

# Magnitude of Caesarean Section and Associated Factors in Lemlem Karl General Hospital, Northern Ethiopia, 2016: Retrospective Cross-Sectional Study

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## Abstract

Caesarean Section is the commonest obstetric operative procedure Worldwide. When used appropriately Caesarean Section can improve infant and/or maternal outcomes. This study intended to assess the magnitude and factors associated with Caesarean Section in Lemlem Karl Hospital. The aim of this study was to assess the Magnitude of Caesarean Section and associated factors in Lemlem Karl General Hospital, Northern Ethiopia, 2016. A cross-sectional study design was conducted in Lemlem Karl Hospital in Northern Ethiopia from July 1, 2015, to June 30, 2016. The collected data was checked for its completeness; entered, edited, cleaned and analyzed using SPSS version 20. Crosstabs, 95%CI and P-value < 0.05 were used to examine the association between dependent and independent variables using logistic regression. We found that the magnitude of Caesarean Section was 28.8%.

Parthograph status (AOR; 0.112, 95%CI (0.041, 0.307)) and ANC follow up (AOR; 0.442, 95%CI (0.250, 0.849)) were found to have association with caesarean delivery. In this research, the magnitude of the Caesarean Section was high. It is possible to decrease the Caesarean Section by increasing the antenatal care coverage and universal use of partograph for all labors.

**Keywords** - Magnitude, Associated factor, Caesarean Section, Lemlem Karl Hospital, Ethiopia.

## I. INTRODUCTION

Caesarean Section (C/S) is a surgical procedure in which, the birth of a fetus occurs through incisions in the abdominal wall (laparotomy) and the uterine wall (hysterotomy). This definition does not include removal of the foetus from the abdominal cavity in the case of rupture of the uterus or in the case of an abdominal

pregnancy. It is considered necessary under some conditions to protect the health or survival of infant or mother [Cunningham, 2010].

Caesarean Section is the commonest obstetric operative procedure Worldwide [RCOG, 2004]. When used appropriately Caesarean Section can improve infant and/or maternal outcomes. There is a growing concern that the Caesarean Section have been rising for all women in the world regardless of medical condition, age, race, or gestational age. World Health Organization (WHO) has proposed that in a country a rate of 5-15 percent of births undergoing a Caesarean Section is optimal and has medical indications for Caesarean Section, and rates above this are unsuitable and unnecessary, imposing financial burden and clinical risks on patients and healthcare systems. The caesarean section rate has risen considerably over the past few decades [WHO, 1985].

The global cesarean section rate is distributed very unevenly and results from 15% of abdominal delivery. Latin America and the Caribbean shows the highest rate (29.2%) and Africa shows the lowest (3.5%) [Thomas et al, 2001]. In developed countries, the proportion of cesarean birth is 21.1% whereas in the least developed countries only 2% of deliveries are by Caesarean Section. The analysis suggests a strong inverse association between Caesarean Section rates and maternal, infant and neonatal mortality in countries with high mortality levels [RCOG press, 2001]. In many developed countries, Caesarean Sections are increased and attention has focused on strategies to reduce its use due to the concern that higher cesarean section rates do not confer additional health gain but may increase maternal risk, have implications for future pregnancies and have resource implications for health service [Betran et al, 2007].

There is a shortage of skilled attendants, poor quality of care is an issue, costs associated with transport and the services themselves present barriers, and norms promote home births. Where maternal mortality and the incidence of fistula are high, the rate of Cesarean Section tends to be low, especially in rural areas. A recent review of global, regional, and national rates of Cesarean Section showed that the lowest regional rate (3.5%) was in Africa. Studies confirmed that the proportion of Antenatal Care, institutional delivery and skilled birth attendant utilization are very low in Ethiopia [Nebret et al, 2011].

Cesarean Section is a marker of access to, and availability and utilization of obstetric services but, where rates are extremely high, it may also indicate the “mismatch between evidence and practice” in obstetrics. Access to obstetric surgery in Ethiopia is hampered by the relatively few appropriate facilities being concentrated in urban centers approximately 1 center with obstetric surgery for every 800,000 population a scarcity of surgeons and anesthetists, and a largely rural population with limited access to roads [Fantu et al, 2015].

It has been shown that a significant number of obstetricians would agree to perform an elective CS without an obstetrical indication upon maternal request [Allen et al, 2003]. Currently, there is much debate as to whether this surgical procedure should be performed for women without clear clinically acceptable indications [RCOG press, 2001]. The most common indications for Caesarean Section include previous C-section, multiple pregnancy, breech presentation, foetal distress, lack of progress in labour, small foetus and macrosomia, cord prolapse, transverse or oblique lie of the foetus, head and pelvis mismatch, Previa or abruption placenta, and severe preeclampsia [Adnan et al, 2012].

Lemlem Karl hospital has been providing Caesarean Section service for multitudes of mothers for a long time. However, there is little evidence about the magnitude and associated factor of Caesarean Section in the hospital. Thus, this study intended to assess the magnitude and factors associated with Caesarean Section in Lemlem Karl Hospital. This will help policymakers, program managers and clinicians for appropriate intervention strategies toward ensuring the availability of obstetric care and hence reducing maternal mortality. The finding of this study can also serve as baseline information for other studies with similar interest.

## **II. METHODS AND MATERIALS**

### **A. Study area and period**

This study was carried out in Miachew town which is found 127 kilometers Southern to Mekelle, the

capital of Tigray regional state. In the town, there are two Health Centers and one general Hospital which was the study site for this research, and this hospital known as Lemlem Karl Hospital (LKH). Lemlem Karl Hospital has a bed capacity of 110, out of this 36 of them belongs to the Obstetrics and Gynecology patients, in this ward, there is 1 Obstetrician and Gynecologist, 1 IESO, 11 Nurses and also in operation room 2 Anesthetics and 9 Nurses were giving care for Obstetrics and Gynecology patients. The study period is from July 1, 2015, to June 30, 2016.

### **B. Study design**

An institutional-based cross-sectional study was employed.

### **C. Source population**

All mothers who were admitted in Obstetrics and Gynecology ward at Lemlem Karl Hospital from July 1, 2015, to June 30, 2016.

### **D. Study population**

All Mother who gave birth at Lemlem Karl Hospital.

### **E. Sample population**

Those who are medical recording numbers have been listed and selected from the study population.

### **F. Technique Sampling and sampling procedure**

Systematic random sampling was used to select the study unit. First list all mothers who gave birth by using their medical recording number (ID no) from the registration book and divided for the sample size  $n$  to get  $k$ , which was 3. So from the registration book, every 3<sup>rd</sup> card was selected after the 1<sup>st</sup> card was taken randomly.

### **G. Sample size determination**

Sample size: To determine the desired sample size which could represent the target population, single population proportion formula used with the following assumptions: with 95% confidence interval, 5% margin of error ( $\alpha=0.05$ ,  $d=0.05$ ). Just not need of adding contingency in this case because I have used other replaced charts. Mathematically,

$$n = (Z)^2(P)(1-P)/d^2 \text{ where}$$

$z$  = value corresponding to 95% confidence level (1.96),

$d$  = margin of error and  $p$ , value = 0.25

So,  $n = (1.96)^2(0.25)(1-0.25)/(0.05)^2$

=288 charts were the final study subjects.

### **H. Data collection**

Quantitative data were collected from the charts (secondary data) during the study period. Four

individuals, who had a diploma and above in health-related professions (Midwives) and previous experience of data collection collected the data and was monitored by one supervisor,

**I. Data analysis**

Data were coded by using standard coding methods and the data was entered, cleaned, stored and analyzed by using SPSS version 20. Both descriptive and binary logistic regression analysis was used to present the results. Descriptive statistics were calculated for all variables by using statistics, graphs, and figures. Binary logistic regression and multiple variable logistic regressions were carried out to examine the association of independent variables with the dependent variable. The strength of association was interpreted by using the odds ratio and 95%CI. The criterion for statistical significance is p-value of  $\leq 0.05$ .

**J. Dependent variable**

- ✓ Cesarean section

**J. Independent variables**

- ✓ Socio-demographic characteristics, Parity, address, gravidity, parity, maternal age, fetal weight, use of partograph, gestational age, ethnicity, Antenatal follow up, onset of labor, pre delivery Hematocrit.

**K. Exclusion criteria**

- ✓ Women in which laparotomy was done for complete uterine rupture irrespective of the fetal outcome.
- ✓ Women in which hysterotomy was done before 28 weeks of gestational age.

**L. Inclusion criteria**

- ✓ All mothers, those gave birth in the hospital during the study period.

**III. ETHICAL CLEARANCE**

Ethical approval was obtained from the institutional review board (IRB) of Mekelle University and official letters were written from Mekelle University to Regional Health Bureau, to Lemelem Karl Hospital to get permission. Moreover; confidentiality of the information was assured by not recording the name of the mothers.

**IV. RESULTS**

**A. Socio-demographic characteristics**

A total number of a mother who included in the study was 288. This number included 83 who delivered by Caesarean Section and 205 who delivered vaginally. Majority of the study subjects were in the age range of 21-30 (72.8%). Majority of the study subjects were

Tigrigna (96.9%). As to the residence of the study subjects, 154(53.5%) of the study subjects were from a rural area (Table 1).

**Table 1: Socio-demographic characteristics of mothers who delivered in Lemlem Karl General Hospital, Tigray, Ethiopia 2016 (N= 288).**

Variable		Frequency (N)	Percent (%)
<b>Ethnicity</b>	Tigray	279	96.9
	Amhara	4	1.4
	Agew	3	1
	Afar	2	0.7
<b>Age of mother</b>	15-19	19	6.6
	20-30	209	72.8
	30-40	59	20.6
<b>Residence</b>	Rural	154	53.5
	Urban	134	46.5

**B. Reproductive history, Clinical and laboratory findings**

From the study subjects, 90(31.3 %) were their first pregnancy; 178(61.8%) had ANC follow up documented. Partograph was used in 258 (89.6 %) of the study subjects. The mean age of the gestation of the study participants at labor was  $38.6 \pm (2 \text{ SD})$  weeks. The mean weight of the newborn was  $3045.8 \pm (561.34 \text{ SD})$  in grams. The mean pre-operative hematocrit of the study participants was  $39.9 \pm (4.46 \text{ SD})$  (Table 2).

**Table 2:- Reproductive history of mothers who delivered in Lemlem Karl Hospital, Tigray, Ethiopia 2016 (N=288).**

Variable	Category	Frequency (N)	Percent (%)
<b>Gravidity</b>	1	90	31.3
	2 – 4	151	52.4
	>4	47	16.3
<b>Parthograph</b>	Documented	258	89.6
	Not documented	30	10.4
<b>Labour onset</b>	Spontaneous	264	91.7
	Induced	17	5.9
	Elective CS	7	2.4
<b>ANC</b>	Booked	178	61.8
	Unbooked	36	12.5
	Unbooked but referred	74	25.7
<b>Sex of the Newborn</b>	Male	160	55.6
	Female	128	44.4

**C. Prevalence of Caesarean Section and the common indications**

The number of Caesarean Section was 83(28.8%). Majority of the cesarean section 71 (85.5%) were done for the first time. Out of the total Caesarean Section,

95.2% were performed in an emergency base. The mean pre-delivery hematocrit of the study participants, for whom CS was done, was  $39.9 \pm (4.46SD)$  in days and the mean postoperative hematocrit were  $36.77\% \pm (4.33\%SD)$ . The mean post-operative hematocrit drop was  $3.13 \pm (SD)$  in hemoglobin.

The mean length of hospital stay after operation for mothers delivered with Caesarean Section was  $4.53 \pm (2.35SD)$  in days. The earliest discharge was after two days while the longest discharge was after 15 days (Table 3).

**Table 3:- Clinical findings of mothers delivered through Caesarean Section in Lemlem Karl Hospital, Tigray, Ethiopia 2016.**

Variable	Frequency(N)	Percentage (%)
Number of CS	First	71 85.5
	Repeat	12 14.5
Type of CS	Elective	4 4.8
	Emergency	79 95.2
Labour onset for those emergency CS was done	Spontaneous	76 96.2
	Induced	3 3.8
Type of Anaesthesia Used	General	5 6
	Spinal	78 94

The commonest indication of the Caesarean Section was cephalic-pelvic disproportion 30(36.1%) followed by NRFHR 18(21.7%) (Table 4).

**Table 4:- Indications of Caesarean Section in Lemlem Karl Hospital, Tigray, Ethiopia 2016 (N= 288).**

Indication	Frequency(N)	Percent (%)
Cephalic pelvic proportion	30	36.1
None reassure fetal heartbeat	18	21.7
Failed vaginal delivery after Caesarean Section	4	4.8
Non-candidate for vaginal delivery after Caesarean Section	5	6.0
Breech with x-factor	7	8.4
Failed induction	4	4.8
Obstructed labor	3	3.6
Multiple gestations with x-factor	3	3.6
Antepartum hemorrhage	2	2.4
Cord prolapse	1	1.2

Others	6	7.2
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**D. Associated factors of Caesarean section**

Association of the individual variable with the outcome variable was done and partograph status and ANC follow up were found to have the association with caesarean delivery (Table 5).

**Table 5:- Bivariate and Multivariate analysis of variables with Caesarean Section among mother delivered in Lemlem Karl Hospital, Tigray, Ethiopia, 2016(N= 288).**

Variables	Caesarean, n (%)	Vaginal, n (%)	COR(95%CI)	P-Value	
Age	15-20	4(21.1%)	15(78.9%)	0.717 (0.207, 2.485)	0.599
	21-30	62(29.7%)	147(70.3%)	1.134 (0.594, 2.163)	0.704
	>30	16(27.1%)	43(72.9%)	1	0.704
Address	Rural	49(31.2%)	105(68.2%)	1.373 (0.819, 2.300)	0.229
	Urban	34(25.4%)	100(74.6%)	1	
ANC	Booked	40(22.5%)	138(77.5%)	0.290 (0.163, 0.516)*	0.000
	Unbooked/referred	6(16.7%)	30(83.3%)	0.200 (0.074, 0.537)*	0.001
		37(50%)	37(50%)	1	0.000
Gravidity	1	29(32.2%)	61(67.8%)	0.839 (0.400, 1.761)	0.642
	2	37(24.5%)	114(75.5%)	0.573 (0.284, 1.155)	0.119
	3	17(36.2%)	30(63.8%)	1	0.213

Parity	1	32(26.9%)	87(73.1%)	1.076 (0.593, 1.953)	0.809
	2	24(38.1%)	39(61.9%)	1.80(0.921, 3.520)	0.086
	3	27(25.5%)	79(74.5%)	1	
Gestational age	1	3(14.3%)	18(85.7%)	0.333 (0.079, 1.405)	0.135
	2	70(29.5%)	167(70.5%)	0.838 (0.373, 1.882)	0.669
	3	10(33.3%)	20(66.7%)	1	0.306
Labour onset	Spontaneous	75(28.4%)	189(71.6%)	0.529 (0.116, 2.421)	0.412
	Induced	5(29.4%)	12(70.6%)	0.556 (0.090, 3.445)	0.528
	Elective C/S	3(42.7%)	4(57.1%)	1	0.713
Partograph Status	Documented	59(22.9%)	199(77.1%)	0.074 (0.029, 0.190)*	.000
	Not documented	24(80%)	6(20%)	1	
new-born sex	Male	53(33.1%)	107(66.9%)	1	
	Female	30(23.4%)	98(76.6%)	1.618 (0.957, 2.2735)	0.072

The variables which had the association in bivariate regression were run in multivariate regression analysis. Partograph documentation, ANC follow up status, gravidity, parity, and sex of the newborn were included in the multivariate logistic regression to identify the

independent effect of each of these variables on CS. Compared to mothers who have not documented partograph, mothers' who have documented partograph were 88.2% less likely to be delivered by Caesarean Section (AOR=0.112, 95%CI: 0.041, 0.307). Regarding Antenatal Care, mothers who had ANC follow up had 55.8% less likely to deliver by Caesarean Section (AOR=0.442, 95%CI: 0.230, 0.849).

## V. DISCUSSION

Caesarean Section is a life-saving procedure for both the mother and the baby. Delay in deciding for it may be detrimental for both. On the other hand, the premature and wrong decision may increase the maternal and fetal morbidity and mortality. The purpose of this study was to determine the magnitude of Caesarean Section and to identify factors leading to Caesarean Section in Lemlem Karl general hospital. World Health Organization reported that higher than 10% – 15% rates of CS are not justifiable anywhere. However, reports show that there is an alleged overuse of the procedure in many parts of the world [WHO, 2010].

The proportion of women undergoing Caesarean Section in this study was 28.8%. This finding is consistent with studies conducted in Felegehiwot referral hospital, North West, Ethiopia (25.4%) [Fantu et al, 2015] and Attant hospital, Gurage zone, Southern Ethiopia (27.6%) [Moges et al, 2015]. This magnitude may be attributed to a high number of referral cases.

A national survey in Ethiopia is not comparable with this study showing that the overall institutional Caesarean section rate in public sectors was 15% [Fesseha et al, 2011]. The result in this study was higher than the finding in Mizan Aman hospital, Southwest Ethiopia (21%) [Gutema et al, 2014] and Addis Ababa (21.5%) [Gebremedhin et al, 2014]. This discrepancy could be explained by the difference in the study areas, and access to the services.

A study done in Tikur Ambessa hospital showed that the leading indications of cesarean delivery were: repeat cesarean section (32.4%) followed by CPD (29.2%) and APH (12.6%) [Tadesse et al, 2011]. But in this study, the leading indications were: CPD (36.1%), followed by Non-Reassuring Foetal Heart Rate (NRFHR) (21.7%) and failed Vaginal Delivery after Caesarean Section (10.8%). This difference could be due to a high rate of primary cesarean deliveries in private hospitals of Addis Ababa. Similar to this study in Jimma hospital the leading indications were CPD (44%), and repeat cesarean section (18%) [Ayanose et al, 2015].

Compared to mothers who have documented partograph, mothers who have not documented were 88.2% times less likely to deliver by cesarean section.

Similar to this study, clinical guidelines also justify that use of partograph for labor monitoring reduces the likelihood of delivering by cesarean section. It stabilizes the clinician and helps in giving time and preventing premature decisions of cesarean section.

Compared to mothers who had booked ANC, those mothers who had ANC follow up were 55.8% times less likely to deliver by cesarean section. This could be because Antenatal care gives time for correcting or treating the abnormality. Similarly, the study was done in Mizan Aman hospital also showed that cesarean delivery is higher among mothers with no ANC follow-up [Gutema et al, 2014]. Pregnant women should routinely receive information on the signs of complications and be tested for them at all antenatal care visits.

## VI. CONCLUSION AND RECOMMENDATION

The cesarean delivery rate of Lemlem Karl hospital is comparable with the cesarean rate of different hospitals across the nation. Generally, the independent variables found to be a risk for cesarean delivery found with multivariate analysis were: status of partograph documentation and status of ANC follow up. Administrative bodies, health officials and stakeholders should work on ANC follow up so that every pregnant mother gets the care and decrease the likelihood of cesarean delivery. Further detailed prospective and community-based investigation on cesarean delivery should be conducted.

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