

Determinants of Family Planning Service Utilization and Health Facility Delivery in Six Regions of Ethiopia: A Population-Based Cross-Sectional Study

Luche Tadesse Ejeta^{1*}, Habtamu Zerihun Demeke¹, Binyam Fekadu Desta², Mengistu Asnake Kibret¹, Girma Kassie Gebre¹, Ismael Ali Beshir², Luwam Teshome Gari¹, Zergu Tafesse Tsegaye², Bekele Belayihun Tefera¹

Abstract

Background: Ensuring access to family planning (FP) and health facility-based delivery services to women of reproductive age is essential to prevent maternal deaths. Studies conducted thus far in Ethiopia are limited in their geographical coverage and sample size, and they did not adequately address potential factors that influence use of these services. The aim of this study was to assess the determinants of facility-based FP and delivery service utilization in the six regions of Ethiopia.

Methods: The study design was cross-sectional. In total, 7,938 women of reproductive age were selected randomly to answer a structured questionnaire. Data were analyzed using SPSS version 22.0.

Results: Status of a woman's decision-making power about her own health (AOR = 1.95, 95% CI: 1.38 – 2.76), husband's support of FP service utilization (AOR = 4.19, 95% CI: 3.33 – 5.25), delivery of the last child at a health facility (AOR = 1.88, 95%CI: 1.56 – 2.27), and availability of a family health card at household (AOR: 1.28, 95%CI: 1.09 – 1.51) were significantly associated with FP service use. Visit to a health facility for any family member's health problem prior to delivery (AOR = 2.30, 95% CI = 1.70 – 3.12), status of a woman's decision making power about her own health (AOR: 3.71, 95%CI: 2.38 – 5.78), availability of a family health card at household (during the pregnancy period) (AOR = 1.38, 95%CI = 1.05 -1.82), antenatal care visit during the last pregnancy (AOR = 3.61, 95%CI: 2.12 – 6.16), and perception of receiving respectful care (AOR = 9.08, 95%CI: 6.93 – 11.89) were associated with delivery in a health facility. The study considered factors that were inadequately assessed in previous studies. In this study, these factors were associated with FP and health-facility delivery service utilization, corroborating with the findings of other studies done outside the country. It adds new information to the existing literature.

Conclusion: The main implication of this study's findings is that holistic interventions at household and health facility can influence the use of facility-based family planning and delivery services. [*Ethiop. J. Health Dev.* 2021;35(SI-5):03-10]

Key words: family planning, health facility delivery, determinants, service utilization, and Ethiopia

Introduction

The global maternal mortality ratio (MMR) on average declined by 2.9% every year between 2000 and 2017. However, MMR in sub-Saharan Africa is still high, estimated at 542 per 100,000 live births in 2017 (1). In Ethiopia, the MMR declined from 871 per 100,000 live births in 2000 (2) to 412 per 100,000 live births in 2016 (3), and the country's achievement for MMR was close to the Millennium Development Goal (MDG) Five target (4). As the MDG era ended in 2015, Sustainable Development Goals (SDGs) were set by the United Nations (UN) to be achieved by 2030 (5). SDG 3 is to "Ensure healthy lives and promote wellbeing for all at all ages" (6). One target of SDG 3 is to reduce the global MMR to less than 70 per 100,000 live births by 2030 [6]. In line with SDG 3 and as a UN member country, Ethiopia developed its health sector transformation plan (HSTP) for a five-year period from 2015 to 2020, envisioning a reduction in MMR to 199 per 100,000 live births by the end of 2020 (7). Based on the global MMR estimate, MMR in Ethiopia is estimated at 401 per 100,000 live births in 2017 (1). Ethiopia's first HSTP ended in 2020, the second HSTP has been designed to reduce the MMR from 401 to 279 per 100,000 live births by 2025 (8).

The global leading causes of maternal deaths are abortion, embolism, hemorrhage, hypertension, sepsis, and other direct and indirect causes (9). In Ethiopia, the leading direct causes of maternal deaths are

hemorrhage, pregnancy-induced hypertension, sepsis, obstructed labor, and unsafe abortion (10, 11). Adolescent pregnancy is associated with higher risks of adverse pregnancy outcomes such as eclampsia, puerperal endometritis, systemic infections, low birthweight, preterm delivery, and severe neonatal conditions (12, 13). To prevent maternal deaths, addressing these causes and inequalities in access to quality reproductive, maternal, and newborn health (RMNH) services; ensuring universal coverage for comprehensive RMNH care; and strengthening health systems to respond to the health needs of women are the very essential components of the strategy that World Health Organization (WHO) puts forward (14). The specific evidence-based interventions targeting the causes of maternal mortality include interventions focused on intrapartum and postpartum period, provision of voluntary family planning (FP) services to women of reproductive age, safe abortion services, and antepartum care are the major effective ones. And to render these interventions, the health system must be strengthened at all levels (15). To decrease the MMR in low- and middle-income countries, reorienting the health systems toward primary care to provide FP, prenatal care, delivery, and other maternal health services are very essential along with strengthening the comprehensive primary health care approach through increasing the use of these services (16).

^{1*}Pathfinder International, USAID Transform: Primary Health Care, Addis Ababa, Ethiopia. *Correspondence: ltadesse.ejeta@gmail.com, ltadesse@pathfinder.org

²JSI Research and Training Institute Inc., USAID Transform: Primary Health Care, Addis Ababa, Ethiopia

However, availability of maternal health services within a given health system does not necessarily guarantee the use of health services by women of reproductive age. A recent systematic review shows that knowledge about FP methods, male partner approval, sociocultural norms about fertility, education, employment, and communication with male partner were among factors that determine use of FP services in sub-Saharan Africa (17). Similarly, two other systematic reviews demonstrate that wealth, residential status (urban versus rural), education, antenatal care visit, age, medical insurance, clinical risk factors, distance to health facility, perceived quality of care, and social and cultural issues are part of the main determinants of delivery assisted by a skilled health provider in low- and middle-income countries (18, 19).

Ethiopia's health system has evolved over time to provide health services to its population and to contribute to the reduction of MMR. The current health system is a three-tier health care delivery system. The first level is the primary health care, which comprises a primary hospital (for 60,000 to 100,000 people), a health center (for a maximum of 25,000 people), and five health posts (each for 5,000 people). The second level is the general hospital (for a maximum of 1.5 million people). The third level is the specialized hospital (for a maximum of 5 million people) (20). Even though health service utilization by women of reproductive age in Ethiopia is increasing, still the percentages remain low; according to the national mini-DHS conducted in 2019, the contraceptive prevalence rate is 41%, and proportion of births attended in health facilities is 48% (21). To help the government's efforts in increasing service availability and utilization, USAID Transform: Primary Health Care has been implementing different interventions on FP and institutional delivery at primary health care facilities and at the community levels.

In Ethiopia, studies conducted thus far to assess the determinants of FP service utilization and institutional delivery were limited in their geographical coverage and sample size and did not adequately address pressing factors that potentially influence the use of FP services. This study is part of the effort to support the Ethiopian government's efforts in attaining the health transformation agendas and contributing to preventing child and maternal deaths. Initially, the interventions started in 300 (in 2017) rural districts (woredas), and over time expanded to 400 rural woredas of the six regions, and the study setting was in these 400 rural woredas.

Study participants, sampling, and procedures

The study participants were women of reproductive age (ages 15 to 49). For FP service utilization, women who were not pregnant and did not have children under five at the time of data collection were eligible to

health services (22-28). For example, the studies conducted about the determinants of FP service utilization in Ethiopia focused on specific districts, the common demographic factors such as education, religion, and age. Factors considered were only from the perspective of reproductive age of women, and factors related to the service delivery system, such as quality of health service, were not assessed (22-26). Similarly, studies conducted in the past on factors determining institutional delivery were dominated by the association of demographic factors and little attention was given to factors at the health facilities level (27, 28). Hence, this study aimed to overcome the previous limitations of the studies by accounting for a wider geographical coverage with a larger sample size and by considering factors that potentially influence FP service utilization and health-facility delivery. These factors include the decision-making power of women in relation to their own health, husbands' involvement in use of FP services, and the perceived respectfulness of maternal health services from health care providers. In addition, availability of a family health card at the household level was considered as theoretically it is associated with the services utilization. In Ethiopia, family health card has been designed and implemented by the public health care system in collaboration with partners to provide information about MNCH services, including FP and birth preparedness, to women. It was designed even for women of reproductive age who cannot read and write (through pictorial messages) to get information about FP and birth preparedness with the help of health extension workers. Thus, the main aim of this study was to assess the determinants of FP service utilization and delivery at health facility in the six regions of Ethiopia by accounting for factors previously not adequately considered and assessed (stated above). The study was conducted in the rural woredas (districts) of the six regions.

Methods

Study design and setting

The study employed a cross-sectional study design in four agrarian regions of Ethiopia: Amhara; Oromia; Tigray; Southern Nations, Nationalities and Peoples (SNNP[®]); participate. For institutional delivery-related services, any woman with a child under 23 months of age was part of the study. To estimate the needed sample size (households/women), a two-sample proportions formula was used to allow the future comparison. To get the larger sample size of study participants, the assumption was made that 50% of women use any FP method. The desired difference to detect between the two surveys (this survey and the survey to be conducted in the future) was set at 7.5% (based on the target of the activity), the precision level considered was 95%, the power of the study considered was 80%, the design effect taken was 1.5 (because multi-stage sampling applied), and 10% of contingency was taken into consideration for any unwillingness to take part in the study. Thus, by considering the sample size needed based on the above formula and the available resources for data collection, 50% of the 400 intervention woredas were selected by a simple random sampling method from all regions except Tigray. From Amhara,

¹ *®During the time of data collection, Sidama and South-west region was part of SNNP and in this study, the term "SNNP" is used to refer three regions (Sidama, SNNP, South-west)".*

48 woredas; from Oromia, 88 woredas; from SNNP 50 woredas; and from Tigray, all the 23 intervention woredas were selected for the study. In every woreda, there are smaller administrative units called kebeles, and every kebele has been further divided into smaller administrative units called gottes. In Amhara, Oromia, SNNP regions, from each selected woreda, four kebeles were randomly selected. From each selected kebele, four households were randomly selected. To select households from each selected kebele, a sampling frame was made by listing all the gottes in that kebele. Then one gotte was selected by simple random sampling from the list. Being in the center of the selected gotte and by spinning a ball pen, the direction to which the head of the ball pen pointed was determined to be the reference point. From each kebele, five women who had no children under five, and five women with children under 23 months were considered for data collection. Only one woman per household was considered for the interview and data collection. In situations where more than one eligible woman existed in a single household, one woman was selected randomly. Since the intervention woredas in Tigray are relatively small, all intervention woredas (23) were part of the study; from each woreda, six kebeles were selected by simple random sampling, and the selection procedure for households was the same as the other regions.

Data collection

At the beginning of the intervention (2017), the team developed a standardized and structured questionnaire, adapting some of the questions from previous studies to collect data from households for the purpose of routine and random follow up visits. This study used data collected during the random follow-up visits from October to December 2019. During visits to households for data collection, data collectors apart from forwarding the questions to the responders, made specific observations about the availability of health-service-related materials in households—for example, the presence of family health card. The observation guide/checklist was included in the data collection tool. Data were collected by the cluster office staff—health officers and nurses—who hold a minimum of first degree in health sciences. In all regions, data collectors attended a two-day training on data collection instruments and sampling procedures. The collected data were electronically transferred from the tablets to the database prepared for this study on the web-based district health information system (DHIS2) (version 2) and stored at the country office in Addis Ababa. To ensure data quality, training was provided to the data collectors on the data collection tools used; close supervision during the data collection was done; and before analysis, data cleaning was done whereby

outliers were identified and checked with the source data.

Statistical analysis

The stored data from the web based DHIS2 were downloaded and exported to SPSS version 22.0 for the descriptive and analytical analyses. Binary logistic regression analysis was run to assess factors predicting the use of any modern FP method and institutional delivery. Bivariate logistic analysis was run for the estimation of crude odds ratios and the multivariable logistic regression analysis was run to estimate the adjusted odds ratios while controlling the confounding effects of the variables in each model.

Ethical considerations

Data collectors were trained on the required ethical issues. During data collection, each data collector explained to each study participant the objectives of the study, the voluntary nature of participation in the study, that study participants had the right to withdraw from the study at any time, and that they had the right not to answer any question they did not want to answer. In addition, data collectors explained to each study participant that the collected data would be used only for the aim of the study and that the identity of study participants would be kept confidential. Data collectors obtained verbal consent of each study participant before commencing data collection. For study participants less than 18 years, verbal consent was obtained from the parents. This survey, conducted during random follow-up visits, was part of the program interventions. The data collection was approved by USAID Transform: Primary Health Care Activity.

Results

Characteristics of study participants

The descriptive analysis showed that from the 3,778 women of reproductive age who were eligible to participate in the study of FP services, 62.7% were using an FP method at the time of data collection. Of the total 3,778 women of reproductive age who were eligible to participate in the study of FP services, 23.2% (876) of them were from Amhara, 39.7% (1500) of them were from Oromia, 21.2% (801) of them were from SNNP and 15.9% (601) of them were from Tigray. From 4,160 women of reproductive age women who were part of the study of determinants of health facility delivery, 73.8% gave birth to their last child at a health facility. Of the total 4,160 women who took part in the assessment of health facility delivery, 22.8% (948) of them were from Amhara, 40.1% (1668) of them were from Oromia, 20.4% (849) of them were from SNNP, and 16.7% (695) of them were from Tigray. Table 1 groups women by age, FP method use, and health facility delivery status at the time of data collection.

Table 1. Characteristics of women of reproductive age who were using any FP method and who delivered last child at a health facility in Amhara, Oromia, Tigray and Southern Nations, Nationalities and Peoples regions

Age Group	Current use of any FP method			Health facility delivery		
	Yes n (%)	No n (%)	Total n (%)	Yes n (%)	No n (%)	Total n (%)
15-19	70 (52.2)	64 (47.8)	134 (100.0)	106 (73.6)	38 (26.4)	144 (100.0)
20-24	576 (70.0)	247 (30.0)	823 (100.0)	682 (77.1)	203 (22.9)	885 (100.0)
25-29	806 (68.7)	368 (31.3)	1174 (100.0)	1004 (78.3)	279 (21.7)	1283 (100.0)
30-34	470 (67.7%)	224 (32.3)	694 (100.0)	598 (76.7)	182 (23.3)	780 (100.0)
35-39	330 (54.5)	275 (45.5)	605 (100.0)	482 (72.8)	180 (27.2)	662 (100.0)
40-44	89 (44.3)	112 (55.7)	201 (100.0)	126 (57.3)	94 (42.7)	220 (100.0)
45-49	29 (19.7)	118 (80.3)	147 (100.0)	73 (39.2)	113 (60.8)	186 (100.0)
Total	2370 (62.7)	1408 (37.3)	3778 (100.0)	3071(73.8)	1089(26.2)	4160 (100.0)

Determinants of family planning service utilization

The study assessed the association of different factors with use of any modern FP method both in bivariate and multivariable logistic regression models. Status of woman's decision making power about her own health (Adjusted Odds Ratio (AOR) = 1.95, 95% CI: 1.38 – 2.76), husband's support of FP service use (AOR = 4.19, 95% CI: 3.33 – 5.25), delivery of the last child at a health facility (AOR = 1.88, 95%CI: 1.56 – 2.27), and availability of family health card as a source of

information for FP at household level (AOR: 1.28, 95%CI: 1.09 –1.51) were statistically significantly associated with use of any modern FP method. Visit of household by a health extension worker (HEW) in the last three months at the time of data collection (AOR = 1.02, 95%CI = 0.86 –1.21) and household's enrollment status in community-based health insurance (CBHI) (AOR= 0.94, 95%CI= 0.78 - 1.12) were not statistically significantly associated with use of modern FP services (Table 2).

Table 2. Predictors of use of any modern FP method among women of reproductive age (15 to 49) in Amhara, Oromia, Tigray and Southern Nations, Nationalities and Peoples regions

Variable	Category	% FP users	Bivariate	Logistic	Multivariable	Logistic
			Regression Model	Regression Model	Regression Model	Regression Model
			COR	95% CI	AOR	95%CI
Age	15-19 (n=134)	52.2	0.47*	(0.32, 0.68)	0.58*	(0.38, 0.90)
	20-24 (n=823)	70.0	0.50*	(0.35, 0.72)	0.61*	(0.40, 0.94)
	25-29 (n=1174)	68.7	0.52*	(0.36, 0.76)	0.63*	(0.41, 0.98)
	30-34 (n=694)	67.7	0.91	(0.63, 1.33)	0.99	(0.64, 1.55)
	35-39 (n=605)	54.5	1.38	(0.89, 2.13)	1.31	(0.78, 2.19)
	40-44 (n=201)	44.3	4.45*	(2.62, 7.55)	4.11*	(2.21, 7.63)
	45-49 (n=147)	19.7	1.00		1.00	
HEW visit of household in the last three months	No (n=1313)	59.8	1.00		1.00	
	Yes (n= 2455)	64.4	1.22*	(1.06, 1.39)	1.02	(0.86, 1.21)
Household enrollment status in CBHI	No (n = 1442)	63.2	1.00		1.00	
	Yes (n = 1834)	63.2	0.998	(0.87, 1.82)	0.94	(0.78, 1.12)
Status of woman's decision-making power about own health care	No (n = 273)	30.8	1.00		1.00	
	Yes (n =3508)	65.2	4.21*	(3.2, 5.49)	1.95*	(1.38, 2.76)
Husband's support of FP use	No (n = 607)	25.7	1.00		1.00	
	Yes (n = 3160)	69.8	6.70*	(5.50, 8.16)	4.19*	(3.33, 5.25)
Delivery of last child at a health facility	No (n = 937)	42.9	1.00		1.00	
	Yes (2840)	69.2	2.99*	(2.57, 3.49)	1.88*	(1.56, 2.27)
Availability of family health card at household	No (n=2281)	58.6	1.00		1.00	
	Yes (n= 1490)	69.1	1.58*	(1.38, 1.82)	1.28*	(1.09, 1.51)

*Statistically significant

Determinants of health facility delivery

Determinants of delivery of last child at a health facility were assessed in the bivariate and multivariable logistic regression models. Visit to a health facility prior to the child birth for any family member's health problem (AOR = 2.30, 95% CI = 1.70 – 3.12), household enrollment status in CBHI (AOR = 1.38, 95%CI: 1.05 -1.81), status of woman's decision making power about own health (AOR: 3.71, 95%CI: 2.38 –5.78), and availability of family health card

during pregnancy for information that could enable birth preparedness (AOR = 1.38, 95%CI = 1.05 -1.82) were statistically significantly associated with health facility delivery. In addition, antenatal care (ANC) visits during the last pregnancy (AOR = 3.61, 95%CI: 2.12 – 6.16) and perception of receiving compassionate, respectful, and friendly care during visit to a health facility for any maternal health care prior to delivery (AOR = 9.08, 95%CI: 6.93 – 11.89) were associated with health facility delivery. Visit to

household by a HEW within three months prior to the child delivery (AOR = 1.24, 95%CI = 0.94 – 1.64) was not significantly associated with health facility delivery (see table 3 for the detail).

Table 3. Predictors of health facility delivery of last child among women of reproductive age in Amhara, Oromia, Tigray and Southern Nations, Nationalities and Peoples regions

Variable	Category	% of HF delivery	Bivariate Logistic Regression Model		Multivariable Logistic Regression Model	
			COR	95% CI	AOR	95% CI
Age	15-19 (n=144)	73.6	0.83	(0.56, 1.24)	1.48	(0.71, 3.08)
	20-24 (n=885)	77.1	0.78	(0.52, 1.15)	1.84	(0.89, 3.78)
	25-29 (n=1283)	78.3	0.85	(0.57, 1.27)	2.18	(1.03, 4.59)
	30-34 (n=780)	76.7	1.04	(0.69, 1.57)	2.16	(1.00, 4.70)
	35-39 (n=662)	72.8	2.08*	(1.32, 3.29)	1.19	(0.38, 3.78)
	40-44 (n=220)	57.3	4.32*	(2.69, 6.93)	2.90	(0.49, 17.21)
	45-49 (n=186)	39.2	1.00		1.00	
Visited health facility prior to delivery for family member's health issue	No (n=983)	58.5	1.00		1.00	
	Yes (n=3181)	78.7	2.62*	(2.25, 3.06)	2.30*	(1.70, 3.12)
Enrollment status in CBHI	No (n=1583)	72.0	1.00		1.00	
	Yes (n=2024)	78.5	1.42*	(1.22, 1.65)	1.38*	(1.05, 1.81)
Status of woman's decision-making power about own health care	No (n=305)	38.7	1.00		1.00	
	Yes (n=3870)	76.7	5.21*	(4.09, 6.63)	3.71*	(2.38, 5.78)
Availability of family health card at household (during pregnancy)	No (n=2531)	68.5	1.00		1.00	
	Yes (n=1631)	82.3	2.14*	(1.84, 2.50)	1.38*	(1.05, 1.82)
HEW visit of household in the last three months (prior to delivery)	No (n=1454)	65.7	1.00		1.00	
	Yes (n=2705)	78.3	1.88*	(1.64, 2.17)	1.24	(0.94, 1.64)
ANC visit status for the last pregnancy	No (n=425)	20.0	1.00		1.00	
	Yes (n=3751)	80.0	15.98*	(12.44, 20.53)	3.61*	(2.12, 6.16)
Perception of receipt of respectful care	No (n=500)	44.4	1.00		1.00	
	Yes (n=1947)	89.7	10.89*	(8.65, 13.68)	9.08*	(6.93, 11.89)

*Statistically significant

Discussion

This study aimed to assess the determinants of the FP service utilization and health facility delivery in the six regions of Ethiopia. In the multivariate logistic regression model, most of the factors taken into consideration in this study were statistically significantly associated with FP service utilization and health facility delivery. Overall, at the time of data collection, 62.7% of reproductive age women were using one of the modern FP methods, and 73.8% of women with a child under 23 months of age gave birth to their last child at health facility. These results were higher than the national contraceptive prevalence rate (41%) and health facility delivery rate (48%) reported by the mini-DHS conducted in 2019 (21). There are some possible explanations for these differences. In the mini-DHS, all the regions in the country, both urban and rural, agrarian and pastoralist woredas were represented. Whereas this study considered only the rural and agrarian woredas from six of the regions, and the pastoralist and urban areas were not included. Based on the mini-DHS, in regions dominated by the pastoralist woredas, the rates of any modern contraceptive method use among women of reproductive age and health facility delivery are relatively lower. For example, in Afar region, the proportion of women who use any modern FP method is 12.7% and the health facility delivery rate is 28.3%;

and in Somali region, rate of any modern FP method is 3.4% and the rate of health facility delivery is 23.3% among women of reproductive age (21). Hence, these lower rates of FP and health facility delivery in these pastoralists dominated regions might have contributed for the differences observed between the findings of mini-DHS and this study.

The other possible reason for the difference could be since this study was based in the intervention areas of the USAID Transform: Primary Health Care, which has been implementing multifaceted interventions to increase access and use of health services, including FP and facility-based delivery, in rural communities since 2017. The FP service-related interventions mainly include provision of capacity enhancement trainings to health workers and health extension workers on long and short acting contraceptives, and post-partum family planning (PPFP); and provision of support on the distribution of FP services related supplies, job aides, and kits to health facilities. The delivery related interventions include provision of trainings on the basic emergency obstetric and newborn care (BEmONC) and the comprehensive emergency obstetric and newborn care (CEmONC) to health workers; and provision of trainings to health workers on the use of uterine balloon tamponade (UBT), respectful maternity care (RMC), and use of V-scan ultrasound; and provision of

technical and necessary material support to health facilities in strengthening the maternity waiting rooms. Previous studies conducted in Ethiopia show that expansion of primary health care facilities has helped narrow inequalities in health service utilization. Specifically, increasing access to FP and reproductive health (FP/RH) and maternal, neonatal and child health (MNCH) services among rural populations has been shown to improve service use and decrease the rural-urban gap (29). The contribution of the health extension program introduced into the primary health care system in 2003 to provide health services at the community level cannot be overlooked; it has played a crucial role in increasing health-seeking behavior and use of MNCH services (30, 31). In Ethiopia, apart from expansion of the primary health care, to realize universal health coverage, the government has made FP/RH and key MNCH related services available free of charge (32). This also could contribute to the increased health service utilization in this study.

The specific findings of this study showed that in the multivariable logistic regression model, a woman's decision-making power about her own health care, and her husband's support of FP service use, were significantly associated with the use of any modern FP method. Previous studies conducted in Northwest and Central Ethiopia reported a positive association of women's decision-making power (22) and husband's support of wife using FP services (23, 24) with FP service utilization. In addition, this study showed that delivery of last child at a health facility was statistically significantly associated with use of any modern FP method. One reason could be when a woman gives birth at a health facility, she might get information about FP and might have an opportunity to use an immediate postpartum FP method. A study conducted in Senegal corroborates this argument and finding (33).

Availability of a family health card at the household level was associated with the use of modern FP methods in this study, which implies the availability of a family health card at the households was associated with the information women acquire about FP. Previous studies conducted in Ethiopia (though not about family health card) reported that women who have information about FP are more likely to use available FP services (25, 26). HEWs visits to households were not associated with FP use. This might be due to the quality of the messages HEWs provided to women during the visits and signals the need for tailored and targeted interventions by HEWs. Enrollment in CBHI was not significantly associated with the use of modern FP method, and the FP methods at public health facilities are free of charge. However, this study initially considered CBHI for assessment, as it could create an opportunity for women who previously never used the service to get information about the modern FP methods and the services.

Regarding the determinants of health-facility delivery, in the multivariable logistic regression model, a visit to health facility for any family member's health problem prior to delivery, and household enrollment status in CBHI, were positively associated with health-facility

delivery. This could be due to the opportunity created by going to health facility to obtain information from health providers about MNCH services, including ANC services. This in turn could potentially influence health-facility delivery. Furthermore, this study showed that women who had an ANC visit for the last pregnancy were more likely to give birth at a health facility than those did not. Studies conducted in the Northern (27) and Western (28) parts of Ethiopia and a systematic review (34) focused on Ethiopia reported similar findings. Furthermore, availability of the family health card (during pregnancy) in the household was associated with health-facility delivery. This could be due to the availability of birth preparedness messages for pregnant women on the family health card. ANC services, along with availability of a family health card in the household, may enable birth preparedness among pregnant women. A study conducted in a semi-urban setting in Ethiopia reported that birth preparedness has a positive association with health facility delivery (35); however, as our study was based in rural settings and did not directly assess birth preparedness, caution should be exercised in interpreting and comparing with studies conducted in different settings.

Another finding of this study was that the women who had decision-making power about their own health care were more likely to have had their last child at a health facility. Similar findings have been reported by a study in Western Ethiopia (28). Women who perceived that they received compassionate, respectful, and friendly care during a visit to a health facility for any maternal health care (prior to delivery) were more likely to give birth at health facilities than those who perceived otherwise. A cross-sectional study carried out in five countries of Eastern and Southern Africa corroborate with our finding (36).

This study has some limitations that need to be taken into consideration during the interpretation of the findings. The determinants of use of modern FP methods and factors predicting institutional delivery were investigated based on the cross-sectional study design, which did not enable interpretation of the findings beyond association. In this study, recall bias for some factors such as HEWs visits to households and availability of the family health card at household during pregnancy cannot be ruled out; and the fact that the data collectors were also involved in the interventions, might have influenced the findings. In addition, this study considered only the agrarian and rural woredas of the six regions, and the pastoralist and urban woredas were not represented in this study. However, the study was conducted in geographically wide area, and the sample size of the study was large. In addition, the study considered factors that were not adequately assessed in the previous studies, such as compassionate, respectful, and friendly care; women's decision-making power; husband's involvement in and support of FP; the role of the family health card in providing information; and CBHI enrollment status, among others. Despite the limitations, this study adds new information to the existing literature regarding the determinants of current use of FP and health-facility delivery in Ethiopia.

Conclusions

The general implication of the findings of this study is that holistic interventions are necessary at the household and health-facility levels to increase the use of FP services and institutional delivery. At the household level, provision of targeted and tailored information (through the family health card) to women of reproductive age should be enhanced. To improve the health-related decision-making power of women, interventions addressing cultural barriers should be given priority. Involvement of husbands in their wives' use of FP services should be encouraged and strengthened. The roles and duties of HEWs during their visits to households should be revised and redesigned to increase women's health service utilization. At the health facility level, apart from ensuring the availability of all needed services, improving the quality of health services, including companionate, respectful, and friendly care should be prioritized to increase health service utilization for FP, ANC, delivery, and other maternal health services.

Competing interests

The authors declare that they have no competing interests.

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