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Prevalence of Caesarian Section and Associated Factors at Chawama First Level Hospital, in Lusaka Urban District, Zambia

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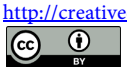

Abstract

Introduction: Caesarean section (C-section) is a major obstetric life-saving intervention for the prevention of pregnancy and childbirth-related complications. The goal of Caesarean section is to improve maternal and neonatal outcomes leading to reduced maternal and neonatal deaths. Globally C-section is increasing, as well as in in Zambia. This study identifies the prevalence of C-section and bio-demographic, socioeconomic, health care seeking and socio-culture factors of C-section among women at Chawama First Level Hospital in Zambia. **Methodology:** A descriptive cross-sectional study design was used. Data was collected from 219 participants who were randomly selected for interviews using a systematic sampling method. A semi-structured interview questionnaire and a checklist were used to collect data from the respondents. Data was analysed using SPSS version 20 computer software statistical package. Chi-square test and binary logistic regression were performed to determine association between the dependent and independent variables. The level of significance was set at 0.05 with 95% confidence interval. **Results:** The study shows a significant association between having a cesarean section and the age of the respondents as seen from the p-value of 0.309. Women aged 25 - 29 were 3.448 times more likely to deliver through the caesarian section, while those aged 30 - 34 were 3.692 times more likely to deliver through the caesarian section. In this study, maternal education was significantly associated with C/S with the p-value of 0.006c. This study also showed a significant association between maternal income and C/S with the p-value of 0.014. In this study, mothers who had ANC follow-up three times were 5.17 times. Similarly, those women who had ANC visit of four were 4.49 times more likely to have cesareans section compared with mothers who had one ANC visit. The current study showed a significant association between birth weight and C/S with the p-value of 0.002c. The study showed a significant association between C/S and parity.

Primipara were more likely to have C/S compared to multipara women. Women with high income were 2.494 times more likely to deliver through the caesarian section as opposed to those with low income. Women aged 25 - 29 were 3.448 times more likely to deliver through the caesarian section, while those aged 30 - 34 were 3.692 times more likely to deliver through the caesarian section. Births that involved big babies were 5.022 times more likely to be caesarian section deliveries as opposed to small and normal babies. Normal birth weight babies showed odds of caesarian section delivery to at 2.334. Primipara women were 1.431 times more likely to give birth through the caesarian section as opposed to multipara women. **Conclusion:** The prevalence of cesarean section was high and the predictors of cesarean section were Age, maternal education, Parity Income and Birth weight.

Subject Areas

Gynecology & Obstetrics

Keywords

Prevalence, Caesarian Section, Associated Factors

1. Introduction

Caesarean section (CS) is an important medical intervention and a life-saving obstetric surgery, which may be necessitated (sometimes the only feasible option) in high-risk pregnancies such as those with multiple/large foetuses, breech presentations, obstructed labour, reducing the risk of poor perinatal outcomes. C-section has played a pivotal role in reducing maternal mortality over the last few decades [1]. Caesarean section (CS) is a life-saving intervention for women and newborns when complications occur, such as antepartum haemorrhage, fetal distress, abnormal fetal presentation and hypertensive disease. CS is the most common major surgical intervention in many countries [2]. Rates of CS have been rising during the last three decades to levels well above recommended CS rates of 10% - 15%, driven by major increases in non-medically indicated CS in many middle- and high-income countries [3]. Yet, population caesarean rates above 20% have not been shown to improve perinatal outcomes [3].

The global rate of C-section delivery is rising steadily and has reached a rate of 21.1% of all births in 2015 with an average annual increasing rate of 3.7% during 2000-2015 [4]. However, CS deliveries have been conducted due to non-medical factors including maternal age, socioeconomic status, literacy levels, occupation, religion and culture [5]. In LMICs, the causes for the increasing CS use remain unclear, although socioeconomic factors have been shown to contribute to the increase [6].

By the end of the year 2015, the Sustainable Development Goals (SDGs) emerged with a target to bring a reduction in maternal mortality ratio (MMR) to less than

70 per 100,000 live births worldwide, and to ensure healthy lives for all ages by 2030 [7]. Despite the immense global interventions to reduce the problem of mother and child deaths due to complications in pregnancy and delivery, the magnitude of maternal mortality remains unabated specifically in sub-Sahara Africa region [5]. This implies the necessity to provide evidence-based, quality, and high-impact maternal healthcare services, particularly universal access to emergency gynecological and obstetric care, which should be made a priority on the global health agenda. Predominantly, developing countries are known to account for approximately 99% of the estimated 303,000 maternal deaths that occur per year worldwide, where access to antenatal care, family planning, postnatal care and emergency obstetric services have been reported inadequate [8]. In the quest to achieve SDG-3, equity and equality in availability of emergency obstetric care including assisted vaginal delivery together with safe caesarean section (CS) is exceedingly essential [9]. On the other end, many low- and middle-income countries still have population CS rates well below 10%, which is considered indicative of inadequate access to medically indicated CS [10].

Caesarean section (CS) is a major procedure in the management of complications during pregnancy and labour. In countries in the Global South, it accounts for the vast majority of obstetric interventions regardless of whether the indication is absolute, necessary or prudent. Ensuring quality access to CS is a key challenge for the millennium [7], and the next sustainable development goal is to reduce maternal and infant mortality. As with any surgical procedure, a CS involves risks and complications and should therefore be performed in an approved way and not used excessively. Studies on the relationship between the CS rate and maternal and perinatal mortality and morbidity have concluded contradictory results, [11]. Maternal mortality has a significant impact on the surviving family, the broader community, healthcare providers and society in general. It is also frequently used as a regional or national public health indicator to assess a healthcare system's quality. Nearly 300,000 women die every year as a result of a pregnancy or a CS or vaginal delivery. Approximately 99% of these deaths occur in developing countries [12]. Systemic action is therefore needed to reduce maternal mortality. These efforts are real but remain insufficient, particularly in Zambia, which is among the sub-Saharan African countries making the slowest progress in combating maternal mortality [9].

Moreover, the population-based caesarean section is used as a process indicator in maternal health to monitor progress [13]. Despite being a lifesaving intervention, caesarean section is not without complications that could lead to maternal, neonate, and infant morbidity and mortality and development of chronic non-communicable diseases. Its high cost may lead to unnecessary expenditure to the already overburdened and economically hard-hit families, especially in developing countries [14]. As caesarean section rates increased above 10% and up to 30%, no effect on mortality rates was observed [15]. Despite that, there has been a tremendous increase in population-based all-cause CS rates globally ranging from

0.4% to 51%. It is worth noting that a continuous rise in the trend has been observed during the past 30 years [17].

When medically indicated, CS has the potential to reduce maternal/neonatal mortalities and morbidities including delivery complications such as obstetric fistula [8]. However, a non-medically indicated CS has no associated additional benefits for mothers and newborns. Rather, like any surgery, it carries both short-term and/or long-term health risks [3]. Caesarean delivery is over-utilised in many middle-income to high-income countries [3]. For instance, the rate is as high as 25.9% in China, 32.3% in Australia/New Zealand and 45.9% in Brazil [16]. It has been argued that many of the caesarean deliveries in these countries were in excess, medically unjustifiable and thus unnecessary [17]. However, in several low-income countries, where over 60% of the world's births occur, the population-based prevalence of CS is low, for example, 3.0% in West Africa [3]. This low prevalence may reflect poor availability of-/accessibility to comprehensive essential obstetric care services (EOC) in the countries/region [17]. Comprehensive EOC refers to a package of clinical services for managing pregnancy/childbirth-related complications of which CS is a critical component [8].

At the top of the World Health Organization's (WHO) agenda regarding maternal mortality is improving the availability, accessibility, quality, and use of services for the management and treatment of complications of pregnancy, labor, and delivery. Epidemiologic studies have shown that in high-income (HIC) and some low- and middle-income countries (LMIC) alike, CS is being provided at higher, and sometimes much higher, rates than recommended. A recent WHO publication reports that between 1990 and 2014 the global average CS rate increased from 12.4% to 18.6% with rates ranging, depending on region, between 6% and 27.2%, and rising at an average rate of 4.4% per year [3]. The lowest rates were found in Africa (7.3%), followed by Asia (19.2%), Europe (25%), Oceania (31.1%), and North America (32.3%) with Latin America and the Caribbean having the highest rates at 40.5% [3]. While all the other regions showed an increase in CS, there was a small, but real increase in the CS rates in Sub-Saharan Africa (SSA) over that time period, as well.

Despite its advantage, CS is associated with adverse maternal and neonatal outcomes including long-term sequels, with appropriate clinical indication significantly saving the life of the mother and the newborn as well. Cesarean section performed with aseptic technique, appropriate anesthesia, the applicability of lower transverse uterine segment cesarean section, safe and rapid availability of blood products collectively decreases the morbidity and mortality associated with cesarean section [18]. The rate of cesarean section is twice as high in private than in public hospitals [19]. According to Betrán *et al.* [3], the global cesarean section rate (CSR) is 18.6% ranging between 6.0% to 27.2% in developing and developed world respectively, Latin American and Caribbean accounts for the highest proportion of cesarean section rate (40.5%) and the lowest rate is in Africa (7.3%), particularly in western Africa (3%). The major obstetrical indication for cesarean

section is obstructed labor, previous CS scar, non-reassuring fetal heart pattern, malpresentation, malposition, antepartum hemorrhage and failed induction, cesarean section rate more than the WHO threshold (15%) causing morbidity and mortality than giving any advantage, so routine use of antibiotics for all women undergoing CS decreases the morbidities associated with CS [20].

However, there is a paucity of data on the topic in Zambia. Therefore, the current study was aimed at determining the prevalence of cesarean section and associated factors at Chawama Level I hospital in Lusaka urban district.

2. Problem Statement

The adequate population-based prevalence for cesarean section intervention remains a subject of strong contentions, worldwide, revealing a lack of consensus [8]. However, evidence suggests that a population-based CS prevalence <5% indicates unmet needs (lack of access to women in need of it), while prevalence >15% may show no additional benefit for mothers and babies [17]. In 1985, the WHO recommended CS rates—as a percentage of live births between 10% and 15% as the optimal range, with a declaration that there is no justification for caesarean section rates in any region to be higher than 10% - 15%. However, the prevalence and associated factors at Chawama First Level Hospital are not clearly understood. The purpose of this research is to develop an empirical body of knowledge for professions in order to improve the way CS is handled. According to HMIS 2021 at Chawama First Level Hospital, there has been an increase in CS compared to the previous years, hence the need to study the prevalence and associated factors. The trend of caesarian sections at Chawama First Level Hospital for the past 3 years is as follows: 2019—497 (7%), 2020—782 (11%) and 2021—798 (12%) respectively [21].

3. Justification of the Study

Rates of CS have been rising during the last three decades to levels well above recommended CS rates of 10% - 15%, driven by major increases in non-medically indicated CS in many middle- and high-income countries [3]. Yet, population caesarean rates above 20% have not been shown to improve perinatal outcomes [3]. Knowledge gained from this study on prevalence and associated factors of C-section factors will help in making recommendations regarding the development of appropriate health education and treatment strategies to empower women on the importance of caesarean section. The information will be used to develop guidelines and education materials that may be used in counseling before patients are taken for C/S during and post-operatively. The findings would contribute to the review of the EMOC treatment protocols and policies, related in-service education for Health personnel and review of health education programs for emergency cases for ANC mothers so as to improve their management and improve the health of the mothers and babies.

4. Methodology

A cross-sectional survey was conducted using a structured questionnaire between September and October 2023 at Chawama General Hospital in Zambia. A total of 219 women 15 - 49 years of age who had delivered within six weeks prior to data collection were interviewed. The study was guided by the ecological framework. For the analysis of associated factors of C-section, the explanatory variables were maternal age, educational status of women and their husbands, women's religion, employment status of the woman and husband, employment status of woman and husband wealth index of the household, the number of ANC visits and presence of complications during pregnancy and the last childbirth. Logistic regression model was run among 219 women, who had facility delivery. Variables found significantly associated with the outcome (C-section) in bivariate analysis were included in the multivariable logistic model. A p-value < 0.05 was considered as statistically significant in the analyses.

Inclusion criteria-Mothers who gave birth after a gestational age of viability (after 28 weeks) at Chawama General Hospital and were willing to participate in the study were included in the study.

Exclusion criteria-Mothers who underwent cesarean section for extra-uterine pregnancy were excluded from this study.

The study population were all women who gave birth during the period of study at Chawama General Hospital Post-natal mothers who gave consent to participate in the study and gave birth after gestation age viability (28 weeks) at Chawama General Hospital. The women were 15 years and above with no record or history of mental health problems, regardless of parity or marital status. Post-natal mothers who did not give consent to participate in the study, those who delivered outside the Chawama general hospital catchment area and those with mental health problems. Purposive sampling method was used to select the study setting (Chawama General Hospital) and systematic sampling method was used to select participants who are receiving their postnatal services. In this sampling procedure, each postnatal woman has an equal chance of being selected for the study and ensures the desired representation from the Hospital.

The sample size was determined using a formula by Taro Yamene 1973 with 95% confidence level as indicated below: [22]

$$n = \frac{N}{1 + Ne^2}$$

where N = population size n = sample size e = margin of error which is 0.5

$$n = \frac{N}{1 + Ne^2}$$

Therefore $n = \frac{550}{1 + 550 \times 0.05^2} = \frac{550}{2.575}$

Total sample size = 232.

A pretested semi-structured interview schedule was used to elicit self-report data to explain the relationship between dependent and the independent variables

under study. It was adopted from previous studies and literature on CS. It was designed in English and then translated into the local language. The data-collecting tool was chosen because it was a relatively simple, quick and efficient method of obtaining data. The semi-structured interview schedule was comprised of four sections. Section A contained questions on bio-demographic data of the respondents, Section B had questions on socioeconomic status, Section C had questions on health-seeking factors Section D had questions on socio-cultural factors and Section E had questions on CS. In addition, a checklist was also used to collect data and it elicited information on the women's obstetric characteristics.

Validity was ensured by conducting an extensive literature search of the current literature on the study, and all necessary information was included in the research instrument. The research instrument was constructed in simple, clear and precise language to avoid ambiguity and misinterpretation of questions. It was translated into a local language to ensure the respondents understood the questions. The research supervisor and experts also examined the tool to determine whether it elicited the desired information. The researcher also consulted the supervisors and experts on the topic.

Reliability was ensured by using the same data-collecting tool to collect data from all the participants. A pilot study was conducted before conducting the main study. The pilot study was conducted in an environment with similar characteristics to the one in which the main study was conducted. Reliability was also assessed by using a Cronbach alpha test with value of 0.80. Data was collected using face-to-face interviews and before data collection the Researcher introduced herself to the respondents and explained the purpose of the study. The Respondents were assured of confidentiality and anonymity. Informed consent was obtained from the respondents, and the interviews were conducted privately. Each interview lasted for approximately 20 to 30 minutes. The researcher asked the interviewee for any questions, comments or contributions regarding the study and then thanked the participants for taking part in the study. At the end of the interview, the researcher went through the interview schedule to check for consistency in the answers given and the completeness of the interview schedule. Data collecting tools were checked on a daily basis for their completeness and accuracy. The collected data was kept under strict security conditions to avoid unauthorized access to the information contained in it. These measures include keeping the computer in a lockable cupboard and putting passwords on the computer to prevent unauthorized access.

Before the actual study was conducted, a pilot study was carried out in Matero First Level Hospital using 10% of actual study sample. A pilot study was conducted to determine and measure the logical, space for answers, need for further instructions, appropriateness and clarity of the language used in constructing the questionnaire. The postnatal women were selected using systemic random sampling procedure. Adjustments were made to the questionnaire where necessary. After completion of data collection, the data was manually checked for errors, corded

and entered into a computer software; Statistical Package for Social Sciences (SPSS). Data was entered into excel then exported to SPSS version 20 and descriptive statistics were used to analyse data. Any value of $p < 0.05$ was considered significant with 95% confidence interval. Initially, bivariate logistic regression was carried out to determine the association of each of the independent variables with the outcome variable.

The Ethical Review Committee of University of Zambia Biomedical Research Ethics Committee (UNZABREC) and the National Health Research Board reviewed and approved the study (Reference number 4099-2023). Participants provided written informed consent to participate in the study either by signing or by giving a thumbprint (if illiterate). A signature or left thumb impression was also obtained from a witness during the consent process. In the case of participants under the age of 18, informed consent was obtained from legal guardians, and assent was obtained from the participants. The privacy, anonymity, and confidentiality of information were maintained in due process. Auditory privacy was maintained during the interview. All the hardcopy data forms were de-identified by separating the identification page. A unique alphanumeric code was assigned to each data form and entered into the database. The identification page and consent form were kept in lock and key. Therefore, participation in the study was voluntary. Participants were informed of their right to withdraw from the study at any point without need to give a reason. Respect for Intellectual Property: Patents, copyrights, and other forms of intellectual property were honored and were given credit where it is due when compiling data and also in processes of report writing. All the data to be collected was not to be used for any other purpose apart from the intended and communicated purpose.

5. Results

From the total of 232 sampled mothers, 219 questionnaires were included in the analysis giving a 94% response rate. The remaining 13 questionnaires were discarded due to incompleteness of data. Approximately 34% of the respondents were between the ages of 20 - 24, 70% were married and were and 99% were Christians. About 70% of the respondents had attained secondary school level of education and 50% earned an income of less than K2000. Most (70%) of the respondents' partners had attained secondary school level of education with an income between 3000 - 5000 (57%). The highest prevalence was seen among Christians at 99% followed by maternal education, partner education and among married women which stands at 70%. The partner income stands at 57%, maternal income at 50% and age at 34%. (See **Table 1**)

The findings in **Table 2** show that 80% of the respondents did not undergo caesarian section and 20% had CS. 95% of those who had CS had an emergency CS. Most (80.8%) of the respondents had visited the antenatal clinic 3 times or more during the current pregnancy. About 37% of the respondents had babies with normal birth weight, 54% of the mothers were Multipara. The overall preva-

lence of caesarian section was 20% and the majority of the mothers 95% had live birth outcome.

Table 1. Respondents sociodemographic data (n = 219).

Variable	Frequency	Percent
Age		
<18	10	4.5
18 - 21	30	13.6
22 - 25	74	34
26 - 29	53	24
30 - 34	29	13
>35	23	11
Total	219	100
Marital status		
Single	64	29
Married	154	70
Widowed	1	0.5
Separated	0	0
Total	219	100
Religion		
Christian	217	99
Moslem	2	1
Total	219	100
Maternal Education Level		
Primary	45	20.5
Secondary	153	70
Tertiary	20	9
Never been to school	1	0.5
Total	219	100
Maternal Income level		
Less than K2000.00	110	50
K3000.00 - K5000.00	66	30
K6000.00 - K8000.00	42	19
K9000.00 - K11,000.00	1	1
Total	219	100
Partner level of education		
Primary	18	8
Secondary	153	70
Tertiary	43	20
Never been to school	5	2
Total	219	100

Continued

Partners Income level		
Less than K2000.00	57	26
K3000.00 - K5000.00	125	57
K6000.00 - K 8000.00	24	11
K9000.00 - K11,000.00	14	6
Total	219	100

Table 2. Respondents obstetric characteristics (n = 219).

Variable	Frequency	Percent
Caesarean section		
Yes	44	20
No	175	80
Total	219	100
ANC visit		
3 - 4 Visits	71	32.4
5 - 6 visits	106	48.4
7 - 8 Visits	42	19.3
Total	219	100
Birth weight		
Small	71	32
Normal	80	37
Big	68	31
Total	219	100
Type of C/S		
Planned	2	5
Emergence	42	95
Total	44	100
Indications for C/S		
NRFHR	17	39
CPD	23	52
Malpresentation	1	2
Severe Pre-eclampsia	3	7
Total	44	100
Parity		
Primipara	100	46
Multipara	119	54
Total	219	100

Continued

Stillbirth		
Yes	13	5
No	207	95
Total	219	100

Table 3 in this study shows a significant association between having cesarean section and age of the respondents as seen from the p-value of 0.091. Women aged 25 - 29 were 3.448 times more likely to deliver through caesarian section, while those aged 30 - 34 were 3.692 times more likely to deliver through caesarian section. In addition, the study showed no significant association between having caesarian section and marital status as this can be seen from the P-value 0.502. Furthermore, the current study showed no significant association between CS and religion with the P-value of 0.638c.

In addition, this study shows maternal education was significantly associated with CS with the P-value of 0.006. This is so because when a woman is educated, she is able to understand the benefits of CS and the consequences that may come if they refuse to be attended to if indications are there for CS. Women who are educated are able to make informed decisions on their own unlike waiting for their husbands or relatives to make decisions for them, because they understand the benefits of CS. This study also showed a significant association between maternal income and CS with the P-value of 0.014. Partner income showed no significant association with CS with the P-value of 0.378.

The predictor variable ANC showed no significant association with CS in this study. This study revealed that those mothers who had ANC follow-up were 5.17 times more likely to have cesarean section compared to mothers who had no ANC visits. Similarly, those women who had ANC visit of four were 4.49 times more likely to have cesareans section compared with mothers who had one ANC visit. The current study showed a significant association between birth weight and CS with the p-value of 0.002. In addition, the study showed a significant association between CS and parity. Primipara were more likely to have CS compared multipara women. Furthermore, gestational age and child spacing were not associated with caesarian section in this study, as shown by the p-value of 0.336c and 0.321 respectively. (See Table 4)

Table 5 indicates a relationship between the predictors (Income, Birth weight, Parity and Age) and the outcome variable (caesarian section). Women with high income were 2.494 times more likely to deliver through caesarian section as opposed to those with low income. Women aged 25 - 29 were 3.448 times more likely to deliver through caesarian section while those aged 30 - 34 were 3.692 times more likely to deliver through caesarian section. Births that involved big babies were 5.022 times more likely to be caesarian section deliveries as opposed to small and normal babies. Normal birth weight babies showed odds of caesarian section delivery to at 2.334. Primipara women were 1.431 times more likely to give birth through caesarian section as opposed to multipara women.

Table 3. Association between C/S and sociology-demographic characteristics—(n = 219).

Predictor	C/S = 44	SVD = 175	TOTAL = 219	p-value
Maternal Age				
<18	1 (10%)	9 (90%)	10 (100%)	
18 - 19	4 (13%)	26 (67%)	30 (100%)	
20 - 24	13 (18%)	61 (82%)	74 (100%)	0.091[c]
25 - 29	9 (31%)	20 (70%)	29 (100%)	
30 - 34	14 (26%)	39 (26%)	53 (100%)	
≥35	3 (13%)	20 (87%)	23 (100%)	
Marital status				
single	10 (19%)		64 (100%)	
monogamy	34 (23%)	54 (84%)	151 (100%)	
polygamy	0	117 (77%)	3 (100%)	0.502[c]
widowed	0	3 (100%)	1 (100%)	
separated	0	1 (100%)	0	
Divorced	0	0	0	
Religion				
Christianity	44 (20%)	173 (80%)	217 (100%)	0.638[fc]
Islam	0	2 (100%)	2 (100%)	
Maternal education				
Primary	7 (16%)	38 (84%)	45 (100%)	
Secondary	27 (17%)	126 (82%)	153 (100%)	0.006[c]
Tertiary	10 (50%)	10 (50%)	20 (100%)	
No been to school	0	1 (100%)	1 (100%)	
Maternal income				
Good	12 (19%)	52 (81%)	64 (100%)	0.014[c]
Average	25 (28%)	64 (72%)	89 (100%)	
Poor	7 (11%)	59 (89%)	66 (100%)	
Partner income				
Good	3 (43%)	4 (57%)	7 (100%)	0.378[c]
Average	28 (23%)	121 (14%)	149 (100%)	
poor	14 (29%)	49 (78%)	63 (100%)	

6. Discussion of Findings

The current study revealed that most of the respondents (34%) were between the ages of 20 - 24 (see Table 1) and were married (70%). Most of the respondents were married because marriage is universal in Zambia. Almost all (99%) the respondents were Christians. This is because Zambia is a Christian nation. About

Table 4. Association between C/S and obstetric characteristics (n = 219).

Predictor	C/S	SVD	Total	P-Value
ANC attendance				
Excellent	12 (30%)	28 (70%)	40 (100%)	
Good	20 (20%)	82 (80%)	102 (100%)	0.184[c]
Average	11 (15%)	60 (85%)	71 (100%)	
poor	1 (17%)	5 (83%)	6 (100%)	
Birth Weight				
Big	20 (34%)	39 (66%)	59 (100%)	0.002[c]
normal	17 (20%)	69 (80%)	86 (100%)	
small	7 (9%)	67 (91%)	74 (100%)	
Parity				
Primiparous	20 (20%)	80 (80%)	100 (100%)	0.556[c]
Multiparous	24 (20%)	95 (80%)	119 (100%)	
Gestational age				
<37 weeks (preterm)	18 (23%)	59 (77%)	77 (100%)	0.336[c]
37 - 42 weeks (term)	24 (18%)	113 (82%)	137 (100%)	
>42 weeks (post term)	2 (40%)	3 (60%)	5 (100%)	
Child spacing				
<12 months	4 (21%)	15 (79%)	19 (100%)	0.321[c]
<24 months	12 (20%)	45 (79%)	57 (100%)	
>24 months	28 (19%)	115 (79%)	145 (100%)	

Table 5. Binary logistic regression analysis of variables (income, birth weight, parity and age) contributing to cesarean-section (n = 219).

VARIABLE	p-value	OR	95% CI	
			Lower	Upper
Income (Ref: Low)				
High	0.052	2.494	0.992	6.267
Parity (Ref: Multipara)				
Primipara	0.377	1.431	0.647	3.164
Birth Weight (Ref: Normal, Small baby)				
Big baby	0.001	5.022	1.867	13.512
Birth Weight (Ref: Big baby, Small baby)				
Normal baby	0.089	2.334	0.878	6.206
Age (Ref: <18, 18 - 19, 20 - 24, 30 - 34)				
25 - 29	0.091	3.448	0.820	14.500
Age (Ref: <18, 18 - 19, 20 - 24, 25 - 29)				
30 - 34	0.087	3.692	0.828	16.465
Constant	0.000	0.020		

70% of the respondents had attained secondary School education. Most (70%) of the respondents' partners had attained a secondary school education level. Half (50%) of the respondents had an income level of less than 2000 Kwacha and 57% of their partners earned an income between 6000 and 8000 Kwacha. The present study showed a significant association between age and caesarian section as women aged 25 to 29 years were 3.448 times likely to deliver through caesarian section while those aged 30 - 34 were 3.692 times more likely to deliver through caesarian section (**Table 5**). However, the study showed no significant association between caesarian section and marital status, as this can be seen from the P-value 0.502. In addition, the current study also showed no significant association between CS and religion with the P-value of 0.638.

The findings showed a significant association between maternal education and CS with the p-value of 0.006. This is so because when a woman is educated, she understands the benefits of CS and the consequences that may arise if they refuse to be attended to quickly especially if CS is indicated. Women who are educated are able to make informed decisions on their own unlike waiting for their husbands or relatives to make decisions for them because they understand the benefits of CS. This study also showed a significant association between maternal income and CS with the p-value of 0.014 (**Table 3**). Most women with high income are educated and have the knowledge of various issues patterning to their health. However, partner income showed no significant association with CS with the P-value of 0.378.

Of the 219 mothers who participated in this study, 20% (44/219) were delivered by CS. This is a facility-based CS rate at Chawama First Level Hospital which offers comprehensive emergency obstetric care (CEmOC) services. The prevalence may be high because the facility is a referral hospital, hence the spike in the prevalence rate. This range is higher than the recommended WHO rate of 10% - 15% [8], however it is similar to a study that was undertaken to determine prevalence and indication of caesarian section in Ndola Central Hospital showed a high rate of 20.7% [23]. Furthermore, the finding is similar to the results of a study done at a large East African referral hospital (Kilimanjaro Christian Medical Center) in Tanzania from 2005 to 2010 that revealed prevalence rate ranging from 29.9% to 35.5% [24] and a prevalence of 21.4% from the study at a teaching hospital in Lahore, Pakistan [25]. It is worth noting that the Pakistan study was a cross-sectional review of the Pakistan Demographic Health Survey data rather than a facility-based one.

The study showed that 48.4% of the respondents visited the ANC 5 - 6 times (**Table 2**) This is attributed to the good sensitization and follow-up of the ANC mothers in the community by the SMAGs and the Public Health Nurses. About 37% of the mothers' babies had normal birth weight and 95% of the C/S was emergency. In addition, 52% of mothers who underwent C/S were due to cephalopelvic disproportion (CPD) and 54% of the respondents were multiparous women. In addition, slightly more than half (54%) of the respondents were multipara and had

not experienced any stillbirths (95%).

In the present study, the predictor variable ANC did not show significant association with CS. This may be due to the fact that most women who don't attend ANC contacts are not identified, so they may be booked for C/S and they mostly deliver by chance, for example. A woman with previous CS comes in the second stage of labour. These findings are contrary to the findings in a study conducted in Ethiopia by Tesfaye *et al.* [26], which showed a significant relationship between Caesarian section and ANC attendance. The current study revealed no significance between ANC visits and caesarian section. These findings are contrary to a study done in Ghana by Manyeh *et al.* [27]. It might be due to the exposure to ANC utilization and exposure of mother to healthcare workers during ANC visits that helped them identify more risk of pregnancy complications [26]. Considering the importance of antenatal care in the reduction of complications, a new World Health Organization guideline emphasizes that every pregnant woman should have at least eight antenatal care visits during each pregnancy [28]. The findings of previous studies also revealed that antenatal care is considered an important component of women's health during the course of pregnancy that can play a pivotal role in reducing the likelihood of caesarean deliveries [29]. Although there's no clear reason behind this, it can be assumed that women with pregnancy complications, such as obesity, hypertension and diabetes, were asked by the gynaecologists to have frequent antenatal care visits in order to handle any undesirable obstetric risk.

In a study conducted in Gondar Ethiopia by Abayneh [30], it was reported that ANC follow-up and the number of ANC visits were significantly associated with cesarean section. Those mothers who hadn't ANC follow-up in their last pregnancy were 75.2% less likely to cesarean section compared with their contour part. Among respondents, those mothers who had ANC follow-up three times were 5.17 times more likely to have a cesarean section compared with those mothers who have one ANC visit (AOR = 5.17, CI 1.48 - 18.00).

Furthermore, the current study showed a significant association between birth weight and C/S with the p-value of 0.002. This is due to the fact that big babies are unable to pass through the birth canal as it is able to stretch to certain extent beyond the estimated size the woman will tear and cause more complications, hence the need for CS. In addition, this study showed a significant association between parity and CS. Primipara were more likely to have CS compared multipara women. This is because the muscles of the pelvis are still rigid; they are not yet stretched to allow the fetus to easily pass through the birth canal, and their pelvis is still contracted. Similar findings were found in a study on nulliparity as a risk factor for poor obstetrical and neonatal outcomes in Rwanda [31]. These findings are contrary to the findings of a study done in South Africa by S. Yaya, where it was reported that multipara significantly increased the odds of having caesarean compared to nullipara. These findings were also consistent with a study conducted in South Africa by Inyang-Otu *et al.* [32] where increase in caesarean section rates

was increased with parity. This could be explained by the tendency for babies to get bigger with successive pregnancies making the delivery process more difficult as the size of the mother's bony pelvis remains constant [33]. Furthermore, a study done in Brazil demonstrated that the odds of having CS among women who got pregnant two or four times were 3.26 times more likely to have CS compared with their counterparts (AOR = 3.26, CI: 1.48, 7.16) [34]. The present study showed that CS deliveries were significantly different among age groups, with CS more common among nulliparity women. Gestational age and child spacing were not associated with caesarian section in this study as seen from the p-value of 0.336 and 0.321 respectively.

7. Conclusion and Recommendations

The study was conducted to determine Prevalence of Caesarian Section and associated factors at Chawama First Level Hospital among post-natal mothers in Lusaka Province in Zambia. A descriptive Cross-sectional study design was used. Furthermore, data was collected using a structured interview schedule on 219 randomly selected participants. The study revealed a CS prevalence of 20%, which is above the WHO recommended rate for developing countries, which is 10% - 15% [8]. There is a need to reduce C/S by evaluating each case for possible vaginal delivery. The high C/S rate at Chawama may be attributed to it being a referral hospital from other facilities. The common contributing factors to CS were big babies, maternal age, maternal complications, maternal education, and income. In addition, the findings of this study showed that women with higher education and income were likely to have CS as compared to those with low education. This could be attributed to the fact that these mothers know the benefits of CS both to the mother and baby. Those with good economic status showed 70% chance of having CS compared to those with low income, who had 30% chance of CS. There is a need, therefore for a conceited effort by all the stakeholders to work together and address the matter urgently. A more rigorous study with a larger study sample could be carried out on the same research topic to enable generalization of findings to the rest of the country.

8. Limitation of the Study

The study could have several limitations. First, as inherent in survey designs, associations are shown and these do not demonstrate causality. There may be potential recall bias or under-reporting of CS cases since this is a self-report study. Participants may not be willing to reveal information on CS. The study sample size was small due to limited resources in terms of funds and time availability. As a result of this small sample size, the results of the study should be generalized with caution to the rest of the women in Lusaka District or elsewhere. However, to minimize this, the researcher was trained in interviewing skills and ensured privacy and confidentiality of the respondents throughout the study. The study was a single-center study with a limited sample size.

9. Strength of the Study

The study has a number of strengths, first the study used recent data from Chawama First Level Hospital and its results will be used immediately the findings are published in order to catalyze prompt improvement within the concerned organization. Furthermore, the study will minimize researcher bias through structured data collection and analysis, hence providing statistically valid and liable results. Additionally, the study will improve on the selection of women going for CS, hence reducing the prevalence. It will also help obstetricians and midwives to improve their skills in handling women who are supposed to go for CS.

Conflicts of Interest

The authors declare no conflict of interest.

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