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ORIGINAL ARTICLE

Caesarean childbirth and associated factors during Covid-19 pandemic at public hospitals in the Sidama region, Southern Ethiopia

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KEYWORDS
Caesarean childbirth;
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Summary
Background. — The increasing number of caesarean births worldwide concerns pregnant women, obstetric service providers, and the country's economy. Unnecessary caesarean childbirth increases childbirth complications and the cost of health care in low-income countries, including Ethiopia.
Objective. — This study aims to assess caesarean birth and associated factors at the Sidama region public hospitals, Southern Ethiopia, 2020.
Methods. — An institution-based cross-sectional study was conducted among 484 women who gave birth at public hospitals in the Sidama region. A multi-stage sampling technique was employed. The data were collected from 1st to 30th of July 2020 by face-to-face interviews using a semi-structured questionnaire (see Table S1: see supplementary materials associated with this article on line), and the wealth index was analysed by principal component analysis. Backward logistic regression used an adjusted odds ratio and a 95% confidence interval to assess the strength and association between the caesarean section and its associated factors. A *P*-value of < 0.05 was used to declare statistical significance.

Abbreviations: ANC, antenatal care; CD, caesarean delivery; CTG, cardiotocography; FGM, female genital mutilation; IESO, integrated emergency surgery and obstetrics; LNMP, last normal menstrual period; NRFHRP, non-reassuring fetal heart rate patterns; WHO, World Health Organisation.

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Result. — Caesarean childbirth in this study was 34.3%. In this study, partograph monitoring (AOR = 2.23, CI = 1.13, 4.38), previous caesarean birth (AOR = 3.21, CI = 1.28,8.17), having genital cutting/mutilation (AOR = 2.51, CI = 1.14,5.53), intermittent cardiotocography monitoring during childbirth (AOR = 2.3, CI = 1.14, 4.49), absence of companionship during delivery (AOR = 4.97, CI = 2.37, 10.43) and is not remembering the last normal menstrual period (AOR = 3.12, CI = 1.40,6.94) had increased the odds of caesarean birth.

Conclusion. — Studies show that the prevalence of caesarean has alarmingly increased in both developed and developing countries. However, the magnitude of caesarean section differs from country to country and in rural and urban areas; the magnitude of caesarean section in this study is much higher than the WHO recommends threshold. The local health bureau and obstetric care providers should pay attention to the caesarean section and need intervention in partograph plotting, companionship, cardiotocography, and female genital mutilation.

Background

One of the Sustainable Development Goals (SDGs) targets raised at the end year of 2015 were to reduce the maternal mortality ratio (MMR) to less than 70 per 100,000 live births and to ensure healthy lives for all women of all ages by 2030 across the world [1]. Although many interventions were made to reduce maternal and child mortality, the complications in pregnancy and childbirth continued with tremendous intensity, especially in sub-Saharan Africa [2]. These implied the necessity to provide evidence-based and quality maternal and child care to minimise perinatal and maternal mortality and morbidity rates [3]. Emergency obstetric care (EmOC) should be available and accessible to all women [4], effectively decreasing caesarean section childbirth. Under ideal conditions, caesarean birth is safe and presents a low rate of severe conditions [5]. Caesarean childbirth had become a priority on the agenda to control the threat of maternal death through better quality and use of services for managing and treating complications in pregnancy and during childbirth [3].

The unnecessary caesarean section increases, and simultaneously complications and the cost of health care also increase, especially for women with limited access to comprehensive obstetric care [3]. These can stay many years even beyond the current childbirth and affect the woman's health, her child, and future pregnancies [3]. These can bear many years beyond the present birth and affect the woman's health, child, and future pregnancies [3].

The rising proportion of caesarean childbirth rates worldwide has significant concern for pregnant women and obstetric health care providers [6]. The optimal range of caesarean delivery (CD) is debatable; however, the 2010 World Health Organization (WHO) suggested that the caesarean delivery rate should not be more than 15% because of no extra benefit for the mothers and newborns above this level. Despite this recommendation, evidence suggests that caesarean childbirth is increasing worldwide by showing significant variation among countries and regions of the same country [3].

Caesarean delivery rates vary globally, ranging from 6% in less developed countries to 40.5% in the Caribbean and Latin America [7]. In Africa, it is also reported to be 11.3% in Nigeria [8], 17.8% in Morocco [9], and 26.3% in Zambia [10]. In Ethiopia, the rate of caesarean childbirth has increased from 24.5% in 2009 to 32.8% in 2014, according to a study done in referral hospitals in Addis Ababa [4]. It also ranges from 27.6% to 38.3% in other parts [11,12]. Increment in caesarean childbirth may significantly burden the economy, especially if it is done without indication. The worldwide medically unnecessary caesarean birth appears to make a considerable burden on economic resources globally. WHO stated that the cost of unnecessary caesarean childbirth across the globe is estimated to be approximately US$ 2.32 billion, while the cost of the globally needed caesarean section was about US$ 432 million [13].

While the majority of caesarean childbirth procedure proceeds smoothly and safely, in some cases, complications have occurred, and neonatal death rate and maternal complications were high among mothers who gave birth by caesarean childbirth compared to those who gave birth by vaginal mode [9,14,15].

This increased rate of caesarean childbirth in main urban cities has to get attention as it exceeds the WHO threshold of 15% [16]. The studies show that medical and non-medical factors likely to be associated with the rising rate of caesarean childbirth include age, maternal income, maternal educational status, antenatal care follow-up, gestational age, referral status, and place of health-seeking [5,17—23] (Fig. S1; see supplementary materials associated with this article on line).

To our knowledge, there is a scarce study on caesarean childbirth during the Covid-19 pandemic in Ethiopia, especially in the Sidama region. Therefore, This study aims to determine caesarean birth and associated factors at public hospitals in the Sidama region, Southern Ethiopia.

Methods

Study design, setting, and period

A hospital-based cross-sectional study was conducted in Sidama national, regional state, Southern Ethiopia, from July 1-30, 2020. Sidama region is the 10th newly established region of Ethiopia. It is located in the Southern part of Ethiopia and bordered by Oromia in the northeast, Wolayita in the West, and Gedeo in the south. According to Sidama region Development Corporation, planning and statistics 2020, the region have an area of 6,981.8 km2 divided into five city administrations and 31 woredas; it has a population of 4,369,214 million, where 2,201,313 are females. About 928,265 are women of the reproductive age group (15—49 years), and 137,845 were pregnant in 2019/2020. According to the regional health bureau, there are 14 primary hospitals, three general hospitals, one teaching specialised hospital, 124 governmental health centres, 526 health posts, and greater than 108 private clinics. Among 18 hospitals, only15 hospitals are giving the caesarean section service. The hospitals that aren't providing caesarean section service are Hantate primary hospital, Mejo primary hospital, and Weteraresa primary. In 2019/2020, according to the preceding 4-month reports (Quarter 1), the total live birth was 137,716, health coverage in the region was 77.2%, maternal death was 4 in number, and neonatal death was 125 in number, and 1299 cesarean delivery was done.

Source and study population

All women who gave birth at the public hospitals of the Sidama region were the source population. All women who gave birth at randomly selected public hospitals in the Sidama region during the data collection period were the study population.

Sample size determination and sampling procedures

The sample size was determined for the proportion of caesarean childbirth by single proportion formula and the factors associated with caesarean birth using Epi info 7.2 version software. Proportion and associated factors were taken from previous research findings at Hawassa city administration [24]. The assumptions for the calculation were 95% confidence level, 80% power, design effect of 1.2, and a 5% non-respondent rate. Finally, a total of 484 women were included in the study.

A multi-stage sampling technique was employed to select a representative sample of mothers in the selected hospitals. During the first stage, from 14 hospitals, six of them were selected using a simple random sampling technique (lottery method). The selected hospitals were Adare general hospital, Yirgalem general hospital, Leku primary hospital, Yirba primary hospital, Bona general hospital, and Aleta Wondo primary hospital (Fig. S2; see supplementary materials associated with this article on line). The sample size was proportionally allocated based on the previous month (June) number of caesarean childbirth in selected hospitals. Systematic random sampling was used using every k interval; the value of K was found to be 2 (983/484). The first women were randomly selected. All selected mothers who consented at the selected hospitals' level were included by jumping every two mothers in the study until the proportion in the hospital was met.

Measurements

Caesarean childbirth: the birth of a fetus from the uterus through an abdominal and uterine incision [25].

Companionship: can be any person chosen by the woman to provide her with continuous support during childbirth, for example, her spouse/partner, relative or female friend, a community member (such as a female community leader, health worker, or traditional birth attendant) but is not part of the healthcare facility's professional staff) [26].

Intermittent Cardiotocography (CTG): is the graphic presentation of fetal heart activity and the uterine contraction monitor for 10—30 minutes every 2.0—2.5 hours during childbirth [27].

Data collection process and tools

The questionnaires (see Table S1: see supplementary materials associated with this article on line) were adapted by reviewing different works of literature [12,13,23,28,29]. The questionnaire was initially prepared in English and then translated to a local language, Sidamo Afo, and to check for consistency, the questionnaire was translated back into English again. A semi-structured questionnaire was used to collect the data through a face-to-face interview. The variables included in the questionnaire were socio-demographic characteristics, obstetric and reproductive health-related history, gynecologic-related history, and clinical indications of caesarean section. Similarly, data were collected from medical records of women on some clinical variables like an indication for caesarean delivery, use of partograph, gestational age, and instrumental delivery. For the women who gave birth by caesarean childbirth, we invited them to interview between 36 and 72 hours after the procedure. The data was collected by six BSc nurses who have worked outside the obstetric ward and supervised by two MSc holders.

Data quality assurance

A pretest was done before the actual data collection began on 24 women (5% of the sample size) at Halaba Kulito Hospital, which is out of the study area. The internal reliability of the questionnaire was checked using Cronbach's alpha after the pretest, and the value was found to be 0.82 and declared valid & consistent.

Two days of training were given to data collectors and supervisors for the study's objective, the confidentiality of information, and the handling of the data collection procedures. The completed questionnaires were collected daily after checking the data's completeness and consistency and providing timely feedback by supervisors. Supervision was held regularly during the data collection period.

Table 1 Socio-demographic characteristics of study participants at public hospitals during Covid-19 pandemic of the Sidama region, southern Ethiopia, 2020 ($n = 484$).

Variables	Category	Frequency	Percentage
Age of respondent	16—20	56	11.6
	21—25	125	25.8
	26—30	157	32.4
	31—35	103	21.3
	36—40	37	7.6
	41—43	6	1.2
Residence of respondent	Urban	274	56.6
	Rural	210	43.4
Religion of respondent	Protestant	303	62.6
	Orthodox	110	22.7
	Muslim	51	10.5
	Catholic	20	4.1
Marital status of the respondent	Married	484	100
Educational status of the respondent	No formal education	46	9.5
	Grade 1—6	97	20.0
	Grade 7—12	194	40.1
	College & above	147	30.4
Educational status of husband	No formal education	37	7.6
	Grade 1—6	67	13.8
	Grade 7—12	151	31.2
	College & above	229	47.3
Occupation of respondent	Housewife	200	41.3
	Private employee	23	4.8
	Student	35	7.2
	Government employee	134	27.7
	Merchant	92	19
Occupation of husband	Farmer	79	16.3
	Private employee	18	3.7
	Student	42	8.7
	Government employee	209	43.2
	Merchant	132	27.3
Wealth quintiles	Lowest	96	19.8
	Second	96	19.8
	Middle	107	22.1
	Fourth	97	20.0
	Highest	88	18.2

Data processing and analysis

First data was entered by Epi data version 3.1 software and then exported to SPSS 20. Independent variables like Mothers' socio-demographic, clinical indications, obstetric, and gynecologic characteristics were described using frequencies, median and percentages. Also, the result was presented in texts, tables, and graphs. The overall goodness of fit was checked by the Hosmer and Lemeshow test. Odds ratios (ORs), 95% confidence intervals (95%CIs), and p-values were done to identify associated factors and determine the strength of association with the dependent variables. Bivariate logistic regression was conducted to see the significant crude association of each variable to the dependent variable.

The wealth index was analysed by principal component analysis (PCA) and classified into five classes (2016 EDHS). In a binary logistic regression, explanatory variables with a *P*-value of $\alpha < 0.05$ were considered in multivariable analysis using backward methods [30]. A *P*-value less than 0.05 is statistically significant.

Result

Socio-demographic characteristics

Four hundred eighty-four sampled mothers were included in this study, with a response rate of 100%. The median maternal age was 26.00 (IQR 8) years. All of the study participants (100%) were married. Economically, 107 (22.1%) participants were categorised under middle wealth index quintiles (Table 1).

Obstetric and reproductive health-related characteristics

Among the participants, 200 (41.3%) of the women ever had a pregnancy of 2—4, and 398 (82.2%) of the participants gave

Table 2 Obstetric and reproductive health-related characteristics of study participants in public hospitals during Covid-19 of the Sidama region, Southern Ethiopia, 2020.

Variables	Category	Frequency	Percentage
Parity (*n* = 484)	1	175	36.2
	2—4	200	41.3
	> 5	109	22.5
Gestational age (*n* = 484)	< 37 weeks	36	7.4
	37—42 weeks	398	82.2
	> 42 weeks	50	10.3
Duration of childbirth (*n* = 484)	< 18 hours	279	57.6
	> 18 hours	205	42.4
The onset of childbirth (*n* = 484)	Spontaneous	410	84.7
	Induced	74	15.3
ANC follow up (*n* = 484)	No	32	6.6
	Yes	452	93.4
Frequency of ANC follow-up (n = 452)	One contact	18	3.7
	Two contacts	74	15.3
	Three contacts	131	27.1
	Four or more	229	47.3
Place of ANC follow-up (*n* = 452)	Government Hospital	151	31.2
	Health centre	263	54.3
	Private clinic	38	7.9
Partograph (*n* = 484)	No	263	54.3
	Yes	221	45.7
Way of admission (*n* = 484)	Referred (professional)	220	45.5
	Admitted at hospital	264	54.5
Membrane status (*n* = 484)	Intact	315	65.1
	Ruptured	169	34.9
Previous Pregnancy complications (*n* = 484)	No	372	76.9
	Yes	112	23.1
Types of pregnancy complications (*n* = 112)[a]	Stillbirth	40	35.7
	Haemorrhage	38	33.9
	Neonatal loss	31	27.7
	Medical illness	35	31.3
	Others[b]	3	2.7
History of CS (*n* = 484)	No	386	79.8
	Yes	98	20.2
Previous mode of childbirth before this pregnancy (*n* = 484)	Primipara	169	34.9
	Instrumental delivery	40	8.3
	SVD	195	40.3
	Caesarean delivery	80	16.5
Current obstetric problem (*n* = 484)	No	355	73.3
	Yes	129	26.7
Types of current obstetric problems (*n* = 129)[a]	Medical illnesses[c]	52	40.3
	PROM	72	55.8
	Others[b]	6	4.7
Partner involvement during ANC (*n* = 452)	No	69	15.3
	Yes	383	84.7
Was current pregnancy wanted? (*n* = 484)	No	66	13.6
	Yes	418	86.4
A female genital cutting (*n* = 484)	No	191	39.5
	Yes	293	60.5
How much does it take to reach a health facility? (*n* = 484)	< 60 minutes	417	86.2
	> 60 minutes	67	13.8
Hemoglobin (*n* = 484)	≤ 10 g/dl	46	9.5
	10-12 g/dl	322	66.5
	≥ 12 g/dl	116	24.0
Presence of early ultrasound scanning (*n* = 484)	Yes	277	57.2
	No	155	32

Table 2 (*Continued*)

Variables	Category	Frequency	Percentage
The current mode of childbirth	Ultrasound was not present	52	10.7
	SVD	318	65.7
	Caesarean delivery	166	34.3

[a] total percentage of types of pregnancy complication is greater than 100% because of multiple responses in the options.
[b] others: big baby, low birth weight, low APGAR score.
[c] chronic medical illnesses: pregnancy-induced hypertension, diabetes, heart diseases, and epilepsy.

Table 3 Gynecologic characteristics of study participants at public hospitals during Covid-19 of the Sidama region, Southern Ethiopia, 2020 ($n = 484$).

Variables	Frequency	Percentage
LMP		
Known	217	44.8
Unknown	267	55.2
History of habitual abortion		
Yes	43	8.9
No	441	91.1
History of infertility		
Yes	3	0.6
No	481	99.4
History of STI		
Yes	34	7
No		93
History of a molar or ectopic pregnancy		
Yes	6	1.2
No	478	98.8
History of contraceptive use		
Yes	334	69
No	150	31
History of myoma		
Yes	5	1
No	479	99
History of other tumours		
Yes	1	0.2
No	483	99.8

STI: Hepatitis B virus, Gonorrhea, syphilis, and HIV/AIDS other tumors: ovarian cyst.

birth at term (37—42 weeks). Around four hundred fifty-two (93.4%) of respondents have ANC follow-up; 47.3% of women had received four ANC contacts. Out of 484 study participants, 112 (23.1%) had previous pregnancy complications, and 60.5% of the respondents were undergone FGM. And also, 322 (66.5%) participants had a hemoglobin level range of 10-12 gm/dl (Table 2). Among 484 mothers in this study, 217 (44.8%) clearly remembered their last normal menstrual period. Around 43 (8.9%) of them had a history of habitual abortion, and 334 (69%) had a history of contraceptive use (Table 3).

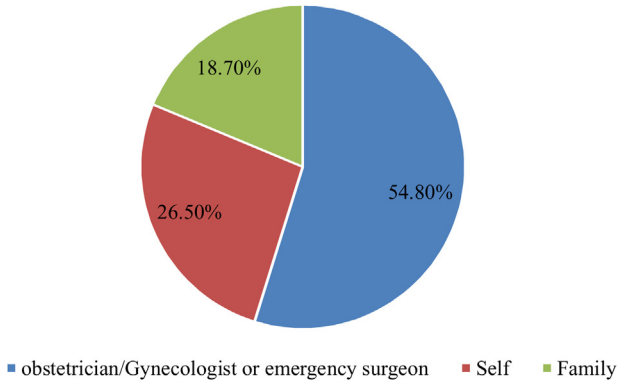

Figure 1. Who decided on current caesarean childbirth at public hospitals during the Covid-19 pandemic in the Sidama region, Southern Ethiopia, 2020 ($n = 166$).

Prevalence and indication of caesarean childbirth

The prevalence of caesarean delivery was 34.3% (95% CI = 30.6, 37.8). Among these, 115 (69.3%) were emergency, and 51 (30.7%) were elective caesarean delivery. Out of this (54.8%) was decided by Obstetrician and Gynecologist or IESO (Fig. 1). The most common indications for caesarean childbirth were NRFHRP 105 (21.7%), followed by previous caesarean childbirth scar 51 (10.5%) (Fig. 2).

Factors associated with caesarean childbirth

On bivariate analysis, duration of childbirth, way of admission, monitoring labour by partograph, history of caesarean birth, female genital mutilation, hemoglobin level at admission, intermittent CTG monitoring during childbirth, absence of companionship during childbirth, and unknown LNMP had an association with a caesarean birth. However, in multivariable analysis, history of caesarean section, female genital mutilation, intermittent CTG monitoring childbirth, absence of companionship during labour, and unknown LNMP remain significantly associated with caesarean delivery.

The odds of having caesarean childbirth were 2.23 times higher in monitored with a partograph chart (AOR = 2.23, CI = 1.13, 4.38). The odds of having caesarean birth among women with a previous history of caesarean section were 3.21 times greater than those without a history of caesarean childbirth (AOR = 3.21, CI = 1.28,8.07). The chances of having a caesarean birth among circumcised women were 2.51

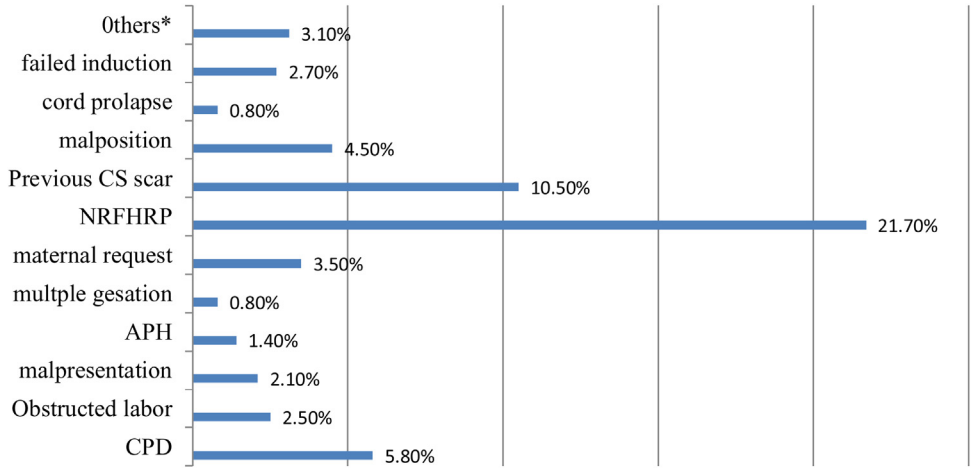

Figure 2. Indication of caesarean section at public hospitals during Covid-19 pandemic in Sidama region, Southern Ethiopia, 2020 ($n = 166$).

Table 4 Factors associated with caesarean childbirth at public hospitals during the Covid-19 pandemic of the Sidama region, Southern Ethiopia, 2020 ($n = 484$).

Variables	Cesarean Delivery		COR (95%CI)	AOR (95%CI)
	No (=318)	Yes($n = 166$)		
Duration of childbirth				
< 18 hours	167(34.5%)	62(12.8%)	1	1
> 18 hours	151(31.2%)	104(21.5%)	1.85(1.264,2.723)[b]	1.44(.802,2.587)
Partograph				
Done	155(32.0%)	135(27.9%)	4.6(2.926,7.168)[b]	2.23(1.130,4.379)[a]
Not done	163(33.7%)	31(6.4%)	1	1
Way of admission				
Referred (self & professional)	123(25.4%)	97(20.0%)	2.23(1.521,3.267)[b]	1.250(.631,2.475)
Admitted normally	195(40.3%)	69(14.3%)	1	1
History of caesarean section				
No	265(54.8%)	77(15.9%)	1	1
Yes	53(11%)	89(18.4%)	5.8(3.781,8.834)[b]	3.21(1.276,8.069)[b]
Female genital cutting				
No	149(30.8%)	42(8.7%)	1	1
Yes	169(34.9%)	124(25.6%)	2.60(1.721,3.936)[b]	2.51(1.143,5.528)[a]
Intermittent CTG monitoring				
Not monitored by CTG	196(40.5%)	34(7%)	1	1
Monitored by CTG	122(25.2%)	132(27.3%)	6.24(4.019,9.680)[b]	2.3(1.136,4.491)[a]
Hemoglobin at admission				
≤ 10 g/dl	40(8.3%)	32(6.6%)	1	1
10-12 g/dl	237(49%)	85(17.5%)	0.45(0.27,0.76)[a]	0.39(.167,0.95)
≥ 12 g/dl	41(8.5%)	49(10.1%)	1.5(0.8,2.8)	0.23(.011,0.71)
Presence of companionship during childbirth				
Yes	81(16.7%)	128(26.4%)	9.9(6.339,15.323)[b]	4.97(2.370,10.426)[b]
No	237(49%)	38(7.9%)	1	1
LNMP				
Known	184(38.0%)	33(6.8%)	1	1
Unknown	134(27.7%)	166(34.4%)	5.53(3.559,8.605)[b]	3.12(1.402,6.937)[b]

1: reference.
[a] significant (P-value < 0.05).
[b] Strongly significant (P-value < 0.01).

times higher than that of uncircumcised women (AOR = 2.51, CI = 1.14,5.53). The chances of having caesarean birth were 2.3 times higher than those who were intermittently monitored by CTG (AOR = 2.3, CI = 1.14, 4.49).

The odds of having caesarean childbirth among women with no companionship during childbirth were 4.97 higher when compared to their counterparts (AOR = 4.97, CI = 2.37, 10.423). The odds of having caesarean birth among women who didn't remember their last normal menstrual period was 3.12 times that of women with normal LMP (AOR = 3.12, CI = 1.40,6.94) (Table 4).

Discussion

This study identified important information regarding caesarean childbirth and its factors. In this study, the prevalence of caesarean birth at the Sidama region public hospitals was 34.3% (95% CI = 30.6, 37.8). This result is in line with a study conducted in Northern America (32.3%), Oceania (31.1%), Harar, Eastern Ethiopia (34.3%), and Hawassa city, southern Ethiopia (35.4%) [7,23,31].

This finding is higher than the WHO recommended threshold (5—15%) and higher than the study conducted in England (26.2%), Nepal (22.3%), Morocco (17.83%), Gondar city, northern Ethiopia (29.7%) and Gurage zone (27.6%) [9,11,31—34]. The possible explanation might be differences in socio-demographic characteristics, study settings and the Covid-19 pandemic. The magnitude of caesarean section differs from country to country and in rural and urban areas [7,11,12].

This finding is lower than a study conducted in India (62%) and Hawassa city administration (49.3%) [24,35]. This discrepancy could be due to the study setting, sample size variation, and inclusion of public hospitals only in the study area. The other possible explanation could be some of the above literature used secondary data while the current study used primary data.

In this study, mothers monitored by partograph had higher odds of having caesarean childbirth. This finding is consistent with a study conducted at public hospitals in southern Ethiopia's Wolayita zone [36]. The possible explanation might be inappropriate plotting of partographs during childbirth. The obstetric care providers might lack knowledge and skill in partograph plotting during childbirth [37].

This finding is inconsistent with the study conducted at Hawassa city administration and Dessie city in northern Ethiopia, which stated that not using partograph increased the odds of caesarean childbirth [22,24]. This difference could be that this study has not incorporated private hospitals where health service delivery and quality of care differ from public hospitals.

In this study, the odds of having caesarean childbirth were higher among mothers with a history of previous caesarean delivery. This finding is supported by studies in northeast Ethiopia and Harar, Eastern Ethiopia, which revealed that caesarean section history increased its risk [22,23]. The odds of having caesarean childbirth among women with a history of female genital mutilation were higher in this study. This finding is consistent with a Meta-analysis study in Oslo, which stated that caesarean delivery was the most frequently reported outcome that followed any FGM [38]. The possible explanation could be that clinically FGM leads to perineal rigidity and affects the mode of childbirth. However, the finding differs from a study conducted in Nigeria, where FGM didn't affect the caesarean birth rate. This discrepancy could be due to sampling size variation, study setting, and socio-demographic and cultural differences [39].

In this study, cardiotocography intermittently monitored during childbirth increased the odds of caesarean birth. This finding coincides with studies conducted by WHO, Cochrane library, and New Delhi, India [27,40,41]. The possible explanation might be that fixed CTG could hinder mobility and ambulation during childbirth that confines the woman in the bed.

Compared to women who had full companionship, women who had no companionship during childbirth had a greater chance of being delivered by caesarean delivery (CD) in this study. This finding is consistent with a study that continuous companionship during childbirth reduces the odds of caesarean childbirth [26]. This could be due to psychological factors like clinically proven that the woman wants someone who reassures and praises her, assist her with measures for physical comfort during childbirth (e.g., providing comforting touch, massage, and promoting adequate fluid intake and output), and undertakes any necessary advocacy on her behalf.

In this study, those mothers who didn't remember their last normal menstrual period had higher odds of caesarean childbirth. This may explain the high caesarean birth post-term pregnancy after failed induction and macrosomia. It is consistent with the study conducted in Sweden and Pakistan [42,43]. This might be because unknown LNMP may lead to false diagnoses of gestational age as evidenced by clinically unknown date, the most common cause for post-term pregnancy. The limitation of this study did not address obstetric service providers' opinions on caesarean childbirth. The result of the study may also be affected by recall bias and social desirability.

Conclusion

Studies show that the prevalence of caesarean has alarmingly increased in both developed and developing countries. However, the magnitude of caesarean section differs from country to country and in rural and urban areas; the magnitude of caesarean section in this study is much higher than the WHO recommends threshold. Partograph monitoring, the previous caesarean birth, having a female genital cutting, intermittent cardiotocography, absence of companionship, and unknown last the normal menstrual period are significantly associated with caesarean childbirth.

The local health bureau and obstetric care providers should pay attention to the caesarean section and need intervention in partograph plotting, companionship, cardiotocography, and female genital mutilation.

Ethics approval and consent to participate

The research proposal was reviewed, and ethical clearance was obtained from Hawassa University's internal research review board (IRB), and approval was obtained under study

ID No. 06/2012 and reference number IRB/207/12 before the study was conducted. It was taken to the Sidama region health bureau and directors of each health facility. Written informed consent was obtained from each study subject before the data collection process proceeded. During the data collection process, the data collectors informed each study participant about the objective and anticipated benefits of the research project. The study participants were also informed of their full right to refuse, withdraw, or reject part or all of their roles in the study. Data were collected anonymously and kept locked with the investigators, and all procedures were performed per the guidelines and regulations put forward under the Declaration of Helsinki.

Human and animal rights

The authors declare that the work described has not involved experimentation on humans or animals.

Informed consent and patient details

The authors declare that this report does not contain any personal information that could lead to the identification of the patient(s) and/or volunteers.

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Author contributions

All authors attest that they meet the current International Committee of Medical Journal Editors (ICMJE) criteria for Authorship.

All authors contributed to the conception, design, execution, data acquisition, analysis, and interpretation. The authors have also read and agreed to its content, given final approval of the version to be published, have decided on the journal to which the article has been submitted, and agree to be accountable for all aspects of the work.

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Disclosure of interest

The authors declare that they have no competing interest.

Online Supplement. Supplementary data

Supplementary data associated with this article can be found, in the online version, at https://doi.org/10.1016/j.jemep.2022.100840.

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