

## ASSESSMENT OF INSTITUTIONAL DELIVERY AND ITS ASSOCIATED FACTORS AMONG CHILDBEARING WOMEN IN NORTH MECHA WOREDA, AMHARA REGION, ETHIOPIA

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Received: 18 May 2022, Revised and Accepted: 10 June 2022

### ABSTRACT

**Objective:** This study aimed to assess institutional delivery and its associated factors among childbearing women in North Mecha woreda, Amhara region, Ethiopia.

**Methods:** A cross-sectional descriptive study was conducted among 422 childbearing women from October 2019 to June 2020. Multistage sampling was used to cluster and select study subjects in urban and rural areas. The study participants were selected using systematic sampling from a listing of women who had been born within the study area. Both bivariate and multivariable logistic regressions were employed. AOR with a 95% confidence interval (CI) and  $p < 0.05$  was used to determine significant factors.

**Results:** The prevalence of institutional delivery was 36.8%. Duration of labor within 12 h (AOR=5.950, CI: 2.852–12.415), within 12 and above hours (AOR=6.653, CI: 1.948–22.717), outcome of last baby (AOR=10.178, CI: 1.871–55.364), residence (AOR=6.275, CI: 1.717–22.936), husband's occupation (AOR=0.109, CI: 0.014–0.840), husband education (AOR=4.865, CI: 1.225–19.321) health facility near to residence (AOR=4.851, CI=2.782–8.459), and time taking to reach health facilities (AOR=14.363, CI: 5.761–35.806) were significantly associated with institutional delivery.

**Conclusion:** The study findings revealed that interventions are needed to enhance the rate of institutional delivery in the study area. Factors associated with safe delivery service utilization are interrelated to each other and related to the mother and health system.

**Keywords:** Antenatal care, Childbearing, Determinate, Institutional delivery, Mecha

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### INTRODUCTION

Worldwide, the key direct causes of maternal mortality are hemorrhage, sepsis, unsafe abortion, pregnancy-induced hypertension, and obstructed labor [1]. Maternal mortality remains a serious challenge to health-care systems worldwide. Hence, improving maternal health has been on the worldwide health agenda for several years [2]. Wide disparities are found among regions within the level of health facility, delivery, ranging from nearly universal in western to about 50% in South Asia and SSA [3].

Maternal mortality reduction remains a priority, and the WHO issued strategies on the termination of preventable maternal deaths under the sustainable development goal (SDG). It is well-known that all major causes of maternal death can be treated with effective and timely clinical interventions. However, achieving the SDG requires continual venture in maternal health research programs and policies at the worldwide level and very attentive action in countries. The government cannot achieve reduction in maternal death rate unless it works on issues such as maternal delays in seeking care [4,5].

According to the UNICEF report, around 50 million births within the developing world, or about 4 in 10 of all births worldwide, are not attended by skilled health personnel [6]. Approximately 1 / 2 of the mothers-in-law and middle-income countries have access to skilled care [7], and yet in these countries, more than half of the women deliver at home; this is often especially common among those of lower socioeconomic status and people who live in rural areas [8].

Institutional delivery services are a crucial component of efforts to scale back health risks to mothers and their children, as they assist to increase the proportion of babies that are delivered in health facilities.

This is often an effective intervention for reducing the risk of maternal morbidity and mortality, especially in places where the general health status of women is low [9].

Ethiopia is one among the countries in sub-Saharan Africa with a markedly high maternal mortality ratio that stands at 676 / 100,000 live births. Most of those deaths occur at home, where skilled birth attendants are lacking. Pregnant mothers get no support at all when delivering at home or may get little (if any) support from neighbors, relatives, or traditional birth attendants [10].

The Ethiopian demographic and health survey reported maternal mortality of 676 and 412 deaths/100,000 in 2011 and 2016, respectively [11,12]. The Safe Motherhood Initiative strongly emphasizes ensuring the availability and accessibility of skilled care during pregnancy and childbirth [12]. Delivering a health facility helps to avoid maternal deaths occurring from preventable obstetric complications. However, as the Ethiopia Demographic and Health Survey demonstrates, the utilization of existing maternal health services is low in Ethiopia, particularly within the Amhara region [12]. According to the 2019 Ethiopia Mini Demographic and Health Survey report, only 48% of women gave birth in health institutions [13].

Unsafe delivery care is one of the most important predictors of maternal and neonatal mortality rates. High levels of unskilled birth attendant presence and low institutional delivery rates cause high-risk birth outcomes and are emerging as a big problem in Ethiopia. Conducting research across Ethiopia can bring new findings and help government and non-government organizations alleviate this problem. Therefore, this study aimed to identify factors associated with institutional delivery among childbearing women in North Mecha woreda.

### General objectives of the study

The general objective of the study was to assess institutional delivery and its associated factors among childbearing women in North Mecha woreda, Amhara region, Ethiopia.

### The specific objectives of this study

The specific objectives of this study were as follows:

- To assess the prevalence of institutional delivery among childbearing women in the study area.
- To identify the associated factors associated among childbearing women in North Mecha woreda, Amhara region, Ethiopia.

## METHODS

### Study area, design, and period

The study was conducted in North Mecha woreda, Amhara region, Ethiopia, which is 34.2 km away from Bahir Dar (the capital city of the Amhara region). In North Mecha woreda, there are 33 rural and three urban kebeles present. A cross-sectional descriptive study was conducted among 422 childbearing women from October 2019 to June 2020.

### Source and study population

The target population was all women who had given birth in the past 12 months in North Mecha woreda. Women who did not give birth in the study area in the past 12 months, as well as women who were mentally or physically sick, were excluded from this study.

### Sampling size and techniques

The sample size was determined using a single population proportion formula and the prevalence of institutional delivery of 48.3% taken from the study was conducted in the world [14]. The estimated total sample size was 422. Multistage cluster sampling was used to select study subjects, and probability proportionate allocation was used to determine a sample of selected kebeles. The districts were divided into urban and rural kebeles using a multistage stratified sampling technique. There were three urban and 33 rural kebeles. One urban and four rural kebeles were selected using simple random sampling. Finally, systematic sampling was used.

### Procedure of data collection

Structured questionnaires were planned in English and translated into Amharic, the local language. The tool was pretested on 5% of the actual sample out of the study area before data collection began. Five data collectors were involved and all of them have a university degree both in population studies, sociology, gender, and development studies. One day intensive training was provided for the data collectors on the aims of the study and data collection procedures. In this community-based study, 402 women who delivered in health institutions in the past 12 months returned their questionnaire out of the 422 questionnaires that were distributed, with a response rate of 95.3%.

### Data processing and analysis

The collected data were checked for completeness by a supervisor every day. The data were checked manually before being entered into the statistical software. The data were entered, coded, cleaned, and analyzed using SPSS version 22. Descriptive statistics and crosstabs were computed. Both bivariate and multivariate logistic regression analyses were carried out to identify factors associated with institutional delivery service utilization. Factors found to be significant at ( $p < 0.25$ ) using bivariate logistic regression were entered into a multivariate logistic regression, with significance in this analysis set at  $p < 0.05$ .

## RESULTS

### Background characteristics of the study population

In this study, out of 422 total sample women, 402 women delivered in health institutions with a response rate (95.3%). The prevalence of institutional delivery was 36.8%. With respect to educational status, 81.8% of women and 76.1% of women's husbands do not attend formal education (Fig. 1).

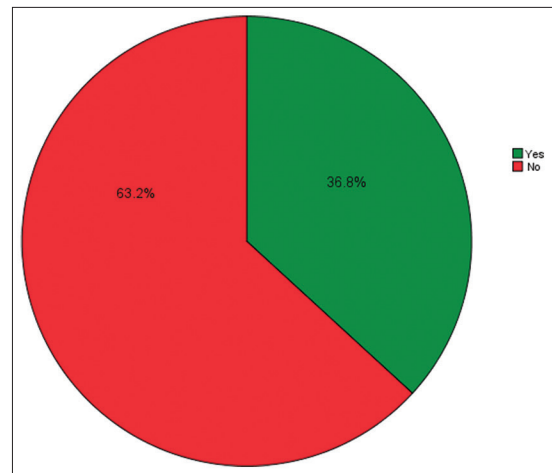


Fig. 1: Give birth to the last child at a health institution

The majority of the respondents were 78.4% housewives and 98% were married women. In terms of where they live, 83.8% said that they live in rural areas. About 63.2% of the study participants did not deliver their last child at a health-care facility, as well as 21.6% were unaware of the risks of giving birth at home. The main reasons for not giving birth at a health institution were distance to health facilities, personal preference, shorter duration of labor, lack of knowledge, and lack of skilled health providers (Table 1).

### Accessibility of services

The majority of respondents (53.5%) did not live near the health facility. Concerning time, 45.8% of respondents took  $< 1$  h to reach a health facility and (54.2%)  $> 1$  h. Regarding the role of health extension workers for women and children, 58% of the study participants were informed that they do not have any role. About 40.3% of participants reported that they did not get transportation services easily to go to health facilities. Of the total, study participant (48.8%) did not prefer the sex of the health service provider during child delivery in health institutions, but 47.3% of the respondents prefer female sex providers (Table 2).

### Obstetrics characteristics

The majority of respondents (74.6%) received antenatal care, and almost half (43.7%) attended ANC care four or more times. Almost all (92%) participants obtained information during ANC on where to give birth. Among the total of respondents, 75.9% did not face health problems during childbirth. Regarding the duration of labor, 55.5% of the respondents gave birth within 12 h, 36% gave birth in  $< 1$  h, and 8.5% within and above 24 h. Concerning the outcome of the last baby, during delivery, 90.8% were normal outcomes in their last birth (90.8%) and 9.2% were not (Table 3).

### Bivariate analysis of factors associated with institutional delivery of service utilization

Based on bivariate logistic regression analysis, a number of factors were significantly associated with institutional delivery: Residence ( $p = 0.000$ ), religion ( $p = 0.000$ ); household income ( $p = 0.003$ ), husband's occupation ( $p = 0.000$ ), husband's education ( $p = 0.000$ ), access to transport services ( $p = 0.000$ ), health facility near to residence ( $p = 0.000$ ), time to reach health facility ( $p = 0.000$ ), information got where to deliver during attending pregnancy ( $p = 0.004$ ), number of attending pregnancy ( $p = 0.000$ ), outcome of last baby ( $p = 0.000$ ), duration of labor ( $p = 0.004$ ), birth order ( $p = 0.003$ ), and road comfortable to go health facility ( $p = 0.000$ ). These factors were entered into a multivariate logistic regression analysis (Table 4).

In the bivariate logistic regression analysis, duration of labor; the outcomes of last birth, residence, husband's occupation, husband's education, health facilities near to the residence, and hours that are

Table 1: Socioeconomic and demographic characteristics

Variable	Frequency, n=402 (%)
Age (years)	
<20	25 (6.2)
20-34	274 (68.2)
35-49	103 (25.6)
Religion	
Orthodox	349 (86.8)
Muslim	20 (5.0)
Protestant	33 (8.2)
Women education level	
No formal education	329 (81.8)
Primary school	37 (9.2)
Secondary or above	36 (9.0)
Women occupation	
Housewife	315 (78.4)
Government worker	16 (4.0)
Private employee	57 (14.2)
Merchant	14 (3.5)
Marital status	
Married	394 (98.0)
Divorced	8 (2.0)
Husbands educational level	
No formal education	306 (76.1)
Primary school	48 (11.9)
Secondary or above	48 (11.9)
Husband occupational level	
Government worker	22 (5.5)
Private employee	66 (16.4)
Farmer	69 (66.9)
Merchant	45 (11.2)
Household income	
100-1300 Ethiopian Birr	235 (58.5)
>1300 Ethiopian Birr	167 (41.5)
Place of residence	
Rural	337 (83.8)
Urban	65 (16.2)
Gave birth to last child at health institution	
Yes	148 (36.8)
No	254 (63.2)
The reasons for not giving birth in institution	
Distance to the health facility	140 (55.1)
Personal preference	12 (4.7)
Short duration of labor	17 (6.7)
Lack of knowledge and	34 (13.4)
Lack of skilled health providers	51 (20.1)
Are there risks to giving birth at home?	
Yes	315 (78.4)
No	87 (21.6)
Risks of childbirth at home	
Maternal death	257 (63.9)
Child death	292 (72.6)
Hemorrhage	207 (51.5)
Who decided the place of delivery?	
Myself	336 (66.3)
My husband	149 (29.4)
My relatives	22 (4.3)
Who assisted your last childbirth?	
Health extension workers	2 (0.5)
Health professionals (doctors)	147 (36.6)
Traditional birth attendants	58 (14.4)
Relatives/neighbors	195 (48.5)

taken to reach the health facility were all found to be independent significant predictors of institutional delivery.

Women whose labor took between 1 and 12 h were 5.95 times more likely to deliver at health institutions than those who had short (<1 h) labor and women whose labor lasted more than 12 h were 6.653 times more likely to deliver at health institutions. Women who lived in an urban area were 6.275 times more likely to deliver at a health

Table 2: Respondent's accessibility to services

Variables	Frequency, n=402 (%)
Is there a health facility near to your residence?	
Yes	187 (46.5)
No	215 (53.5)
Type of health facility available near to residence?	
Hospital	65 (34.2)
Health center	125 (65.8)
Home hours take to reach a health facility?	
<1 h	184 (45.8)
>1 h	218 (54.2)
Do you have role health extension workers during women childbearing?	
Yes	169 (42.0)
No	233 (58.0)
Sex preference of delivery attendants	
Male	16 (4.0)
Female	190 (47.3)
I do not mind	196 (48.8)
Is there the road comfortable to go health facility?	
Yes	176 (43.8)
No	226 (56.2)
Do you obtain a transportation service easily to go health facility?	
Yes	240 (59.7)
No	162 (40.3)
Means of transportation	
On foot	147 (36.6)
Motorcycle/scooter	247 (61.4)
By ambulance	8 (2.0)
Behaviors of health provider	
Good	239 (59.5)
Bad	67 (16.7)
I do not know	96 (23.9)

Table 3: Obstetric characteristics

Variable	Frequency, n=402 (%)
Antenatal care attendance during pregnancy	
Yes	300 (74.6)
No	102 (25.4)
Information given on where to deliver during pregnancy	
Yes	276 (92.0)
No	24 (8.0)
Number of visits to antenatal care	
One	20 (6.7)
Two	70 (23.0)
Three	79 (26.3)
Four or more	131 (43.7)
Health problems during childbirth	
Yes	97 (24.1)
No	305 (75.9)
Health facility taken to at the time of problem	
Hospital	50 (51.0)
Health center	46 (47.0)
Clinic	2 (2.0)
Birth order of last child	
First birth	52 (12.9)
Second birth	88 (21.9)
Third birth	73 (18.2)
Fourth birth	81 (20.1)
More than fourth birth	108 (26.9)
Duration of labor (hours)	
<1	145 (36.0)
Within 12	223 (55.5)
>12	34 (8.5)
Outcome of last birth	
Normal	365 (90.8)
Not normal	37 (9.2)

Table 4: Bivariate analysis of factors associated with institutional delivery service utilization

Variables	Institutional delivery		$\chi^2$	df	p value
	Yes	No			
Residence					
Rural	90	247			
Urban	58	7	88.906	1	0.000
Religion					
Orthodox	112	237			
Muslim	17	3	29.424	2	0.000
Protestant	19	14			
Household income					
100–1300	72	163			
>1300	76	91	8.652	1	0.003
Husband's occupation					
Government worker	19	3			
Private employee	29	37	32.950	3	0.000
Farmer	79	190			
Merchant	21	190			
Husband's education					
No formal education	82	224			
Primary school	24	24	69.798	2	0.000
Secondary or above	42	6			
Access to transport services					
Yes	114	126	28.096	1	0.000
No	34	128			
Health facility near residence					
Yes	119	68	105.978	1	0.000
No	29	186			
Hours taken to reach health facility					
<1	119	65			
>1	299	189	111.002	1	0.000
Information received on where to deliver during antenatal care					
Yes	137	139			
No	4	20	8.358	1	0.004
Visits to antenatal care					
One	4	16			
Two	20	50	29.968	3	0.000
Three	34	45			
Four or more	83	48			
Outcome of last birth					
Normal	146	218			
Not normal	2	35	15.913	1	0.000
Duration of labor (hours)					
<1	38	107			
1–12	96	127	11.019	1	0.004
>12	14	20			
Birth order					
First birth	27	25			
Second birth	39	49			
Third birth	30	43	16.119	4	0.003
Fourth birth	26	55			
More than fourth birth	26	82			
Road comfortable to go to health facility					
Yes	104	72	65.084	1	0.000
No	44	182			

institution than those who lived in a rural area. Study participants who had a normal outcome at birth were 10.178 times more likely to deliver in health institutions than women who did not have a normal birth.

Women whose husbands were private employees were 10 times less likely to deliver at health institutions than those whose husbands were government workers (AOR=0.109). Women whose husbands attended secondary school and above were 4.865 times more likely to give birth at health institutions than those whose husbands did not attend.

Women who lived near a health facility were 4.851 times more likely to give birth at a health institution than women who did not live near to one. Similarly, women whose journey to a health facility took less (Table 5).

## DISCUSSION

This study examined the factors that influence institutional delivery utilization among women in North Mecha woreda, Amhara region, Ethiopia. Based on the study findings, only 36.8% of respondents gave birth to their most recent child in a medical facility, and the majority of participants received no skilled nursing care 63.2%. This study is consistent with the study that was conducted in Dembecha, 34% [15] and Dega Damot, 38.2% [16]. However, the findings of this study were higher than other studies in Ethiopia region, including in Munisa (12.3%), Egela (10.3%) [17], and rural Jimma Horror (8%) [18]. In multivariate logistic regression, duration of labor, the outcome of the last birth, residence, husband occupation, husband's education, health facility near to the residence, and time were taken

Table 5: Bivariate and multivariate logistic regression analysis of factors associated with institutional delivery

Variables	Institutional delivery		B	Odds ratio (OR)	
	Yes	No		COR (95%CI)	AOR (95%CI)
Residence					
Rural	90 (60.8%)	247 (97.2%)		1	1
Urban	58 (39.2%)	7 (2.8%)	3.124 (1.837)	22.740 (10.010–51.657) 0.000	6.275 (1.717–22.936) 0.002
Religion					
Orthodox	112 (75.7%)	237 (93.3%)		1	1
Muslim	17 (11.5%)	3 (1.2%)	1.055 (–0.679)	2.872 (1.389–5.935) 0.000	0.507 (0.206–1.252)
Protestants	19 (12.8%)	14 (5.5%)	–1.429 (–0.040)	0.239 (0.059–0.979) 0.001	0.961 (0.119–7.738)
HH income					
100–1300	72 (48.6%)	163 (64.2%)		1	1
>1300	76 (51.4%)	91 (35.8%)	–0.637 (–0.239)	0.529 (0.350–0.798) 0.003	0.788 (0.427–1.452)
Husband occupation					
Gov.t worker	19 (12.8%)	3 (1.2%)		1	1
Private employee	29 (19.6%)	37 (14.6%)	2.089 (–2.217)	8.080 (2.178–29.980) 0.000	0.109 (0.014–0.840) 0.013
Farmer	79 (53.4%)	190 (74.8%)	2.723 (–0.703)	15.232 (4.383–52.932) 0.000	0.495 (0.076–3.208)
Merchant	21 (14.2%)	24 (9.4%)	1.979 (–1.300)	7.238 (1.874–27.953) 0.000	0.273 (0.035–2.127)
Husband education					
Not formal education	82 (55.4%)	224 (88.2%)		1	1
Primary school	24 (16.2%)	24 (9.4%)	2.951 (0.622)	19.122 (7.837–46.659) 0.000	1.862 (0.730–4.750)
Secondary and above	42 (28.4%)	6 (2.4%)	1.946 (1.582)	7.000 (2.510–19.521) 0.000	4.865 (1.225–19.321) 0.011
Get transport services easily					
Yes	114 (77.0%)	126 (49.6%)	1.529 (0.136)	4.613 (2.908–7.318) 0.000	1.145 (0.441–2.977)
No	34 (23.0%)	128 (50.4%)		1	1
HF near to your residency					
Yes	119 (80.4%)	68 (26.8%)	–2.418 (1.579)	0.089 (0.054–0.146) 0.000	4.851 (2.782–8.459) 0.004
No	29 (19.6%)	186 (73.2%)		1	1
Hours take to reach HF					
<1 h	119 (80.4%)	65 (25.6%)	2.479 (2.665)	11.932 (7.279–19.557) 0.000	14.363 (5.76135.806) 0.000
>1 h	299 (19.6%)	189 (74.4%)		1	1
Information where to deliver during attending pregnancy					
Yes	137 (97.2%)	139 (87.4%)	1.595 (0.973)	4.928 (1.642–14.792) 0.004	2.645 (0.709–9.862)
No	4 (2.8%)	20 (12.6%)		1	1
Number of attending					
One time	4 (2.8%)	16 (10.1%)		1	1
Two times	20 (14.2%)	50 (31.4%)	0.470 (–0.433)	1.600 (0.476–5.377)	0.649 (0.164–2.563)
Three times	34 (24.1%)	45 (28.3%)	1.106 (0.263)	3.022 (0.926–9.862)	1.301 (0.345–4.906)
Four and above	83 (58.9%)	48 (30.2%)	1.934 (0.629)	6.917 (2.186–21.885) 0.000	1.877 (0.501–7.030)
Outcome of the last baby					
Normal	146 (98.6%)	218 (86.2%)	2.461 (2.320)	11.720 (2.776–49.481) 0.000	10.178 (1.871–55.364) 0.000
Not normal	2 (1.4%)	35 (13.8%)		1	1
Duration labor					
<1 h	38 (25.7%)	107 (42.1%)		1	1
Within 12 h	96 (64.9%)	127 (50.0%)	0.755 (1.783)	2.128 (1.350–3.356) 0.004	5.950 (2.852–12.415) 0.000
Within and above 24 h	14 (9.5%)	20 (7.9%)	0.679 (1.895)	1.971 (0.906–4.286)	6.653 (1.948–22.717) 0.000
Birth order					
First birth	27 (18.2%)	25 (9.8%)		1	1
Second birth	39 (26.4%)	49 (19.3%)	–0.305 (0.134)	0.737 (0.371–1.466)	1.144 (0.418–3.125)
Third birth	30 (20.3%)	43 (16.9%)	–0.437 (–0.098)	0.646 (0.316–1.322)	0.906 (0.311–2.640)
Fourth birth	26 (17.6%)	55 (21.7%)	–0.826 (–0.617)	0.438 (0.214–0.896) 0.003	0.539 (0.186–1.567)
Above four	26 (17.6%)	82 (32.3%)	–1.226 (–0.316)	0.294 (0.146–0.591) 0.000	0.729 (0.265–2.009)
Road comfort to go health facility					
Yes	104 (70.3%)	72 (28.3%)	1.788 (–0.039)	5.975 (3.826–9.331) 0.000	0.961 (0.332–2.789)
No	44 (29.7%)	182 (71.7%)		1	1

to reach a health facility which were significantly associated with institutional delivery.

The study showed that the duration of labor was significantly associated with delivery at health institutions, with those who have longer labor being more likely to give birth in a health institution. This study is in line with the study that was conducted in the East Wollega zone, Oromia region state, West Ethiopia [19]. This might be because longer labor means mothers are more likely to want to deliver in health institutions. Due to the fact that short time, most of the time and short duration of labor women who deliver at home rather than a health institution because of the distance to a health facility.

Place of residence was found to be one of the most important predictors of institutional delivery. Those living in urban areas were more likely to deliver at a health institution than those who lived in rural areas, which has been seen in another study in Asaita, Ethiopia [20]. This may be related to other factors found in rural areas, including low levels of education and inaccessibility of services, because there are fewer health facilities in such areas and, therefore, are more likely to have a longer journey to reach and transport is lacking. In the present study, living near a health facility was also an important predictor for institutional delivery. Women who reported that they lived near a health facility were more likely to give birth there than those who lived further away. Women who could reach a health facility in under an hour were 14 times more likely to deliver at a health institution than those who had

a longer journey. This may be attributed to women who live closer to a health facility being less liable to high transport costs and inconvenient travel during labor. This is consistent with other studies done in Tigray and Dodota in Ethiopia [21,22].

Regarding the outcome of the last birth, women who have a normal outcome at birth were 10 times more likely to deliver at health institutions than women who do not have a normal birth. This may be because those with a normal birth attended ANC care during pregnancy and received advice on where to give birth.

Women whose husbands were government workers or who had received secondary education or higher were more likely to deliver at health institutions. This may be because women whose husbands were government employees have a better understanding of the advantages of giving birth at a health institution than those whose husbands were privately employed. Two studies in Mekelle [23,24] similarly found that a husband's education status affected utilization of health facilities at birth. This might be because higher education means having a greater understanding of the importance of institutional delivery and encourages discussion between a husband and wife about delivery at a health institution to avoid delivery complications.

#### Limitations of the study

This study was done for the first time in the woreda, so women were frustrated about giving the response. Most women did not know their age perfectly. There might be the possibility of recall bias. However, we have tried to minimize the problems by focusing on those women who gave birth in the past 1 year.

#### CONCLUSIONS AND RECOMMENDATION

This study found that institutional delivery service utilization in the North Mecha woreda, Amhara region, Ethiopia, was low (36.8%). There is a great disparity between those who live in urban and rural areas in the utilization of health facilities for childbirth. The majority of women (74.6%) followed at least one ANC visit with skilled health-care providers during their most recent pregnancy. However, the majority of women gave birth at home (63.2%). This was due to factors such as long travel time to reach a health facility in rural areas, shorter labor, and lack of knowledge on the advantages of giving birth in a health institution.

Most of the women and their husbands in the study area have not received any formal education, which play an important role in women not giving birth at health institutions. Education offices in the region should strengthen access to education by establishing schools within rural communities. Health extension workers also should assist pregnant women to give birth at a health institution, particularly for rural women. The health office should assign qualified, skilled trained health-care providers to each health facility, and health-care providers should promote the use of maternal health services and consistently counsel pregnant mothers to attend antenatal care appointments. The health office should also increase the coverage of rural health services to reduce travel times and distance for pregnant women living in these areas.

#### ETHICAL CONSIDERATIONS

Ethical clearance was approved by University of Gondar. Next, a permission letter written by the Department of Population Studies was provided to North Mecha District administrative office. Then, after communicating each selected study kebele, each respondent was informed about the study objective. Finally, the issue of confidentiality was clarified, and verbal consent was allowed to collect data from participants.

#### ACKNOWLEDGMENTS

The authors would like to thank the University of Gondar for providing permission for ethical clearance. The researchers would also like to thank the study participants and data collectors who participated.

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