

# Prevalence, indications and associated factors of cesarean section delivery at public hospitals in Wolayta Zone Southern, Ethiopia

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## Research

**Keywords:** Prevalence, indication, associated factors, cesarean section, Ethiopia

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# Abstract

Background : Cesarean section is a common major operation performed on women in developing and developed parties. Today the cesarean section is alarmingly increasing in both low and middle-income countries while maternal morbidity and mortality could not be decreased at the expected level. The aim of this study was to assess the prevalence, indication and associated factors of cesarean section, in Wolayta Zone, Southern, Ethiopia. Methods: A hospital-based cross-sectional study was conducted from January 01-February 30, 2017 on a sample of 514 mothers who delivered at public hospitals in Wolayta Zone. The mothers were selected using systematic random sampling. The data were collected using structured and pretested interviewer-administered questionnaires at the postnatal ward of each hospital. Data entry and cleaning were done by using EPI Data3.5.1 and exported to SPSS version 20.0 software package for analysis. Bivariate and multivariable analyses were done to test the presence of association between dependent and independent variables. P-value < 0.05 was considered as statistically significant. Results : The result revealed that 29.8% (95% CI:25.9-33.7) of women who delivered at public hospitals were by Cesarean section. A woman who had unstable conditions during labor and women who followed by partograph had higher odds of cesarean section delivery .Whereas, women who live in urban, women who had previous pregnancy complications, women who had not current obstetric problems and the number of seniors less than two had lower odds of cesarean section delivery. Obstructed labor, fetal distress, cephalic pelvic disproportion, previous c/s scar, Antepartum hemorrhage, mal-presentation, big baby, failed induction or augmentation, twin pregnancy, and cord prolapse were the identified indications for cesarean section in Wolayta Zone. Conclusion: In this study, the prevalence of cesarean section was high compared to the WHO threshold. Women who follow up by partograph had high odds of cesarean section delivery. The number of seniors greater than two had a significant effect on the reduction of the cesarean section. Hence, the hospital could be trained obstetric care providers proper plotting of partograph to decrease unnecessary cesarean section. Deployment of the above two seniors at the hospitals could be a reduced unnecessary cesarean section. Keywords: Prevalence, indication, associated factors, cesarean section, Ethiopia

## Background

The quality of obstetric care is reflected in the magnitude of perinatal and maternal mortality rates of a certain country, which is considered as one of the vital indicators of the health status [1]. Despite advances in modern obstetrics, maternal morbidity and mortality remain international global problem [2]. Sub Saharan Africa has the highest maternal mortality ratio (MMR) 500 maternal deaths per 100,000 live births [3].

Accordingly, the Ethiopian Federal Ministry of Health (EFMOH) has applied multi-pronged approaches to reducing maternal and newborn morbidity and mortality. Improving access to and strengthening facility-based maternal and newborn services is one such approach, and is also a major issue of concern in Health Sector Transformation Plan 2015/16-2019/20 of Ethiopia [4].

Childbirth is a normal physiological process and a significant emotional event in a woman's life [5].

Proper choice of proven interventions could be associated with the highest safety and effectiveness and to minimize maternal and neonatal morbidity and mortality during childbirth[6].

Cesarean section (C/S) is a surgical intervention designed to prevent or treat life-threatening maternal or fetal complications [7]. A C/S is often performed when a vaginal delivery would be put the baby's or mother's life or health at risk. Some are also performed upon request without a medical reason. Whereas, the rate of C/S is largely increasing all over the world with wide variations among countries and regions[8]. Currently, the quality of C/S has improved in low and middle-income countries while morbidity and mortality are high compared to spontaneous vaginal delivery[9]. The C/S significantly associated with maternal education and wealth, whereas less likely associated with increasing parties [7]. The international health-care community has considered the ideal rate for a cesarean section to be between 10% and 15% and there is no justification in any specific geographic region to have more than 10-15% C/S births [10].

The C/S rate in Addis Ababa has increased considerably from 2.3% in 1995–1996 to 24.4% in 2009–2010. Since 2003 the rate persisted beyond the upper optimum level of 15% [7].

The appropriateness and ethical aspects of C/S have been hotly debated by obstetricians and women's groups for so many years. Now the debate has focused on the questions of risks and benefits of vaginal and C/S deliveries and woman's autonomy to choose a mode of delivery. C/S without proper medical indication can be associated with an increased risk of adverse maternal and perinatal outcomes [7]. However, there is, still insufficient published data concerning the magnitude, indications and associated factors of C/S in the study area particularly in the Wolayta zone. Therefore, the aim of this study was to assess prevalence, indications and associated factors of C/S delivery among women who delivered at public hospitals of Wolayta Zone southern Ethiopia.

## Methods

### Study design and setting

A hospital-based cross-sectional study was conducted from January 01-February 30, 2017 among mothers who delivered at public hospitals in Wolayta Zone. Wolayta Zone is one of the zones found in the Southern Nations, Nationalities and Peoples Regional State (SNNPRS) of Ethiopia. Based on the projection from the 2007 census of Ethiopia, the total population in the Wolayta zone was 1.7 million. The public health institutions found in the zone include one referral hospital, four district hospitals and 70 health centers (5 urban and 65 rural). The total number of deliveries from the five hospitals in the 2015/16 Ethiopia fiscal year was 7445 (3511 in Otona Referral Hospital, 1228 in Bonbe Hospital, 1142 in Halale Hospital, 956 in Bitana Hospital, and 608 in Bale Hospital).

### Sample size determination and sampling procedure

The sample size was determined using Epi Info version 7 with the following assumptions; by considering confidence level 95%, the prevalence of C/S % or factors [11], the margin of error and the calculated sample size was 514. All public hospitals in the Wolayta zone were included in the study and the sample size proportionally allocated to five hospitals based on the expected number of deliveries.

The systematic random sampling procedure was used to select study participants in each hospital. The monthly expected number of deliveries at public hospitals in Wolayita zone was 620; thus the sampling interval used was 2.

### **Data collection tools and procedures**

A structured interviewer-administered questionnaire which included socio-demographic characteristics, obstetric history and mode of delivery was used to collect data. Data were collected through face-to-face interviews by ten obstetric care providers who have received BEmONC (basic emergency obstetrics and newborn care) training and who can fluently communicate with the local language (Wolaytigna). The data collectors were trained for three days on data collection methodology and related issues prior to the start of data collection and were closely supervised during the data collection.

### **Statistical analysis**

Data entry and cleaning was done by using EPI Data 3.5.1 and exported to SPSS version 20.0 software package for analysis. Bivariate and multivariable analyses were done to test the presence of an association between dependent and independent variables. Adjusted odds ratios (AORs) with 95% confidence intervals (CIs) were used to judge the presence and strength of association between C/S delivery and different factors. P-value < 0.05 was considered as statistically significant.

## **Results**

### **Socio-demographic characteristic of study participants**

A total of 514 mothers participated in the study with a 99% response rate. The ages of the participants ranged from 15 to 38 years with a mean (standard deviation) age of 26.14 (4.76) years. Wolayta was the dominant ethnic group (83.9%). Four hundred and eighty-six (95.3%) were married. Whereas, (69%) of the participants were housewives and 36.5% had completed primary (**Table 1**).

### **Obstetric history of study participants**

Three hundred and twenty (62.7%) of the study participants were multipara. About (82.7%) of women had planned pregnancy and about three-fourth (75.9%) gave birth at term. Forty-one percent of the mothers were referred from health centers due to prolonged labor, fetal distress and cephalic pelvic disproportion (CPD) (**Table 2**).

## Prevalence of C/S delivery

The prevalence of C/S was 29.8%(n=152) (95% CI:25.9-33.7) of women who delivered at public hospitals were by Cesarean section. Emergency cesarean section accounted for 96 % of all C/S deliveries (Figure 1).

## Time of emergency cesarean section

Most of the emergency cesarean section was performed in the morning and evening(Figure 2).

## Indications for C/S delivery

Obstructed labor, antepartum hemorrhage, and twin pregnancy were the main indications of cesarean section delivery (Figure 3).

## Factors associated with C/S delivery in Wolayta zone

Urban residency(AOR=0.55, 95%CI (0.33-0.92)),previous pregnancy had complication (AOR=0.39,95%CI (0.21-0.72)), unstable condition of the mother during labor (AOR=11.7 95% CI (6.94-19.73)), Partograph follow up (AOR=2.2595%CI(1.29-3.89)), Current obstetrics problem (AOR=0.0595%CI(0.02-0.12)) and increased number of seniors (AOR=0.5195%CI (0.30-0.85)) were significantly associated with C/S delivery (Table 3).

## Discussion

This study revealed that the prevalence of cesarean section among mothers who delivered in public hospitals in the Wolayta zone is 29.8 %. This finding is higher than the WHO threshold recommended(10) and a study was done in Addis Ababa 24.4% [7].The possible explanation for the high prevalence of C/S in the present study could be study time, study settings and most of the study participants came with complications. Above half of the decision was made by residents,general practitioners,midwives, and women,whereas 42.3% of the decision for the mode of delivery was made by obstetricians and/or emergency surgeons. This might be increased the C/S rate due to the overdiagnosis of indications of C/S .

Even if emergency C/S should be performed at any time, since it is an emergency, this study showed that about seven in ten of the emergency C/S operations were performed in mornings or evenings. The remaining emergency C/S operations were performed in the afternoon or at night.

The woman who had unstable conditions during labor and women who followed by partograph had higher odds of cesarean section delivery .Whereas, women who live in urban, women who had previous pregnancy complications,women who had not current obstetric problems and the number of seniors less than two had lower odds of cesarean section delivery. The factors found to be associated with C/S by

this study were different from the results of a study conducted in eastern Ethiopia except for previous C/S scar [11].

The strength of this study was relative to previous similar studies is incorporating relevant variables that were not addressed previously such as the number of seniors and time of emergency cesarean section performed to identify the factors which associate with cesarean section. The limitation of this study did not involve in private hospitals and did not incorporate the obstetrics provider's ideas. Outcomes can be, to some degree, affected by the recall and social desirability biases.

## **Conclusion**

In this study, the prevalence of cesarean section was high compared to the WHO threshold. women who follow up by partograph had high odds of cesarean section delivery. The number of seniors greater than two had a significant effect on the reduction of the cesarean section. Hence, the hospital could be trained obstetric care providers proper plotting of partograph to decrease unnecessary cesarean section. Deployment of the above two seniors at the hospitals could be a reduced unnecessary cesarean section.

## **List Of Abbreviations**

AOR: Adjusted odds ratio; APH: Antepartum hemorrhage; BEmONC: Basic emergency obstetric and newborn care; CI: Confidence interval; CPD: cephalic pelvic disproportion; C/S: Caesarean section; E.C: E Ethiopian calendar; EFMOH: Ethiopian Federal Ministry of Health; MMR: Maternal mortality ratio; MMR: Maternal mortality ratio; SNNPRS-Southern Nations Nationalities and Peoples Region; WHO: World Health Organization.

## **Declarations**

### **Ethics and consent**

Ethical clearance was obtained from the Institutional Review Board at the College of Medicine and Health Sciences of Hawassa University. Wolayita Zone Health Office and management of the respective public hospitals offered consent to conduct the study. Written consent was gained from the study participants before data collection started. Anonymous questionnaires were used to assure the confidentiality of study participants.

### **Consent for publication**

Not applicable.

### **Availability of data and materials**

We send all which is available as there is no remaining data and materials

## Competent interests

The authors declare no conflict of interest

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This research was funded by Hawassa University for the academic staff's fund. There was no role from funding body on data collection, analysis, interpretation, study design, manuscript writing.

## Authors' contribution

ZT conceived of and designed the study, participated in data collection, analyzed the data and drafted the paper. ZY, ZK, MS, SM, GB, KT, and AA critically reviewed the study protocol, participated in data acquisition and analysis and reviewed the draft manuscript. All authors read and approved the final manuscript.

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## Tables

Table 1: Socio-demographic and economic characteristics of study participants in Wolayta Zone, southern Ethiopia, February 2017 (n=510)

Variables		Frequency	Percentage
<b>Age</b>	15-19	32	6.3
	20-24	162	31.8
	25-29	203	39.8
	30-34	85	16.7
	35-38	28	5.5
<b>Religion</b>	Orthodox	154	30.2
	Muslim	14	2.7
	Protestant	327	64.1
	Catholic	12	2.4
	Jehovah witness	3	0.6
<b>Ethnicity</b>	Wolayta	428	83.9
	Amara	16	3.1
	Oromo	21	4.1
	Gamo	33	6.5
	Gurage	10	2
	Others®	2	0.4
	<b>Marital status</b>	Married	486
Single		9	1.8
Divorced		12	2.4
Widowed		3	0.6
<b>Occupation of The mother</b>	House wife	352	69
	Government employed	54	10.6
	Private employed	16	3.1
	NGO employed	71	13.9
	student	7	1.4
	Daily labor	6	1.2
	Other <sup>Ω</sup>	4	0.8
<b>Occupation of spouse</b>	Farmer	116	22.7
	Government employed	67	13.1
	Private employed	150	29.4
	NGO employed	150	29.4
	student	25	4.9
	Other	2	0.4
<b>Residency</b>	Urban	261	51.2
	rural	249	48.8
<b>Monthly income</b>	<825(extreme poverty)	205	40.2
	825-1320(under poverty)	61	12.0
	>1320(above poverty)	244	47.8
<b>Family size</b>	1-2	63	12.4
	3-5	369	72.4
	6-9	78	15.3
<b>Educational status of mother</b>	Illiterate	135	26.5
	Read and write	27	5.3
	Primary school complete	186	36.5
	Secondary school complete	105	20.6
	Graduated from collage/university	57	11.2

Others®-Dawro, Hadya, Sltie Other<sup>Ω</sup>-No occupation

**Table 2:** Obstetric history of the study participants in Wolayta Zone, southern Ethiopia, February 2017 (n=510)

Variables		Frequency	Percentage (%)
Para	Prime Para	162	31.6
	Multi Para	320	62.7
	Grand multi Para	29	5.7
Pregnancy	Planned	422	82.7
	Unplanned	88	17.3
Gestational age	Pre-term	113	22.2
	Term	387	75.9
	Post term	10	2
ANC follow up	Yes	483	94.7
	No	27	5.3
Number of ANC visit	No visit	27	5.3
	1	13	2.5
	2	61	12
	3	179	35.1
	4	210	41.2
	More than four	20	3.9
Referral status	Refer	209	41
	Not refer	301	59
Day of admission	Working day	397	77.8
	Other day	113	22.2
Time of admission	Morning	106	20.8
	Mid -day	150	29.4
	Evening	126	24.7
	Night	128	25.1
Previous pregnancy complication	Yes	92	18
	No	418	82
Types of Previous pregnancy complication	c/s scar	24	4.7
	still birth/neonatal loss	34	6.7
	Underweight baby	17	3.3
	Over weight baby	13	2.5
	Three /more spontaneous abortion	4	0.8

**Table 3:** Multiple logistic regression analysis results of participants for caesarean section delivery in Wolayta zone, southern Ethiopia, February 2017 (n=510)

Characteristics			C/S delivery		OR (95%CI)	
			Yes	No	Crude	Adjusted
Age		15-19	7	25	1.55 (0.66-3.67)	
Residency		20-38	145	333	1.00	
		Urban	101	160	1.00	1.00
		Rural	51	198	<b>0.40(0.28-0.60)*</b>	<b>0.55(0.33-0.92)**</b>
Marital status		Not married	338	20	0.46(0.15-0.36)	
ANC follow-up		Married	148	4	1.00	
		Yes	143	340	1.12(0.52-2.70)	
Pregnancy		No	9	18	1.00	
		Un planned	128	294	0.86(0.52-1.44)	
GA		Planed	24	64	1.00	
		Term	128	259	1.00	
		Pre/post-term	24	99	<b>2.04(1.24-3.34)*</b>	1.14(0.59-2.19)
Day of admission		Working day	126	127	1.00	
		Weekend	26	87	0.64(0.39-1.04)	
Previous complication	Px	Yes	39	53	<b>0.50(0.32-0.80)*</b>	<b>0.39(0.21-0.72)**</b>
		No	113	305	1.00	
Condition of mother		Stable	49	282	1.00	1.00
		Unstable	103	76	<b>7.8(5.10-11.9)*</b>	<b>11.7(6.94-19.73)**</b>
Parthograph follow up		Yes	98	282	<b>2.05(1.35-3.10)*</b>	<b>2.25(1.29-3.89)**</b>
		No	54	76	1.00	1.00
Amniotic fluid		Rupture	47	80	1.00	
		Intact	105	278	<b>0.64(0.42-0.98)*</b>	0.66(0.38-1.15)
Current obstetrics problem		Yes	34	10	1.00	1.00
		No	118	348	<b>0.10(0.05-0.20)*</b>	<b>0.05(0.02-0.12)**</b>
Number of senior		Two	73	116	<b>0.52(0.35-0.76)*</b>	<b>0.51(0.30-0.85)**</b>
		More than two	79	242	1.00	1.00
Parity		Prime Para	53	108		
		Multi Para	99	250	1.24(0.83-1.85)	

\*P-value <0.05,

\*\* P-value < 0.05 after adjustment for socio demographic characteristics and some concepts of caesarean section

# Figures

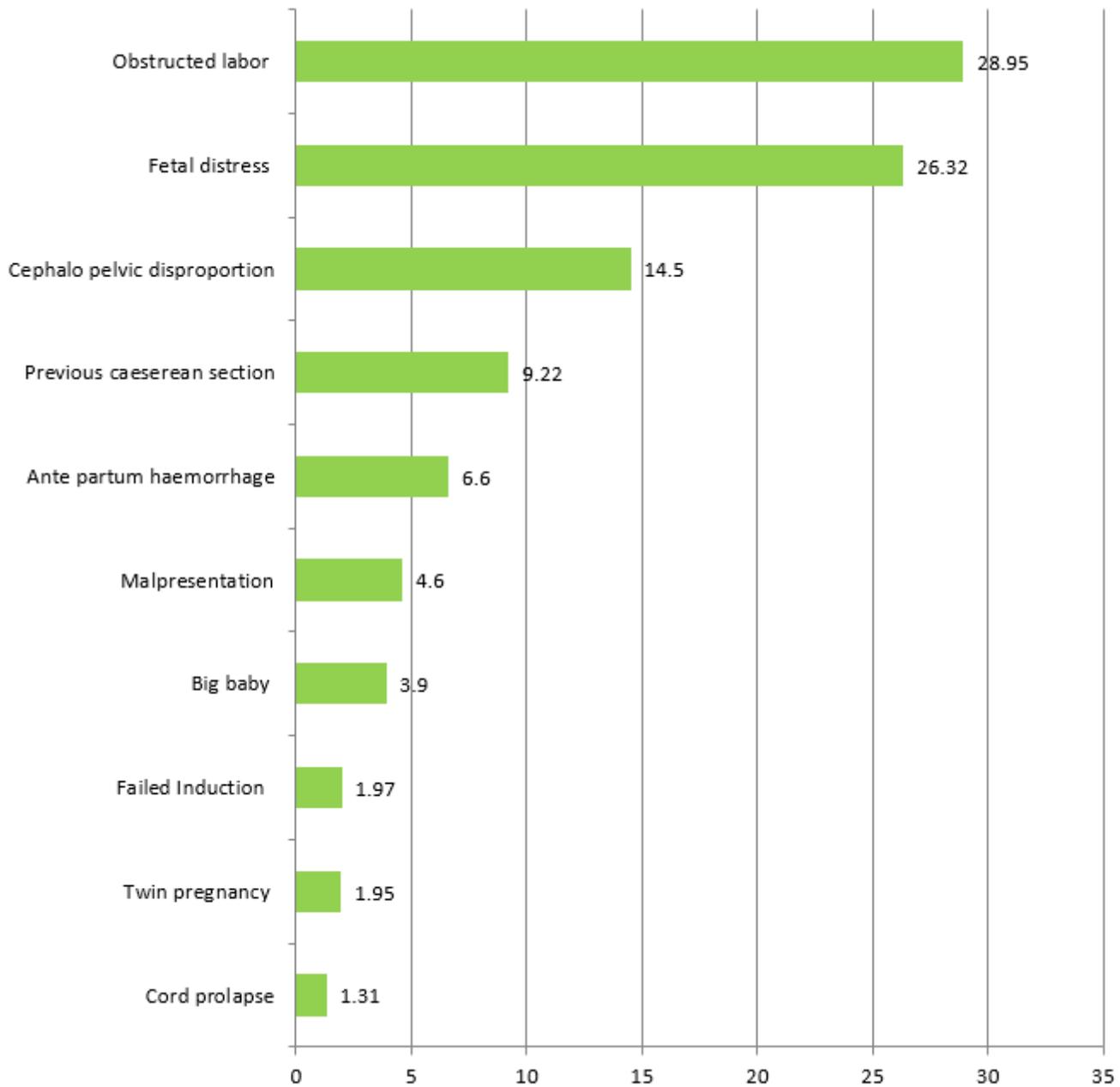


Figure 1

Indications for caesarean delivery