The Prevalence and Indications for Caesarean Section at Kitwe Teaching Hospital in 2018

Fines B. Kamanda[1*], Angel Malama[2]

[1]Copperbelt University, Kitwe, Zambia.

[2]Consultant Radiologist, Kitwe Teaching Hospital: Honorary Lecturer Copperbelt University, Kitwe, Zambia.

ABSTRACT

Introduction: Worldwide, there has been an increase in the prevalence of Caesarean sections. Zambia has a national prevalence of 7.2%, however, in its two major referral Hospitals, the University Teaching Hospital (UTH) and Ndola Teaching Hospital (NTH) the prevalences were 18% and 20% respectively which are above the recommended 10 to 15%. The prevalence and indications for caesarean sections at Kitwe Teaching Hospital (KTH) can be used to make an indication monitoring criteria to reduce foetal and maternal death.

Objective: To determine the prevalence and indications for caesarean sections at Kitwe Teaching Hospital from January to December of 2018 and define their demographics.

Methodology: An analytical Cross-sectional, hospital-based retrospective study was conducted at Kitwe Teaching Hospital (KTH) to determine the prevalence and indications of caesarean sections. Randomly sampled information was collected, entered, and analysed with the statistical package for social sciences (SPSS) and Microsoft Excel 2013.

Results: The prevalence of caesarean sections was 37.5% and the most common indications where foetal distress (20.6%), cephalopelvic disproportion (19.8%), prolonged labour (14.9%), previous caesarean section (14.6%), and psychosis as the least (0.3%).

Conclusion: The prevalence was higher than recommended by World Health Organisation even if it is comparable to other referral hospitals in sub-Saharan African, American, and Asia. It needs to be lowered because there is a correlation of C-sections near 10% with a reduction of maternal and neonatal mortality. The most common indication was Foetal distress followed by cephalopelvic disproportion, prolonged labour, and previous where which require proper monitoring and audit to avoid speculative diagnosis.

Keywords: Prevalence, Indication, Caesarean Section.

Address for Corresponding Author

Dr. Fines B. Kamanda; Copperbelt University, Kitwe, Zambia.

E-mail: finesbosskamanda@gmail.com

Crossref Doi: https://doi.org/10.36437/irmhs.2021.4.4.A

1. Introduction

1.1 Background Information

A caesarean section (C-section) is a surgical procedure in which a baby is delivered through an incision on the mother's abdomen and uterus according to the American College of Obstetrician and Gynaecology (ACOG) (2015). This is necessitated by the potential risks to the life of the mother or the foetus with conditions such as cephalopelvic disproportion, malpresentation, and pregnancy-induced life-threatening hypertension (Mylonas and Friese, 2015). According to the World Health Organisation (WHO) (2018) the prevalence of this lifesaving intervention for the mother and child, has been increasing in number in hospitals worldwide. In some institutions, the prevalence's are sometimes more than the

recommended 10% to 15% by WHO (2015). Because Zambia is a developing country, there has been an increase in the hospital's ability to do C-sections, thus a need to determine the prevalence and the indications which will help reduce the high maternal and neonatal mortality and morbidity due to unequal distribution of health facilities between urban and rural areas (Ng'anjo et al, 2016).

1.2 Statement of the Problem

Two studies done in Zambia at the University Teaching Hospital (UTH) and Ndola Teaching Hospital (NTH) regarding the prevalence of caesarean sections showed that the prevalence of caesarean sections is 18.5% and 20.7% respectively, which are above the prevalence recommended by WHO of 10% to15% (WHO, 2015). No studies have been done at Kitwe Teaching Hospital (KTH) to find the prevalence of the most common obstetric surgical procedure done. KTH is also in the second largest populated town in Zambia and the same province as NTH which increases its probability of having a higher prevalence of C-sections than those recommended by WHO in 2015. Hence the need to conduct this study to determine the prevalence and indications which can be used to establish a scientifically based policy on the criteria for foetal and maternal monitoring.

1.3 Literature Review

Global Prevalence and Indication: According to the WHO definition of maternal death, it is the immediate demise of a pregnant woman or within 42 days of termination of pregnancy from any cause related to the pregnancy. No woman should die during childbirth, thus guidelines have been laid down on how to handle an obstetric emergency by performing emergency caesarean sections ACOG (2015). The prevalence of C-sections worldwide has been increasing (Azami-Aghdash et al, 2014). A WHO publication reports that between 1990 and 2014 the global average C-section rate increased from 12.4 to 18.6 % with different rate ranges, depending on the region from 6 and 27.2 %, and are rising at an average rate of 4.4 % per year. The lowest rates are in Africa (7.3 %), Asia (19.2 %), Europe (25 %), Oceania (31.1 %), and North America (32.3 %), while Latin America and the Caribbean have the highest rates at 40.5 % (Betran et al, 2016). In 1991, 15.3% of all births were by caesarean in Germany however, by 2012 this had increased to 31.7% with only as little as 10% having medical indications for them (Mylonas and Friese, 2015). In Iran, the increase in the prevalence of caesarean sections in recent years demanded the need for awareness of the indications in order to improve the planning and effectiveness of the interventions being made to reduce maternal and neonatal mortality and morbidity in the country (Setudezadeh and yousefinezhandi, 2018). The Dutch study by Mylonas and Friese (2015) showed that there is a need to understand why there is an increase in C-sections and to find out the best method of counteracting it effectively by alleviating the risks of increasing caesarean sections. They also emphasised a seen for scientific advances, social and cultural changes, and medicolegal considerations as the main reasons for the increase.

In Felegehiwot referral hospital, Bahir Dar, northwest Ethiopia 25.4% of all the women delivered through C-section while Ghana had 15.6% as the highest in its government institutions (Adebe et al, 2016). Burkina Faso had the least percentage of 3% while Rwanda had the highest percentage in its private institutions with 64% (Yaya et al, 2018). These results tally with the findings that most private institutions have rates higher than those recommended by WHO (2018).

C-sections are commonly done during an obstetric emergence due to multiple indications which can be classified into two,

absolute and elective C-sections (Mylonas and Friese, 2015). The number of deaths has reduced significantly due to the availability of emergency C-sections done during absolute indications like foetal distress and the increase in the number of doctors qualified to diagnose obstructed labour and perform C-sections (Patrick et al, 2017). More than 90% of the caesarean sections are due to emergencies referrals from other medical institutions to the hospitals and of these, 89% percent were due to a previous caesarean section as an indication after they failed to give birth virginally (Adebe et al, 2016). Medical practitioner's fear of legal charges due to maternal and neonatal mortality in most countries around the world has led them to increase in performance of C-sections as a way of avoiding medical-legal charges (Mylonas and Friese, 2015). The patient's desire for rejecting vaginal delivery is also seen to be influenced by various factors including social, demographic, and medical reasons (WHO, 2018). There is a need to handle the rise using the biopsychosocial model by educating the patients, providing psychological counselling, reducing the pain during childbearing, and prohibiting doctors from forcing personal opinions and profit from them (WHO, 2018; WHO, 2014).

There is a correlation of C-sections prevalence's nearing 10% with a reduction of maternal and neonatal mortality but no benefit is achieved with rates above 10%. Therefore a 10% to 15% rate was set as the ideal prevalence for all the hospitals worldwide (WHO, 2015; WHO, 2007). Women undergoing pre-labour and intra-labour caesarean delivery have an increased risk of having postpartum haemorrhage due to the use of general anaesthesia (Butwick, 2017). Postpartum haemorrhage is the leading cause of death with higher risks seen in emergency C-sections (Creanga, et al, 2015). There is a need for proper screening and decision based on clear, sound, and well-supported scientific evidence before C-sections are done (Adebe et al, 2016; Azami-Aghdash et al, 2014).

Sub-Sahara

While all the other regions of the world show an increase in C-sections, there is a small increase in the rates in sub-Saharan Africa (SSA) over the same time period (Yaya et al, 2018). This is because the populations of southern Asia and sub-Saharan Africa 20 % are poor and only account for less than 2 % of all the deliveries among a majority of countries while in some countries the rate are less than 1 % in the poorest 80 % of the population (Cavallaro et al, 2013).

The main maternal risk factors for C-section in the region are prior C-section, a referral from other facilities, cephalopelvic disproportion, vaginal bleeding, hypertensive disorders, and premature rupture of membranes (Briand et al, 2012). Socio-demographic risk factors have also contributed to an increased risk of C-sections in certain populations like in Ethiopia where women with a secondary or higher level of education are two times more likely to undergo C-sections than those with no or only primary education (Engida et al, 2019). Delivering in private institutions can also double your chances of delivering via C-section (Gebremedhin, 2014). In Tanzania Litorp et al (2015) found that women preferred vaginal birth, as they failed to understand the indications for the procedure.

While C-sections save a life, those done in low and middle-income countries have a 100 times chance of a woman dying during the procedure than those in developed countries like the UK (WHO, 2019, March 28). It should thus be performed only when it is clearly advantageous because it can increase the risks of infection, organ injury, and need for blood transfusion to the mother and child (Vasant et al, 2018). There is a need to reduce primary caesarean sections by encouraging vaginal delivery after caesarean sections (Vasant et al, 2018).

Local

Zambia has a C-section prevalence of 7.2% in public hospitals nationwide (Yaya et al, 2018) which is less than the recommended rate by WHO (2015). Although studies done at UTH and NTH regarding the prevalence of caesarean sections found prevalence's of 18.5% and 20.7% respectively, which are above the recommended rates by WHO (Musonda et al 2012 and Nkhata et al, 2016). At NTH the most prevalent indicators for C-section were maternal and foetal distress, prolonged labour, pregnancy-induced hypertension, and malpresentations of the foetus (Nkhata et al, 2016 and Patrick, 2017. UTH had Obstructed labour as the most common indication. The women in rural areas also have a higher odds of delivering by caesarean section, leading to a need for proper screening and decisions based on clear, sound, and well-supported scientific evidence before it is performed (Adebe et al, 2016; Nkhata et al, 2016).

In order to meet the sustainable development goals 4 and 5 to decrease maternal mortality, obstetric interventions like caesarean section are performed (Gunn et al, 2016 and UN, 2016). According to the Emergency Obstetric and New-born Care (EmONC, 2018) providing obstetric training to health practitioners has resulted in reduced maternal mortality from 591 to 398 in 2014due to postpartum haemorrhage. The fear of doctors losing a baby which is medicolegal influences them to take the safer way out of performing a C-section (Mylonas and Friese, 2015). Without clear medical indications, C-sections may pose a risk for both the mother and the baby (WHO, 2018; Heemelaar et al, 2016; Dekker et al, 2018).

1.4 Objectives

Main Objective: To determine the prevalence and indications for caesarean sections at Kitwe Teaching Hospital.

Specific Objectives

1. To define the demographics of mothers delivering at KTH through C-sections.
2. To determine the prevalence of C-sections at Kitwe Teaching Hospital.
3. To determine the indications of C-sections at Kitwe Teaching Hospital.

1.5 Research Questions

Is the prevalence of caesarean sections at KTH within the recommended range for WHO?

1.6 Justification

Globally the problem of maternal and neonatal mortality and morbidity in terms of prevalence and indications of caesarean sections have been documented; sub-Saharan Africa and in Zambia at UTH and NTH. Unfortunately, no studies have been conducted at KTH on the prevalence and indications of caesarean sections.

1.7 Measurement

Prevalence: Prevalence is calculated by obtaining the total number of cases that occurred in a particular population over a certain period of time over the total population. It was calculated as a percentage of the total number of caesarean section deliveries over the total number of deliveries conducted in the whole year of 2018.

Indications for caesarean section; a medical indication is a valid reason to use a certain test, medication, procedure and surgery (Sohn and Liu 2014). The indications where coded numerically from 1 to 19. Foetal distress=1, cephalopelvic disproportion=2, previous C-section=3, prolonged labour=4, malpresentation=5, pre-eclampsia=6, cord around neck=7, ante-partum haemorrhage=8, elimination of mother to child transmission=9, oligohydramnios=10, high parity=11, hydrocephaly=12, macrosomia=13, post-dates=14, epilepsy=15, post laparotomy=16, pre-eclampsia=17, prolonged labour=18 and unknown=19.

Mother's age: the age of the mothers was obtained from the delivery registers which is recorded during admission into labour ward. The mother's age was defined as numeric. The

age was later transformed into age ranges. 1= <16yr, 2= 16-24yr, 3=25-34yr, 4=35-44yr and 5=anything else.

Distance from Hospital; this showed the distance of the patient's location from Kitwe Teaching Hospital and its catchment area. It was defined as numeric and encoded as follows; 1= within 12km of catchment area, 2= from more than 12km but within catchment area, 3= Within Kitwe district but outside catchment area, and 4= From outside Kitwe district.

Location; this recorded the patients residing place without their actual home address in order to ensure anonymity. It was defined ad nominal without encoding.

Duration of pregnancy: the duration of pregnancy is obtained from the mothers during history taking but can also be confirmed during the physical examination and during investigations with an Ultrasound. The duration of pregnancy was defined as numeric data which was later encoded as follows; 1=34-36weeks preterm, 2=37-42 weeks full-term and3= for greater than 42 as post-term.

Mode of delivery: mode of delivery is determined by maternal and foetal factors. Some of the maternal factors that determine the mode of delivery are; maternal maturity and any medical condition that may require special attention during labour e.g. foetal distress. Some of the Foetal factors that may determine the mode of delivery are; the size of the baby, the lay of the baby, and medical conditions that may require special attention. C-section was the only mode of delivery considered with a numerical. 1= C-section.

1.1 Conceptual Frameworks

Figure 1 shows how the independent variables of indications for C-sections all end up leading to the dependant variable C-section delivery which can be used to find the prevalence of C-sections conducted.

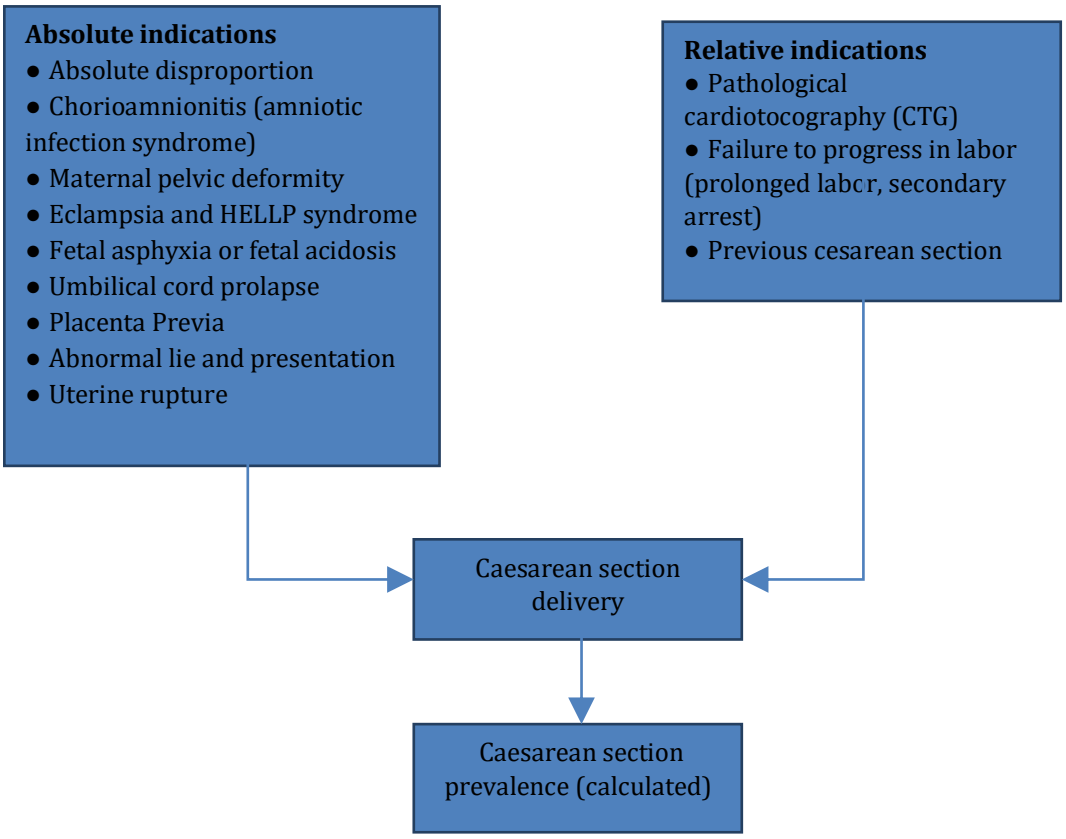

Figure 1: Conceptual frame work of indications and prevalence for caesarean section.

2. Methodology

2.1 Study Site

Kitwe Teaching Hospital (KTH) is a third government referral hospital located in the city of Kitwe which is in the northern Copperbelt region of Zambia. It was commissioned in 1958 as Llewlyn hospital named after Lord Llewelyn one of the governors of Northern Rhodesia. The name later changed to Kitwe Central Hospital in 1964 and later to a Teaching Hospital in 2018. It is located outside the main city of Kitwe in parklands Kuomboka drive at plot No. 2832 which is the second-largest city in the country with a population of 522, 092 and surrounded by many mines and government clinics which refer cases to it. It has various departments among which is the gynaecology and obstetrics department which handled 5401 maternal deliveries as of 2018. Other services offered are ante-natal care, post-natal care, and complications such as C-section and malaria cases. Patients come from various areas such as parklands, Buchi, Chimwemwe, Nkana East, Nkana West, and Garneton. It is one of the three teaching hospitals in the country. It has a bed capacity of 664 with traffic of patients of 1300 according to the Kitwe Teaching Hospital website.

2.2 Target Population

The study population comprised of all pregnant women delivering through C-sections at KTH from January to December 2018 irrespective of the referral status, age, location, and indication for the C-section. A total of 2025 women delivered via C-section in the whole of 2018.

2.3 Study Design

A quantitative research method with Cross-sectional, hospital-based retrospective study was used as it ensures systematic collection and analysis using the statistical procedure.

2.4 Sample Size

To ensure total representation and statistical significance of the general population, a sample size of 347 was used even though a sample size of 256 was calculated after considering a confidence level of 2.0, the margin of error of 5%, and the prevalence of 20.7% found at NTH by Nkhata et al, (2016) and the population size of 4184 collected from the hospital registers office. The calculation was done using the proposed formula by Saunders, Thornhill, and Lewis (2009, p.581-582).

$$\text{Unlimited population: } n = \frac{z^2 \times \hat{p}(1-\hat{p})}{\varepsilon^2}$$

$$\text{Finite population: } n' = \frac{n}{1+\frac{z^2 \times \hat{p}(1-\hat{p})}{\varepsilon^2 N}}$$

Where
z is the z score= 2
ε is the margin of error= 5%
N is population size= 4184
p̂ prevalence= 20.7%
Unlimited population: n= (2) ^2*20(100-20.7)/ (5) ^2
=6400/25
=256
Finite population: n'=256/ (1+ (6400)/ (25*4184))
=256

2.5 Sampling Procedure

Systematic random sampling was utilised in the collection of patient records from the patient register books at the health information office in order to avoid biasness in data collection. Records for the first 29 C-section deliveries were collected in order to avoid biasness in collected information and obtained a sample size of 347.

2.6 Inclusion Criteria

The study included all the women who delivered via C-sections at KTH from the beginning of January to the end of December 2018 irrespective of the age, location, and indication for the procedure.

2.7 Exclusion Criteria

The study excluded all the women who delivered vaginally at KTH from January to December of 2018. It also excluded records which were not clearly visible due to poor record-keeping.

2.8 Data Collection

Data about the patients from the hospital registers records who delivered at KTH through C-section was entered onto the designed data extraction/collection sheet after collection by the researcher to ensure uniformity. Records for the first 29 patients who had C-section delivery in each month for the year 2018 were collected in order to avoid biasness in the collected information. Prior to data collection permission was gotten from KTH management and the ethical committee who reviewed the data extraction to ensure that patient's names are not collected.

2.9 Data Analysis

Raw data that was collected was systematically organised which was transformed into ordered error free data before analysis was done. The data was coded, entered and cleaned using the Statistical Package for Social Sciences (SPSS) software version 23 to avoid errors. Analysis also done using SPSS after transformation of information entered. The tables and figures were generated using SPSS and modified using Microsoft Office Excel 2013. The Chi-square was used to identify associations between indication for C-sections and various social and demographical markers such as age.

2.10 Ethical Consideration

Ethical consideration for the study was obtained from Tropical Disease Research Centre (TDRC) and the National Health Research Council after submission and review of the study proposal which the Provincial Health Office granted permission for data collection at KTH. KTH management and the ethical committee also reviewed the study before granting permission for the researcher to collect hospital records. Names and home addresses where omitted in order to ensure the anonymity of the patient's identity. All other ethical considerations where observed during the study.

2.11 Study Limitation

The study was hospital-based, therefore, the results could not be generalised to the general population and the secondary information collected over a short span of one year may have been influenced by other variables such as the absence of a universal protocol for C-section indications.

There was no computerised system for storing patient's records, consequently, some of the patient's records were not found at the register's office. Information on the percentage of women who had elective and emergency C-sections could not be found and studied as the records books were missing.

3. Results

3.1 Demographic Information

347 patients with a mean age of 26.7 years and an age range of 5-44 years were studied.

Characteristics	Frequency	Percentage
Age		
<16	5	1.4
16-24	150	43.2
25-34	138	39.8
35-44	54	15.6
Distance from the Hospital		
Within 12km of catchment area	282	80.6
From more than 12km but within catchment area	46	13.1
Within Kitwe district but outside catchment area	14	4.0
From outside Kitwe district	8	2.3
Location		
Chimwemwe	37	10.6
Kawama	28	8
Ndeke	24	6.9
Kwacha	23	6.6
Mindolo	22	6.3
Wusakile	14	4
Buchi	12	3.4
Mulenga	12	3.4
Bulangililo	11	3.2
Miseshi	11	3.2

Table 1: shows 150 (43.2%) where aged 16-24 years and 138 (39.8%) where 25-34 years. However 5 (1.4%) where younger than 16 years with a minimum age of 15 years.

282 (80%) come from high population density areas within a Hospital radius of 12km like Chimwemwe 37 (10%), Kawama 28 (8%), and Ndeke 24 (6.9%) while only 8 (2.3%) came from outside Kitwe district.

3.2 Prevalence

Figure 2 shows 5401 deliveries conducted in 2018 in which 2025 (37.5%) are C-sections while 3376 (62.5%) are virginal deliveries.

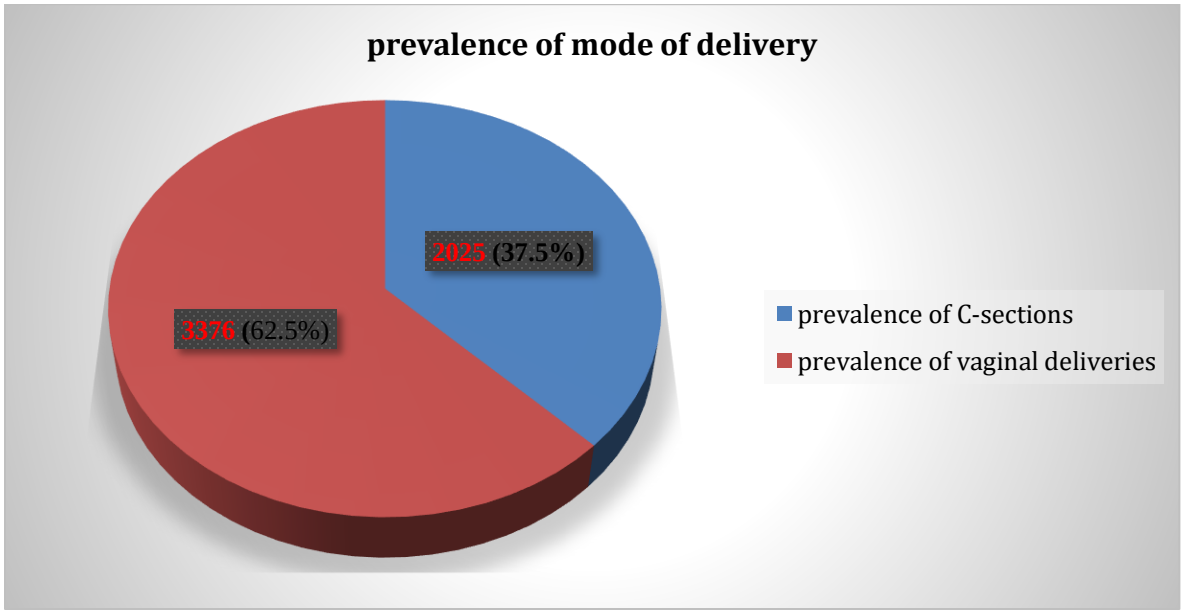

Figure 2: Prevalence of C-sections and vaginal deliveries.

Figure 3 displays the quarterly delivery prevalence's for 2018 in which C-sections range from 35.7% to 38.9% of all the deliveries.

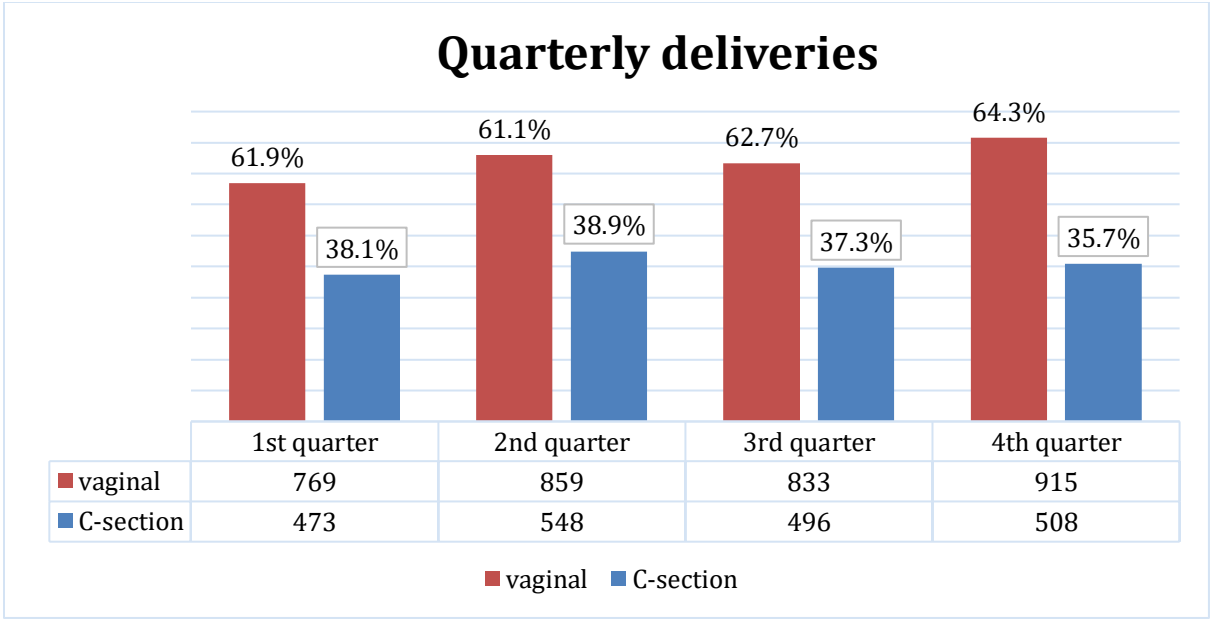

Figure 3: Quarterly prevalence's of C-sections and virginal deliveries.

3.3 Indications

Table 2 shows the indications for C-sections at Kitwe Teaching Hospital. Foetal distress 72 (20.6%) was the commonest indication followed by Cephalopelvic disproportion 69 (19.8). Among the least indications are epilepsy 1 (0.3%) and psychosis 1 (0.3%).

Indications	Frequency	Percent
Foetal Distress	72	20.6
Cephalopelvic Disproportion	69	19.8
Prolonged Labour	52	14.9
Previous C-Section	51	14.6
Malpresentation	32	9.2
Pre-Eclampsia	22	6.3
Cord Around Neck	9	2.6
Ante-Partum Haemorrhage	7	2
Elimination of Mother to Child Treatment	6	1.7
Cord Prolapse	5	1.4
Unknown	5	1.4
Oligohydramnios	4	1.1
High Parity	3	0.9
Hydrocephaly	2	0.6
Macrosomia	2	0.6
Post Dates	2	0.6
Retained placenta	1	0.3
Post Laparotomy	1	0.3
Psychosis	1	0.3
Epilepsy	1	0.3

Table 2: Indications for caesarean sections at Kitwe Teaching Hospital

3.4 Distribution

Table 3 shows the distribution of caesarean sections by gestational age and parity. The majority 238 (68.6%) where late preterm deliveries with a gestational range of 34 to 36 weeks and 1 (03) post-term. In terms of parity 175 (50.4%) where multiparous (1-4 children) while 11 (0.3%) were grand multiparous (>5 children).

Variable	Frequency	Percentage
Gestation (weeks)		
34-36	238	68.6
37-42	108	31.1
>42	1	0.3
Parity		
Prime gravid	134	38.6
Multiparity	175	50.4
Grand multiparity	38	11

Table 1: Distribution of caesarean sections by gestational age and parity

Table 4 shows the common indications in various age groups, distance from the hospital, term of pregnancy, parity and gravidity. Although the p value where not significant Cephalopelvic disproportion 37 was common in 16-24 years while foetal distress was common in preterm (34-36 gestation) and in those within a distance of 12km from the hospital with 58 and 60 patients respectively. However the parity and gravidity had a significant p value less than zero with Previous C-section as the most common indication with 46 and 51 respectively.

FACTORS		CEPHALOPELVIC DISPROPORTION	CORD AROUND NECK	ELIMINATION OF MOTHER TO CHILD TREATMENT	FETAL DISTRESS	MALPRESENTATION	PRE-ECLAMPSIA	PREVIOUS C-SECTION	PROLONGED LABOUR	TOTAL	P-VALUE
Age distribution	<16	2	0	0	1	0	1	0	0	5	0.338
	16-24	37	3	4	29	14	9	15	31	150	

	25-34	25	5	0	30	12	8	26	15	138	
	35-44	5	1	2	12	6	4	10	6	54	
Origin code	1	57	7	4	60	27	15	42	43	279	0.8
	2	8	1	2	6	5	6	5	6	46	
	3	2	1	0	4	0	0	2	2	14	
	4	2	0	0	2	0	1	2	1	8	
Term of pregnancy	34-36	40	8	4	58	18	19	36	36	238	0.5
	37-42	29	1	2	14	14	3	15	15	108	
	>42	0	0	0	0	0	0	0	1	1	
parity type	Prime gravida	41	2	3	27	14	6	0	33	134	0
	Multiparity	26	6	3	35	12	13	46	15	175	
	Grand multiparity	2	1	0	10	6	3	5	4	38	
Gravidity	Prime	43	2	4	27	14	7	0	35	138	0
	Multigravida	26	7	2	45	18	15	51	17	209	

Table 4: Relationship between indication and demographic factors.

4.1 Discussion

Worldwide there is an increase in the prevalence of C-section attributed to various socio-economic reasons and indications (Manyeh et al, 2018). The prevalence of C-sections in this study was 37.5% which is higher than prevalence's reported by Nkhata et al, (2016) and Musonda et al, (2012) at NTH (20.7%) and at the largest hospital in Zambia UTH (18.5%). The prevalence at KTH was higher than that at Ndola Teaching Hospital Partially because it is the only public hospital located in the second largest populated city in Zambia which receives referral cases for C-sections from local clinics.

Studies done in the sub region by long et al, (2015) in Mozambique and Worjoloh et al, (2012) in Tanzania reported prevalence of (20.6%) and (33.2%) respectively. These prevalence ranges in studies done in the sub region are comparable to those found in Zambia with ranges of 18.5% to 37.5%. Equally, prevalence shown in studies done in North America by Betran et al, (2016) 32.3% and in Asia by Li et al, (2017) 34.9% and Smrity

et al, (2019) 36.8% were comparable to the prevalence shown in this study.

In 2015, WHO recommended C-Section rates of 10% to 15%, however, it further recommended hospitals not to strive to achieve a specific rate but all effort should be made to provide C-sections to all women on whom it is indicated as it reduces maternal and infant mortality.
The C-section mean age found in this study where comparable to those found by Smrity et al, (2019) (26.1 +/- 0.5), Nelson (2017) (23.9), Musonda et al, (2012) (26.3) and Nkhata et al, (2016). Sozou & Hartshorne (2012) observed that the peak fertile age for a woman to get pregnant was 24.9 years and this was in agreement with the findings in this study.

The most common indication in this study was foetal distress, followed by cephalopelvic disproportion, prolonged labour and previous C-section. Among multiparity and multigravidae women previous C-section was the commonest. These findings are comparable to a Zambian study by Nkhata et al, (2016) at NTH in which the commonest indication was foetal distress (14.9%) followed by prolonged labour (10.8%). However Musonda et al, (2012) found previous caesarean (28.8%), as the most common indications at UTH followed by cephalopelvic disproportion (22.4%) and foetal distress (10.4%).

A study done by Chu et al, (2017) which investigated the indications of C- Section in a number of countries in sub-Saharan region found obstructed labour (31%) as the most common indication followed by poor presentation (18%), previous C-section (14%) and foetal distress (10%). The top four indications of C-Sections in this study were the same as those found by Chu et al, (2017). The most common indication in this study foetal distress was also similar to findings by Desai et al (2017) and Smrity et al, (2019). The similarity in the indications seen in the sub-Saharan region can be attributed to the matching ethnicity background.

Previous C-section was the fourth most common indication in our study and commonest among multiparity and multigravidae women. These results are consistent with the sub-Saharan findings by Chu et al, (2012) in which there is a 14% increase in chance of having a repeat C-section during delivery. Although this study found an increase in the chance of repeat C-section, its percentages may not be comparable to those found by Mascarello et al, (2017) in Brazil (87.4%) because of limitations in this study as it could not count women as repeat C-section who had different indications of C-sections even if they had a previous C-section.

4.2 Conclusion

The prevalence of C-section was significantly higher than the recommended range by WHO even if it comparable to other referral hospitals in sub-Saharan African, American and Asia. According to World Health Organisation there is a correlation of C-sections near 10% with reduction of maternal and neonatal mortality. The most common indication was foetal distress followed by cephalopelvic disproportion, prolonged labour and previous which require proper monitoring and audit to avoid speculative diagnosis.

4.3 Recommendation

There is need for maternal education and physician supervision for non-medical indications of C-sections which can reduce prevalence of C-sections if implemented with trial of labour after C-sections.

This study recommends adoption of the World Health Organisation recommended classification system to monitor and compare C-section rates such as the ROBSON classification of C-sections and provision of evidence based

guidelines regarding vaginal birth after C-section.

There is a need for a proper and organised health information storing system at all hospitals for easy record keeping and future researcher.

Dedication

This work is dedicated to my beloved parents Mr. and Mrs. Kamanda and all my kin whom the Lord Jesus gave to me for they have always made me go further when I thought it was not possible to. Lastly, it is dedicated to all the women in the world who have given consent to undergone caesarean sections during maternal complications in order to save both the child and mother's life.

Acknowledgement

To begin with, I would like to thank the almighty God above in heaven through His Son Jesus Christ for the good health, strength, and protection throughout my study period and for my family.

Secondly, I wish to extend my heartfelt appreciation to my study supervisor Dr. Angel Malama for the guidance, encouragement, support, and patience he gave to me during the time I began the project up to its completion.

Thirdly I would also like to thank the Tropical disease Research Centre and the management of Kitwe Teaching Hospital for granting me permission to conduct this study.

A special appreciation to all my family members and fellow students at the Copperbelt University School of Medicine for the emotional and technical support they gave me during data analysis with the statistical package for social sciences (SPSS).

Finally, I would like to show my great appreciation to the Government of the Republic of Zambia and my parents for the financial support they rendered to me during the course of this work.

References

1. Abebe, F. E., Gebeyehu, A. W., Kidane, A. N., & Eyassu, G. A. (2016). Factors leading to cesarean section delivery at Felegehiwot referral hospital, Northwest Ethiopia: a retrospective record review. Reproductive health, 13, 6. Doi: 10.1186/s12978-015-0114-8
2. American College of Obstetricians and Gynecologists (ACOG). (2015) Cesarean birth (C-section).
3. Azami-Aghdash, S., Ghojazadeh, M., Dehdilani, N., Mohammadi, M. &Asl Amin Abad, R. (2014) Prevalence and Causes of Cesarean Section in Iran: Systematic Review and Meta-Analysis. Iran J Public Health.
4. Betran, A.P., Ye, J., Moller, A.B., Zhang, J., Gumezoglu, A.M. & Torloni, M.R. (2016)The increasing trend in cesarean section rates: Global, regional, and national estimates: 1990–2014.
5. Briand, V., Dumont, A., Abrahamowicz, M., Traore, M., Watier, L. & Fournier, P. (2012) Individual and instutional determinants of cesarean section in referral hospitals in Senegal and Mali: A cross-sectional epidemiological survey. BMC Pregnancy Childbirth.
6. Butwick, A.J., Ramachandran, B., Hegde, P., Riley, E. T., El-Sayed, Y. Y. & Nelson L.M. (2017) Risk Factors for Severe Postpartum Hemorrhage After Cesarean Delivery: Case-Control Studies.
7. Cavallaro, F.L., Cresswell, J.A., Franca, G.V.A., Victora, C.G., Barros, A.J.D. & Ronsmans, C. (2013) Trends in cesarean delivery by country and wealth quintile: Cross-sectional

surveys in southern Asia and sub-Saharan Africa. Bull World Health Organ.

8. Chu, K., Cortier, H., Maldonado, F., Mashant, T., Ford, N., & Trelles, M. (2012). Cesarean section rates and indications in sub-Saharan Africa: a multi-country study from Medecins sans Frontieres.
9. Creanga, A.A., Berg, C., Syverson, C., Seed, K., Carol, B. F. & Callaghan, W.M. (2015) Pregnancy-related mortality in the United States, 2006–2010.
10. Dekker, L., Houtzager, T., Kilume, O., Horogo, J., van Roosmalen, J., & Nyamtema, A. S. (2018) Caesarean section audit to improve quality of care in a rural referral hospital in Tanzania. BMC pregnancy and childbirth, 18(1), 164. doi:10.1186/s12884-018-1814-1
11. Desai, G., Anand, A., Modi, D., Shah, S., Shah, K., Shah, A., Desai, S. & Shah, P. (2017) Rates, indications, and outcomes of caesarean section deliveries: A comparison of tribal and non-tribal women in Gujarat, India.
12. Engida, Y., Lisa, G.S., John, W.L. & Ben, W. M. (2019) Cesarean section in Ethiopia: prevalence and sociodemographic characteristics, The Journal of Maternal-Fetal & Neonatal Medicine, 32:7, 1130-1135, DOI: 10.1080/14767058.2017.1401606.
13. Gebremedhin, S. (2014) Trend and socio-demographic differentials of cesarean section rate in Addis Ababa, Ethiopia: Analysis based on Ethiopia demographic and health surveys data. Reprod Health.
14. Gunn, J.K., Ehiri, J.E., Jacobs, E.T., Ernst, K.C., Pettygrove, S., Center, K.E., Osuji, A., Ogidi, A.G., Musei, N., Obiefune, M.C., Ezeanolue, C.O. & Ezeanolue, E.E. (2017) Prevalence of Caesarean sections in Enugu, southeast Nigeria: Analysis of data from the Healthy Beginning Initiative.
15. Heemelaar, S., Nelissen, E., Mdoe, P., Kidanto, H., Roosmalen, J. & Stekelenburg, J. (2016) Criteria-based audit of caesarean section in a referral hospital in rural Tanzania. Trop Med Int Health, 21: 525-534. https://kth.gov.zm, retrieved on October 28 2019.
16. Kakoma, J. B. (2016) Cesarean section indications and anthropometric parameters in Rwandan nulliparae: preliminary results from a longitudinal survey. The Pan African medical journal, 24, 310.
17. Keila, C.M., Alicia, M., Aluisio, M., Aluisio, J. D. B., Ina', S.S., Eliana, Z. & Mariangela, F.S. (2017) Repeat caesarean section in subsequent gestation of women from a birth cohort in Brazil, Reproductive Health Biomed central.
18. Li, H.T., Luo, S., Trasande, L., Hellerstein, S., Kang, C., Li, J.X., Zhang, Y., Liu, J.M & Blustein, J. (2017) Geographic variations and temporal trends in cesarean delivery rates in China, 2008-2014. JAMA. 2017 01 3; 317(1):69–76.
19. Li, y., Bai, z., Long, D., Wang, H., Wu, Y., Reilly, K. H., Huang, S. & Ji, Y. (2019) Predicting the success of vaginal birth after caesarean delivery: a retrospective cohort study in China. BMJ Open 2019.
20. Litorp, H., Mgaya, A., Kidanto, H.L., Johnsdotter, S. & Essen, B. (2015) What about the mother?' Women's and caregiver's perspectives on cesarean birth in a low-resource setting with rising cesarean section rates. Midwifery.

21. Long, Q., Kempas, T., Madede, T., Klemetti, R. & Hemminki, E. (2015) Caesarean section rates in Mozambique. BMC Pregnancy and Childbirth. 15. 10.1186/s12884-015-0686-x.

22. Manyeh, A.K., Amu, A., Akpakli, D.E., Williams, J. & Gyapong, M. (2018) Socioeconomic and demographic factors associated with caesarean section delivery in Southern Ghana: evidence from INDEPTH Network member site. BMC Pregnancy Childbirth 18, 405 (2018) doi: 10.1186/s12884-018-2039-z.

23. Mascarello, K.C., Matijasevich, A., Barros, A.J.D., Santos, S.I., Zandonade, E. & Silveira, M.F (2017) Repeat cesarean section in subsequent gestation of women from a birth cohort in Brazil. Reprod Health 14, 102 (2017) doi:10.1186/s12978-017-0356-8

24. Musonda, A., Chisembele, M. & Ahmed, Y. (2012) A Comparative Study of Septic Complications in HIV Infected and HIV-Uninfected Women Undergoing Caesarean Section at the University Teaching Hospital, Lusaka, Zambia.

25. Mylonas, I. & Friese, K. (2015) Indications for and Risks of Elective Cesarean Section. DtschArztebl Int.

26. Nelson, J. P. (2017) Indications and appropriateness of caesarean sections performed in a tertiary referral centre in Uganda: a retrospective descriptive study. The Pan African medical journal, 26, 64.

27. Ng'anjo, P.S., Fylkesnes, K., Moland, K.M., Byskov, J. & Kiserud, T. (2016) Rural-Urban Inequity in Unmet Obstetric Needs and Functionality of Emergency Obstetric Care Services in a Zambian District.

28. Nkhata, E., Mulenga, D., Tembo, M., & Siziya, S. (2016) The prevalence and indication for caesarean section at Ndola Central Hospital, Ndola, Zambia. Asian Pacific Journal of Health Sciences.

29. Patrick, S., Seter, S. & Muleta, K. (2017) Rate, indications and foetal outcome of emergency caesarean section- A retrospective study at Ndola teaching hospital, Ndola, Zambia.

30. Saunders, M., Thornhill, A., & Lewis, P. (2009) Reseach Methods for Business Students. 5th Edition. Harlow: Pearson Education.

31. Setudezadeh, F. & yousefinezhandi, T. (2018) The increasing prevalence of caesarean in Iran: How the rate of caesareans could be controlled: 532-535.DOI:10.15406/ogij.2018.09. 0040402.

32. Smrity, M., Manisha, B. & Sunita B. (2019) Prevalence of caesarean section and its indications in A tertiary care hospital. Journal of Nepal medical association.

33. Sohn, S., & Liu, H. (2014) Analysis of medication and indication occurrences in clinical notes. AMIA ... Annual Symposium proceedings. AMIA Symposium, 2014, 1046–1055.

34. Sozou, P.D. & Hartshorne, G.M. (2012) Time to Pregnancy: A Computational Method for Using the Duration of Non-Conception for Predicting Conception. PLOS ONE 7(10): e46544. https://doi.org/10.1371/journal.pone.0046544

35. United Nations (UN). (2016) Sustainable Development Goals: 17 Goals to Transform Our World.

36. Vasant, k., Lakshmi, k. s., &Umadi, M.M. (2018) Retrospective study of caesarean rate in a tertiary care hospital. International Journal of

Reproduction, Contraception, Obstetrics and Gynecology.

37. Worjoloh, A., Manongi, R., Oneko, O., Hoyo, C., Daltveit, A., &Westreich, D. (2012) Trends in cesarean section rates at a large East African referral hospital from 2005-2010. Open Journal of Obstetrics and Gynecology. 02. 255-261. 10.4236/ojog.2012.23053.

38. World Health Organisation (WHO) (2014) Trends in Maternal Mortality: 1990 to 2013 Estimates by WHO, UNICEF, UNFPA, the World Bank and the United Nations Population Division.

39. World Health Organisation (WHO) (2015) statement on Caesarean Section rates. Department of Reproductive Health and Research.

40. World Health Organisation (WHO) (2018) Recommendations; non clinical interventions to reduce unnecessary caesarean sections.

41. World Health Organisation (WHO) (2019). Deaths for caesarean sections 100 times higher in developing countries: global study on Sexual and reproductive health.

42. World Health Organization (WHO) (2007) WHO Recommended Interventions for Improving Maternal and Newborn Health.

43. Yaya, S., Uthman, O.A., Amouzou, A. & Bishwajit, G. (2018) Disparities in caesarean section prevalence and determinants across sub-Saharan Africa countries. glob health res policy 3, 19 (2018) doi:10.1186/s41256-018-0074-y.

44. Zambia Ministry of Health, UNFPA, Population Council. National Emergency Obstetric and Newborn Care (EmONC) Needs Assessment 2014-2015 Policy Brief: Status of EmONC Services in Zambia. Lusaka, Zambia. 2018.

How to cite this Article: Fines Kamanda, Angel Malama; The Prevalence and Indications for Caesarean Section at Kitwe Teaching Hospital in 2018; Int. Res. Med. Health Sci., 2021; (4-4): 1-17; doi: https://doi.org/10.36437/irmhs.2021.4.4.A

Source of Support: Nil,

Conflict of Interest: None declared.

Received: 10-7-2021; **Revision:** 23-8-2021; **Accepted:** 31-8-2021