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Cesarean Section Rate, Maternal and Fetal Outcome of Birth Following Cesarean Section at Finoteselam Hospital, Northwest Ethiopia: A Descriptive Retrospective Data

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Methods: Hospital based two-year retrospective descriptive cross-sectional study design was conducted from March to May 2015 in Finoteselam hospital, Northwest Ethiopia. A total of 250 mothers who delivered by cesarean section from September 2013 to December 2015 and have completed data were included in the study. Data were extracted using structured data collection format and cleaned, and entered into EPI info software version 3.5.3 and transferred into SPSS version 20 for further descriptive analysis.

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Result: Among 2267deliveriesin the two years of retrospective data, a total of 250 mothers were delivered by cesarean section, giving cesarean section rate 11%. The leading indication for cesarean section was fetal distress (24.8%). Among the total cesarean section deliveries, 42neonates were died, giving the proportion of neonate mortality rate 16.8%.Three mothers were died following cesarean section delivery, giving maternal mortality rate following cesarean section delivery 12 per 1000 live births.

Conclusion: However, cesarean section rate in this study was within the WHO recommended range, the health outcome of mothers and neonates' following cesarean section was not acceptable. The neonatal and maternal mortality following cesarean section deliveries was 16.8% and12 per 1000 live births respectively. The main cause of neonatal death was birth asphyxia.

Keywords: cesarean section rate, maternal and neonate outcomes, northwest ethiopia.

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I. Background

Basic obstetric and newborn care provided by skilled attendants during prenatal and delivery has good maternal and neonatal outcomes[1, 2]. Cesarean section delivery as one of life saving procedure has played a major role in lowering both maternal and neonatal mortality rate[3]. Cesarean section refers to the delivery of afetus, placenta and membrane through the abdominal and uterine incision after 28 weeks of gestation[4]. Though cesarean section is considered as a life-saving intervention for both the maternal and a child health, the quality of obstetric care further determines the outcomes of the mother as well as the fetus [5-7]. Cesarean section unless used appropriately, the potential risk to the mother and baby becomes more than the vaginal delivery, therefore it can considered as the vital indications of the health status of the neonate and the mother [6, 8-10].

Poor outcomes of cesarean section among mothers and fetus in developed and developing countries were reported consistently higher compared to vaginal deliveries [3, 11, 12]. In resource-poor countries where poor quality of obstetric care is the problem, and most cesarean section deliveries are performed when a vaginal delivery puts the babies or the mother's life or health at risk, cesarean section delivery is the marker for poor outcomes of maternal and neonatal health [1, 3, 11, 13]. Unlike developed countries, most cesarean section deliveries in developing countries are conducted because of obstetrical complications or medical illness. Consequently, the risk of cesarean section may be worsening if it is performed under emergency situations [14-16].

Though, World Health Organization (WHO) suggesting that cesarean rate should not exceed 15% [17, 18], rate of cesarean section delivery are increasing dramatically. Due to the rising CS rate in both developed and developing countries, mothers and neonates are also vulnerable to unnecessary risks. However, there is variation on the rate of cesarean section delivery in the world; the rate cesarean section delivery in developed nations ranged from 12 to 86% [8, 19-21]. In developing

countries, especially in Sub-Saharan country where maternal and neonatal mortality rate is high, maternal and infant mortality corresponding with the increasing rate of cesarean section delivery is associated with the quality of obstetric service during pregnancy and childbirth. In low and middle income countries, the rate of cesarean section delivery range between 2 to 39% [18, 19, 22, 23]

Maternal and neonatal morbidity and mortality is not only accounted by the surgical procedure, but also other risk factors such as un-booked status, severe blood loss[11, 12, 24, 25], previous antenatal care service, use of general anesthesia, anemia, dehydration, prolong labor, repeated vaginal examination, previous surgery Gestational age, and medical condition diagnosed before cesarean section[26-29].

In Ethiopia, maternal and neonatal morbidity and mortality rate is high. Maternal and neonatal death in the country is reported as 470 per 100,000 live birth and 37 per live births respectively. Though, institutional delivery rate across the country become increasing, the change in reducing maternal and neonatal mortality rate is not reduced substantially. According to 2011 Ethiopian demographic and health survey report, 2% of the pregnant women are delivered with cesarean section which is increased by 1% from the 2010 Demographic and health survey report[30-32]. Therefore, this study assessed the cesarean section rate, outcomes of cesarean section on the mother and fetus in Finoteselam hospital.

II. Methods

a) Study setting and Study Design

Hospital based cross-sectional retrospective study was conducted from September 2013 to December 2015 at Finoteselam hospital. The hospital provides health services for more than 500,000 residents of in the catchment areas at outpatient and inpatient wards. The hospital provides inpatient service with 80 beds, and 8 delivery couches. A total 2,267 mothers are delivered during the period from September 2013 to December 2015 and 250women were delivered by cesarean section.

b) Study participants, sample size and sampling procedure

All women who delivered by caesarean section after a failed instrumental delivery between September 2013 to December 2015 at Finote Selam zonal hospital were the population under the study. All caesarean deliveries including elective, emergency, primary and repeat cases are included in the study. The charts of all 250 mothers who gave birth by caesarean section during the retrospective period were reviewed. Charts with incomplete information were excluded from the study.

c) Data collection tool and procedure

Data were collected using pre-tested structured questionnaire using chart review method. The questionnaire consists of socio-demographic variables, obstetric history and outcomes of cesarean section. mothers' information including age, parity, gestational age, antenatal care, stage of labor at admission, fetal condition at admission, reason for admission prior to intervention, onset of labor, spontaneous or induced, oxytocin infusions, instrumentation and reason for referral before admission to the hospital. Information was obtained from theatre records, labor ward records, and neonatal ward. To maintain consistency, the questionnaire was first translated from English to Amharic (the native language of the study area) and was retranslated to English by professional translators and Public Health experts. Five midwifery as data collector and two health officers as supervisors were recruited for the study. Two days intensive training regarding the objective of the study, confidentiality of information, and techniques to conduct interview was given to data collectors and supervisors. To address the ethical issues, the data collectors were recruited among the permanent employees of the respective hospitals. Maternal death was defined as death of the mother during hospitalization. Early neonatal death was defined as death of the infant within 7 days of delivery. Cesarean section rates were calculated by dividing the total number of Cesarean section by the total number of deliveries excluding stillbirths.

d) Data Processing and Analysis

Data were entered into Epi-info version 3.5.3 and exported to Statistical Package for Social Sciences (SPSS) version 20 for further analysis. Data cleaning was done by running frequencies. Descriptive statistics, including frequency and proportions were computed to summarize the study variables.

III. Result

a) Socio-demographic characteristics of respondents

From September 2013 to December 2015, there was a total of 2267deliveries and 250 pregnant women delivered by a cesarean section giving an overall cesarean section rate 11%. The proportion of cesarean section delivery was higher among rural residents, which was 54.4%. A majority of cesarean section deliveries (63.6%) were in the age between 20 and 29 years of age. The mean ($\pm$SD) age of pregnant women who undergo cesarean section delivery was 27 years ($\pm$5.5). Nearly half (46.4%) of mothers conduct the cesarean section delivery procedure for their first child, while thirty mothers had previous CS delivery.

Among the total mothers who underwent cesarean section delivery, majority (85.2%) of these women had emergency CS, and the higher (75%) of referred cases were responsible for majority of

emergency CS. More than half (56%) of CS were made by general anesthesia and the remaining were spinal anesthesia **(table-1).**

Table 1: Cesarean section cases with socio-demographic characteristics of in Finoteselam Zonal Hospital, West Ethiopia

Variables	Frequency	Percent (%)
Age		
10-19	12	4.8
20-29	159	63.6
30-39	72	28.8
40-49	7	2.8
Residence		
Urban	113	45.3
Rural	137	54.7
Marital status		
Single	8	3
Married	236	97
ANC follow-up		
No	69	28.7
Yes	171	71.3
Parity		
Primigravida	176	69.3
Para(1-4)	53	20.8
Grand multi	25	10.9
Gestational age		
Term	128	51.2
Post term	23	9.2
Unknown	99	39.6
Booking status		
Booked	77	70.8
Un-booked	73	29.2
Type of cesarean section		
Emergency	213	85.2
Elective	37	14.8
Frequency of cesarean section		
Primary	166	66.4
Repeat	84	33.6
Type of anesthesia		
General anesthesia	140	56
Spinal anesthesia	110	
Neonatal death	42	16.8
Maternal deaths	3	1.2

b) Cesarean section rate, maternal and neonatal outcomes of cesarean section (CS)

Among 2267 deliveries in the two years of retrospective data (from September 2013 to December 2015), a total of 250 mothers were delivered by cesarean section, giving cesarean section rate 11% (95% CI: 7.1, 14.9).

Among the total deliveries (2267), two hundred six (206) neonate and eight (8) mothers were died, giving the overall neonatal and maternal mortality rate of the hospital as 90.8 per 1000 live births and 353 per 100, 000 live births respectively. while, among the total mothers who delivered by cesarean section (250), three mothers and forty two neonates were died, giving the proportion of maternal mortality rate and neonatal mortality rate following cesarean section 12 per 1000 live births and 16.8% were attributed due to cesarean section delivery **(Table-1).** Hemorrhagic shock was the major 2(67%) responsible causes of maternal deaths. The rest one mother was died due to respiratory failure. Of the total mothers who conduct CS procedure; the leading indications of admission for cesarean section delivery were fetal distress (25%), Cephalo-pelvic disproportion (CPD) (24%), obstructed labor and fetal mal-presentation (11%) (**Figure-1**).

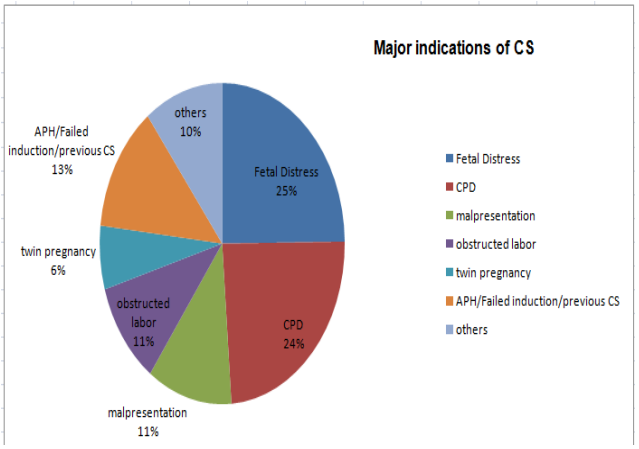

Figure 1: Major Indication of Cesarean section (CS) in Finoteselam Hospital, Northwest Ethiopia, 2015

One-third (28%) of the mothers would develop one or more complication following CS delivery, the most causes for these complications were wound site infection, PPH, anesthesia complication and puerperal sepsis **(figure-2).**

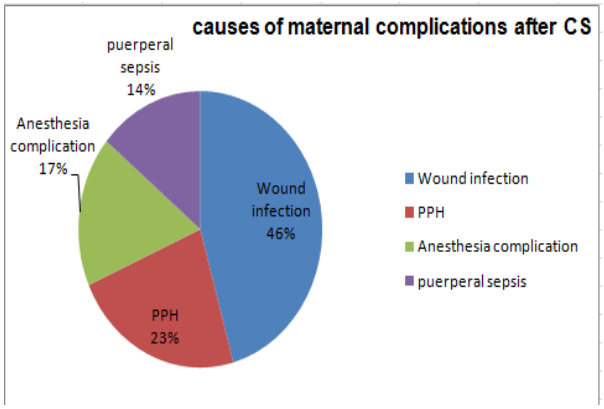

Figure 2: Causes of Maternal complication after Cesarean section in Finoteselam Hospital, northwest Ethiopia, 2015

In this study, nearly all fetuses (98.8%) had a positive fetal heart beat at the time of admission, and majority (84.4%) of them presented with the vertex. Three-fourth of newborn babies (76.4%) had normal birth weight (2.5-3.9 kg). Higher than two-third of (68.4%) fetus had normal Apgar score (table-2).

Table 2: Fetal Obstetrics related variables before and after CS intervention in Finoteselam zonal hospital, Northwest Ethiopia

Obstetrical variables	Frequency	Percent
Fetal heart beat arrival		
Positive FHB	247	98.8
Negative FHB	3	1.2
Fetal presentation		
Vertex	211	84.4
Breech	20	8
Other	12	4.8
Apgar score		
Very low Apgar(0-3)	41	16.4
Low Apgar(4-6)	38	15.2
Normal Apgar(≥7)	171	68.4
Birth weight		
Low birth weight	42	16.8
Normal birth weight	191	76.4
Macrosmia	17	5.8

Among the total deliveries, 25(10.4%) newborns were stillbirths. The still birth rate among CS deliveries was 9.4%. There were 42 neonatal deaths following cesarean section. The four leading causes of neonatal mortality were perinatal asphyxia (45%), neonatal sepsis (22%), neonatal jaundice/MAS/HMD 8(19%), and meconium aspiration syndrome 6(14%) (Figure-3).

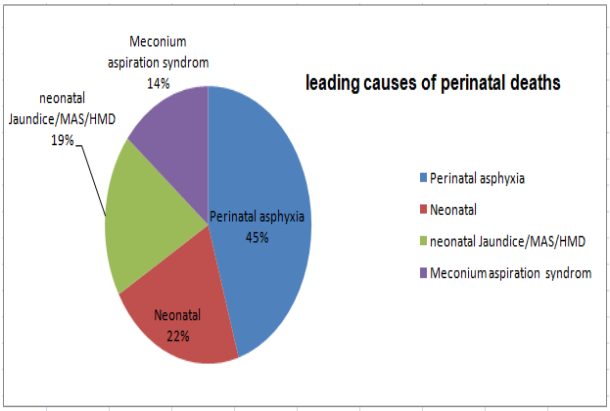

Figure 3: Leading causes of perinatal deaths in Finoteselam Hospital, Northwest Ethiopia, 2015

IV. Discussion

Cesarean section is the commonest obstetric operative procedure worldwide. When cesarean section is used appropriately it can improve the health outcomes of both the neonate and the mothers. However, when used inappropriately the potential harm may exceed the potential benefit of cesarean section. World health organization recommends that the rate of CS should not exceed 15% in developing countries. The purpose of this study was to determine the cesarean section rate, maternal and fetal outcomes and associated factors in Finoteselam hospital.

In this study, the rate of cesarean section (CS) delivery was 11%. This finding was consistent with the WHO recommendation which is between 5-15% [17, 18]. However, it was lower than studies conducted elsewhere in Ethiopia[12, 33, 34]. In this study majority (63.6%) of cesarean section deliveries were conducted within the age ranged from 20-29 years, which is consistent with the study conducted in Sudan[8]. this might be because of the reason that these age groups are the most reproductively active age group.

The finding of this study indicated that, the leading indication for cesarean section delivery was fetal distress; it accounted 25% of all the cesarean section which was consistent with the finding at southern Ethiopia, and Yekatit 12 hospital in Ethiopia [35] while, fetal distress proportion in this study was higher than studies at Jimma[12], Nigeria and Pakistan[26]. The higher proportion of fetal distress responsible for Cesarean section delivery might be due to the use of intermittent auscultation and nature of amniotic fluid as means of fetal monitoring during labor in the study center, because there were no facilities for electronic fetal monitoring in this study.

Although the cesarean section rate in this study was in line with the WHO recommended range, the two years of retrospective data analysis indicated that; two hundred six babies died in all forms of delivery and 42 neonates were died following cesearian section

procedure, giving the overall neonatal mortality rate of 98.8% per 1000 live birth and a proportion of 16.8% neonatal death due to cesarean section delivery. Similar finding was reported in Ethiopia at Black lion hospital and Jimma Hospitals[11, 12].

On the other hand, in this study among the total 2267 total deliveries, eight mothers were died, giving the overall maternal mortality ratio 353 per 100,000 live births, while maternal mortality following cesarean section delivery accounted 12 per 1000 live births, which was higher than the finding from Jimma[12]. Besides maternal deaths, 28% of the mothers develop one or more illness following cesarean section delivery, majority of the poor health outcomes other than death was noted among mother whose age between 40-49 years. The major causes of maternal illness was wound infection (46%), hemorrhage (PPH) (23%), anesthesia complication (17%) and sepsis (14%), which was higher compared with the finding from Jimma[36]. The higher proportion of poor health outcomes of the mother following cesarean section delivery was due to the poor pre-operative preparation (preoperative prophylaxis), cleanness of the surrounding environment, and poor follow-up.

As limitation, outcomes of cesarean section delivery that were discharge at home from the hospital were not assessed. In addition, the nature of the study which was retrospective data analysis misses some variables.

V. Conclusion

The cesarean section rate of 11.0% of observed in this review is within the recommended range by the WHO for developing countries (5%-15%). The health outcome of both the mother and neonate following cesarean section delivery was worrisome. Hemorrhagic shock and respiratory failure was the major causes of maternal deaths. While, cephlopelivic disproportion (including failure to progress secondary to arrest disorder) was a major maternal indication for poor maternal health outcomes. Therefore, timely and adequate progress of labor evaluation should be conducted. In addition, fetal heart rate monitoring in labor is recommended to reduce the suspected fetal distress. Moreover, basic maternal health service and basic emergency obstetric care should be strengthening. Furthermore, establish neonatology unit near to the maternity ward to prevent neonatal hypothermia is very essential.

VI. Acknowledgment

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Abbreviations

AOR, Adjusted Odds ratio;
ANC, Antenatal Care;
CI, Confidence Interval;
CS, Cesarean section;
CPD, Cephalopelvic disproportion;
OR, operating room;
SD, standard deviation;
SPSS, Statistical Package for Social Sciences;
PPH, post-partum hemorrhage; and
WHO, World Health Organization.

Competing interest

All authors declare that they have no any conflict of interest

Availability of data

Data will be available upon request from the correspondence authors.

Ethics consideration

Ethical clearance was obtained from Research Ethical Review Committee of the University of Gondar. Permission letter was secured from department of Gynecology and surgery. The data were kept with confidentiality.

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