

# MISSED OPPORTUNITY FOR MATERNAL HEALTH CARE SERVICES IN EASTERN ETHIOPIA

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## ABSTRACT

**Background:** In developing countries, a large number of maternal deaths happen due to complications of pregnancy and delivery. In Ethiopia, the maternal mortality ratio had been 353/100,000 live births in 2015. Therefore, this study was conducted to assess the missed opportunity for maternal health care services in Eastern Ethiopia.

**Methods:** A community-based cross-sectional study involving pregnant women in their third trimester and women who gave birth in the last five years was conducted between September to December 2017. Structured questionnaire was used for data collection and data were collected from a sample of 422 subjects in the districts. Descriptive (Univariable), bivariable and multivariable logistic regression analyses were conducted. Statistical tests were done at a level of significance of  $p < 0.05$ .

**Results:** The result of this study showed that among 359 (85%) pregnant women who planned for ANC visit, 16 (4.5%) received ANC four or more times during their last pregnancies, the respondents (81.3%) claimed that they were taken care of by skilled delivery attendant during delivery, 18.5% of them said that they delivered at home and 71.1% of them received medical care after delivery. Women in the age group 15-24 years (AOR=??95% CI: 0.37, 3.74) and women who intended their last pregnancy (AOR=??95% CI: 0.11, 0.94) were significant predictors of unplanned home delivery.

**Conclusion:** For optimal and effective interventions of maternal health services utilization, provisions should be made for better women's education, family planning, job opportunity, and women empowerment; provisions should also be made for creating income-generating activities for women. Strengthening village women's army wing, refreshing and enabling health extension workers and traditional birth attendants. What is more, optimal measures should be taken to discourage traditional practices such as female genital mutilation, polygamy, violence against women, and teenage marriage. Finally, free maternal and child health services should be advocated for so that the gap in maternal healthcare services is bridged.

**Keywords:** Antenatal care, Delivery, Maternal mortality, Maternal Health Care, Postnatal care.

## Background

Every day, nearly 830 women die due to treatable or avoidable causes related to pregnancy and childbirth. Ninety-nine percent of maternal deaths occur in developing countries, which would mean 822 women die each day in developing countries due to pregnancy and childbirth (WHO, UNICEF, UNFPA Group, World Bank, UNPD., 2015). Even though maternal mortality is a worldwide phenomenon, the critical issues associated with it are most profound in developing countries. Hence, the estimated figure for maternal deaths worldwide, developing countries account for 99 percent, with an estimated 201,000 maternal deaths occurring in sub-Saharan Africa (WHO, 2016).

In Ethiopia, the maternal mortality ratio had been in 2005 was 743/100,000, and it was 353/100,000 live births in 2015. Consequently, the chance of an Ethiopian woman dying from reproductive health disorders and complications was put at 1 in 25 in 2005, 1 in 39 in 2010, and 1 in 64 in 2015, placing the Ethiopian woman at far greater risk than her counterpart in the developed world, where the risk was estimated to be 1 in 23,700 and 1 in 22,100 in countries such as the Greece and Poland, respectively (WHO, UNICEF, UNFPA Group, World Bank, UNPD., 2015)

Studies have shown that despite the differences in maternal mortality ratio between developed and developing nations, the pattern of maternal mortality and morbidity has not changed over the decades. The reasons that are adduced for this are the persistent tradition of deliveries in domiciliary settings in unsafe and unhygienic conditions by untrained or poorly trained birth attendants (WHO, 2016). Although maternal deaths in Ethiopia are mainly due to complications of pregnancy and delivery, it is the socio-cultural context under which these pregnancies and deliveries occur that paves the way for these complications and mortality are not well documented. Therefore, understanding the socio-cultural contexts under which these pregnancies and deliveries occur is very crucial for solving these complications and mortality. Despite the importance of socio-cultural factors for solving maternal health care service complications and mortality, previous studies have mostly focused on other determinants of maternal health care services without giving attention to the socio-cultural

contexts under which these pregnancies and deliveries occur. Hence, this study was conducted to examine and describe the socio-cultural determinants of maternal health care in Eastern Ethiopia

## Methods

### Study design and setting

A cross-sectional community-based method study that employed quantitative data collection methods were carried out to assess socio-cultural determinants of maternal health care services. The study was conducted in selected 3 districts of East Hararghe Zone of Oromia National Regional State, Ethiopia: Metta, Grawa, and Haramaya district. The study areas were selected purposively as they represent the areas with major health intervention (Belina *et al.*, 2018). The study was conducted from September to December 2017. Haramaya, Metta, and Grawa districts are located in kms and have population based on the information obtained from woreda health office, in 2015 about (526, 291,498), (423, 226,388) and (552,313,473) respectively from Addis Ababa in the eastern direction. The majority of the residents depend on agriculture and petty trade for their livelihoods. The study subjects were a sample of women of childbearing age, who had given birth in the past five years before the survey and who were residents of the Woreda.

### Sample size and sampling procedures

A sample size of 422 participants was determined using the formula for single population proportion based on the assumptions that in the absence of the previous prevalence data on the population under study, and to obtain the maximum sample size,  $p$  was assumed to be 0.5. Moreover, a margin of error of 5%, a confidence interval of 95% assumed ( $Z_{\alpha/2}=1.96$ ) (Nikose *et al.*, 2015), Population ( $N=124,470$ ), and 10% contingency for non-response were used to calculate a sample size of 422 women.

In this study, a three-stage sampling strategy was followed. In the first stage, 30 percent of the total Kebeles in each district were included (Ergano *et al.*, 2015). As the number of Kebeles varies in the three districts, proportional sampling to give equal weights was used (Ergano *et al.*, 2015). Thus, 39 percent Kebeles from Grawa, 33 percent from Metta, and 28 percent from Haramaya were sampled. In drawing the sample Kebeles and households (HHS), 10 Kebeles and 118 HHs from Haramaya, 12 Kebeles, and 165 HHs from Metta and 14 Kebeles and 139 HHs from Grawa were sampled based on the total population size. Villages were randomly selected by using a lottery method to choose the respondents (Belina, 2018). From the sampled kebeles in the three woredas, a total of 422 study samples were selected using a systematic sampling procedure.

There are many different methods for collecting data. The possible (existing and new) data sources are primary data and secondary data collections:- retrieving existing documents and data, collecting data from individuals or groups, observation, and physical measurement (Peersman, 2014). It now follows that this study used interviews, in-depth interviews, document review, and self-administered questionnaires as instruments to critically analyze the Ethiopian maternal healthcare policies and programs about maternal health. Also, all available health policy documents and materials with the capacity to impact on maternal health, including all documents from the maternal, child, and women's health, from national and provincial health directorates were analyzed.

The field procedure was started at the same time in both sites to conduct the fieldwork in East Hararge over four weeks in September. Data were collected by 16 female data collectors who had a minimum of secondary level education. They had three days of training for data collection. The data collection process was closely supervised by field supervisors and the research team. The study obtained ethical approval from the UNISA Research Ethics Committee and the Ethiopian Scientific and Ethics Committee. The survey commenced after written consent was obtained from the East Harargee health bureau and district offices. Informed verbal consent was requested from each study subject. Each respondent was informed about the objectives of the study and assurance of confidentiality.

How you operationalised the "Missed opportunity for MHCS.

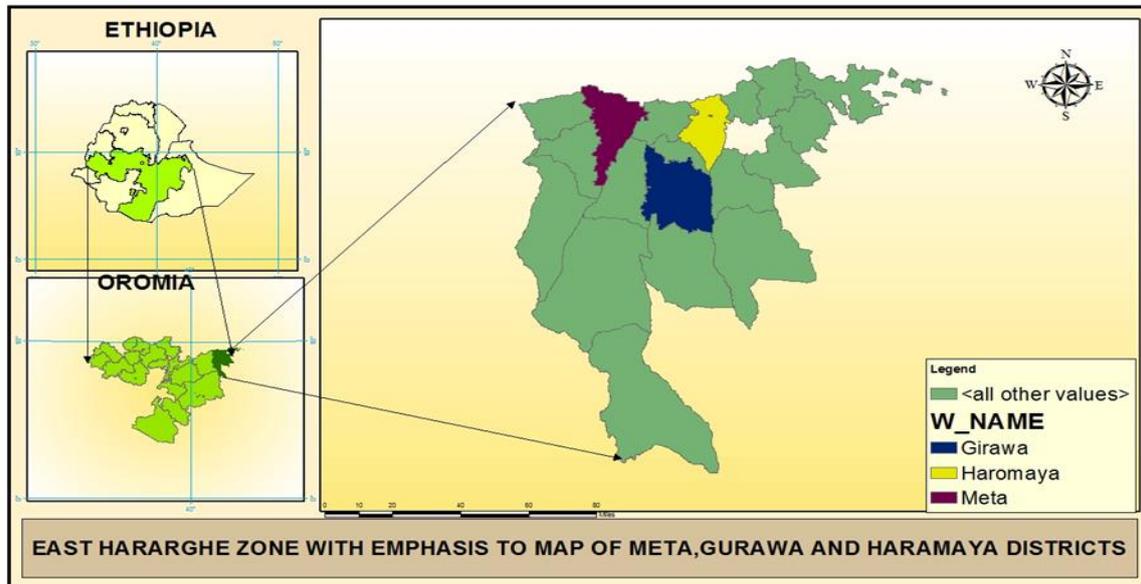


Figure 1: Map of Study Area

### Data analysis

After the data collection is completed and questionnaires edited and coded, the data were entered and processed by using SPSS version 20. Descriptive analysis like percentage, mean, standard deviations was used to describe the study population about demographic and socio-economic and other relevant variables. Bivariate and multivariate logistic regression analyses were done to identify the association between the independent and dependent variables. The chi-square test was used to identify independent variables, which have an association with the dependent variable that would be retained for further analysis at the multivariate stage. Further, multivariate analysis was carried out to explore the net effect (relative risk) of all independent variables on the dependent variable by controlling possible intervening variables.

## Results

### Antenatal care

The results show that 8 out of 10 women (84.6%) in their respective reproductive ages went for modern ANC visits during their last pregnancy. Among them, only 4.5% received ANC services four or more times. About 56% of these women indicated that they initiated the first ANC visit during the recommended time, i.e., during the first trimester of pregnancy. About 68% of the respondent reported that the use of ANC had benefits not only for maternal but also for child health care services.

The result of the study shows that about 79.0% of the women declared that they got respect from health workers. The waiting time required to get ANC services was reported to be average time by 54.1% of the respondents. The majority of the women (53.8) suggested that they initiated ANC services because of health problems. The survey result shows that 60.5% of respondents claimed that they received health education during ANC visits. Concerning privacy, nearly 89% of the respondents felt that their privacy was not protected during ANC visits. About 56% of the respondents felt that they got good quality ANC services, and very slightly over 80% of the respondents said that they had confidence in the services provided by health workers.

About 65%, 81%, and 65% of the respondents reported that the health workers' behavior was good; respondents reported that they never paid for ANC, and the respondents reported that they paid greater than 51 ETB on average for ANC respectively. The majority of the respondents (88.4%) declared that their husbands had a positive attitude to their wives' ANC services attendance.

Table 2: Maternal Healthcare characteristics of Antenatal care

<b>ANC Service</b>			
<b>Characteristics (n=422)</b>	<b>Responses</b>	<b>Freq (no)</b>	<b>(%)age</b>
Did you have ANC check-ups in your last pregnancy	Yes	357	84.6
	No	65	15.4
Frequency of ANC visits	Once	34	8.1
	2 times	100	23.7
	3 times	204	48.3
	4 or more	19	4.5
Timing of first ANC	1-3 months	202	56.6
	4 - 6 months	124	34.7
	6-9 months	31	8.7
Benefits of ANC	Maternal Health	78	18.5
	Child Health	58	13.7
	Maternal and child health	286	67.8
Health workers are respectful	Yes	282	79.0
	No	75	21.0
Waiting time to get ANC	Short time	140	39.2
	Average	193	54.1
	Long time	24	6.7
Reason for initiating ANC	Health problems	192	53.8
	Start regular check-up	161	45.1
	Other	4	1.1
Health education during ANC	Yes	216	60.5
	No	136	38.1
	I don't know	5	1.4
Lack of privacy during ANC	Yes	317	88.8
	No	40	11.2
Feeling about quality of ANC	Good	202	56.6
	Satisfactory	112	31.4
	Poor	43	12.0
Confidence in health service	Yes	287	80.4
	No	61	17.1
	I don't know	9	2.5
Ranking behavior of health workers	Very good	41	11.5
	Good	232	65.0
	Fair	74	20.7
	Bad	10	2.8
Ever pay for ANC	Yes	67	18.8
	No	290	81.2
Average payment for ANC (N=67)	Less than 50-ETB	124	34.7
	Greater than 51 ETB	233	65.3
The attitude of husbands to ANC	Positive	373	88.4
	Negative	33	7.8
	Don't know	16	3.8

The results emanating from the bivariate analysis revealed that women's main occupation, average, family size, last pregnancy intention, polygamy marriage, decision-making autonomy, and previous history of FGM were found to be significantly associated with antenatal care services at  $P < 0.001$ . Intra household violence and husbands' main occupation were also found to be significantly associated with ANC services at  $P < 0.05$  whereas women's age, ethnicity, parity, house type, access to healthcare, and maternal healthcare services satisfaction rating were not significantly associated with of ANC services at  $P < 0.05$ .

The multivariate analysis revealed that women who lived in urban areas had no significant correlation or did not use more/less services than women who lived in rural areas. However, the analysis revealed that women aged 15–24 are 1.2 times more likely (C.I:0.37, 3.74) to use postnatal care than those aged 35–49. Housewives/maids (C.I: 3.43, 197.27) were 26 times less likely to seek antenatal care service utilization when compared to women working petty trade and daily labour work. Households with less than five children (CT: 0.21, 0.91) were 2.3 times more likely to seek ANC service as compared with those who had more than five children.

Concerning parity, women who had given birth to less than 3 children (CT: 0.82, 3.87) were less likely to seek ANC service as compared to those women who birthed more than 3 children. On the other hand, women who intended their last pregnancy (CI: (0.11, 0.94) were 3 times more likely to seek ANC services than those who had an unplanned pregnancy. In connection with this, women who had no history of FGM (CI: 0.36, 1.50), not in polygamous marriage (CI: 0.06, 0.40), who had equal autonomy in the household (CI: 1.13, 7.16), and who had no violence with their partner (CI: 0.09, 2.62) were 1.4, 6.7, 2.85 and 2.0 times more likely to seek ANC services than their counterparts, respectively. Husbands who were employed in an organization (CI: 0.07, 2.36) had more than 2.6 times more likely to use skilled ANC services than those husbands employed on petty trade and daily labors. Women who had access to health care services (C.I:0.60, 2.73) were 1.3 times less likely to seek ANC services than women who had no access to health care services. Likewise, women who were satisfied with the health care services they received (CI: 0.10, 0.90) were 3.3 times more likely to seek the services than those not satisfied with the health care services they received.

### Delivery Care

Table 2 presents characteristics of delivery services women surveyed received. The majority of the respondents (81.5%) are using institutional deliveries, as compared to the 18.5% who still use home deliveries. About 45% of the respondents reported that they delivered their babies in that particular place because there was little/no expense for delivery services. From the respondents delivered at home, about 42% of respondents said that they delivered at home because their relatives were nearby. The majority of the respondents (53.9%) stated that they went to a health facility by foot; almost half of the respondents reported that it took them less than 30 minutes to see a medical staff for service. About 50.4, 39.7 and 12.5% of the respondents were satisfied, completely satisfied, and dissatisfied with the care they received from the skilled birth attendant respectively.

Table 3: Maternal Healthcare characteristics of delivery

<b>Delivery Service</b>			
Characteristics (n=422)	Responses	Freq (no)	(%) age
Used skilled delivery attendant	Yes	343	81.3
	No	79	18.7
Place of delivery	Home	78	18.5
	Hospital	81	19.2
	Health center	259	61.4
	Health Post	3	0.7
	Other	1	0.2
Why did you want to deliver your baby in that particular place	Close to where I live	83	24.2
	Little/no expense	154	44.9
	A good approach of health workers	62	18.1
	Convenient time of services	27	7.9
	High quality of services	9	2.6
	Other	8	2.3
Why you delivered at home	The expense of delivery is unaffordable	2	2.5
	Dislike behavior of health workers	20	25.3
	Delivers at home where relatives are nearby	33	41.8
	More trust in TBAs more than Health workers	24	30.4
Mode of transport you use to go to the primary health clinic?	Walking	185	53.9
	Ambulance	70	20.4
	Public Transport	88	25.7

The average amount of time that you waited to see medical staff	Less than 30-min	173	50.4
	30min-1hr	124	36.2
	1hr-1:30 hr.	43	12.5
	1:30hr-2hr	2	0.5
	More than 2hr	1	0.3
Are you satisfied with the care you received from the skilled birth attendant?	Completely satisfied	136	39.7
	Partially satisfied	149	43.4
	Neither satisfied Nor dissatisfied	15	4.4
	Dissatisfied	43	12.5

The results emanating from the bivariate analysis revealed that pregnancy intention, previous history of FGM, decision-making autonomy, intra-household violence, and husband support on maternal healthcare were found to be significantly associated with delivery service utilization at  $p < 0.001$ ; Enrolment status into CBHI and possession of latrine facility within one's compound were also significantly associated with delivery service utilization at  $p < 0.01$ ; family size, polygamous marriage, access to healthcare and maternal satisfaction rating on maternal healthcare were found to be significantly associated with skilled delivery at  $p < 0.05$ , whereas residence area, age of women, age at first pregnancy, parity and husband's main occupation were not significantly associated with skilled delivery utilization at  $p < 0.05$ .

In multivariable logistic regression, it was found that women living in urban residences (CI: 0.25, 2.95) had 1.2 times increased likelihood of delivery in a health facility compared to women living in a rural area, and the odds of delivery in health facility among women aged 20 years old (CI: 0.63, 3.25) were 1.4 times higher than those women aged 35 years and above likely to seek delivery services.

Households of less than five family size (CT: 0.50, 1.59) were 1.12 times to seek delivery service as compared with those who had more than five family size. Women who were first pregnant at age less than 25 years (CT: 0.67, 2.11) were 1.2 times less likely to seek delivery services than women who first pregnancy at age greater than 25 years old.

Regarding parity, women who had given birth to less than 3 children were less likely (CT: 0.81, 2.40) were 1.4 times more to seek delivery services as compared with women who have more than 3 birth. Women plan to intention of last pregnancy (CI: 0.10, 0.42) were 5 times more likely to seek delivery services than an unplanned one. In connection with this women who have no history of FGM (CI: 0.17, 0.49), not in polygamy marriage (CI: 0.26, 1.37), and have no violence from a partner (CI: 0.07, 0.47) were 3.4, 1.7, and 5.6 times more likely to seek delivery services than the counterpart respectively. Women who had as their husbands in the household (CI: 1.84, 7.18) were 3.6 times more likely to deliver in a health facility than those women who had less autonomy than their husbands. Women who received support from their husbands (CI: 1.41, 4.45) were 2.5 times more likely to seek delivery services than those women who had no to support from their husbands.

Women who had latrine facilities in their compounds (CI: 0.56, 1.85) were a 1.01 times less chance of seeking delivery services than women who did not have this facility in their compounds. Finally, women who had access to health care services (CI: 0.17, 0.49) were 3.4 times less likely to seek skilled delivery services than women who had no access to health care services, and women who were satisfied with the health care services provided to them (CI: 0.32, 1.61) were 1.4 times more likely to seek the skilled delivery services.

### **Postnatal care**

Table 3 displays the characteristics of postnatal care services. It can be established that postnatal care is not being completely utilized in the country; this is evidenced by the low 28.9% use rate meaning that more than quarters of women do not use this service. Regarding the respondents' access to healthcare, 37.2% of them claimed that they could access a healthcare facility for PNC in more than one hour. The majority of the respondents (58.5%) felt that they were partially satisfied and 22.3% of respondents felt dissatisfied with PNC maternal health care services provided to them.

**Table 3: Maternal Healthcare characteristics of postnatal care services**

<b>PNC service</b>			
Characteristics (n=422)	Responses	Freq (no)	(%) age
Did you receive medical care after delivery	Yes	300	71.1
	No	122	28.9
How satisfied were you with the maternal health services you received	Completely satisfied	81	19.2
	Partially satisfied	247	58.5
	Dissatisfied	94	22.3
Access to healthcare (double trip in hrs)	Yes (= <1hour)	265	62.8
	No (> 1hrs)	157	37.2
Maternal healthcare service satisfaction rating	Completely satisfied	81	19.2
	Partially satisfied	247	58.5
	Dissatisfied	94	22.3

The result of the crude analysis of postnatal, family size, age at first delivery, parity, previous history of FGM, decision making autonomy, husband support on maternal healthcare, and access to healthcare facility with the utilization of PNC service at  $P < 0.001$ ; intra-household violence significantly correlated with PNC service at  $P < 0.01$  and polygamy and maternal satisfaction rating significantly associated with PNC service at  $P < 0.05$ . Occupation, religion, ethnicity, last pregnancy intention, and husband's main occupation were not significantly associated with PNC services at  $P < 0.05$ .

Women who were farmers/merchants/others (CI: 0.94, 5.95) were 2.4 times more likely to use PNC service compared to housewives/maids. Christian women (CI: 0.08, 1.18) were 3.2 more likely to seek PNC than Muslim women, and women from the Oromo ethnic group (CI: 0.15, 8.79) were 1.2 times more likely to get PNC. Households with >5 family members (CI: 0.36, 1.17) were 1.5 times more likely to seek PNC service as compared to those households with more than five family members.

Women whose first pregnancy was before the age of 25 years (CI: 0.48, 1.56) were 1.2 times less likely to seek postnatal services than women who had their first pregnancy after they were 25 years old. Women who had given birth to less than 3 children (CI: 0.08, 0.28) were 6.7 times more likely to seek postnatal services as opposed to women who had given birth to more than 3 children. Women who intended their last pregnancy (CI: 0.84, 3.53) were 1.72 times less likely to seek postnatal services than women who did not plan or intend their last pregnancy. In connection with obtaining PNC, women who had no history of FGM (CI: 0.28, 0.84), who were not polygamous (CI: 0.317, 2.23), who had equal autonomy in the household (CI: 1.74, 6.85) and had not experienced violence from their partners (CI: 2.81, 11.01) were 2.1, 1.2, 3.5 and 5.6 times more likely to seek postnatal services, respectively, than their counterparts.

Table 5: Bi-variable analysis of factors associated with Utilization of ANC, Delivery, and PNC

Characteristics (n=422)	Responses	ANC Utilization		Utilization of Delivery		Utilization of PNC	
		Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)
Residence area	Rural	270(85.2)	47(14.8)	87(82.9)	18(17.1)	87(82.9)	18(17.1)
	Urban	87(82.9)	18(17.1)	270(85.2)	47(14.8)	270(85.2)	47(14.8)
Age category	35-49 years	70(80.5)	17(19.5)	70(80.5)	17(19.5)	70(80.5)	17(19.5)
	25-34 years	177 (84.3)	33(85.7)	177 (84.3)	33(85.7)	177 (84.3)	33(85.7)
	15-24 years	110(88.0)	15(12.0)	110(88.0)	15(12.0)	110(88.0)	15(12.0)
Occupational status	Housewife/Maid	29(64.4)	16(35.6)	29(64.4)	16(35.6)	29(64.4)	16(35.6)
	Employee (gov't/NGO)	30(93.8)	2(6.2)	30(93.8)	2(6.2)	30(93.8)	2(6.2)
	Merchant/Student/other	298(86.4)	47(13.6)	298(86.4)	47(13.6)	298(86.4)	47(13.6)
Marital status	Married	342(84.4)	63(15.6)	342(84.4)	63(15.6)	342(84.4)	63(15.6)
	Currently not married	15(88.2)	2(11.8)	15(88.2)	2(11.8)	15(88.2)	2(11.8)
Religion	Christian	30(90.9)	3(9.1)	30(90.9)	3(9.1)	30(90.9)	3(9.1)
	Muslim	327(84.1)	62(15.9)	327(84.1)	62(15.9)	327(84.1)	62(15.9)
Ethnicity	Others	21(95.5)	1(4.5)	21(95.5)	1(4.5)	21(95.5)	1(4.5)
	Oromo	336(84.0)	64(16.0)	336(84.0)	64(16.0)	336(84.0)	64(16.0)
Family size	< 5	103(79.8)	26(20.2)	103(79.8)	26(20.2)	103(79.8)	26(20.2)
	>=5	254(86.7)	39(13.3)	254(86.7)	39(13.3)	254(86.7)	39(13.3)
Age at first pregnancy	<25 years	338(82.6)	6(17.4)	338(82.6)	6(17.4)	338(82.6)	6(17.4)
	>=25 years	19(84.7)	4(15.3)	19(84.7)	4(15.3)	19(84.7)	4(15.3)
Parity category	=<3	112(85.5)	30(14.5)	112(85.5)	30(14.5)	112(85.5)	30(14.5)
	>3	245(87.3)	35(12.7)	245(87.3)	35(12.7)	245(87.3)	35(12.7)
The pregnancy intention	Planned	79(90.8)	8(9.2)	79(90.8)	8(9.2)	79(90.8)	8(9.2)
	Unplanned	278(83.0)	57(17.0)	278(83.0)	57(17.0)	278(83.0)	57(17.0)
Previous history of FGM	No	184(85.2)	32(14.8)	184(85.2)	32(14.8)	184(85.2)	32(14.8)
	Yes	173(84.0)	33(16.0)	173(84.0)	33(16.0)	173(84.0)	33(16.0)
Polygamy marriage	Yes	344(86.0)	56(14.0)	344(86.0)	56(14.0)	13(59.1)	9(40.9)
	No	13(59.1)	9(40.9)	13(59.1)	9(40.9)	344(86.0)	56(14.0)
Decision making autonomy of mothers	Myself/Jointly	290(83.0)	58(17.0)	290(83.0)	58(17.0)	67(90.5)	7(9.5)
	Husband	67(90.5)	7(9.5)	67(90.5)	7(9.5)	290(83.0)	58(17.0)
Intra household violence	No	43(86.0)	7(14.0)	43(86.0)	7(14.0)	43(86.0)	7(14.0)
	Yes	314(84.4)	58(15.5)	314(84.4)	58(15.5)	314(84.4)	58(15.5)
Husband' main occupation	Employee (Gov't/NGO)	57(95.0)	3(5.0)	57(95.0)	3(5.0)	57(95.0)	3(5.0)
	Student/Farmers	244(81.6)	55(18.4)	244(81.6)	55(18.4)	244(81.6)	55(18.4)

	Merchant/labourers/other	56(88.9)	7(11.1)	56(88.9)	7(11.1)	56(88.9)	7(11.1)
Husband Support	No	203(81.9)	45(18.1)	159(64.5)	89(35.5)	125(73.1)	46(26.9)
	Yes	154(88.5)	20(11.5)	147(84.5)	27(15.5)	175(69.7)	76(30.3)
Maternal healthcare's satisfaction rating	Completely satisfied	74(91.4)	7(8.6)	74(91.4)	7(8.6)	74(91.4)	7(8.6)
	Partially satisfied	207(83.8)	40(16.2)	207(83.8)	40(16.2)	207(83.8)	40(16.2)
	Dissatisfied	76(80.9)	18(19.1)	76(80.9)	18(19.1)	76(80.9)	18(19.1)

The finding also indicates that husbands who were able to read and write (CI: 0.06, 0.37) and who were employed in organizations (CI: 0.10, 0.79) were 6.7 and 3.6 times more likely to use skilled PNC services than women whose husbands were unable to read and write and those husbands who were employed on petty trades and daily labors, respectively. Women who got support from their husbands (CI: 3.16, 12.12) were 6.18 times more likely to seek PNC compared to women who had no support from their husbands.

## DISCUSSIONS

Three models were fitted for institutional prenatal services. The first, second, and third models were fitted with ANC, Delivery, and PNC respectively. The multivariate factors associated with utilization of maternal health care are the age of women, educational status, occupation of women, ethnicity, monthly income of the household, family size, enrolment into CBHI, parity, intention, history of FGM, polygamy, the autonomy of women, violence, house type, drinking water, access to maternal care providers and maternal satisfaction, and husband's education, occupation and support to his wife.

The multivariate factors associated with utilization of individual-level factors ANC are the age of women, gender and behavior of healthcare providers, occupation of women, history of FGM, polygamy, the autonomy of women, violence, access to maternal care providers, and maternal satisfaction and support to the wife.

Maternal healthcare services utilization is influenced by the gender of the head of the household and by the gender of healthcare providers. This finding is consistent with the findings of similar studies conducted in Namibia, Kenya, and India (Press, 2012; Lowe *et al.*, 2016). Male family members influence females' utilization of maternal healthcare services because the communities in the study area are patriarchal. Therefore, 'gender plays an important role in decision-making in the society wherein men are considered as more important than women socially and culturally'. This finding is similar to the study done by Neil and Domingo (2015).

Women's preference and use of MHC services are determined by the autonomy they have in the household. As the communities in the research area have a patriarchal structure, most women do not have parity with men in making decisions concerning the use of MHC services and decisions over family issues. This finding is consistent with the study done in Ghana and Nepal by Lewis *et al.* (2015) and Craymah *et al.* (2017).

Table 6: Logistic regression of factors associated with utilization of ANC, Delivery, and PNC in eastern Ethiopia

Variables	Responses	Utilization of ANC		Utilization of Delivery		Utilization of PNC	
		COR (95% CI)	AOR (95% CI)	COR(95%CI)	AOR(95%CI)	COR(95%CI)	AOR(95%CI)
Age category	35-49 years	1	1	1	1	1	1
	25-34 years	1.30( 0.68, 2.49)	1.06( 0.42, 2.72)	1.55(0.96, 2.49)	0.86(0.25, 2.95)	1.27(0.50, 3.27)	0.71(0.17, 2.96)
	15-24 years	1.78(0.84,3.79)	1.18(0.37, 3.74)	1	1	1.81(0.95, 3.43)	2.36(0.94, 5.95)
Occupational status	Housewife/Maid	1	1	1.01(0.62, 1.63)	0.66(0.26, 1.72)	0.37(0.11, 1.28 )	1.15(0.15, 8.79)
	Employee (gov't/NGO)	8.28(1.75,39.30)**	26.03(3.43, 197.27)**	1.78(0.93,3.40)	0.96(0.49, 1.87)	1	1
	Merchant/Student/other	3.50(1.77,6.93)***	10.67(3.73, 31.05)***	1	1	0.32(0.20, 0.50)***	0.45(0.25, 0.80)**
Ethnicity	Others	1	1	0.63(0.41, 0.97)*	1.39(0.81, 2.39)	1	1
	Oromo	0.25(0.03, 1.90)	0.32 (0.01, 28.51)	1	1	0.42(0.28,0.65)***	0.65(0.36, 1.17)
Family size	< 5	1	1	0.46 (0.29, 0.74 )**	0.76(0.43, 1.36)	1	1
	>=5	0.34 (0.20, 0.59)***	0.44(0.21, 0.91)*	1		0.40(0.26, 0.62)***	0.87(0.48, 1.56)
Parity category	=<3	1	1	0.73(0.47,1.11)	1.39(0.81, 2.40)	1	1
	>3	0.690.41, 1.18)	1.79(0.82, 3.87)	1		0.63 (0.39, 1.02)	1.72(0.84, 3.53)
Pregnancy intention	Planned	1	1	0.20 (0.11, 0.37)***	0.20(0.10, 0.42)***	1	1
	Unplanned	0.20 (0.08, 0.44)***	0.32(0.11, 0.94)*	1	1	0.34(0.22, 0.52)***	0.48(0.28, 0.84)**
Previous history of FGM	No	1	1	0.26(0.17, 0.41)***	0.29(0.17, 0.49)***	1	
	Yes	0.43(0.24, 0.63)**	0.73(0.36, 1.50)	1	1	0.46(0.24, 0.89)*	0.84(0.317, 2.23)
Polygamous	Yes	1	1	0.47(0.24, 0.92)*	0.59(0.26, 1.37)	1	1

	No	0.15(0.08, 0.30)***	0.15(0.06, 0.40)***	1	1	3.82(0.22, 6.56)***	3.45(1.74, 6.85)***
Decision-making autonomy of mothers	Myself/Jointly	1	1	4.84(2.69,8.72)***	3.64(1.84, 7.18)***	1	1
	Husband	5.10 (2.26, 11.49)***	2.85(1.13, 7.16)*	1	1	0.37(0.18, 0.77)**	5.56(2.81, 11.01)***
Intra-household violence	No	1	1	0.23 (0.11, 0.48)***	0.18(0.07, 0.47)*	1	1
	Yes	0.36 (0.16, 0.80)*	0.50(0.09, 2.62)	1	1	0.93(0.56, 1.55 )	0.15(0.06, 0.37)***
Husband's main occupation	Employee (Gov't/NGO)	1	1	1.72(0.72, 4.09)	0.95(0.32, 2.83)	0.61(0.32, 1.19)	0.28(0.10, 0.79)*
	Student/Farmers	0.42(0.10, 1.71)	0.23(0.03, 1.70)	0.86(0.46, 1.60)	0.78(0.31, 1.97)	1	1
	Merchant/labourers/other	0.23(0.07, 0.77)*	0.39(0.07, 2.36)	1	1	5.38(3.17, 9.14)***	6.18(3.16, 12.12)***
Husband support	No	1	1	3.05(1.88, 4.95)***	2.51(1.41, 4.45)**	1	1
	Yes	1.71(0.97, 3.01 )	0.64(0.30,1.38)	1	1	0.51(0.31, 0.82 )**	0.98(0.51, 1.91)
Maternal healthcare satisfaction rating	Completely satisfied	1	1	0.28(0.18, 0.43)*	0.29(0.17, 0.49)***	1	
	Partially satisfied	0.49 (0.21,1.14 )	0.3(0.10, 0.90)*	1	1	1.27(0.50, 3.27)	0.03
	Dissatisfied	0.40 (0.16, 1.01)	0.50(0.15, 1.60)	0.51(0.27, 0.95)*	0.72(0.32, 1.61)	1.81(0.95, 3.43)	0.22

Significance level: \* = P < 0.001; \*\* = P < 0.01; \*\*\* = P < 0.05; Source: Authors survey, 2017

In addition, Women who have equal autonomy in their households were 2.85 times more likely to seek ANC services than their counterparts. The result of the present study is found to be similar to previous studies in Ethiopia (Yaya *et al.*, 2017). "Husband's or partner's approval of ANC was most significantly related to antenatal care attendance." It is expected that having a husband who approves antenatal care significantly increases the likelihood that a woman used antenatal care, irrespective of the husband's background characteristics. Therefore, efforts to improve husbands' or partners' attitudes would probably increase the utilization of health services by women.

In this patriarchal society, cultural and traditional beliefs about labor and delivery and the type of family affect women's use of MHC services. Consequently, "women's use of MHC services can be decided by husbands and mothers-in-law who have a powerful voice in the household." This finding is again consistent with the results of studies done in Ethiopia and Nepal (Roudsari *et al.*, 2015; Pun *et al.*, 2016; Mesele, 2018). In terms of women's occupation, it has been found that housewives/maids were 26 times less likely to seek antenatal care services when compared to women who were petty traders or daily laborers. The result of this study is similar to the result of a study done in Bako, a town in Oromia, Ethiopia wherein being a housewife or a private employee is associated with ANC visits and independent institutional delivery (Tadele and Lamaro, 2017).

The result of this study shows that utilization of antenatal services declined with the increase in the number of births. A household with less than five children was found to be 2.3 times more likely to seek ANC service as compared with a household with more than five children. Given that a woman had a six and above safe delivery history, she may feel healthy but is less likely to seek maternal health care services (Kifle *et al.*, 2017a). When the number of pregnancies increases, the woman might feel it is risky, and she is likely to seek maternal health care services. The current study, however, has found that several births are negatively associated with antenatal care service seeking (Kifle *et al.*, 2017a). The finding shows small numbers of children have a lower percentage when compared to a high number of children. The gap could be mainly due may feel healthy.

The present study revealed that pregnant women with a smaller number of children utilized ANC often compared with women with a larger number of children. This finding was found to be consistent with previous studies done in South Sudan which confirmed the direct association between the number of children born to a woman and ANC utilization (Vermaak, 2015). The high utilization of ANC services in this group might be attributed to health complications as a result of the increased number of pregnancies. Moreover, the knowledge, experience, and confidence a woman with more children gains from previous pregnancies may lead to more frequent ANC utilization (Singh *et al.*, 2014). In contrast, other studies had revealed that a low number of parity to a woman associated with more frequent ANC used; this might be attributed to low educational level or close attachment to local cultures and traditions which restrict women with high parity to use ANC even if she is at risk (Vermaak, 2015).

This study revealed that women whose husbands were polygamous were negatively associated with their husbands' involvement. Women who were not in polygamous marriages were 6.7 times more likely to seek ANC services than their counterparts. In a polygamous society, husbands may have difficulty in changing their perceptions as they do not need to be involved in maternal issues (Kwambai *et al.*, 2013; Wai *et al.*, 2015). Thus, husbands' involvement should be enhanced to mitigate barriers against maternal care services utilization.

The study also found a significant association between emotional IPV and the likelihood of having first ANC within three months of gestational age. In connection with this, women who had no violence from their partners were 2.0 times more likely to seek ANC services than those women with any experience of violence. This finding is consistent with the study done in Nigeria where women who reported that they had ever experienced emotional IPV in their relationship were less likely to have their first ANC within the first trimester of their pregnancy, which supports the report of a study in (Mohammed *et al.*, 2017). Similarly, the study found that women who have been sexually abused in their relationship were less likely to use ANC four or more times.

-Women whose ANC attendance was influenced by cost or distance were two times more likely to experience an adverse outcome compared with women whose attendance was not influenced by these factors. Women who have access to healthcare services were 1.3 times less likely to seek ANC services than those who have no access to healthcare services. Access influence ANC attendance and are also associated with adverse pregnancy outcomes (Asundep *et al.*, 2013).

The multivariate associated factors that affect delivery are residence area, age category, family size, age at first pregnancy, parity, the intention of last pregnancy, FGM, polygamy, autonomy, household violence, types of house material, latrine facility, health access, and healthcare satisfaction rate, and husband's occupation and support.

-Teenage mothers are more likely to experience adverse pregnancy outcomes and are more constrained in their ability to pursue educational opportunities than young women who delay childbearing. Women whose first pregnancy was under the age of 25 years were 1.2 times less likely to seek delivery services than women whose first pregnancy was at or later than 25 years old. This finding is consistent with the study done in Ethiopia where childbearing has risen rapidly from 2% among 25-year old women age and 15 to 28% among those aged 19 years old (CSA, 2016). In addition, husbands' occupation was associated with delivery use. Husbands who were employed in organizations were 1.47 times more likely to use skilled delivery services than those who were petty traders or daily laborers. This finding was comparable to the results of other studies that found women with husbands employed in organizations were more likely to use institutional delivery (Tsegay *et al.*, 2013).

Family size and facility delivery vead a significant association, and a household of less than five family members was 1.12 times more likely to seek delivery services as compared to women who had more than five family members. The finding shows that families in the study area with high birth rates may be more conservative toward maternal health services (Kawakatsu *et al.*, 2014). This result is also consistent with other national studies in which the probability of giving birth at health facilities decreases for women with five or more births (Tsegay *et al.*, 2013; Melaku *et al.*, 2014; Shahabuddin *et al.*, 2017). One reason for this relationship could be the limited access to resources and time constraints related to child care and household activities.

Similarly, it was found that women who had no history of FGM were 3.4 times more likely to seek delivery services than their counterparts. Studies have shown that women with FGM are significantly more at risk of cesarean section, episiotomy, extended maternal hospital stay, and inpatient prenatal death than women without FGM (Egenberg *et al.*, 2017). The present study also found that women who were not in polygamous marriages were 1.7 times more likely to seek delivery services than their counterparts. This finding is also consistent with indicated that polygamous women are less likely to obtain treatment for which a monetary fee was required.

Various researchers across the global regions have identified GBV as a major contributor to poor reproductive outcomes (Bishwajit *et al.*, 2017). Women who have no violence from their partners were 5.6 times more likely to seek delivery services than their counterparts. The finding is consistent with the finding of Silverman and Raj (2014) that states abused women are twice as likely to report unintended pregnancy and three times more likely to give birth as an adolescent compared to those not experiencing any violence.

In households that have sanitation facilities, women are more likely to give birth at a health facility. Women who have latrine facilities in their compounds had 4% times more chance to seek delivery services. This indicator would be associated with health awareness/practices in the household and the level of available expenditure for health amenities (Kawakatsu *et al.*, 2014). The physical proximity of healthcare services plays an important role in service utilization. Women who have access to healthcare services were 3.4 times more likely to seek ANC services than those who have no access to healthcare services. The study shows that reducing maternal deaths, especially in rural areas of Ethiopia, required not just the provision of medical care but an engagement of the whole society.

In multivariable logistic regression, it was found that women living in urban areas had 1.2 times increased likelihood of delivery in a health facility compared to women living in rural areas. Better information about and access to services are likely to explain much of these differences. The finding that a woman's residence affects where she is likely to deliver is consistent with the findings of other studies in Ethiopia (Acharya *et al.*, 2010; Melaku *et al.*, 2014).

The multivariate associated factors that affect PNC are occupation, religion ethnicity, family size, age at first pregnancy, parity, intention of last pregnancy, FGM, polygamy, autonomy, household violence, husband support and occupation, health access, and healthcare satisfaction rate.

This study has shown that women's ability to influence decisions as to using SBA care depends on their position in the household and which in turn depends on their maternal age. This is to say that young women, first-time mothers, and mothers with one or two children were more likely to use maternal healthcare services than those who had more than three children and/or who were aged thirty years and older. This finding of the present study is consistent with the findings of studies done in Kenya and Uganda (Turyakira and Pettersson, 2012; Nyandieka *et al.*, 2016).

The study shows that farmers, merchants, and other professionals were 2.4 times more likely to use PNC services compared to housewives/maids. Compared to housewives/maids, being a government or private employee was found to have significantly reduced the odd of PNC service utilization by 29%. This finding is consistent with the finding of (Ramezani *et al.*, 2016) which states that employed women, compared to

housewives, more frequently received postnatal care. These women are more likely to receive timely prenatal care services as well. The current finding shows housewives/maids women have a lower percentage of utilization compared to farmers and merchants women as the results of a study done (Ramezani *et al.*, 2016), which states that employed women, compared to housewives, more frequently received postnatal care.

In addition, husbands employed in organizations were 3.6 times more likely to use skilled PNC services than husbands who were petty traders and daily laborers. This finding is consistent with the study done in Ethiopia that indicates husbands working in government or private organizations were 4.7 times more likely to seek PNC services utilization when they were compared to men working on petty trades and unskilled jobs (Dereje, 2017).

Women whose first pregnancy was under the age of 25 years were 1.2 times less likely to seek postnatal services than women whose first pregnancy was at age of 25 years or older. However, the study conducted by Shiferaw *et al.* (2013) contradicting that maternal age was not associated with the use of all three maternal health services. As to the final decision maker on PNC service utilization, a mother who has as equal decision power as their partners utilized PNC services 3.5 times more likely than woman whose healthcare decision is made by others. This evidence is in line with a similar study conducted in Ethiopia (Workineh and Hailu, 2014). This can be due to the autonomy of the women to take any action at any time on their health-related issues.

Women who are employed can decide by themselves or in consultation with their husbands whether to use maternal health services or not. This finding is similar to the result of a study done in India ( Shimpuku *et al.*, 2017). A household that had less than five children was 1.5 times more chances of seeking postnatal services as compared to a household with five or more children. This finding is in agreement with evidence from a study conducted among women (Workineh and Hailu, 2014). The probability of utilizing PNC decreased in mothers who bore five or more children than primigravida.

Parity is a factor affecting post natal care services. Regarding parity, women who had given birth to fewer than 3 children were 6.7 times more likely to seek postnatal services as compared with women who had more than 3 births. This finding is consistent with the finding that women with more than five deliveries were nearly 4 times more likely to experience an adverse outcome compared with women with one delivery (Asundep *et al.*, 2013). Similarly, women who were to give their 4th or 5th births were 78% less likely to give birth at a health facility as compared to those who were to give birth for the first time (Dansereau *et al.*, 2016).

The intention of pregnancy is a factor affecting prenatal care. Women with unintended pregnancies start prenatal care later and receive fewer prenatal care visits, compared to others (Ramezani Tehrani *et al.*, 2016) is in line with this finding of the present study. Women who have been subjected to violence by their partners were 5.6 times more likely to seek postnatal services than their counterparts. Again, this finding is consistent with the finding by (Silverman and Raj, 2014) that revealed abused women report unintended pregnancy and give birth as an adolescent as opposed to women who have not experienced any violence.

Preferences of maternal healthcare services are a factor affecting postnatal care. Women's traditional beliefs about pregnancy and childbirth are one of the social factors that determine mothers' choice and utilization of MHC services. That is to say mothers-in-law and traditional birth attendants believe that pregnancy and childbirth is a normal process not requiring special care. They had neither experience of professional care nor a tradition of going to a hospital for delivery. Therefore, mothers-in-law do not encourage their expectant daughters-in-law to go to the hospital for maternal care services. This finding is similar to the results of studies done in Ghana, Nepal, and Zambia (Kaphle *et al.*, 2013; Sialubanje *et al.*, 2015; Aziato and Omenyo, 2018). Nevertheless, safety in case of complications during pregnancy and delivery is found to be a key reason for women to prefer MHC at health facilities. This finding is consistent with the results of studies conducted in Bangladesh, Malawi, and Zambia (Kumbani *et al.*, 2013; Sialubanje *et al.*, 2015; Sarker *et al.*, 2016).

Muslims were found to have low maternal healthcare service-seeking behavior as compared to Christians. Christian women were 3.2 times more likely to seek postnatal care than Muslim women. This finding is consistent with studies done in Ethiopia (Kifle *et al.*, 2017). The possible explanation could be Muslim women in the study area believed that their naked bodies could only be seen by their husbands. Generally, Muslim women prefer female traditional birth attendants to skilled healthcare providers (Kifle *et al.*, 2017).

In connection with FGM, women who have no history of FGM were 2.1 times more likely to seek PNC as compared to those women with a history of FGM. One study which is in line with this finding has shown that women with FGM are significantly more at risk of postpartum hemorrhage and extended maternal hospital stay (Egenberg *et al.*, 2017). Ethnicity of women also affects maternal health services utilization and participants belong to Oromo women, it was found, were 1.2 more times likely to get postnatal care. In contrast to this

finding, another study's finding shows that there was no significant association between ethnicity and the use of PNC services (Shiferaw *et al.*, 2013).

Women's expectation of maternal healthcare services is a factor affecting postnatal care. Women's expectations of the speed and quality services at health facilities and their expectations of the behaviour of medical personnel are social determinants of preference and use of MHC services. Thus, women who have a positive expectations of quality services at health facilities and the behavior of medical personnel prefer to deliver at a hospital. The finding is similar to the studies done in Kenya, Nigeria, and South Sudan (Tsawe and Susuman, 2014; Lang and Mwanri, 2015; Okonofua *et al.*, 2017).

The planned use of maternal healthcare services is a factor affecting PNC. The study has indicated that timely access to services was a problem even if women had planned SBA's use during delivery. This finding is similar to the findings of studies done in Ethiopia and Ghana (Cofie *et al.*, 2015; Wilunda *et al.*, 2015). Relatives' influence on maternal healthcare services is a factor affecting PNC. Owing to social factors, pregnant women's non-use of MHC services has been influenced by the presence of extended family members, household affairs, mothers-in-law, and daughters-in-law. This finding is similar to a finding of a study done in Malawi (Mokomane, 2012).

This study has revealed that women who are not in polygamous marriage were 16% times more likely to seek PNC services than women in a polygamous marriage. This finding shows that women need to work exceedingly hard to save money for their medical and other related expenses like transport fares which are unlikely to be provided by their polygamous husbands. Yet, other studies show that giving women decision-making powers by their spouses could raise the rates of delivery at healthcare facilities (Lowe *et al.*, 2016).

The use of PNC services is found to be significantly affected by social support provided to pregnant women by family members. Thus, women with husbands' support were 6.18 times more likely to seek PNC services as opposed to their counterparts. Also, as revealed by the literature review, women who are not supported by friends and family members are less likely to receive prenatal care services (Ramezani Tehrani *et al.*, 2016).

Women who have delivered two or more times prefer to deliver at home ( Sarker *et al.*, 2016). The finding is consistent with the study done by Srivastava *et al.* (2015); Aborigo *et al.* (2018). Women's pregnancy history and maternal healthcare services are factors affecting postnatal care. The present study finds that women's health status is another key factor that influences their use of MHC services. Accordingly, women do not plan to use SBA services if everything goes normal during pregnancy; nevertheless, they decide to go to a health facility if they feel unwell during pregnancy and when the baby due draws nearer and nearer. Thus, this finding is similar to the study done in southern Malawi (Kumbani *et al.*, 2013).

Women's fear of their privacy being invaded and their confidential information not kept are barriers to their use of maternal healthcare services. The finding of this study is consistent with this study by (Mannava *et al.*, 2015; Srivastava *et al.*, 2015). To increase women's regular use of MHC services, relevant information about how their privacy is kept should be given to women by health workers and medical staff at health facilities.

Family living arrangements are a factor affecting postnatal care. Mothers' use of MHC services has also been found to be determined by family types. In other words, mothers in a nuclear family type and who have parity with their spouses can decide whether they should use MHC services or not. Women in an extended family type and who do not parity with their spouses over household issues can hardly make decisions by themselves to use MHC services or not because in a patriarchal society decisions about family members are made by fathers. Similarly, pregnant women's use of MHC services is influenced by mothers-in-law as mothers-in-law have the social power to make decisions for/against their daughter's-in-law preferences to use MHC. The finding of this study is consistent with the study done by (Shahnazaryan *et al.*, 2017). Knowledge about maternal healthcare services is also a factor affecting postnatal care. Women with knowledge about/of maternal healthcare services use them more often use MHC than women without information or knowledge of MHC as a result of their being culturally and traditionally dominated. This finding is consistent with findings of studies done in Ethiopia and Zimbabwe (Dodzo and Mhloyi, 2017; Mezmur *et al.*, 2017; Aborigo *et al.*, 2018).

It has been found that choice and use of hospital delivery are determined by the health condition of some pregnant women. That is these women prefer hospital delivery if only they did they feel unwell and the baby due came closer and closer. This finding is again consistent with a study done in northern Greece (Sapountzi-krepia *et al.*, 2010). Similarly, the use and choice of hospital delivery are determined by pregnant women's awareness and the availability of safe delivery facilities in their residence. In other words, these women would

like to get safer delivery facilities in the village rather than going to places where they could get safe delivery services were similar to a study done by (Sarker *et al.*, 2016).

What is found from the interviewees with women is that choice and utilization of hospital delivery are affected by pregnant women's fear and sense of shame. Most women in the study area were unwilling to go to the hospital due to fear and a sense of shame. For these women, it is shameful to show their body parts to others, and it is embarrassing for them during labour their body parts be touched by a doctor. This is the result is consistent with the study by (Van Busum, 2014). In addition, pregnant women's choice and utilization of hospital delivery are influenced by the women's perceived fear of their privacy being invaded after delivery at the hospital where its rooms were open with no curtains. On the other hand, it is found that pregnant women preferred to go to the hospital for more safety in case of complications during delivery. This is in line with the findings by (Anastasi *et al.*, 2015; Cofie *et al.*, 2015; Sarker *et al.*, 2016; Karanja *et al.*, 2018; Mulenga *et al.*, 2018).

The delivery skill of healthcare providers is another factor affecting postnatal care. Mothers would not like to go to the hospital because they feel that health service providers lack the skill required for assisting a woman in giving birth. The result of this study is also consistent with studies done in Ethiopia and Bangladesh (Roro *et al.*, 2014; Sarker *et al.*, 2016). Similarly, the study has revealed that hope for faster services at a hospital, good behavior, and politeness of health personnel in the hospital is found to be factors influencing choice and use of hospital delivery by the expectant women. Furthermore, mothers' prior negative experience of hospital delivery affects an expectant mother's preference and use of hospital services as these mothers advise the woman not to go for hospital delivery. This finding is again consistent with the studies done in Ethiopia and Malawi (Kumbani *et al.*, 2013; Roro *et al.*, 2014). Moreover, the use of maternal healthcare services is affected by women's belief that once the genitalia is cut by medical personnel, it remains open and be a problem forever. This particular finding is similar to the finding of a study done by (Jiang *et al.*, 2017).

Quality services of maternal healthcare are another factor affecting postnatal care. Besides choice and access of maternal healthcare services and delivery skills of healthcare providers, one more health system factor found to influence mothers' choice and utilization of hospital delivery is the quality of services provided at maternal healthcare centers. More specifically, the study has found that because some women do not feel comfortable sleeping on a bed in a maternity ward, they would prefer home delivery to hospital delivery. This finding is consistent with the findings of studies carried out in Kenya, Tanzania, and Malawi by Afulani *et al.* (2017); Kumbani *et al.* (2013); Pfeiffer, and Mwaipopo (2015), respectively.

## CONCLUSION

In conclusion, this study identifies the important predictors of maternal healthcare in Ethiopia using the Logistic regression model. The study revealed that socio-cultural, socio-economic, and demographic variables have significant effects on the utilization of maternal healthcare in Ethiopia. Factors influencing maternal health services utilization operate at various public policy level factors, organizational and health system-level factors, community and social level factors, interpersonal or family-level factors, and individual-level factors. While family size, parity, the intention of last pregnancy, history of FGM, maternal healthcare access, and satisfaction are consistently strong predictors of all the maternal health services considered in this study, other determinants of service utilization generally vary in magnitude and level of significance by the type of maternal service.

The associated factors on the maternal health care are age of women, occupation of women, ethnicity, family size, parity, the intention of last pregnancy, history of FGM, polygamy, the autonomy of women, violence, husband's occupation and support, the material of house type, drinking water, access, and client satisfaction. The associated factors of delivery are residence area, age category, education, family size, enrolment into community health insurance, age at first pregnancy, parity, the intention of last pregnancy, history of FGM, polygamy, autonomy, household violence, support, and occupation, types of house material, source of drinking water, latrine facility, healthcare access, and satisfaction rate. Finally, the associated factors affecting postnatal care are: occupation, religion, ethnicity, family size, age at first pregnancy, parity, the intention of last pregnancy, history of FGM, polygamy, autonomy, household violence, husbands support and occupation, health access and healthcare satisfaction rate were the most important determinants of the three maternal healthcare services in the country.

To be optimally effective, interventions to promote maternal health service utilization need to consider these findings. In other words, they should target the underlying individual, household, community, and state-level factors that are relevant to each type of maternal health service. In the light of the above conclusions, the study

particularly would recommend that effort should be made for providing better access to education, family planning, community-based health insurance, health facilities and creating job opportunities for mothers and discourage traditional practices like women FGM, polygamy and teenage marriage so that the gap in maternal healthcare services will be bridged. The listed findings will be implemented by different stakeholders. We also suggest that future studies could use the qualitative approach to study issues associated with maternal health care services.

### Competing interests

The authors declare that they have no competing interests.

### Authors' contributions

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