PREVALENCE OF CESARIAN DELIVERY AND ASSOCIATED FACTORS AMONG MOTHERS WHO GAVE BIRTH AT PUBLIC HOSPITALS IN ETHIOPIA: A CROSS-SECTIONAL STUDY

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ABSTRACT

Background: Caesarean delivery is a procedure used to save a mother's and foetus's lives when the labour situation becomes complicated. However, a wrong decision can substantially increase the rates of morbidity and mortality of the woman and the fetus. **Purpose:** the study aimed to assess the prevalence of cesarean delivery and associated factors. **Methods:** A health facility-based cross-sectional study has been conducted. A systematic random sampling technique was used. A face-to-face interview was employed to collect data through a pre-tested and structured questionnaire. Descriptive statistics were counted on. A binary logistic regression was employed to assess factors associated with cesarean delivery. The odds ratio and corresponding 95% confidence interval 95% confidence intervals were used. **Results:** The prevalence of cesarean delivery in this study is 27.4% (95% CI 23.3, 31.8%). monthly income 3,000-6,000 birr [AOR = 3.91 (95% CI: 1.50, 10.17)], previous cesarean delivery [AOR = 15.86 (95% CI: 8.01, 31.40)] and mother not directed counselling [AOR = 2.87 (95% CI: 1.46, 5.68)] are factors significantly associated. The prevalence of cesarean delivery uses is high. **Conclusion:** The obstetric factors occurring around delivery are the master ground leading cesarean delivery rather than the background characteristics. There is a low rate of pregnant mother counselling. We recommend interventions for the prevention of unnecessary primary cesarean delivery, counselling for pregnant mothers, particular emphasis on training all health care providers, and further investigation.

Keywords: prevalence, cesarean delivery, public hospitals

INTRODUCTION

Cesarean delivery is a surgical procedure that involves the incision of the walls of the mother's abdomen and uterus for the delivery of the fetus (WHO, 2018). It is an effective and life-saving procedure when life-threatening complications occur (Antoniou *et al*., 2021). On the other hand, medically unindicated CS delivery can put the mother and/or the newborn at risk for both short- and long-term health problems (Hadizadeh-Talasaz *et al*., 2021).

However, in the last several decades, cesarean delivery has inflated steadily worldwide, from approximately 7% in 1990 to 21% at present, and continues to increase over this decade (WHO, 2015).

Globally, the number of mothers with babies born through CS is rapidly growing in both developed and developing countries, and it is estimated that approximately 20 million CS occur annually worldwide (Ayalew *et al*., 2020). According to the global epidemiology of CS, data collected from 169 countries, which represent 98.4% of worldwide births, revealed that 21.1% of pregnant women have given birth through CS (a range of 19.9-22.4% has been revealed to be unnecessary CS) (Shibre *et al*., 2020).

In addition, all recently conducted studies have revealed a substantial increase. For instance, in Brazil, 55.5% of all live births occur via CS. USA (29.1%) and UK (20%) of mothers' pregnancies had been terminated through CS, respectively (Rudey *et al*., 2020). In Jordan, 27% of mothers were delivered by CS (Al-Rawashdeh *et al*., 2021).

In Africa, according to a study conducted in Kigali City, Rwanda, the rate of CS has significantly increased (15.6%) (Kibe *et al*., 2022). Although the mean cesarean delivery rate in Sub-Saharan Africa (SSA) has shown the lowest increase (5%), this rate is not representative of all regions (Harrison and Goldenberg, 2016).

In Ethiopia, caesarean delivery shows significant variation from regional state to regional state, while the lowest rate of CS has been revealed in Somali regional state (0.4%), and conversely, the highest rate was shown in Addis Ababa (21.4%), Amhara (2.3%), Benishangul-Gumuz (2.0%), Tigray (2.0%), Gambela (1.3%), Southern nation nationalities and peoples of Ethiopia (1.2%), Oromia (0.9%), and Afar (0.7%) Ethiopia Demographic and Health Surgery (Yisma *et al*., 2019). Additionally, a nationwide health survey in 2019 revealed the average prevalence of CS in Ethiopia was 5.44% (Hailegebreal *et al*., 2021).

Even though the World Health Organization (WHO) recommends CS rates be between 5 and 15% (WHO, 2018), several health-facilities-based studies conducted in Ethiopia found a substantial increase in CS rates higher than the recommended optimal level. For instance, a study conducted in Addis Ababa hospitals found that 38.3% of CS rates (Tsegaye *et al*., 2019) another study done at hospitals in Dessie, Northeast Ethiopia, revealed 47.6% (Wondie *et al*., 2019) and another study carried out at public hospitals in Wollo Zone, Northern Ethiopia, showed 30.9% (Ayalew *et al*., 2020).

A number of factors were associated with the rising CS rates, including previous CS, non-reassurance fetal heart rate (NRFHR), residency, and maternal age (Wondie *et al*., 2019; Ayalew *et al*., 2020). Multiple pregnancies, women's education, failed induction, weight of the baby, pregnancy-induced hypertension, prolonged or obstructed labor, and gestational age (Abebe *et al*., 2015; Duressa *et al*., 2020).

However, the previous studies focused on the prevalence of CS and associated factors, and most of them seem to have overlooked the quality of maternal healthcare services. On the other hand, there was limited information about the prevalence of CS and associated factors in the setting of the current study.

The novelty of this study is that investigating the quality of maternal healthcare services offered by the selected hospitals. Additionally, to evaluate the most common indicators of the cesarean delivery in the setup

The findings of this research support health care providers and health policy makers towards the improvement of maternal health services. It also gives evidence to planning and implementing interventions to reduce unnecessary cesarean deliveries. Additionally it will serve as a baseline for researchers who are interested in the topic. Therefore, the aim of this study was to assess the prevalence of cesarean delivery and determine factors influencing CS.

METHOD

Research Design

This study used a health-facility-based, cross-sectional study design. It was conducted at two public hospitals in the Jigjiga city administration from September to 01-30, 2022. Jigjiga is the capital city of Somali regional state, and it is located in the eastern part at 628 km away from Addis Ababa, the capital city of Ethiopia.

Study Population nd Eligibility

Mothers who give birth at public hospitals in Jigjiga were considered as source population, and those mothers who were mothers admitted to the maternity ward of the selected hospitals during the study period as study populations. Those participants who had hearing ability and agreed to consent were included.

Sample Size Determination

This study to determine sample size, a single population proportion formula was employed by taking a prevalence value of 33.1% from a previous study, with the following parameters: 95% CI and 5% margin of error (Duressa et al., 2020). Considering the non-response rate, 5% of the sample was added, and the final sample size was 357.

Sampling Technique and Procedure

There are three public hospitals in the Jigjiga city administration, two of which are currently providing CS services; thus, they were selected for this study. The sample was allocated proportionally to each hospital considering the expected client size based on the previous month. Finally, a systematic random sampling technique was used to interview the participants who fulfilled the inclusion criteria.

Data collection Techniques and Tools

The data collection of this study was carried out through face-to-face using structured questioner, that was developed by reviewing relevant literature. Data interviews with trained midwives.

Study Variables

Dependent variable: Caesarean Delivery was the dependent variable, and the Independent Variables: were sociodemographic factors (age, marital status, educational status of respondent, educational level, occupation, residence, and socioeconomic status). Obstetric and other reproductive health-related factors (gravidity, history of abortion, gestational age, ANC follow-up, number of ANC visits, previous CS, mother counselling directed, and onset of labor). Obstetric Complications: Complication type (fetal factors – male-presentation/male-position, non-reassuring fetal heart rate, macrosomia, multiple pregnancy, and/or maternal factors – hypertensive disorders of pregnancy, obstructed labor, premature rupture of membranes, cephalopelvic disproportions, ruptured uterus, prolonged labor, APH, gestational DM). The outcomes of the mother and newborn related factors were mode of delivery, CS delivery type, decision for CS, number of newborns, maternal outcome, fetal outcome, and baby weight.

Data Quality Control

In order to conserve data quality, the data collection tools were initially prepared in English, translated into local language (Somali), and re-translated into English to ascertain consistency. 5% of the instruments were pre-tested to check whether the instrument was efficient enough to meet the objective of the study (to check for content validity). Before data collection, the data collectors and supervisors were trained. To ensure data quality and completeness, daily follow-up was performed.

Operational Definitions

Cesarean delivery: In this study, we referred to an operational procedure in which one or more foetuses are delivered through the mother's abdominal incisions. Elective cesarean delivery: delivery of a mother through CS without medical indications. Emergency cesarean delivery: In this study, we refer to a surgical procedure performed because of an immediate threat to the mother and/or fetus. Medical Complication: In this study, the mother was considered to have a medical complication if she had at least one medical problem/disease during the pregnancy. Obstetric Complication: In this study, the mother was considered to have obstetric complications if she had at least one maternal or fetal complication during labor or delivery.

Data Processing and Analysis

The data were cleaned, coded, entered into EpiData version 3.1 and exported to and analysed in SPSS version 22. Descriptive statistics were computed. Logistic regression was analyzed for association, and bi-variate analysis was performed first to check crude odds, then variables with a p-value less than 0.25 at this stage were considered as candidates and entered into multivariate analysis to check for adjusted odds. Odds ratios (ORs) and accompanying 95% CIs were employed to identify the extent of associations between the explanatory variables and the outcome variable.

Results were considered statistically significant at p < 0.05. Multi-collinearity was checked using a multi-collinearity diagnostic test for Variance Inflation Factor (VIF). The data were described and presented using narrative text, tables, graphs, and charts.

Goodness of the fit of the model was checked by the Homer–Lemeshow goodness of test.

Ethical Consideration

This research project was reviewed and ethically approved with this Ref. No; [JHC/2/2O4O5-99/14] by institutional review board (IRB) of Jigjiga Health Science College. A support letter was provided to each organization. Data were kept confidential. The participants of this study; a written document was explained the purpose of the study, the procedures involved, and any potential risks or benefits. They were informed of their rights, including the right to withdraw from the study at any time, and each respondent was given the opportunity to ask questions before providing their written consent and were able to make an informed decision about their voluntary participation.

RESULT

Table 1. Participants' socio-demographic characteristics among mothers who gave birth at Public Hospitals, in Jigjiga city administration, eastern Ethiopia, September 2022, n=343.

Variable	Category	n	%
Age (years)	15–19	31	9.0
	20–24	63	18.4
	25–29	125	36.4
	≥30	124	36.2
Level of Education	Not educated	112	32.7
	Basic education	102	29.7
	College/above	129	37.6
Monthly income (ETB)	< 3,000	111	32.4
	3,000-6,000	188	54.8
	> 6000	44	12.8
Residence	Rural	83	24.2
	Urban	260	75.8
Marital status	Single Mother	23	6.7
	Married	320	93.3
Occupational status	Housewife	70	20.4
	Self-employed	136	39.7
	Government	68	19.8
	GNOs	23	6.7
	Student	46	13.4

Table 1 shows the sociodemographic characteristics of the participants. A total of 343 women participated in this study, with a response rate of 96.1 %. The mean age of the women who participated in this study was 26.96 (+5.36 SD) with a range–15-38 years of age.

Two-third 260 (75.8%) of the participants were from urban areas. Educationally, one hundred twenty-nine (37.6%) mothers attended college or above. Occupationally; one hundred thirty-six (39.7%) of the respondents were self-employed.

Table 2. Obstetric and other reproductive health-related factors among mothers who gave birth at Public Hospitals, in Jigjiga city administration, eastern Ethiopia, September 2022, n=343.

Variable	Category	n	%
Gravidity	Premi-gravida	62	18.1
	Multi-gravida	281	81.9
History of abortion	No	253	73.8
	Yes	90	26.2
ANC follow up	Yes	214	62.4
	No	129	37.6
Number of ANC visits (N = 214)	Zero visit	129	37.6
	1 -2 visits	57	16.6
	3 -4 visits	157	45.8
Previous CS	Yes	124	36.2
	No	219	63.8
Gestational age	< 37 weeks	64	18.7
	37 -42 weeks	262	76.4
	> 42 weeks	17	5.0
Baby Weight (In gram)	< 2500 grams	74	21.6
	2500-4000 gms	185	53.9
	> 4000 grams	84	24.5
Labor onset	Spontaneous	209	60.9
	Induced	134	39.1

Table 2 shows that the majority (81.9%) of the mothers who participated in this study were multigravidas. Approximately one-fourth (26.2%) of the patients had previous abortions. About 124 (36.2%) respondents had a history of cesarean delivery. Two hundred and fourteen (62.4%) of the respondents had ANC follow-ups for that pregnancy. Of those who underwent ANC follow-up, 45.8% had 3-4 visits. The majority of mothers (56.0%) had the necessary information. Sixty-four (18.7%) mothers were < 38 weeks old. More than two-thirds (76.4%) of the participants' gestational age at delivery was 37-40 weeks and 5.0% had GA > 42 weeks.

Table 3. Obstetric complications and the Outcomes of the woman and the newborn among mothers who gave birth at Public Hospitals, in Jigjiga city administration, eastern Ethiopia, Sept 2022.

Variable	Category	n	%
Obstetric complications	No	275	80.2
	Yes	68	19.8
Obstetric Complication type (N = 68)	NRFHR	13	19.1
	PIH	18	26.5
	Multiple pregnancy	5	7.4
	Obstructed labor	23	33.8
	Others	9	13.2
CS (N=94) indication	Maternal	62	66.0
	Fetal	32	34.0
CS type (N = 94)	Planned	41	43.6
	Emergency	53	56.4
CS (N=94) Decision	Mother	18	19.1
	Physician	76	80.9
No; of newborn	Single	334	97.4
	Twins	9	2.6
Maternal outcome	Alive	342	99.7
	Dead	1	0.3
Fetal outcome	Alive	339	98.0
	Dead	7	2.0

As shown in Table 3 describes; sixty-four (19.8%) of the study participants experienced obstetric complications, 33.8% of the complications were obstructed, and 26.5% of the complications were hypertensive disorders of pregnancy. The majority (56.4%) of CS deliveries were emergencies. Regarding the decision, 80.9% of the CS decisions were physician decisions, while 19.1% of the CS decisions were at the mothers' request. Of all the mothers, one (0.3%) died. CS reasons were maternal indications in 66.0% of the cases. A total of 336 (98.8%) infants were alive. The mean weight of the babies was 3222.29 grams + 698.91 SD. Of those alive newborns, more than half (53.9%) of the new-born weights were between 2,500-4,000 grams of babies' weight was between 2,500 and 4,000 grams.
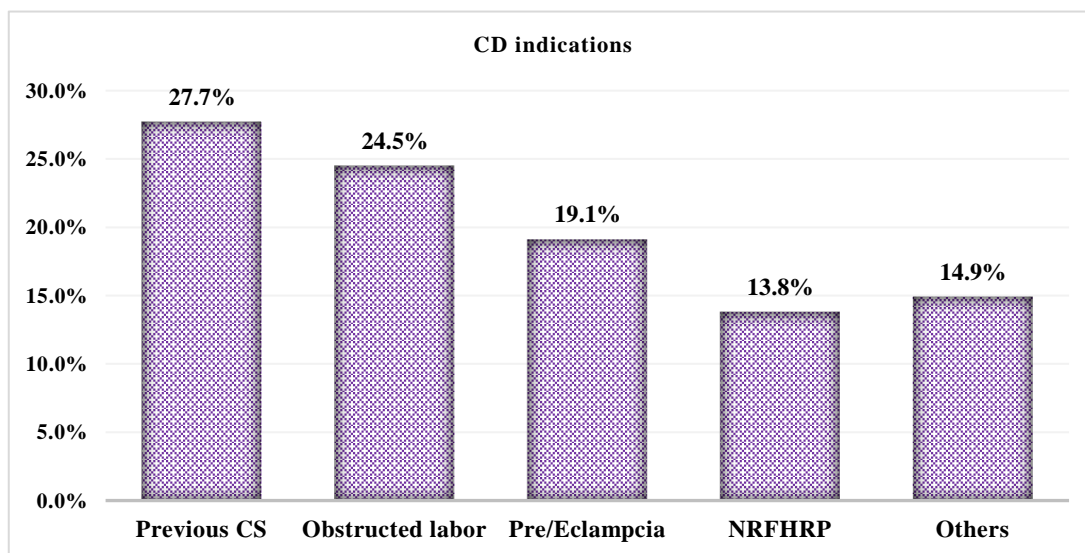
CD indications

Figure 1. The leading indications of CS among mothers who gave birth at Public Hospitals, in Jigjiga city administration, eastern Ethiopia, September 2022, n=343.

Figure 1 shows the common indications for Cesarean deliveries. The data analysis showed that a history of cesarean delivery (27.7%), obstructed labor (24.5%), pregnancy-induced hypertension (19.1%), and no reassuring fetal heart pattern were the leading indications for cesarean delivery.

Figure 2 shows that the current prevalence of Cesarean deliveries was 27.4% (95% CI 23.3, 31.8%).
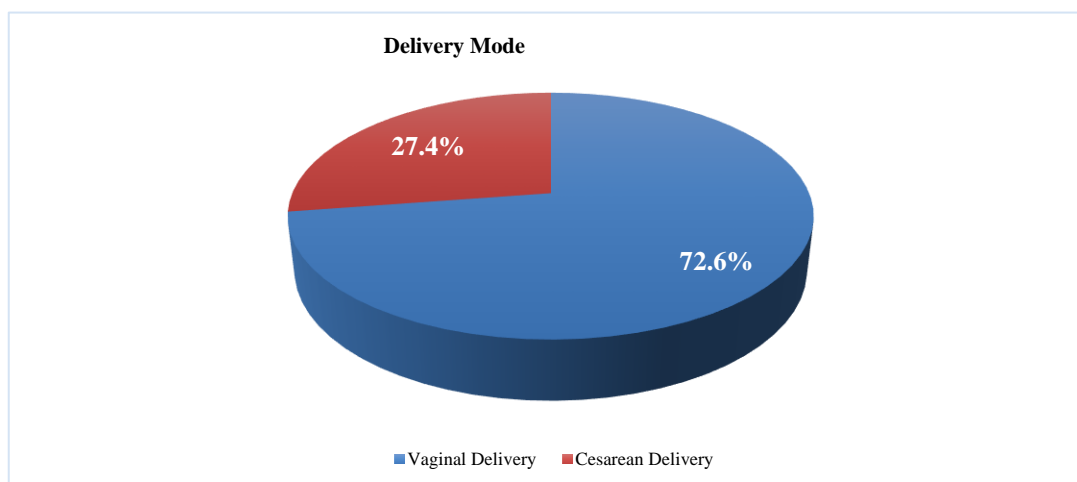
Delivery Mode

■ Vaginal Delivery   ■ Cesarean Delivery

Figure 2. Prevalence of cesarean delivery among mothers who gave birth at Public Hospitals, in Jigjiga city administration, eastern Ethiopia, Sept 2022, n=343.

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Table 4. Explanatory factors with CS among mothers who gave birth at Public Hospitals, in Jigjiga city administration, eastern Ethiopia, Sept 2022, n=343

Variable	Type of delivery		P-valeu	COR (95% CI)	AOR (95% CI)
	VD n (%)	CS n (%)			
Residence					
Rural	76 (91.6)	7(8.4)		1	1
Urban	173(66.5)	87(33.5)	0.00	5.46 (2.42, 12.35) *	2.72 (0.99, 7.51)
Education					
Not educated	95 (84.8)	17 (15.2)		1	1
Basic education	76 (74.5)	26 (25.5)	0.06	1.91 (0.97, 3.78)	1.39 (0.56, 3.42)
College/above	78 (60.5)	51 (39.5)	0.00	3.65 (1.96, 6.83) *	1.95 (0.66, 5.77)
Occupation					
Housewife	58 (82.9)	12 (17.1)		1	1
Self-employed	101 (74.3)	35 (25.7)	0.17	1.68 (0.81, 3.48)	0.94 (0.37, 2.36)
Government	42 (61.8)	26 (38.2)	0.00	2.99 (1.36, 6.60)	0.34 (0.10, 1.17)
GNOs	15 (65.2)	8 (34.8)	0.08	2.58 (0.89, 7.44)	0.57 (0.12, 2.61)
Student	33 (71.7)	13 (28.3)	0.16	1.90 (0.78, 4.65)	0.33 (0.10, 1.14)
Monthly income (ETB)					
< 3,000	99 (89.2)	12 (10.8)		1	1
≥ 3,000-6,000	124 (66.0)	64 (34.0)	0.00	4.26 (2.18, 8.33)	3.91 (1.50, 10.17) *
> 6000	26 (59.1)	18 (40.9)	0.00	5.71 (2.45, 13.34)	3.35 (0.92, 12.20)
History of CS					
Yes	53 (42.7)	71 (57.3)	0.00	11.42 (6.52, 19.98) *	15.86 (8.01, 31.40) *
No	196 (89.5)	23 (10.5)		1	1
Mother counselling directed					
Yes	130 (86.1)	21 (13.9)		1	1
No	119 (62.0)	73 (38.0)	0.00	3.80 (2.20, 6.55) *	2.87 (1.46, 5.68) *
Baby Weight (In gram)					
< 2500	61 (82.4)	13 (17.6)		1	1
2500-4000	133 (71.9)	52 (28.1)	0.08	1.84 (0.93, 3.62)	0.77 (0.32, 1.88)
> 4000	55 (65.5)	29 (34.5)	0.02	2.47 (1.17, 5.23) *	0.97 (0.37, 2.56)

Note: 1 stands the reference category, *shows significant variable at p-value <0.05

Table 4 details explanatory factors that shown p-value <0.25 in the bi-variate analysis, that have been considered as candidates to multivariate analysis. Based on this, the identified variables are the participants' residents, educational status, socio-economics status, history of previous CS, mothers counselling and the baby weights. However, the final model analysis, monthly income, previous CS and mothers' counselling have been found to have significant associations with CS uses.

Those respondents who had monthly income 3,000-6,000 birr had three times [AOR=3.91 (95% CI:1.50,10.17)] higher Odds ratio of CS delivery when compared to those who had monthly income <3,000. The mothers who had a history of CS delivery had about 15 times (AOR=15.86 (95% CI:8.01, 31.40]) higher odds ratio of CS delivery than mothers who had no history of CS. Participants who had not been directed counselling during their antenatal care flow up had two times (AOR=2.87(95% CI:1.46, 5.68]) more odds when compared to mothers who had been directed counselling during their antenatal care flow up.

Table 5. Variables that have exhibited a p-value > 0.25 in the bi-variate analysis with CS among mothers who gave birth at Public Hospitals, in Jigjiga city administration, eastern Ethiopia, Sept 2022, n=343.

Variable	Type of delivery		P-valeu	COR (95% CI)
	VD n (%)	CS n (%)		
Marital status				
Single mother	18(78.3)	5 (21.7)	1	1
Married	231(72.2)	89(27.8)	0.53	1.39(0.50, 3.85)
Parity				
Primipara	46 (76.7)	14 (23.3)	0.44	1.30(0.68, 2.49)
Multipara	203 (71.7)	80 (28.3)	1	1

Continuation of Table 5. Variables that have exhibited a p-value > 0.25 in the bi-variate analysis with CS among mothers who gave birth at Public Hospitals, in Jigjiga city administration, eastern Ethiopia, Sept 2022, n=343.

Variable	Type of delivery		P-valeu	COR (95% CI)
	VD n (%)	CS n (%)		
Aborsion hx				
No	186 (73.5)	67 (26.5)	1	1
Yes	63 (70.0)	27 (30.0)	0.52	1.19(0.70, 2.02)
ANC follow up				
No	153 (71.5)	61 (28.5)	0.56	1.16(0.71, 1.90)
Yes	96 (74.4)	33 (25.6)	1	1
Labor onset				
Spontaneous	154 (73.7)	55 (26.3)	1	1
Induced	95 (70.9)	39 (29.1)	0.57	1.15(0.709, 1.86)
Fetal outcome Numbers of newborn				
Single	237(73.1)	87(26.9)	1	1
Twin	12(63.2)	7(36.8)	0.73	0.75(0.15, 3.68)
GA at labor				
< 37 weeks	48(75.0)	16(25.0)	1	1
37 -42 weeks	188(71.8)	74(28.2)	0.60	1.18(0.63, 2.21)
> 42 weeks	13(76.5	4(23.5)	0.90	0.92(0.26, 3.24)
Gravidity group				
Premigravida	46(74.2)	16(25.8)	0.76	0.91(0.48, 1.69)
Multigravida	203(72.2)	78(27.8)	1	1
Age group				
15 - 19	22(71.0)	9(29.0)	0.84	0.90(0.35, 2.35)
20 - 24	46(73.0)	17(27.0)	0.45	0.71(0.30, 1.72)
25 - 29	97(77.6)	28(22.4)	0.73	1.16(0.49, 2.76)
$\geq$30	84(67.7)	40(32.3)	1	1
Number of ANC visit				
No ANC Visit	96(74.4)	33(25.6)	0.41	0.81(0.48, 1.36)
1-2 ANC Visit	43(75.4)	14(24.6)	0.44	0.76(0.38, 1.52)
3-4 ANC Visit	110(70.1)	47(29.9)	1	1

Table 5 shows the variables that exhibited a p-value > 0.25 in the bivariate analysis.

DISCUSSION

Cesarean delivery is a life-saving surgical procedure that is medically indicated. However, the increasing number of medically unnecessary C-sections can have serious implications for the health and well-being of mothers and babies, which can put both at unnecessary risk of short and long-term health problems as well as health care costs if performed when there is no medical need. This study aimed to assess the rates of cesarean delivery and to determine the associated factors in selected public hospitals.

According to our data analysis, the prevalence of CS delivery was 27.4% (95% CI 23.3, 31.8%). The results are comparable to those of other studies at Attat Hospital (Moges *et al.*, 2015), a systematic review and meta-analysis (Gedefaw *et al.*, 2020), a study carried out at public hospitals in the Wollo Zone (Ayalew *et al.*, 2020), and a prospective study conducted in Jordan (Batieha *et al.*, 2017). However, this result exceeded the optimal range of 5-15% that is recommended by the WHO (WHO, 2018). and comparing with a national review of CS, which revealed the lowest rate (5.7%) of CS occurring in this region (Geleto *et al.*, 2020).

Our findings are also higher than those of a study conducted in Misan Province (Alheshimi *et al.*, 2019). This increase may be due to the fact that one of the selected hospitals is a referral site (the only referral hospital in the region) receiving referred complicated cases from surrounding as well as all-health facilities in the region, which could increase the prevalence. It could also reflect the

improvement of CS-related facilities and availability of fetal monitoring electronic apparatus in these selected hospitals.

On the other hand; the present study is lower than those studies done in different sets, including that conducted at Debre Tabor Comprehensive Specialized Hospital (Taye *et al.*, 2021), that study carried out in Addis Ababa hospitals (Tsegaye *et al.*, 2019) and that study done at Aira Hospital, Oromia Region (Duressa *et al.*, 2020). It is also lower than that reported in Greece (Antoniou *et al.*, 2021) and the CS rates reported in Brazil (Rudey *et al.*, 2020).

This variance might be due to the variations in the settings, that the possible explanation of CS increment is associated with where there is better economic development or human development index having advanced obstetric services that the community utilizes more private health services than public health care facilities, and availability of health care facilities that have high rates of maternal healthcare utilization to have a higher percentage of cesarean deliveries compared to those settings with low human development index and low rates of maternal healthcare utilization (Rudey *et al.*, 2020)

The present study also determined the major indications for CS delivery. Thus, previous CS delivery, obstructed labor, pregnancy-induced hypertension, and no reassuring fetal heart pattern were the dominant indicators to perform cesarean delivery. These findings are similar to those of other studies conducted at the Aira Hospital, Oromia Hospital, and Addis Ababa Hospital (Duressa *et al., 2020*; Tsegaye *et al.*, 2019).

This may be because the major CS indications mentioned above are medically possible reasons. For example, a woman who had undergone CS before tends to give birth again because of the risk of uterine rupture. Pregnancy hypertensive disorders, obstructed labor, and non-reassuring fetal heart pattern are also indications for cesarean delivery.

However, this finding is different from that of a study conducted in hospitals in Dessie town, Northeast Ethiopia, which revealed that the most frequent indication for cesarean delivery was fetal distress (Wondie *et al.*, 2019), and a study conducted in Misan Province that found failure to progress in labor was the main indication for CS (Alheshimi *et al.*, 2019).

The factors identified to be associated with CS utilization in this study were income, history of CS, and maternal counselling. For instance, mothers with a monthly income of 3,000-6,000 birr had higher Odds of CS than those who had less monthly income. This finding is contrary to other studies conducted at Debre-Tabor and Felegehiwot hospitals, which revealed that mothers who had a higher monthly income had a higher chance of having a cesarean delivery than those whose income was lower (Taye *et al.*, 2021; Abebe *et al.*, 2015).

A prospective study conducted in Iran also found that women with a higher monthly income had higher rates of CS than those with a lower income (Moosavi *et al.*, 2017). From the findings, participants with a history of CS had higher odds of undergoing CS when compared to those with no CS history. The result is comparable with studies carried out in Southwest Ethiopia (Mose and Abebe, 2021), that done in North Wollo Zone public hospitals, Northeast Ethiopia (Ayalew *et al.*, 2020) and one that carried out in Addis Ababa public hospitals (Tsegaye *et al.*, 2019) and study conducted in Brazil (Wondie *et al.*, 2019).

This could be due to the fear of uterine rupture associated with waiting longer. Women who had undergone CS before were more likely to have CS indications (WHO, 2018; de Souza *et al.*, 2019). The present study confirmed that mothers who had not received directed counselling about avoidable CS had higher odds of undergoing CS delivery than those who had received directed counselling. A similar pattern of results was obtained in a study conducted in the United States and a study conducted in rural areas of Bangladesh (Sung and Mahdy, 2022; Begum *et al.*, 2018). This is also comparable to a randomized clinical trial conducted at Gonabad University of Medical Sciences, Iran, which revealed that shared counselling increased the rate of VBAC (Hadizadeh-Talasaz *et al.*, 2021).

Owing to its cross-sectional nature, this study has some limitations. The temporal relationship between CS and the explanatory factors has not yet been determined. We did not examine postnatal outcomes following deliveries. CS overestimation can occur because of referral cases. As a result, the use of these

findings for decision making should be considered an inherent limitation of this study.

CONCLUSION

The main conclusion drawn from this study is that the prevalence of CS is higher than that recommended by WHO. Our data analysis indicates that obstetric factors that exist around delivery are the predominant reasons for cesarean The obstetric factors occurring around delivery are the master ground leading cesarean delivery, rather than background factors. The data also showed low rates of pregnancy-mother mother counselling. The present study is in agreement with other studies that have shown that the health education offered to pregnant mothers throughout pregnancy has a potential influence.

These findings are interesting and can play a vital role in understanding, planning, and implementing effective interventions. Thus, the findings of this study could have significant implications for advancing knowledge, implementing interventions to reduce unnecessary cesarean deliveries, and establishing interventions to improve obstetric services and create conducive environments for mothers and newborns. The present study also serves as a benchmark for future studies that focus on understanding the experiences of women undergoing cesarean deliveries.

SUGGESTION

Based on the study conclusions, the investigators suggest that WHO recommendations should be implemented, particularly emphasizing non-clinical interventions to prevent unnecessary primary CS and advocating vaginal delivery for a woman who had a previous cesarean delivery if medically appropriate. It is important for healthcare providers and policymakers to promote evidence-based practices and guidelines to ensure that C-sections are performed only when medically necessary.

Pregnant mothers' counselling through purposefully designed health education and tailored messages on the risk of unnecessary cesarean delivery and have the opportunity to attend classes on natural childbirth preparation and alternative methods during ANC. A particular focus is on offering training to all healthcare providers. Further investigation on the reasons for the increased prevalence of CS

and implementation of further studies with a rough methodology to inquire about the quality of care offered to pregnant mothers.

AUTHOR CONTRIBUTION

Abdulahi Yusuf Contribution: title selection, literature review, proposal writing, data analysis, results, and discussion writing. Abdifetah Sheik contributed to article review and data collection tool preparation. Mohamud Ali contribution: Monitoring evaluation of fieldwork. Hussen Hassen Contribution: Data cleaning and entry.

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