admitted to the general word after the caesarian section with no maternal death. In regards to the foetal outcome, the study found that most of them were delivered alive babies.

## 6.2 Recommendations

1. Measures such as trial of labor in primigravidae and increase the rate of instrumental delivery have to take to reduce this high rate of cesarean delivery in Sudan hospitals
2. Routine monitoring of clinical indication of C-section in public facilities is needed to ensure rational use of the procedure
3. It is necessary to improve the appearance and quality of emergency caesarean sections and good preparation for them and follow-up after the operation to reduce complications for the mother and the fetus in Sudan

## REFERENCES


1. Hafeez M, Yasin A, Badar N, et al. Prevalence and indications of caesarean section in a teaching hospital. JIMSA 2014;27:15-6.
2. World Health Organization. Appropriate technology for birth. Lancet 1985; 2(8452):436–7.
3. Betran AP, Merialdi M, Lauer JA, Bing-Shun W, Thomas J, look PV, et al. Rates of caesarean section: analysis of global, regional and national estimates. Paediatr Perinat Epidemiol 2007; 21:98–113.
4. Linn Becher and Siril Stokke . INDICATIONS FOR CESAREANSECTION IN ST. JOSEPH MEDICAL HOSPITAL MOSHI, TANZANIA 2013.
5. Mylonas I, Friese K. The indications for and risks of elective cesarean section. Dtsch Arztebl Int 2015;112:489-95.
6. Stjernholm YV, Petersson K, Eneroth E.Changed indications for cesarean sections. Acta Obstet Gynecol Scand 2010;89:49-53.
7. Heffner LJ, Elkin E, Fretts RC. Impactof labor induction, gestational age, andage on cesarean delivery rates. Obstet Gynecol 2003;102:287-93.

8. Smith GCS, White IR, Pell JP, DobbieR. Predicting Cesarean section and uter ine rupture among women attempting vaginal birth after prior Cesarean section. PLoS Med 2005;2.
9. Sharma PP, Giri DK, Bera SN. Planned versus emergency cesarean delivery with previous one cesarean section: a prospective observational study. Int J Reprod Contracept Obstet Gynecol 2018.
10. Kjersti S. Bakken & Babill Stray-Pedersen (2019) Emergency cesarean section among women in Robson groups one and three: A comparison study of immigrant and Norwegian women giving birth in a low-risk maternity hospital in Norway, Health Care for Women International,40:7-9, 761-775, DOI: 10.1080/07399332.2019.1623800 .
11. Linn Becher and Siril Stokke . INDICATIONS FOR CESAREANSECTION IN ST. JOSEPH MEDICAL HOSPITAL MOSHI, TANZANIA 2013.
12. Adam, Ishag & Elmugabil, Abdelmageed & Rayis, Duria & Hassan, Ahmed & Ali, Abdelaziem. (2016). Epidemiology of Cesarean Delivery in Kassala, Eastern Sudan: A community-based study 2014- 2015. Sudan JMS. 11. 49-53.
13. Adam I. An Epidemic of Cesarean Deliveries at Khartoum Hospital in Sudan with Over Journal of Women ' s Health , Issues & Care An Epidemic of Cesarean Deliveries at Khartoum Hospital in Sudan with Over Two-Fifths of Neonates Delivered through the Abdomen. 2014;(December 2013).
14. Begum T, Rahman A, Nababan H, et al. Indications and determinants of caesarean section delivery: Evidence from a population-based study in Matlab, Bangladesh. PLoS One. 2017;12(11):e0188074.
15. Betrán AP, Merialdi M, Lauer JA, Bing-Shun W, Thomas J, Van Look P, Wagner M. Rates of caesarean section: analysis of global, regional and national estimates. Paediatr Perinat Epidemiol. 2007 Mar;21(2):98-113.

16. Dumont A, de Bernis L, Bouvier-Colle MH, Bréart G; MOMA study group. Caesarean section rate for maternal indication in sub-Saharan Africa: a systematic review. Lancet. 2001 Oct 20;358(9290):1328-33.
17. Althabe F, Sosa C, Belizán JM, Gibbons L, Jacquerioz F, Bergel E. Cesarean section rates and maternal and neonatal mortality in low-, medium-, and high-income countries: an ecological study. Birth. 2006 Dec;33(4):270-7.
18. Festin MR, Laopaiboon M, Pattanittum P, Ewens MR, Henderson-Smart DJ, Crowther CA; SEA-ORCHID Study Group. Caesarean section in four South East Asian countries: reasons for, rates, associated care practices and health outcomes. BMC Pregnancy Childbirth. 2009 May 9;9:17.
19. Glynn Israel, determining sample size, University of Florida, 2008, revised 2010, 2-3
20. Baldo MH. Caesarean section in countries of the Eastern Mediterranean Region. East Mediterr Health J. 2008 Mar-Apr;14(2):470-88.
21. http://www.emro.who.int/emhj-volume-14-2008/volume-14-issue-2/caesarean-section-in-countries-of-the-eastern-mediterranean-region.html
22. Fesseha N, Getachew A, Hiluf M, Gebrehiwot Y, Bailey P. A national review of cesarean delivery in Ethiopia. Int J Gynaecol Obstet. 2011 Oct;115(1):106-11
23. Briand V, Dumont A, Abrahamowicz M, Traore M, Watier L, et al. (2012) Individual and institutional determinants of cesarean section in referral hospitals in Senegal and Mali: a cross-sectional epidemiological survey. BMC Pregnancy Childbirth 12:11.
24. Chu K, Cortier H, Maldonado F, Mashant T, Ford N, et al. (2012) Cesarean section rates and indications in sub-Saharan Africa: a multi-country study from Medecins sans Frontieres. PLoS One 7: e44484.

25. Stanton C, Ronsmans C; Baltimore Group on Cesarean (2008) Recommendations for routine reporting on indications for cesarean delivery in developing countries. Birth 35: 204-211.
26. Torloni MR, Betran AP, Souza JP, Widmer M, Allen T, et al. (2011) Classifications for cesarean section: a systematic review. PLoS One 6: e14566.
27. Maaløe N, Sorensen BL, Onesmo R, Secher NJ, Bygbjerg IC (2012) Prolonged labour as indication for emergency caesarean section: a quality assurance analysis by criterion-based audit at two Tanzanian rural hospitals. BJOG 119: 605-613
28. Bayrampour H, Heaman M. Advanced maternal age and the risk of cesarean birth: a systematic review. Birth. 2010;37(3):219–26.
29. Ecker JL, Chen KT, Cohen AP, Riley LE, Lieberman ES. Increased risk of cesarean delivery with advancing maternal age: indications and associated factors in nulliparous women. American journal of obstetrics and gynecology. 2001;185(4):883–7.
30. Surekha S. Mohan et al. Primary caesarean section in multiparous women . Indian Journal of Obstetrics and Gynecology Research 2017;4(4):420-423
31. Kulas T, Bursac D, Zegarac Z, Planinic-Rados G, Hrgovic Z. New Views on Cesarean Section, its Possible Complications and Long-Term Consequences for Children's Health. Med Arch. 2013;67(6):460-463.
32. Al Rowaily MA, Alsalem FA, Abolfotouh MA. Cesarean section in a high-parity community in Saudi Arabia: clinical indications and obstetric outcomes. BMC Pregnancy Childbirth. 2014;14:92.
33. G Sharmila, Ch.Nishitha. Study of primary caesarean section in multigravida. Asian Pac. J. Health Sci., 2016; 3 (4):89-94

34. Abbas S, Mughal S, Hussain SNF, Hossain N. Blood transfusion and high-order cesarean delivery; Report from a developing country. Pak J Med Sci. 2019;35(6):1520-1525.
35. Simm A, Ramoutar P: Caesarean section: techniques and complications. Current Obstretics & Gynaecology. 2005, 15: 80-86.

# *Proportion and Indication of Emergency Cesarean Section at Khartoum Bahri teaching Hospital, 2021*

***Appendix 1***

***Study questionnaire***

**DEMOGRAPHICAL CHARACTERISTICS**

1. Age
   - □ < 18 years
   - □ 18 – 39 years
   - □ ≥ 40 years
2. Residence
   - □ Urban
   - □ Rural
3. Education
   - □ Illiterate
   - □ Primary
   - □ Secondary
   - □ University or above
4. Occupation
   - □ Housewife
   - □ Worker
   - □ Employee
   - □ Medical related
   - □ Other, please specify …

**CLINICAL CHARACTERISTICS**

5. Parity
    - Nulliparous
    - Primiparous
    - Multiparous
    - Grand multiparous
6. Chronic illness
    - Hypertension
    - Diabetes mellitus
    - Asthma
    - Other, please specify …
    - None
7. Gestational age
    - < 37 weeks
    - 37 - 42 weeks
    - > 42 weeks

8. Indications for emergency caesarian section
    - Pre-eclampsia
    - APH previa
    - Maternal request
    - Tubal ligation
    - Prolonged 1st stage of labour
    - Prolonged 2ed stage of labour
    - Placenta abruption
    - Uncontrolled GDM
    - Uterine rupture
    - Abnormal presentation
    - Sizable baby
    - Fetal distress
    - Cord prolapse
    - Twins
    - Others, please specify …

## OUTCOME ASSESSMENT

9. Maternal outcome
    - Well, discharged without complications
    - Presence of complications
    - Dead
10. If complication occurred, please specify
    - Anesthetic complications
    - Bladder injury

- Bowel injury
- Wound infection
- Hematoma
- Others, please specify …

11. Blood transfusion
    - Yes
    - No
12. Reactions after blood transfusion
    - Yes
    - No
13. After the operation, mother went to
    - Word
    - HDU
    - ICU
14. Duration of stay … days
15. Foetal outcome
    - Alive and well
    - Complications
    - Dead
16. If complications occurred, please specify …
17. If dead please specify
    - Fresh stillbirth
    - Macerated
18. Admitted for NICU
    - Yes, please specify the cause ….
    - No
19. Duration of stay … days