The prevalence and indication for caesarean section at Ndola Central Hospital, Ndola, Zambia

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ABSTRACT

A Caesarean section (C-section) is a procedure in surgery done to deliver a baby when vaginal deliveryendangers the baby's or mother's life or health. No studies on prevalence or indications of C-section have been conducted at Ndola Central Hospital (NCH) in Zambia. Hence a retrospective study was undertaken aimed at determining the prevalence and indications for C-sections at NCH between January and December, 2013. The major goal was to contribute to the reduction of maternal and neonatal mortality at NCH. Following ethical approval from Tropical Diseases Research Centre (TDRC) Ethical Committee, data collection was performed from June to July, 2016. Data was extracted from maternity in-patient and theatre register records of 358 systematically randomly selected clients. Data was entered and analyzed using SPSS. Proportions of various variables were compared using the Chi-square test and only results yielding p value of less than 0.05 were considered to be of statistical significance. Findings were that 74 clients had caesarean sections and 284 clients delivered by spontaneous vaginal delivery (SVD). The overall prevalence of Caesarian section at NCH during period under review among 358 clients admitted was 20.7%. The most common indications were foetal and maternal distress (14.9%), prolonged labour (10.8%), cephalopelvic disproportion (8.1%), pregnancy induced hypertension (6.8%), malpresentation or breech presentation (6.8%), antepartum haemorrhage (4.1%), multi-gestation (4.1%) foetal and maternal distress together with pregnancy induced hypertension (4.1%). The observed rate is higher than the recommended rate by World Health Organization. Hence need to strengthen antenatal monitoring of indications for C-section and improve access to antenatal services.

Key words: Prevalence, indications, Caesarean section, C-section, Zambia.

Introduction

Problem of maternal and neonatal morbidity and mortality in terms of prevalence and indications of Caesarean Section (C-section) at the Global level; at sub-Saharan Africa level and in Zambia at the University Teaching Hospital in particular have been documented [1,2]. However, no studies on the prevalence and indications of C-section at Ndola Central Hospital (NCH) have been undertaken to determine the magnitude of the problem.C-section is usually performed when a vaginal delivery may result in the risk to baby's or mother's life or health.

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A study to determine the prevalence and indications for C-Section at Ndola Central Hospital, the second largest hospital in Zambia with a bed capacity of 851 bed and 97 colts was therefore undertaken. The hospital (NCH) provides health services for a population of 503,649 [3].Although no prevalence studies had been done at NCH, a similar study was done at the University Teaching Hospital, the largest and leading teaching hospital, in Zambia. The prevalence was noted to be 18.5% [2]. The overall C-section rate for Zambia was 4.4% of 13,383 sampled [4] in contrast to the World Health Organization recommended range of 5-15% [1]. In some studies, increase in C-section even without medical or clinical indications was attributed to the increase in women requesting for it, as well due to respect for autonomy and rights[5]. In developing nations, C-sections rose by 50% [6] and it was

discovered that the undue advantage of doctorsto persuade the pregnant women deliver by C-section and pregnant women requests were the factors contributing to swift increase in C-sections in Shanghai, China [7]. C-section rates in the Arab region were reported to bein the range 5% to 15% [8]. In South East Asian countries and between hospitals, the prevalence was 12% to 39% [9]. In the United States of America the C-section delivery rate increased from 26% to 36.5% between 2003 and 2009 [10]. Within Central Africa, Tanzania recorded low national C-section rate of 3% since 1999 [11]. No studies had been documented on indications for C-section at Ndola Central Hospital. In other studies the indicators were arequest by pregnant woman for C-section,for prevention of mother to child transmission of HIV, malpresentation (breech presentation), previous C-section, cephalopelvic disproportion[12-15]. At the UTH the common indications for C-section were failure to progress in labour, Cephalo-pelvic disproportion, Previous C-section, maternal and foetal distress, breech presentation, ante-partum haemorrhage, cord prolapse and hypertensive disease in pregnancy [16]. As no studies on caesarean sections have been done at NCH**,** the prevalence of C-section has not been determined and contrasted with the national prevalence of 4.4% [2,17]. Out of a total of 21,152 admissions to NCH, 5,313 were admissions to maternity wards and 1,480 clients underwent C-section [18]. The implication of the lack of studies on C-section that was noted was loss of opportunities to learn from past experiences. The developing countries' prevalence was low due to inadequacy of the health facilities and thus poor maternal outcomes – maternal and perinatal mortality. Little progress had been made in attaining Millennium Development Goals (MDGs) 4 and 5: to reduce child and maternal mortality and morbidity. There was loss of time to promptly monitor the trends and employ remedial measures. The study could assist in finding the gaps in the management and care of pregnant women and the neonates essential for the provision of comprehensive maternal and child health. Identification of the common indications for C-section and associations with mortality had not been realized hence lack of enhancement of antenatal services and emergency obstetric care. There were variations worldwide, within countries and practitioners within the same hospital.The research questions were: What is the prevalence of C-section for NCH? And what are the indications for C-section even if more had been known?The objectives to be addressed were to determine the overall prevalence and indications for C-section at NCH between January and December 2013.

Materials and methods

The study was a retrospective data review.The sample size for the study was 358. Data was collected from maternity in-patient case and theatre registers from January to December 2013 between June and July, 2016. Data was entered using Microsoft Excel and analyzed using SPSS. Proportions of various variables were compared using the Chi-square test and only results yielding a p value of less than 0.05 were considered to be of statistical significance.

Results

Out of a total of 21,152 admissions recorded, 5,313 were of maternity admissions and 1,480 of those admitted delivered by C-section [18]. A total sample size of 358 clients' records was systematically randomly selected. The prevalence of C-section at NCH for the period January to December 2013 was 20.7%. Out of 346 clients with data captured on their residential locality, 33.5% were from low residential areas and 66.5% from high residential areas. Twelve clients had missing information on locality.The low density areas included town centre, Kansenshi, Itawa, Kanini and Northrise. High density areas included Kabushi, Bwana Mukubwa, Chifubu, Mushili, Twapia and Chipulukusu.All the 358 clients had their ages recorded. About a third (37.4%) of the clients were in the age range 15-24 years and another third (34.4%) was in the age range 30-44 years (Table 1).

Table 1: Shows distribution of study clients according to age groups

Years	n=358	%
15-24	134	37.4
25-29	101	28.2
30-44	123	34.4

Out of the 358 clients, 36.3% had the first pregnancy (Table 2).

Table 2: Shows distribution of study clients according to gravidity		
Gravidity	n=358	%
First pregnancy	130	36.3
Second pregnancy	67	18.7
Third pregnancy	65	18.2
Fourth to Eleven pregnancies	96	26.8

Of the 358 clients, 37.7% had no children and 25.4% had 3-9 children (Table 3).

Table 3: Shows distribution of study clients according to number of children		
Parity	n=358	%
No child	135	37.7
One Child	65	18.2
Two children	67	18.7
Three to Nine children	91	25.4

Of the 346 studied records of clients, 91% had lost one pregnancy where as 9% had lost 2-7 pregnancies.
Out of 357 clients, 20.7% delivered by C-section and 79.1% by spontaneous vaginal delivery. One client's mode of delivery was missing.

Table 4 shows indications of C-section among the clients. Common indications were foetal and maternal distress (14.9%), prolonged labour (10.8%), cephalopelvic disproportion (8.1%), pregnancy induced hypertension (6.8%) and malpresentation (6.8%).

Table 4: Shows distribution of someindications of C-section among studied clients		
Indicator for C-section	n=62	%
Foetal and maternal distress	11	14.9
Prolonged Labour	8	10.8
Cephalopelvic disproportion	6	8.1
Pregnancy induced hypertension	5	6.8
Malpresentation	5	6.8
Ante-partum haemorrhage	3	4.1
Multi-gestation	3	4.1
Foetal and maternal distress and PIH	3	4.1
Cephalopelvic disproportion and prevention of mother to child transmission of HIV	2	2.7
Cephalopelvic disproportion and foetal and maternal distress	2	2.7
Cephalopelvic disproportion	2	2.7
Multiple gestation and prolonged labour	2	2.7
Prevention of mother to child transmission of HIV and foetal and maternal distress	2	2.7
Prevention of mother to child transmission of HIV and ante-partum haemorrhage	2	2.7
Multiple gestation and prolonged labour	2	2.7
Macrosomia	1	1.4
Foetal and maternal distress and ante-partum haemorrhage	1	1.4
Foetal and maternal distress and prolonged labour	1	1.4
Multiple gestation and prolonged labour	1	1.4

Out of the 74 clients, 3.4% had previous C-section, 2.5% were in advanced maternal age above 35 years, 1.4% had missing information on factors related to C-section and 0.6% had advanced age and previous C-section.

Table 5 Shows factors associated with mode of delivery. None of the factors was significantly associated with mode of delivery.

Table 5: Showing the relationship of factors with mode of delivery

Factor	Total	MODE OF DELIVERY		P-value
LOCALITY		**C-section**	**SVD**	
Low density	116 (33.6%)	21(29.6%)	95 (34.7%)	0.418
High density	229 (66.4%)	50 (70.4%)	179 (65.3%)	
AGE (YEARS)				
15-24	134 (37.5%)	24 (32.4%)	110 (38.9%)	0.591
25-29	101 (28.3%)	23 (31.1%)	78 (27.6%)	
30-44	122 (34.2%)	27 (36.5%)	95 (33.6%)	
GRAVIDITY (Number of pregnancies)				
1	130 (36.4%)	34 (45.9%)	96 (33.9%)	0.091
2	66 (18.5%)	9 (12.2%)	57 (20.1%)	
3	65 (18.2%)	16 (21.6%)	49 (17.3%)	
4-9	96 (26.9%)	15 (20.3%)	81 (28.6%)	
PARITY (Number of children)				
1	135 (37.8%)	37 (50%)	98 (34.6%)	0.073
2	64 (17.9%)	9 (12.2%)	55 (19.4%)	
3	67 (18.8%)	14 (18.9%)	53 (18.7%)	
4-11	91 (25.5%)	14 (18.9%)	77 (27.2%)	
NUMBER OF LOST Pregnancies/children				
1	314 (91%)	62 (87.3%)	252 (92.0%)	0.222
2-7	31 (9%)	9 (12.7%)	22 (8.0%)	

Discussion

Maternal reproductive health remains a high priority not only due to associated morbidity and mortality of women and neonates but also the need for sufficient allocation of resources for improved health. Evidence based data to inform policy and guidelines for health improvement necessitated this study on indications and prevalence for caesarian sections at NCH. The prevalence of C-section in the current study was 20.7%. This level of prevalence is unacceptably high compared to WHO estimated standards of 5-15% [1]. However 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% [19] and to a prevalence of 21.4% from the study at a teaching hospital in Lahore, Pakistan [21].

The most prevalent indictors for C-section were maternal and foetal distress, prolonged labour and cephalopelvic disproportion, Pregnancy Induced Hypertension (PIH) and malpresentation (breech presentation). Similar findings have been reported by others at University Teaching Hospital, large East African Hospital and Shanghai, China [16,19-20].

Study limitations

The study bias might have arisen as the study was undertaken at a referral central hospital which received complicated cases from district hospitals out of Ndola and health centres. Hence, the rate of C-section might have been overestimated. Missing data in records might have lowered the statistical power of the study.

Conclusion

The observed C-section rate is higher than the recommended rate by World Health Organization. Antennal monitoring of indications for C-section should be strengthened and improved access to the services.Documentation of all cases for completeness of data to inform health management information systems (HMIS) should be strengthened to avoid missing information.

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References

1. Chu K, Cortier H, Maldonado F, Mashant T, FordN, Trelles M. Cesarean Section Rates and Indications in Sub-Saharan Africa: A Multi-Country Study from Medecins sans Frontieres. PloS ONE 2012;7:e44484.
2. Musonda A. A comparative study of complications in HIV infected and HIV uninfected women undergoing of Caesarean Section at the University Teaching Hospital, Lusaka, Zambia, University of Zambia, School of Medicine, Master of Medicine, Research project report 2012.
3. Central Statistical Office [Zambia]. 2010 Census of population and housing: Preliminary population figures. Lusaka: CSO, 2011.
4. Central Statistical Office (CSO) [Zambia], Ministry of Health (MOH) [Zambia], ICF International. Zambia Demographic and Health Survey 2013-14. Rockville, Maryland, USA: Central Statistical Office, Ministry of Health, and ICF International; Lusaka, CSO, 2015:127.
5. Muula AS. Ethical and practical consideration of women choosing Caesarean Section Deliveries Without ‘’Medical Indication in’’ in Developing Countries. Croatian Medical Journal 2007;48: 94-102.
6. Goldani MZ**,** Barbieri MA**,** Moura da Silva AA**,** Gutierrez MRP**,** Bettiol H,Goldani HAS.Caesarean section and increased body mass index in School children: two cohort studies from distinct socioeconomic background areas in Brazil. Nutrition Journal 2013; 12:104.
7. Ji H, Jiang H, Yang L, Qian X, Tang S. Factors contributing to rapid rise in caesarean section: a prospective study of primiparous Chinese women in Shanghai. British Medical Journal Open 2015; 5: 1136.
8. Jurdi R, Khawaja M. Caesarean section rates in the Arab region: a cross- national study. Health Policy and Planning 2004;19:101–110.
9. Festin MR**,** Laopaiboon M, Pattanittum P**,** Ewens MR**,** Henderson-Smart DJ**,** Crowther, C, SEA-ORCHID Study Group. Caesarean section in four South East Asian countries: reasons for, rates, associated care practices and health outcomes. BMC Pregnancy and Childbirth 2009;9:17.
10. Kozhimannu KB, Law MR, Virnig BA. Caesarean Section Delivery Rates vary tenfold Among United States Hospitals: Reducing the variation may address Quality and Cost issues. Health Affairs (Millwood) 2013;32:527-535.
11. Sørbye IK**,** Vangen S**,** Oneko O, Sundby J, Bergsjø P. Caesarean Section among referred and self-referred birthing women: a cohort study from a Tertiary hospital, northeastern Tanzania. BMC Pregnancy Childbirth 2011;11:55.
12. American Congress of Obstetricians and Gynecologists – ACOG Committee on Obstetric Practice. Number 234 Scheduled Cesarean Delivery and the Prevention of Vertical Transmission of HIV Infection. Danvers, MA. American College Obstetric and Gynecologist, 2000.
13. Festin MR**,** Laopaiboon M**,** Pattanittum P, Ewens MR**,** Henderson-Smart DJ**,** Crowther CA, SEA-ORCHID Study Group.Caesarean section in four South East Asian countries: reasons for, rates, associated care practices and health outcomes. BMC Pregnancy Childbirth 2009;9:17.
14. Costa ML, Cecatti JG, Souza JP, Milanez HM, Gülmezoglu MA. Using a Caesarean Section Classification System based on characteristics of the population as a way of monitoring obstetric practice. Reproductive health 2010;7:13.
15. Owonikoko KM, Adeniran M, Tijani AM, Akinola S. Demographic and Obstetric determinants of caesarean section among patients in Ladoke Teaching Hospital, Ogbomoso, Oyo

State, Nigeria. International Journal of Development *R*esearch 2015;5:5024-5028.

16. Gundumure G. Characteristics and determinants of Caesarean Section and prolapse at the University Teaching Hospital, Lusaka, Zambia, University of Zambia, School of Medicine, Master of Medicine, Research project report, 2002.

17. Buekens P, Curtis S, Alayón S. Demographic and Health Surveys: caesarean section rates in sub-Saharan Africa. British Medical Journal2003;326:136.

18. Ndola Central Hospital. Health management information System report 2013. Ndola, Ndola Central Hospital. 2014.

19. Worjoloh A,Mamongi R, Oneko O,Hoyo H, Daltvelt AK,Westriech D. Trends in Caesarean rates at a Large East African Hospital from 2005-2010. Open Journal of Obstetrics and Gynaecology 2002;2:255-261.

20. Feng XL, Xu L, Gao Y, Ronsmans C. Factors influencing caesarean section in China between 1988 and 2008. Bulletin of the World Health Organization 2012;90:30-39A.

21. Hafeez M, Yasin A, Badar N, Pasha MI, AkramN, Gulzar B. Prevalence and Indications of Caesarean Section in a Teaching Hospital. Journal International Medical Sciences Academy 2014;27:15-16.

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