

## Proportion of Caesarean Section and its Associated Factors among Women who Gave Birth in Debre Tabor General Hospital, North West Ethiopia

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### Abstract

**Introduction:** The World Health Organization considers Caesarean section rates of 5 - 15% to be the optimal range for targeted provision of this life saving intervention. However, access to safe Caesarean section in resource-limited settings is much lower, estimated at 1 - 2% reported in sub-Saharan Africa. The aim of this study was to determine the Proportion of Caesarean Section and its associated factors among women who gave birth in Debre Tabor General Hospital South Gondar Zone, Northwest Ethiopia, 2017.

**Methods:** Institutional based cross-sectional study was done among 500 women's who gave birth in Debre Tabor General Hospital from February 15 to May 15, 2017. A pre-tested structured questionnaire were used to collect data and data were entered by Epi info version 7 statistical software and exported to SPSS version 21 statistical package for analysis, Bivariable and multivariable logistic regression analysis were employed and odds ratio with 95% confidence intervals (CI) and P-value of < 0.05 was computed to identify associated factors for Caesarean section.

**Results:** Proportion of caesarean delivery was determined which accounts 20.2% with 95%CI of 16.6 to 23.8%, with the odd of undergoing caesarean section was lower among mothers had ANC follow up (AOR: 0.172, 95% CI: 0.035, 0.843), mothers reported to have gestational age between 37 - 41 weeks (AOR: 0.156, 95% CI: 0.034, 0.713), mothers in age group of 20 - 34 (AOR: 0.044, 95% CI: 0.018, 0.106) and higher among mothers had previous Caesarean section (AOR: 12.12, 95% CI: 4.538, 32.373).were identified factors significantly associated with Caesarean section.

**Conclusion and Recommendation:** Proportion of the caesarean section in Debre Tabor general hospital is high as compared to WHO recommendation. Maternal age, gestational age, previous Caesarean Section and ANC follow up have significant association with caesarean section at the hospital. Therefore, the rate of caesarean section at the hospital would be better to be reduced as per recommendation, Trial of vaginal birth after caesarean section in appropriate cases is recommended.

**Keywords:** Caesarean section; Proportion; Associated Factors; Ethiopia

### Introduction

Caesarean delivery is defined as the birth of a foetus (s) through incisions in the abdominal wall (laparotomy) and the uterine wall (hysterectomy) after 28 weeks of gestation [1].

Caesarean section is the most common obstetric operation aside from episiotomies and also the oldest operations in surgery. The objective of Caesarean section in ancient times was mainly post-mortem delivery of dead or alive foetus, not to bury both together. In the early medieval period, Caesarean section is performed by midwives or clergy purely in a religious context. Withdrawal of surgery from religious authority in renaissances times led to the emergence of Caesarean section as a medical procedure [1].

Caesarean section is one of life saving procedures medical intervention attributed to the decrease of the maternal mortality and morbidity rates. It is one of the indications for the quality of maternal health services offered in a country. The safety of the operation has improved with time, largely due to improved surgical and anesthetic techniques as well as the availability of blood transfusion services [2].

The main advantage of Caesarean section is the avoidance of adverse complications associated with vaginal delivery especially difficult deliveries and deliveries that pose a threat to the life of the unborn baby. Advances in medical knowledge over time and improvements in anesthetic techniques and infection control have made Caesarean section to be a relatively safe operation to perform. In district hospitals in South Africa, most medical officers rate themselves as being proficient in performing Caesarean section operations [3].

Caesarean section rate is regarded as “an important indicator of access to essential obstetric care” [4].

The World Health Organization considers Caesarean section rates of 5-15% to be the optimal range for targeted provision of this life saving intervention. However, access to safe Caesarean section in resource-limited settings is much lower, estimated at 1 - 2% reported in sub-Saharan Africa [5].

Every minute in the world 380 women become pregnant, 110 experience pregnancy-related complication and one woman dies from a pregnancy-related cause. Reducing maternal mortality and morbidity are the key international development goals [6].

An estimated 289,000 maternal deaths worldwide in 2013, equivalent to about 800 women dying each day. Maternal deaths are concentrated in sub-Saharan Africa and Southern Asia, which together accounted for 86 per cent of such deaths globally in 2013 [7].

Globally the maternal mortality ratio curved by 45% between 1990 and 2013, from 380 to 210 deaths per 100,000 live births. However, this still falls to achieve on time the MDG target to reduce the maternal mortality ratio by three quarters by 2015 [8].

Over the last 15 years, the international public health community focused on reduction of maternal morbidity and mortality. There is no “magic bullet” for preventing maternal morbidity and mortality. There is no single technology, drug, or procedure that can effectively solve maternal health related problems. Most maternal complications are preventable but not predictable [9]. Maternal death is preventable even in resource-poor country but it needs the right kind of information on which to base programmes [10].

For about birth preparedness and complication readiness plan higher resource countries focused mainly on the woman’s psychological and physical comfort but lower resource countries focused on measures to ensure and prepare for birth and its complication [11].

Ethiopia is one of the countries in sub-Saharan Africa with markedly high maternal mortality ratio. According to Ethiopian demographic and health survey, the maternal mortality ratio was 353/100,000 live births in 2015. This indicates there is no significant change over five year’s period. Even if Ethiopia’s Health Sector Development Program (HSDP) advert the importance of increasing access to high reproductive health care and increasing access to skilled delivery still unable to prevent pregnancy related complications [12].

Post caesarean endometritis remains the most common complications of caesarean delivery despite its reduced frequency as a result of the use of prophylactic antibiotic. In the past, emergency CS was associated with an average rate of endometritis of 30 - 40% without administration of prophylaxis [13]. But recently data suggested the risk for this complication is considerably low to 8.6% of cases. Labour, repeated vaginal examination, PROM and low socio-economic status appear to be the factors that most influence the rate of this complication [14].

There is considerable evidence that caesarean delivery put women at risk for obstetric hemorrhage and infection which are the most frequent causes of severe maternal morbidity and the leading causes of hospital readmission in the first 30 days after delivery. Others short and long term consequences are pain, surgical adhesions as well as possible increased risk for fertility issues and perinatal complications in subsequent pregnancies, placental implantation problems like placenta Previa and placenta accreta. There is growing evidence that for the majority of women having a caesarean section is associated with greater psychological distress and illness including post-partum anxiety, depression and post traumatic disorder. It can also have an adverse influence on maternal infant contact at birth, and women’s satisfaction [15].

The extent of recommended Proportion of Caesarean Section and its associated factors in Debretabor General Hospital is not studied specifically and also may vary by individual, social and demographic characteristics are not well understood. Therefore, conducting of this study on Proportion of Caesarean Section and its associated factors in debretabor general hospital is crucial.

## **Methods**

### **Study setting and period**

Institutional -based cross-sectional study was conducted from February 15 to May 15, 2017 among women who gave birth in Debretabor General Hospital, South Gondar Zone. Debretabor is located 668 kilometres northwest from the capital city of Ethiopia, Addis Ababa and 103 kilometres from Bahirdar a city of Amhara National regional state.

There are 15 Woredas in South Gondar Zone, situated in Amhara National Regional State, Ethiopia. South Gondar Zone is one of the 11 Zones of the Amhara National Regional State and has a total of ten rural woredas and five town administrations. There are three health centers, three private clinics and one governmental hospital which gives different services.

The Hospital provides different obstetrics and gynaecological services like ANC, Delivery, PNC, family planning, abortion, and so on. In this obstetrics ward there are total of 31 beds including coaches. The Hospital gave health service to more than 2 million populations (2.485.528). In its catchment area there are 4 Hospital and 93 Health Centers.

### **Sample size and sampling techniques**

The sample size of study were calculated using single population proportion formula assuming a 25.4% proportion of women who undergoing caesarean section in Bahirdar, Felegehiwot Hospital [16] at a 95% confidence interval, 4% margin of error and adding 10% as contingency for non-response rate. Total sample size with 10% of non-response rate is 500.

Systematic random sampling was used; average number of women who gave birth at the hospital was 290 per month. Therefore the number of women who deliver at hospital was estimated for the study period; then sampling fraction (k) for selecting the study participants was determined by dividing with total estimated number of patients during the data collection period to the total sample size which was calculated approximately 2 (1.74).

Study participant was identified systematically in every other mother's intervals, the first mother randomly selected by lottery methods by using their card number from Delivery Registration book to select 500 study subjects. Mothers give birth in Debretabor General Hospital, during data collection period in reproductive age group was included in the study.

### **Measurement**

The data was collected from mothers who gave birth at Debretabor General Hospital by using a structured questionnaire adopted from different literatures which were developed for similar purpose done by different authors, was prepared according to the objectives of the study and the local situation of the study area in English language. Then the questionnaire was translated to Amharic and back to English to assure consistency of the tool.

The data was collected from February 15 to May 15 at Debretabor hospital three trained midwife and one supervisor were recruited for data collection and then data were collected by face to face interview and chart review by using a pre-tested, structured questionnaire developed in Amharic language after one day training was given for data collectors and supervisors, Questionnaire was checked by data collectors and supervisors on daily base for completeness, consistency and fully completed.

### **Statistical analysis**

The collected data was entered by using Epi info version 7 then export to Statistical Package for Social Science (SPSS) software version 21 was used for cleaning and analyze the data. In addition, the statistical tools of descriptive analysis statistical results was presented by tables, frequency distributions and percentages to give a condensed picture of the data. This was achieved through summary statistics of the means, standard deviations values which are computed for each variable in this study.

Analysis was done by using logistic regression, the odds ratio (OR) with 95% confidence intervals (CI) and two-tailed *P* values have been calculated. Variables found to be statistically significant (*P* < 0.05) on adjusted analysis was included in a multivariable logistic regression model through a backward stepwise to identify the significant association between predictor variables and C/S deliveries.

**Results**

**Socio-demographic characteristics**

A total of 500 mothers were included in this study making a response rate of 100%. The mean age of respondents was 27.96 years with (SD ± 5.6). Majority of the patients were between 20 - 34 years 425 (85%), older than 35 years 54 (10.8%) and the rest were younger than the age of 20 years 21 (4.2%).

Variables		Frequency	Percent (%)
Age	15 - 19 Years	21	4.2
	20 - 24 Years	425	85
	≥ 35 Years	54	10.8
Resident	Rural	237	47.4
	Urban	263	52.6
Religion	Orthodox	456	91.2
	Islam	39	7.8
	Protestant	5	1.0
Ethnicity	Amhara	500	100.0
Marital Status	Married	481	96.2
	Divorced	14	2.8
	Widowed	4	.8
	Single	1	.2
Level of education	Can't read and write	166	33.2
	Can read and write	99	19.8
	Primary Completed	81	16.2
	Secondary and above	154	30.8
Occupation	Housewife	134	26.8
	Farmer	162	32.4
	Merchant	61	12.2
	Daily labourer	19	3.8
	Employee	105	21.0
	Others	19	3.8
Monthly income	< 500	1	.2
	500 - 1499	53	10.6
	≥ 1500	446	89.2

**Table 1:** Distribution of socio demographic characteristics of mother's delivered in Debretabor General Hospital 2017.

*N.B: Others - private workers and students.*

**Obstetric characteristic**

The Obstetric characteristic the mothers are presented in table 2. Out of mothers delivered at the hospital 206 (41.2%) of them had less than two parity. 475 (95%) of them had ANC follow up for their current pregnancy, of those who have ANC follow up 242 (48.4%) of them

had less than four times. For majority of mothers 457 (91.4%) the gestational age at labor was between 37 - 41 weeks. Majority (79.8%) of mother delivered through vagina while the remaining 101 (20.2%) of them delivered by Caesarean Section.

Variables		Frequency	Percent (%)
Gravidity	1	176	35.2
	2 - 4	242	48.4
	>=5	82	16.4
Parity	1	206	41.2
	2 - 4	265	53.0
	>=5	29	5.8
ANC follow up	Yes	475	95
	No	25	5
Frequency of ANC n = 475	<=3	242	50.7
	>=4	233	49.3
History of Abortion n = 324	Yes	93	28.7
	No	231	71.3
History of Stillbirth n = 324	Yes	22	6.8
	No	302	93.2
Previous C/S n=324	Yes	34	10.5
	No	290	89.5
GA at Labour	< 37	15	3.0
	37 - 41	457	91.4
	≥ 42	28	5.6
Weight of baby	< 2500g	20	4.0
	2500 - 3999g	461	92.2
	≥ 4000g	19	3.8
Maternal illness	Yes	11	2.2
	No	489	97.8

**Table 2:** Obstetric characteristics of mothers delivered in Debretabor general 2017.

### Indications of caesarean section

This determined the Proportion of Caesarean Section, which revealed that 101 (20.2%) with 95% CI (16.6 to 23.8%) were Caesarean section mode of deliver in Debretabor general Hospital during the study period. This study also identified that the major indications of CS were Non reassuring foetal heart rate pattern (NRFHRP) (22.8%), previous caesarean section (19.8%) and cephalopelvic disproportion (15.8%) respectively. Others (14.9%), (filled induction 4%, post term 3%, cord prolapse 3%, uterine rupture 2% macrosomia 2% and retained twin 1%) (Figure 1).

### Factors associated with caesarean section

The association between caesarean section and independent variables was presented in table 3. Within all variables which are associated with Caesarean section in Bivariate and multiple analysis age of the mothers, gestational age at labour, previous c/s and ANC follow up were significantly associated with Caesarean section after adjusting for other variables by multivariate analysis.

Mothers whose age is between 20 - 34 years are 95.6% less likely to undergo Caesarean section as compared with those who age is between ≥ 35 years with, (AOR: 0.044, 95% CI: 0.018, 0.106).

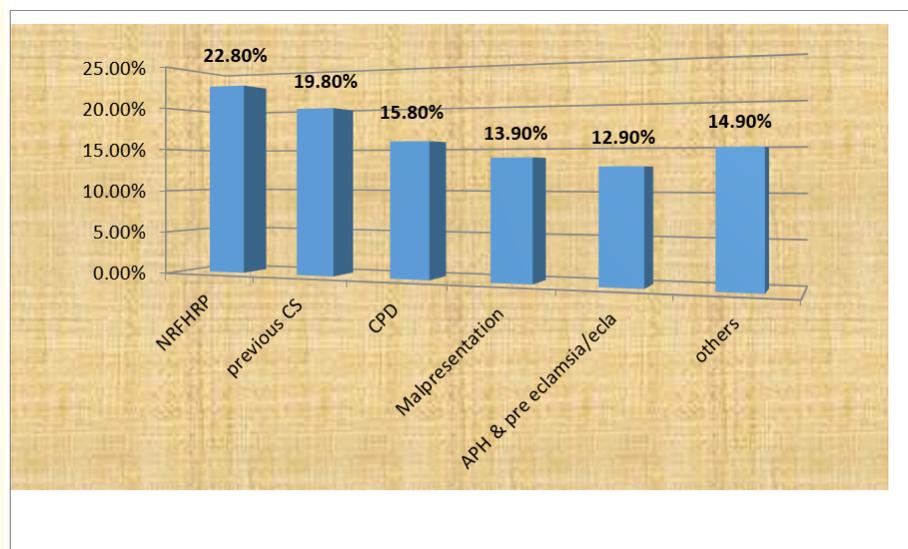


Figure 1: Indications of C/S in debretabor General Hospital.

Variables	Caesarean section		OR (95% CI)		
	Yes (%)	No (%)	Crude	Adjusted	p-value
<b>Age</b>					
15 -19	2 (9.5)	19 (90.5)	0.078 (0.017,0.369) *	0.533 (0.043,6.567)	.623
20 -34	68 (16)	357 (84)	0.141 (0.078,0.257) *	0.044 (0.018,0.106) *	.000
≥ 35	31 (57.4)	23 (42.6)	1	1	
<b>Previous History of c/s</b>					
Yes	19 (55.9)	15 (44.1)	8.937 (4.173, 19.141)*	12.121 (4.538, 32.373)*	.000
No	36 (12.4)	254 (87.6)	1	1	
<b>Parity 1</b>					
2-4	53 (25.7)	153 (74.3)	1	1	.188
≥5	43 (16.2)	222 (83.8)	0.559 (0.356, 0.879)*	0.341 (0.102, 1.137)	.080
	5 (17.2)	24 (82.8)	0.601 (0.218, 1.656)	0.269 (0.051, 1.424)	.123
<b>ANC follow up</b>					
Yes	89 (18.7)	386 (81.3)	0.250 (0.110, 0.566)*	0.172 (0.035,0.843)*	.030
No	12 (48)	13 (52)	1	1	.000
<b>GA at labour</b>					
< 37	6 (40)	9 (60)	1	1	
37 - 41	83 (18.2)	374 (81.8)	0.333 (0.115, 0.961)*	0.156 (0.034,0.713)*	.017
≥ 42	12 (42.9)	16 (57.1)	1.125 (0.314, 4.029)	0.424 (0.058, 3.076)	.396

Table 3: Bivariate and multiple association between Caesarean section and selected variables in Debre Tabor General Hospital 2017.

\*P < 0.02 -COR, P < 0.05 - AOR.

Mothers those had previous CS 12 times more likely undergone C/S as compared to those whom hadn't CS previously with (AOR: 12.121, 95% CI:4.538, 32.373).

C/S is 82.8% less likely among mothers had ANC follow up as compared with those who hadn't any ANC follow up with (AOR:0.172, 95% CI: 0.035, 0.843).

Mothers whose gestational age at labor is between 37-41 is 84.4% less likely undergone C/S as compared to those whom gestational age less than 37 weeks with (AOR: 0.156, 95% CI:0.034, 0.713).

## **Discussion**

This study gives important information regarding the rate of Caesarean section and its associated factors. The Caesarean section rate of 20.2% in this study was approximately similar to 21.1% reported from mizan aman hospital in Ethiopia [17] and 21.4% reported from Pakistan teaching hospital [18]. The possible reason for this similarity may be both are developing countries.

The figure is lower than the rate of caesarean section in different countries like California 33% [15], Cairo university hospital, in Egypt and Almatariya hospital the rate is 37.8% and 36.5% respectively [19]. The study conducted in the other side of Ethiopia at Attat hospital, Jimma Specialized University Hospital and Bahirdar felegehiwot referral hospital the rate of C/S was 27.6%, 28.1% and 25.4% respectively [20-22]. It may be because of, the frequency of caesarean section depends on the inherent characteristics of the obstetrics population, socio-demographic pattern, referral role of the hospital, departmental policies regarding management of cases, physician factor and medico legal aspects and consideration of maternal choice and wishes.

But this figure is higher as compared with the study done in different African country like 11% in Tanzania and 11.8% in Nigeria [23,24] and other parts of the country 5.5% in Tikur Anbessa Hospital and 8% in Jimma Hospital [23]. This rate was above 15% recommended by the World Health Organization. This may be due to the fact that Debretabor general Hospital is the only governmental institution performing caesarean section in the town and no private institution performing caesarean section which increases referral to the hospital.

In this study the associated factors with caesarean section were Age, ANC follow up, previous CS and gestational age at labour. The chance of undergone caesarean section, Mothers whose age is between 20 - 34 years were 95.6% less likely as compared with those whose age is 35 years and above. These result is supported by different studies, which is Cairo university hospital, in Egypt and Almatariya hospital [25] mizan Aman hospital [17], Adigrat hospital [26], Felegehiwot referral hospital [22]. This is due to the possibility of pregnancy related complication increased by age.

In this study CS is 82.8% less likely among mothers had ANC follow up as compared with those who hadn't any ANC follow up. This findings supported in the studies done Adigrat hospital [26], Mizan Aman general hospital [17]. Jimma university specialized hospital [21] and Bamako-Mali point G National Hospital [27]. This could be because ANC helps to early prevention and identification of the causes like PIH, diabetes mellitus and anemia.

It also gives time for correcting or treating the abnormality. The other possible reason is presence of 1 to 5 network armies in the community that mobilizes pregnant mothers to visit health institution. 42.9% of mothers gestational age at labour was above 41weeks, but in the study done in Mizan Aman the majority of the mothers gestational age is less than 38 weeks [17]. CS is 84.4% less likely among mothers whose gestational age at labour is between 37 - 41 thirty eight weeks as compared with those who gestational age at labour is less than thirty seven. This may be due to risk of mal presentation and malposition is high in preterm labours.

In the current study, those Mothers had previous CS 12 times more likely undergone CS as compared to their counterparts, In similar different study done in Pakistan hospital [18], Cairo university hospital, in Egypt and Almatariya hospital [25], Jimma university specialized hospital [21] and Bahirdar felegehiwot referral hospital [22]. Unless there is a clear, compelling and well supported justification for CS, a carefully supervised and justified trial of labor is necessary. Trial of scar in singleton pregnancies can be given to reduce rate of repeated Caesarean section as the risk of uterine rupture is low.

## **Conclusion and Recommendation**

The Proportion of the caesarean section in Debretabor General Hospital was high. Maternal age, gestational age, previous Caesarean Section and ANC follow up have significant association with caesarean section at the hospital. Therefore, the rate of caesarean section at the hospital would be better to be reduced as per recommendation. Federal Ministry of health would be emphatically considered those

factors increases odd of caesarean section during maternal health program development in collaboration with others responsible bodies in order to reduce as per recommendation.

Hospitals and Health care providers would be better to reducing primary caesareans sections is important for preventing the next or repeat caesarean section rate.

Health professionals would be given comprehensive counselling during antenatal care for pregnant women potential at high risk of Caesarean delivery and should follow ANC fully.

Health professional who working in labour and delivery would be better to implement trial of vaginal birth after Caesarean section (VBAC) encouraged in appropriate cases.

### **Authors' Contributions**

Toyiba Hiyaru Wassie, Mesafint Ewnetu, Almaz Akililu and Dereje Bayissa Demissie conceptualized the study, designed the study instrument and conducted the data analysis and wrote the first draft and final draft of the manuscript.

Toyiba Hiyaru Wassie and Dereje Bayissa Demissie: Approved the research proposal with some revisions, participated in data analysis, revised subsequent drafts of the paper and involve in critical review of the manuscript. All authors read and approved the final manuscript.

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### **Competing Interests**

The author(s) declare that they have no competing interests.

### **Availability of Data and Materials**

The data sets generated during the current study are available from corresponding author on reasonable requests.

### **Consent for Publications**

Not applicable.

### **Ethical Approval and Consent to Participate**

Ethical approval has been obtained from Institutional Review Board (IRB) of the Bahirdar University. Letter of permission has been obtained from college of Medicine and health sciences, Bahirdar University. Permission to pursue the study has been obtained from Health Bureau of Amhara National Regional State and Debretabor general hospital. During data collection, the purpose of the study was clearly explained and informed consent has been obtained from each mother before the start of interview. The questionnaire was anonymous and no name of mothers was used. The data collected from each participant was kept and locked the confidentiality and privacy when handling the file throughout the study period. Any mother had the right to withdraw at any point during data collection.

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