International Journal of Science and Healthcare Research
Vol. 8; Issue: 3; July-Sept. 2023
Website: ijshr.com
Original Research Article *ISSN: 2455-7587*

Prevalence and Factors Associated with Cesarean Section at UTH Women and Newborn Hospital Lusaka, Zambia

Joan Himalowa[1], Chola Mumbi[2], Simon Himalowa[3]

[1,2,3]The University of Zambia, Department of Epidemiology and Biostatistics, University of Zambia, Lusaka, Zambia

Corresponding Author: Joan Himalowa

DOI: https://doi.org/10.52403/ijshr.20230344

ABSTRACT

Background: Increase in cesarean section (CS) has been a source of public health concern globally. There is scanty updated information about cesarean section and associated factors in developing countries like Zambia. The aim of this study was to determine the prevalence of CS and associated factors at The University Teaching Hospital women and New-born in Lusaka Zambia.

Methodology: The study design was cross sectional. It involved retrospective collection of data from birth registers of women who gave birth at the University Teaching Hospital-Women and Newborn from 1st January, 2018 to 31st December 2018. The total sample size was 6,965 women (15-49 years) after the inclusion and exclusion criteria were met. Statistical analysis was conducted using Binary Logistic Regression, level of significance was 0.05 and Confidence Interval of 95%. Goodness of fit was conducted using the likelihood ratio test. Data was analyzed using STATA version 14.2.

Results: The Prevalence of Cesarean section was 44%. Factors significantly associated with Cesarean Section were maternal age (grouped), Birth weight (grouped), gestational age (grouped) and still birth (AOR=0.47 P<0.0001). There was an increased odds of having Cesarean Section among multipara (AOR= 1.10 P=0.73) and Multigravida (AOR=1.04, P=0.73). Common maternal indicators identified were repeat caesarean section (18%), obstructed labor (11%) and failure to progress (10%). The common fetal indicators identified were fetal distress (18%), big baby (10%) and mal presentation (7%).

Conclusion: Prevalence is higher than the recommended WHO limit. There is need to reinforce health education, reinforce fetal monitoring and promote vaginal birth after caesarean.

Key words: Cesarean Section, Prevalence, Factors, Women and newborn, Zambia.

INTRODUCTION

Cesarean Section (CS) is an important lifesaving surgical intervention that can reduce maternal and newborn morbidity and mortality [1]. Cesarean section is considered an essential treatment for antepartum hemorrhage, prolonged or obstructed labor, preeclampsia or eclampsia, and intrapartum fetal distress and other medical conditions [2]. However, there is a growing public health concern that the prevalence of CS has been rising for all women in the world regardless of the medical condition, maternal age or gestational age [3]. Despite the WHO recommending the optimal range of CS to be between 10-15%, countries are still recording high prevalence [4][5], although in developing countries the range varies from extremely low to high[3][6] [7]. Nonetheless studies have revealed that this rise has not resulted in significant improvement in neonatal or maternal mortality [8][9]. On the contrary, a study argued that the increase in CS prevalence

resulted in the rapid decrease in both mortality and morbidity of fetus and mothers who had undergone the surgical intervention [10]. With these back-and-forth arguments, it can be noted that cesarean section remains a subject of strong contentions, worldwide, revealing a lack of consensus. In view of the fore mentioned, various studies have been conducted across the globe and have reported different factors associated with CS. These include place of health seeking (private or public hospital)[11], social economic status[12], premature rapture of membrane, gestational age, maternal age, umbilical cord prolapse, multiple pregnancy, parity, repeat cesarean section, prolonged labor and mal presentation among others[12][6][13][14]. However such information has not been largely explored in low middle income countries like Zambia which could cripple the prospect of putting up any intervention measures where need be, hence the study.

MATERIALS AND METHODS

This was a cross sectional study. It involved retrospective collection of information which included maternal age, gestational age, birth weight, gravida, parity, immediate fetal outcome mode of delivery and reason for cesarean section. The study was unable to assess social economic status such as employment status and income as it was not recorded in the delivery books. The dependent variable was mode of delivery of which 0=vaginal delivery and 1=Cesarean Section.

The sampling frame was 12,606 women who gave birth either by cesarean section or vaginal birth at UTH Women and New-born. A complete enumeration of all reported births between January 2018 and December 2018 was conducted. A total sample size of 6,965 women met the inclusion criteria and were considered eligible for the study. Data was collected using a pre tested data collection sheet.

STATISTICAL ANALYSIS

Normally distributed data was tested for association with the outcome variable using a T-test while a chi squared test was used for categorical variables. For data that did not meet the assumptions of the chi squared test a Fisher's exact test was used. Binary logistic regression was used to report the unadjusted and adjusted odds ratios of the predictor variables over time. The level of significance was 0.05 and a confidence interval of 95% was considered. To determine the goodness of fit for competing models the nested and full, a likelihood ratio test was used. Variables were considered for inclusion in the nested model if they satisfied the assumption of <0.05. Data was analyzed using Stata software version 14.2. Results were presented using graphs and tables.

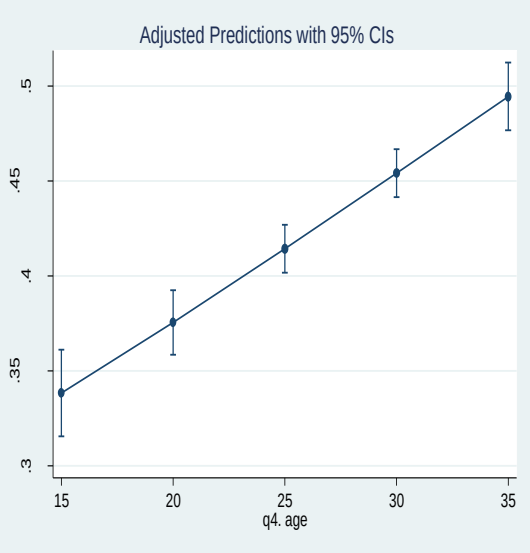
RESULTS

Among the 6,965 eligible women in the study, 3 039 (44%) had cesarean section while 3 926(56%) had vaginal delivery. Continuous variables were categorized for comparison purposes, hence sample characteristics between the cesarean group and vaginal group were compared. The mean maternal age in the normal delivery group was 26 years while 28 years was the mean maternal age in the Cesarean group. Among the teenage group, there were more vaginal deliveries (72%) compared to cesarean (28%), however among advanced maternal age the difference was minimal with 52% in the vaginal group and 48% in the cesarean group ($p<0.0001$). Post term birth was observably more in the cesarean group (59%) compared to vaginal group (49%) and this difference was statistically significant ($p<0.0001$). High birth weight deliveries constituted 58% of cesarean deliveries compared to vaginal ($p<0.0001$). There were less Primiparas (40%) observed in the cesarean group compared to vaginal group. There were more still births observed in the vaginal group (72%) compared to the cesarean group (28%).

Table 1; Predictors of Caesarean section

Predictors	Caesarean = 3039	Spontaneous Vaginal Delivery = 3926	Total=6965	P-value
Maternal Age				
<15-19	255(28%)	655(72%)	910(100%)	
20-24	679(40%)	1020(60%)	1,699(100%)	0.0001[c]
25-29	838(48%)	908(52%)	1,746(100%)	
30-34	675(49%)	698(51%)	1,373(100%)	
>=35	592(48%)	645(52%)	1,237(100%)	
Mean age	28(SD, 6.51)	26(SD, 6.94)	27(SD6.81)	0.0001[t]
Gestational age				
37-42 weeks(term)	2312(48%)	2487(52%)	4,799(100%)	
<37 weeks(preterm)	660(32%)	1393(68%)	2,053(100%)	0.0001[c]
>42 weeks (post term)	67(59%)	46(41%)	113(100 %)	
Mean Gestational age	38(SD, 2.95	37(SD,3.71)	38(SD,3.45)	
Birth weight(grams)				
<=2400	471(37%)	792(63%)	1,264(100%)	
2500-3500	1916(42%)	2656(58%)	4,572%)	0.0001[c]
>3600	651(58%)	478(42)	1,129(16%)	
Mean Birth weight	3056(670.10)	2863(SD, 704.43)	2948(SD,696.20)	
Parity				
0=Nulliparous	23(29%)	55(71%)	78(100%)	
1=Primiparous	1004(40%)	1528(60%)	2,532(100%)	0.0001[c]
>=2 Multiparous	2012(46%)	2343(54%)	4,355(100%)	
Gravida				
1=primigravida	913(39%)	1441(61%)	2,354(100%)	0.0001[c]
2=Multigravida	2126(46%)	2485(54%)	4,611(100%)	
Immediate birth outcome				
Live Birth	2934(45%)	3648(55%)	6,582(100%)	
Still birth	104(28%)	275(72%)	379(100%)	
Asphyxia	1(25)	3(75)	4(100%)	0.0001[f]
Number of indicators	Frequency	Percentage		
1	2192	72%		0.0001[c]
2	846	28%		
3	1	0.03%		

Abbreviations: C=chi square, T=ttest, F= fisher's exact test



The figure shows that at 15 years the estimated probability of having CS is 34%, at 20 years the estimated probability of having CS is 38%, at 25 years the estimated probability increases to 42%, at 30years the probability is 46% while at 35 the estimated probability increases to about 49%. Therefore, from the results obtained in the different maternal age, there is overwhelming evidence to conclude that as one increases in maternal age the likelihood of having CS increases.

Fig1: Probability estimates of Cesarean Section at different maternal age

After running the logistic regression, the odds of having cesarean section among advanced maternal age increased by 2.48 compared to the teenage group adjusting for other predictor variables (p<0.0001, CI 1.99,3.09). In addition, the odds of having cesarean section decreased by 0.52 among preterm birth compared to term birth taking

account of maternal age, gestational age, preterm birth, fetal outcome and birth weight (p<0.0001, 0.48, 0.65). Meanwhile post term had an increased odds of having cesarean section by 1.47 compared to term birth taking account of maternal age, parity, gravida, immediate fetal outcome and birth weight (P=0.048, 1.04, 2.17). Furthermore, primipara compared to nullipara had an increased odds of having cesarean section by 1.26 adjusting for other predictor variables, this was not statistically significant (p=0.38, CI (0.75, 2. 11). The likelihood of having cesarean section reduced by 0.81 among women with normal birth weight babies compared to women with low-birth-weight babies adjusting for other predictor variables (p=0.007, CI0.70,0.94). On the contrary, women who had babies with high birth weight had increased odds of having cesarean section compared to women with babies who had low birth weight (OR=1.34 P=0.002 CI 1.11, 1. 61). There were notably decreased odds of having still birth of 0.55 compared to live birth (p<0.0001, CI 0.43, 0. 70). Multigravida increased the odds of having caesarean section by 1.35 compared to primigravida. This finding was statistically significant (P< 0.001, CI 1.22, 1.49).

Table 2; Binary logistic regression for predictors of caesarean section

	Unadjusted			**Adjusted**		
	OR	**P-value**	**95%CI**	**OR**	**p-value**	**95%**
Age						
<20	Ref	1	1	1	1	1
20-24	1.71	<0.001	(1.44,2.04)	1.73	<0.001	(1.45,2.09)
25-29	2.37	<0.001	(1.99,2.82)	2.37	<0.001	(1.95,2.88)
30-34	2.48	<0.001	(2.08,2.97)	2.61	<0.001	(2.11,3.24)
>35	2.36	<0.001	(1.96,2.83)	2.48	<0.001	(1.99,3.09)
Gestational age						
37-42 weeks	Ref	1	1	1	1	1
<37 weeks	0.52	<.0001	(0.45,0.59)	0.56	<0.001	(0.48, 0.65)
<42weeks	1.72	<0.005	(1.17,2.50)	1.47	0.048	(1.04, 2.17)
Parity						
Nulliparous	Ref	1	1	1	1	1
Primiparous	1.57	0.07	(0.96,2.57)	1.26	0.38	(0.75,2.11)
Multiparous	2.05	<0.004	(1.26,3.35)	1.10	0.73	(0.63,1.92)
Gravida						
Primigravida	Ref	1	1	1	1	1
Multigravida	1.35	<0.0001	(1.22,1.49)	1.04	0.73	(0.80,1.37)
Birth weight						
<=2400	Ref	1	1	1	1	1
2500-3500	1.21	<0.003	(1.07,1.38)	0.81	0.007	(0.70,0.94)
>=3600	2.29	<0.001	(1.94,2.69)	1.34	0.002	(1.11,1.61)
Birth outcome						
Live birth	Ref	1	1	1	1	1
Still birth	0.47	<0.001	(0.37,0.59)	0.55	<0.001	(0.43,0.70)
Ashyxia	0.42	0.45	(0.04,4.98)	0.55	0.61	0.05,5.56)

The maternal indications identified were antepartum hemorrhage, bad obstetric history, cephalopelvic disproportion, preeclampsia, repeat caesarean section and failure to progress. Antepartum hemorrhage also included post-partum hemorrhage and placenta previa. Preeclampsia also included severe preeclampsia and eclampsia. Obstructed labor also included cephalopelvic disproportion while, failure to progress also included prolonged labor. The most common maternal indicators identified were repeat caesarean section (19%), cephalopelvic disproportion (11%) and failure to progress (10%). The fetal indications identified in this study were big baby, mal-presentation, multiple pregnancy, fetal distress, cord prolapse and postdates. The most common fetal indicators identified in this study were fetal distress (18%), big baby (10%) and mal presentation (7%). Repeat caesarean section was the most frequent indicator among maternal indicators while fetal distress was the most frequent indicator among fetal indicators.

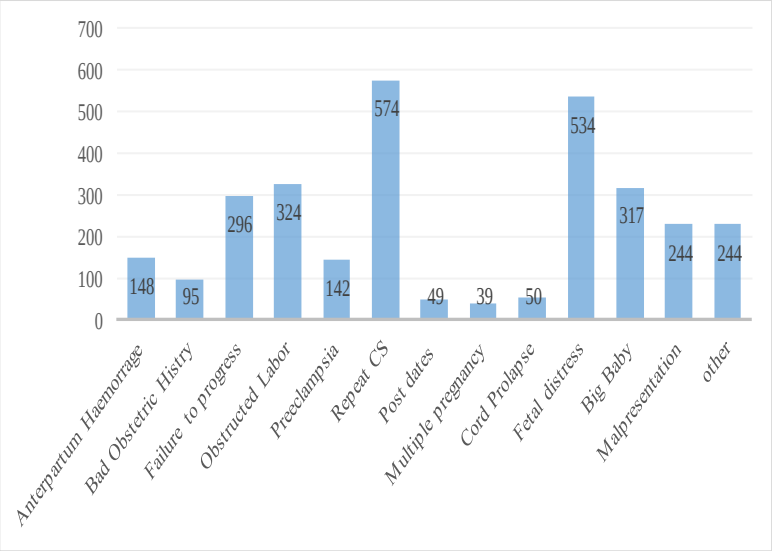


Fig 2; Indicators of Cesarean Section

Goodness of fit

To determine the goodness of fit for competing models the nested and full, a likelihood ratio test was used to establish the best predictors of cesarean section. The null hypothesis of the test states that the nested or smaller model fits the data better, while the alternative hypothesis states that the full model fits the data better. Therefore, the null model was nested within the full model. Given that the p-value of the likelihood ratio test was 0.237, we fail to reject the null hypothesis that the nested model is better. Hence the regression coefficients of parity, gravida, birth weight could be zero. Henceforth, there is sufficient evidence to conclude that the nested model which had variables maternal age, gestational age (term birth), birth weight and immediate birth outcome (fetal still birth) were the best predictors of cesarean section respectively.

DISCUSSION

The study findings reveal that the estimated proportion of women who underwent caesarean section in 2018 was 44%. This proportion may have been due to a high number of referral cases from outside the district and therefore, may not be used as reference for the source population. Other similar studies conducted in Sub Saharan Africa also recorded high prevalence of CS in institutions [1][15][16]. Meanwhile an extremely high prevalence of 72% was recorded in Tehran [17]. The increased probability of having CS in all age groups compared to the teenage group was sustained even after adjusting for other variables. The highest odds were observed in the age group 30-34 with 2.61(p=0.001) while advanced maternal age had 2.48(p=0.001). These findings are consistent with a similar study conducted in Ethiopia at Felegehiwot referral hospital where women aged 35 and above were 2.3 times more likely to undergo caesarean section compared to those under 20 years [1]. Similarly, another study reported that cesarean section increased with increasing maternal age and the association was stronger in nulliparous women compared to multiparous women [18][19]. This effect could be attributed to pregnancy risks and complications that occur as one increases in age such as diabetes, hypertension and preeclampsia [20]. Another study explained that the variation in CS numbers as one increases in age could be due to pelvic rigidity [21]. On the contrary, interesting findings were observed by Inyang-Otu (2014) who reported that the odds of having cesarean section by age decreased by 0.96 after adjusting for other variables [18]. However, in some studies, researchers did not choose to compare vaginal versus

cesarean section such as this one but opted elective versus emergency cesarean section as a binary outcome. One such study was conducted by Darnal and Dangal (2020) where it was reported that elective CS was higher among women with advanced maternal age [22].

Multipara significantly increased the odds of having caesarean compared to nullipara. This finding is consistent with a study conducted in South Africa where increase in caesarean section rates were increasing with parity [18]. 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 [23]. Contrary to these results, a study demonstrated an increased risk of caesarean section in nulliparas than multiparas after conducting a study on nulliparity as a risk factor for poor obstetrical and neonatal outcomes in Rwanda [24]. This may be because nulliparous have a higher chance of obstructed labour due to the contracted pelvis while multiparas can handle contractions.

Gestational age showed that the likelihood of having CS for preterm birth decreased compared to term birth. This contradicts with a study which reported that there was a significant increase of Cesarean section in preterm birth [25]. In addition, Preterm birth is attributed to pregnancy complications of which common reasons include pre-eclampsia, eclampsia, and intrauterine growth restriction [26]. Furthermore, the odds of having caesarean section for post term birth compared to term birth increased. This finding was consistent with a study which reported that Cesarean delivery was more in women undergoing labor at 38 weeks gestation (11.9%), compared to women beyond 38 weeks gestation (13.3%) [27]. This could be explained by the fact that babies of 37 weeks gestational age or higher are more likely to have larger bodies which increases the risk of the shoulder getting stuck (shoulder dystocia), thereby increasing the risk of having caesarean section [28]. Post-mature births carry risks for both the mother and the baby which include fetal malnutrition, meconium aspiration syndrome, and stillbirths, after the 42nd week of gestation, the placenta which supplies the baby with nutrients and oxygen from the mother, starts aging and will eventually fail hence increases the need for caesarean section at post term [28]. This study also found that there is a strong association between gestational age and maternal age after using chi squared test for association (p value 0. 0001). Advanced maternal age increases the risk of having babies that are small for gestational age, because as one increases in age there is an increased risk of diabetes and essential hypertension which can affect placental transfer of nutrients there by not having a fully grown fetus [29].

In addition, the likelihood of having caesarean section is lower among normal birth weight babies compared to low-birth-weight babies. This finding is consistent with a study conducted in China, that low birth weight is one of the factors that causes adverse pregnancy outcomes and increases the risk of having caesarean section, these factors include fetal growth restriction, multiple pregnancies, fetal depression, gestational hypertension, abnormal amniotic fluid among others [30]. Furthermore, one study reported that that among 350 women who gave birth by cesarean section, 46% had low birth weight and the associated risk was observed more in the age group below 20 years, suggesting that women with low-birth-weight babies are more likely to undergo cesarean section as observed in this study [31].

Furthermore, the likelihood of having still birth compared to live birth significantly decreased among women who underwent caesarean section in both adjusted and unadjusted logistic regression. This finding is consistent with a study by Chen et al (2016) where the rates of stillbirth and neonatal mortality of infants who were delivered via caesarean section (0.5% and 1.0%, respectively) were found to be

significantly lower than the vaginal-delivery group (5.2% and 6.9%, respectively), the study went on to conclude that caesarean section alleviates the incidence of stillbirths and neonatal deaths but cannot completely eliminate complications [30]. Furthermore, the sole purpose of conducting caesarean section is to save the life of mother and or baby, therefore caesarean section performed on pregnancies that have fetal complications such as big baby, fetal distress umbilical cord prolapse can possibly contribute to an advantage of survival. On the contrary a study argued that caesarean section has not contributed to reduced fetal death, it was reported that the rising trend of caesarean delivery did not result in a downward trend of perinatal mortality rate [18]. This supported the fact that most caesarean deliveries in the study were done when there were already existing fetal compromise either which resulted in poor fetal outcome with reasons of poor fetal monitoring, injudicious use of oxytocic and unavailability of equipment for early diagnosis of fetal compromise among others [18].

In addition, the likelihood of having birth asphyxia decreased (although not statistically significant) when someone underwent caesarean section in both adjusted and unadjusted logistic regression. These findings contradict with findings where birth asphyxia rates were significantly higher and correlated with increasing CS deliveries [32]. On the other hand, a study found that CS reduced the rate of asphyxia, indicating that although the procedure prolongs delivery time, the intact sac and/or amniotic fluid within the sac can ameliorate an impact of external stimulation to breathe before the fetal head is delivered, and that the pressure exerted by the uterus on the fetus is less, thus preventing umbilical cord compression [29].

Repeat CS revealed to be a major contributor of caesarean section rates. In this study 574 caesarean section deliveries were repeat which constituted 19%. The finding is similar to other studies who found repeat caesarean section to be the highest indicator of cesarean section [18] [33]. The results of this study showed that the most common indicators of CS were; repeat CS, failure to progress and obstructed labor. Consistent with a study conducted in eastern Ethiopia [14], fetal distress was one of the indicators of CS with a high frequency. In this study, fetal distress was diagnosed among 534 deliveries, of these about one-third were diagnosed with a second indicator which was cephalopelvic disproportion (CPD). Labor progress in the presence of CPD causes the fetal heart rate to decelerate thereby causing oxygen deprivation, as head compression increases there will be early prolonged decelerations which will gradually become more and more pronounced and lead to severe fetal distress if meconium appears for the first time while labor is in progress [34].

CONCLUSION

This study has made an effort to obtain accurate information about the prevalence and factors associated with CS. Prevalence of CS for the year 2018 at the University Teaching Hospital Women and New-born was 44%. Despite the high prevalence which has been reported by some scholars to be harmful, the increase in CS has contributed to reduction in still birth hence CS has yielded good results in the institution. The study has demonstrated that factors significantly associated with CS were; maternal age, gestational age, high birth weight and immediate fetal outcome (still birth). This study also found that the highest maternal indicator of CS is repeat CS while the highest fetal indication is fetal distress. This suggests that first time labor should be properly managed in order to minimize repeat CS which is not harm free The study revealed that as one increases in age the likelihood of undergoing CS increases, hence the need for health care team to provide health education and information during antenatal care visits and also emphasizing to older women that they are at high risk of undergoing caesarean

section and must oblige to antenatal care rules accordingly.

Study limitations

Certain variables of interest such as education level and income status among others were not recorded and could not be tested for association in this study. Furthermore, the study used secondary data hence has no control over the variables and quality of data. The study was not able to determine cause and effect because it is a cross-sectional study.

Declaration by Authors

Ethical Approval: Ethical clearance for this study was provided by UNZABREC Board reference number 3172019.

Acknowledgement: We greatly acknowledge the University Teaching Hospital Management for allowing us to access data from their cesarean section records.

Source of Funding: None

Conflict of Interest: The authors declare no conflict of interest.

REFERENCES

1. Elnakib S, Abdel-Tawab N, Orbay D, Hassanein N. Medical and non-medical reasons for cesarean section delivery in Egypt: a hospital-based retrospective study. BMC pregnancy and childbirth. 2019 Dec; 19(1):1-1.
2. Eyowas Abebe F, Worku Gebeyehu A, Negasi Kidane A, Aynalem Eyassu G. Factors leading to cesarean section delivery at Felegehiwot referral hospital, Northwest Ethiopia: a retrospective record review. Reproductive Health. 2016 Jan 20.
3. Zgheib SM, Kacim M, Kostev K. Prevalence of and risk factors associated with cesarean section in Lebanon—A retrospective study based on a sample of 29,270 women. Women and Birth. 2017 Dec 1; 30(6): e265-71.
4. Hamilton, B.E., Martin, J.A., Osterman, M.J., Curtin, S.C. and Mathews, T.J., 2015. Births: final data for 2014.
5. Adewuyi EO, Auta A, Khanal V, Tapshak SJ, Zhao Y. Cesarean delivery in Nigeria: prevalence and associated factors - a population-based cross-sectional study. BMJ open. 2019 Jun 1; 9(6): e027273.
6. Blanchette H. The rising cesarean delivery rate in America: what are the consequences? Obstetrics & Gynecology. 2011 Sep 1;118(3):687-90
7. Ali Y, Khan MW, Mumtaz U, Salman A, Muhammad N, Sabir M. Identification of factors influencing the rise of cesarean sections rates in Pakistan, using MCDM. International journal of health care quality assurance. 2018 Oct 8.
8. Ye J, Zhang J, Mikolajczyk R, Torloni MR, Gülmezoglu AM, Betran AP. Association between rates of caesarean section and maternal and neonatal mortality in the 21st century: a worldwide population-based ecological study with longitudinal data. BJOG: An International Journal of Obstetrics & Gynaecology. 2016 Apr; 123(5):745-53.
9. Gutema H, Shimye A. cesarean section and associated factors at mizan aman general hospital, southwest Ethiopia. J Gynecol Obstet. 2014 May 19; 2(3):37-41.
10. Onoh RC, Eze JN, Ezeonu PO, Lawani LO, Iyoke CA, Nkwo PO. A 10-year appraisal of cesarean delivery and the associated fetal and maternal outcomes at a teaching hospital in southeast Nigeria. International journal of women's health. 2015; 7:531.
11. Feng XL, Xu L, Guo Y, Ronsmans C. Factors influencing rising caesarean section rates in China between 1988 and 2008. Bulletin of the World Health Organization. 2012; 90:30-9A.
12. WHO, U. and Unicef, . AMDD: Monitoring emergency obstetric care: a handbook. Geneva: WHO, 2009 .152(4),pp.430.
13. Ali Y, Khan MW, Mumtaz U, Salman A, Muhammad N, Sabir M. Identification of factors influencing the rise of cesarean sections rates in Pakistan, using MCDM. International journal of health care quality assurance. 2018 Oct 8.
14. Taye MG, Nega F, Belay MH, Kibret S, Fentie Y, Addis WD, Fenta E. Prevalence and factors associated with caesarean section in a comprehensive specialized hospital of Ethiopia: A cross-sectional study; 2020. Annals of Medicine and Surgery. 2021 Jun 23:102520.
15. Tsega F, Mengistie B, Dessie Y, Mengesha M. Prevalence of cesarean section in urban health facilities and associated factors in Eastern Ethiopia: hospital based cross sectional study. J Preg Child Health. 2015;2(3):169-73.
16. Akinola OI, Fabamwo AO, Tayo AO, Rabiu KA, Oshodi YA, Alokha ME. Caesarean section–an appraisal of some predictive

factors in Lagos Nigeria. BMC pregnancy and childbirth. 2014 Dec;14(1):1-6.
17. Amini P, Mohammadi M, Omani-Samani R, Almasi-Hashiani A, Maroufizadeh S. Factors associated with cesarean section in Tehran, Iran using multilevel logistic regression model. Osong public health and research perspectives. 2018 Apr;9(2):86.
18. Inyang-Otu US. Factors associated with high caesarean Section rates in bertha gxowa hospital (Doctoral dissertation).2014
19. Maskey, S., Bajracharya, M. and Bhandari, S., 2019. Prevalence of Cesarean Section and Its Indications in A Tertiary Care Hospital. Journal of the Nepal Medical Association, 57(216).
20. Qublan, H., Alghoweri, A., Al-Taani, M., Abu-Khait, S., Abu-Salem, A. and Merhej, A., 2002. Cesarean section rate: The effect of age and parity. Journal of obstetrics and gynaecology research, 28(1), pp.22-25.
21. Batieha AM, Al-Daradkah SA, Khader YS, Basha A, Sabet F, Athamneh TZ. Cesarean section: incidence, causes, associated factors and outcomes: a national prospective study from Jordan. Gynecol Obstet Case Rep. 2017;3(3):55.
22. Darnal N, Dangal G. Maternal and Fetal Outcome in Emergency versus Elective Caesarean Section. Journal of Nepal Health Research Council. 2020 Sep 7;18(2):186-9.
23. Cunningham FG. leveno KJ, Bloom SL, Hauth JC, Rouse DJ, Spong CY. 23. 2010
24. Qublan, H., Alghoweri, A., Al-Taani, M., Abu-Khait, S., Abu-Salem, A. and Merhej, A., 2002. Cesarean section rate: The effect of age and parity. Journal of obstetrics and gynaecology research, 28(1), pp.22-25.
25. Delnord M, Blondel B, Drewniak N, Klungsøyr K, Bolumar F, Mohangoo A, Gissler M, Szamotulska K, Lack N, Nijhuis J, Velebil P. Varying gestational age patterns in cesarean delivery: an international comparison. BMC pregnancy and childbirth. 2014 Dec;14(1):1-9
26. Goldenberg RL, Culhane JF, Iams JD, Romero R. Epidemiology and causes of preterm birth. The lancet. 2008 Jan; 5;371(9606):75-84.
27. Caughey, A.B., Nicholson, J.M., Cheng, Y.W., Lyell, D.J. and Washington, A.E., 2006. Induction of labor and cesarean delivery by gestational age. American journal of obstetrics and gynecology, 195(3), pp.700-705.
28. Muglu J, Rather H, Arroyo-Manzano D, Bhattacharya S, Balchin I, Khalil A, Thilaganathan B, Khan KS, Zamora J, Thangaratinam S. Risks of stillbirth and neonatal death with advancing gestation at term: A systematic review and meta-analysis of cohort studies of 15 million pregnancies. PLoS medicine. 2019 Jul 2;16(7):e1002838.
29. Palatnik A, De Cicco S, Zhang L, Simpson P, Hibbard J, Egede LE. The association between advanced maternal age and diagnosis of small for gestational age. American journal of perinatology. 2020 Jan;37(01):037-43.
30. Chen Y, Wu L, Zhang W, Zou L, Li G, Fan L. Delivery modes and pregnancy outcomes of low-birth-weight infants in China. Journal of Perinatology. 2016 Jan;36(1):41-6.
31. Qureshi, Z.S., Chandio, A.M., Ligahri, J., Samoon, N.A., Chandio, S.M., Soomro, M. and Rajput, M.S., 2020. prevalence of low birth weight among cesarean section delieveries at pmc hospital nawabshah (sba). Journal of People University of Medical and Health Sciences, 10(04)
32. Liabsuetrakul, T., Sukmanee, J., Thungthong, J. and Lumbiganon, P., 2019. Trend of cesarean section rates and correlations with adverse maternal and neonatal outcomes: a secondary analysis of Thai universal coverage scheme data. *American Journal of Perinatology Reports*, *9*(04), pp. e328-e336.
33. Younis, F.M. and Fahmy, M.M., Cesarean Section in Althawra Teaching Hospital. Blood transfusion, 159, pp.11-5.
34. Branger B, Savagner C, Roze JC, Winer N. Eleven cases of early neonatal sudden death ou near death of full term and healthy neonates in maternity wards. Journal de gynecologie, obstetrique et biologie de la reproduction. 2007 Jun 13;36(7):671-9.

How to cite this article: Joan Himalowa, Chola Mumbi, Simon Himalowa. Prevalence and factors associated with cesarean section at UTH women and Newborn Hospital Lusaka, Zambia. *International Journal of Science & Healthcare Research.* 2023; 8(3): 320-328. DOI: *https://doi.org/10.52403/ijshr.20230344*

******