

# Magnitude and Predictors of Institutional Delivery Among Mothers Who Gave Birth in the Last One Year in Nejo Rural District, West Wollega Zone, Western Ethiopia

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## To cite this article:

Robera Haile Getaneh, Dufera Rikitu Terefa. Magnitude and Predictors of Institutional Delivery Among Mothers Who Gave Birth in the Last One Year in Nejo Rural District, West Wollega Zone, Western Ethiopia. *Science Journal of Public Health*. Vol. 10, No. 1, 2022, pp. 33-42.

doi: 10.11648/j.sjph.20221001.15

**Received:** December 20, 2021; **Accepted:** January 21, 2022; **Published:** February 5, 2022

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**Abstract:** *Background:* Globally about six out of ten births take place in health institutions. However, in Sub-Saharan African countries institutional delivery is very low. Also, in Ethiopia majority of women gave birth at home even though significant numbers of women attended antenatal care follow-up, particularly in the rural area. *Objective:* This study aimed to assess the magnitude and identify predictors of institutional delivery among mothers who gave birth in the last one year in Nejo rural district of western Ethiopia from September 1 to 30, 2019. *Method:* A community-based cross-sectional study was employed among 508 mothers who gave birth in the last one year in Nejo rural district of western Ethiopia from September 1 to 30, 2019. The data was collected using a semi-structured pretested questionnaire through face-to-face interviewing of the participants. A multistage sampling technique was used to collect data. Data were entered into Epi-Data version 3.1 and exported to SPSS version 21 for analysis. Binary logistic regression analysis was performed to assess the association between independent and dependent variables. The association was measured by odds ratio with 95% confidence interval and P-value <0.05 was used as the cut-off point to declare significance in the final model. *Result:* The magnitude of institutional delivery among mothers who gave birth in the last one year was 207 (41.4%). Mothers who attended more than secondary school [AOR=12.0; 95% CI=4.5-26.20], husbands' occupation being government employee [AOR=6.9; 95% CI=2.2-21.5], merchants [AOR=7.6; CI=2.3-24.6] and engaged in private work [AOR=0.09; CI=0.02-0.47], ANC visits of three times & above [AOR=2.1, 95% CI=0.00-0.006], health education on maternal health [AOR=6.2, 95% 8.12-39.1] were the significant predictors of institutional delivery. *Conclusion:* The study found that institutional delivery service utilization at the study area was low, which was below the health sector transformation goal of the country which was planned to make home delivery free in which this indicator is the most important one in modeling kebeles, woredas, and finally to transform woredas. Maternal educational status, husbands' occupation, ANC visits, and health education on maternal health were the most important predictors of institutional delivery service utilization. Hence, health planners, decision-makers, and other stakeholders should give due attention to maternal health improvement strategies in accessing health institutions for the rural community to increase institutional delivery.

**Keywords:** Institutional Delivery, Magnitude, Predictors, Western Ethiopia

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## 1. Introduction

Globally, maternal mortality due to various reasons has been observed as a problem where the magnitude is highly significant especially in developing countries. It was reported

that nearly 289,000 women die per year as a result of preventable causes, yielding a maternal mortality rate (MMR) of 210 maternal deaths per 100,000 live births worldwide. Hemorrhage, infection, unsafe abortion, prolonged labor, and eclampsia are some of the factors

identified as major causes of maternal mortality [1]. These causes are more common in a situation where mothers delivered out of health institutions and turn will lead to a large proportion of maternal deaths which could be prevented if deliveries were supported by skilled personnel. This is supported by studies where maternal mortality could be reduced by 13-33% if there were skilled birth attendants at all deliveries [2].

According to WHO, skilled birth attendant refers to health professionals such as midwives, doctors or nurses, etc., who are trained and competent in the skills needed to manage normal childbirth and immediate postnatal care, who can identify complications and, as necessary, provide emergency management [3]. Institutional delivery means when a pregnant mother gives birth at a health institution assisted by these skilled birth attendants. Thus, proper medical attention and hygienic conditions during delivery can reduce the different risks of complications and infections that can cause the death or illness of the mother and the newborn baby [4].

Worldwide only six out of ten births take place in health institutions. Although proper care during pregnancy and delivery is vital for the health of the mother and baby, there are problems regarding coverage and utilization of institutional delivery services where the problem is critically high in developing countries where only 52% of pregnant women had four or more ANC visits during their pregnancy and skilled personnel attended 68% of deliveries [1]. The lowest level of institutional delivery (33.7%) occurs in eastern Africa as opposed to more than 99% in many developed regions [5]. In Ethiopia, majority (74%) of women give birth at home even though 62% of women attend ANC [6]. Also, according to the 2016 EDHS report, institutional delivery is low in Oromia (19%) following Somali (18%) and Afar, 15% [7].

The type of care a woman receives during birth impacted the health of the mother and her child. An effort to reduce health risks from mothers and children is increasing the proportion of deliveries at health facilities by a qualified health care provider is a critical requirement for safe maternity and their babies. Despite this, inadequate use of institutional delivery services has contributed to the number of maternal and neonatal deaths over the past few decades [8]. As a result, using health institutions for delivery by skilled birth attendants is the best process indicator to reduce maternal death and improve delivery outcome [9].

Even though institutional delivery has gained attention in Ethiopia, home delivery is still common in hard-to-reach areas where the distance from health facilities, inaccessibility, and lack of health facilities were some of the most hindering factors [7].

Studies showed a strong correlation between institutional delivery use, skilled birth attendance, and maternal mortality as risks for mothers and their newborns are highest at the time of labor and delivery [10]. So, increasing institutional delivery by skilled birth attendants has been the most important key factor in reducing

maternal and neonatal deaths and improving maternal and child health [11].

In Ethiopia, a low proportion of childbearing age women visited skilled providers during pregnancy and childbirth [12]. Almost three-fourths of maternal deaths could be avoided, if all women could access the interventions that can address complications of pregnancy and childbirth, basically emergency and obstetric care [13].

Despite, the international safe motherhood initiative has made maternal mortality an international priority by accessing basic maternity care during pregnancy and institutional delivery to all women, discrepancies exist in accessing institutional delivery between developed and developing world, urban and rural areas, and educated and uneducated communities [9].

Also, in our country Ethiopia, the government identified maternal and child survival as high priorities needing greater attention [14]. Although lots of efforts have been conducted in the country, the national proportion of institutional delivery by skilled health professionals is lower in the rural areas of the country [15-17]. Great efforts to promote giving birth at health facility was reflected in many national health programs including the most recent health sector transformation plan in which home delivery free is a key indicator in modeling kebles which in turn make model woreda to achieve the main goal of the reform.

Hence, it was known that promoting institutional delivery service is vital to reduce the devastating maternal mortality which is caused by not using institutional delivery services conducted by skilled health professionals. Studying institutional delivery and associated factors will help for evidence-based program planning and intervention.

However, to the level of the author's knowledge, there was no study conducted on magnitude and predictors of institutional delivery among mothers who gave birth in the last year, particularly in the study area. So, the study aimed to assess the magnitude and predictors of institutional delivery among mothers who gave birth in the last year in Nejo rural district, West Wollega Zone, Western Ethiopia.

## 2. Methods and Materials

### 2.1. Study Setting and Period

The study was carried out in Nejo Rural district, West wollega zone, Western Ethiopia from September 1 to 30, 2019. The district is located 500kms far from Addis Ababa, the capital city of Ethiopia. As projected from 2007 CSA, the total population of the district is 107,500 of which 52,675 are male and 54,825 are female. There are a total of 22,396 households in the district. The district has three public Health centers, thirty-five health posts, four private clinics, twenty-four governmental organizations, and two non-governmental organizations namely World Vision and Mothers and children multi-sectorial developmental organizations providing preventive, promotive, curative, and rehabilitative services for the community.

## 2.2. Study Design

A community-based cross-sectional study design was conducted among mothers who gave birth in the last year in Nejo Rural district, West wollega zone, Western Ethiopia.

## 2.3. Population and Eligibility Criteria

### 2.3.1. Source Population

All women who gave birth in the last year before the study in the district were the source population for this study.

### 2.3.2. Study Population

All women who gave birth in the last year before the study in the selected Keble's of the district were the study population for this study.

### 2.3.3. Eligibility Criteria

Women of the reproductive age group who gave birth in the last year regardless of the birth outcome were included in the study. Whereas, women who were critically sick and who gave birth in the last year in other districts but who came to the study area were excluded from the study.

## 2.4. Sample Size Determination and Sampling Techniques

### 2.4.1. Sample Size Determination

The sample size was determined by a single population proportion formula using the proportion of institutional delivery service utilization of 74%, obtained from a study conducted in Jimma town [18] by considering 95% degree of confidence level ( $Z_{\alpha/2}=1.96$ ), 4% margin of error (d), 10% non-response rate. Then, the final computed sample size was 508.

### 2.4.2. Sampling Techniques and Procedures

A multi-stage sampling technique was employed to select the study participants. The primary sampling unit was the District in which ten Kebeles were selected by simple random sampling from a total of 35 kebeles. The sample size was distributed to Kebeles by the population proportion to size (PPS) formula. The secondary sampling units were the Kebeles (the smallest administrative unit in Ethiopia) which were selected by a simple random sampling method. Women in the selected Kebeles were selected by using simple random sampling based on the sampling frame obtained from Master Family Index (MFI) folders of Community Health Information System (CHIS) registrations at health posts of each Kebeles. Home to home visit was carried out on randomly selected mothers and a revisit of three times was made in a case where eligible respondents were not available at the time of the data collection.

## 2.5. Study Variables

Institutional delivery among mothers who gave birth was the dependent variable, whereas socio-demographic factors (maternal age, women's marital status, ethnicity, religion, women's education, women's occupation, husband occupation, and husband education) and obstetric and health service-related factors (age at first pregnancy, parity, ANC

visit, frequency of ANC visit, abortion, health education on maternal health, advice on place of delivery at ANC visit, advice about complications during pregnancy at ANC visits) were the independent variables.

## 2.6. Operational Definitions

1. Institutional Delivery Service Utilization: Mothers who used health institutions (governmental hospitals, or health centers, and/or private hospitals or clinics) for delivery services in their last pregnancy in the last year by skilled birth attendants. Those who have utilized the services are classified as "Yes" and those who did not utilize as "No" [18, 19].
2. Home Delivery: When a mother gave birth at her home or others' home (neighbor, relatives, or family) or when a birth takes place outside of a health institution [20].
3. Skilled Birth Attendants: Health professionals with midwifery skills (midwives, doctors, nurses and etc. with additional midwifery education) who are trained to proficient in the skills necessary to manage normal deliveries and diagnose, manage or refer obstetric complications [21, 22].

## 2.7. Data Collection Instrument and Procedures

A semi-structured interviewer-administered pre-tested questionnaire by face-to-face interviewing of the respondents was employed from September 1 to 30, 2019. The questionnaire was adapted and modified by reviewing different literatures [23-25] to collect data. The questionnaire had the following sections: socio-demographic and obstetric and health service related factors. Data were collected by four experienced health professionals who had a college diploma and who were proficient in the local language (Afan Oromo). Both data collectors and supervisors were trained for two days on the data collection questionnaires, study procedures, and research ethics.

The data collection processes were implemented in such a way that data collectors approached every respondent after obtaining consent. The overall data collection processes were monitored and supervised by two public health officers who had a qualification of Bachelor of Science degree and who were proficient in the local language.

## 2.8. Data Quality Assurance

To assure the quality of data different measures were undertaken before, during, and after the actual data collection. Before the actual data collection, the questionnaire prepared in English was translated into the local language, Afan Oromo, and then translated back into English and the contents of the questionnaires were checked whether both versions are of the same content. The training was also given for all data collectors and supervisors by the investigator for two days on the objective of the study, contents of the questionnaire, and issues of maintaining confidentiality, about informed verbal consent and techniques of interview. Before the actual data collection, the questionnaire was pre-tested in one of the Keble out of the study

area on 5% of the total samples (25), then after the results were discussed and some modifications and corrections has been made accordingly to the questionnaire. During data collection, strict supervision was undertaken by the supervisors throughout the data collection period. In addition, problems encountered at the time of data collection were reported immediately and appropriate action has been taken.

After data collection, each questionnaire was checked for completeness, consistency, accuracy, and clarity daily by supervisors, and questionnaires that were found to have lots of missing values and inconsistencies were excluded. Furthermore, data entry and the check was made using Epi-Data version 3.1 to minimize errors during entry.

## 2.9. Data Processing and Analysis

Collected data were checked for completeness and consistency. Data were entered into Epi-Data version 3.1 and exported to SPSS version 21. Descriptive statistics such as frequencies and percentages were utilized. Then, data were presented using tables and graph. Multivariate logistic regression was performed to identify the potential predictors of institutional delivery. All variables with a P-value less than

0.25 in the bi-variable logistic regression analysis were entered into a multivariable model and run by the backward stepwise variable selection method with a probability of removal of 0.10 and a p-value of less than or equals to 0.05 and an Adjusted Odds Ratio (AOR) with 95% CI were used to declare the predictors of the outcome variable. Finally, the fitness of the model was checked by using Hosmer and Lemeshow's goodness-of-fit test.

## 2.10. Ethical Considerations

The study was conducted after appropriate research ethical clearance was obtained from the ethical review Board of Adama Hospital Medical College. Study permission or support letters were also obtained from West Wollega Zonal health department and Nejo district health office. This study was conducted in accordance with the Declaration of Helsinki. All study participants were well-informed about the aim of the study, benefits and risks. Following this, informed written consent was secured from study participants. Study participants' confidentiality was maintained. No personal identifiers were used in the data collection tools and codes were used in place of it.

**Table 1.** Socio-demographic characteristic of the study participants among mothers who gave birth in the last one year in Nejo Rural district, West Wollega zone, Western Ethiopia, September 2019 (N=500).

Variables	Categories	Frequency	Percent
Age (in years)	15-25	13	2.6
	26-35	239	47.8
	36-49	248	49.6
Religion	Protestant	219	43.8
	Orthodox	167	33.4
	Muslim	111	22.2
	Catholic	3	0.6
Ethnicity	Oromo	458	91.6
	Amhara	36	7.2
	Gurage	6	1.2
Mother's marital status	Married	444	88.8
	Divorced/Widowed	56	11.2
Mother's educational status	No education	229	45.8
	Primary school	109	21.8
	Secondary school	106	21.2
	More than secondary school	56	11.2
Mother's occupational status	Farmer	190	38
	Government employee	122	24.4
	Merchant	105	21
	Student	83	16.6
Husband's occupational status	Farmer	213	42.6
	Government employee	68	13.6
	Merchant	120	24
	Private work	99	19.8

### 3. Results

Out of the total study participants (n=508), 500 participated in the study with a response rate of 98.4%.

#### 3.1. Socio-demographic Characteristics of the Participants

From a total of participants interviewed, 248 (49.6%) and 13 (2.6%) were in the age group of 36-49 and 15-25 respectively. The mean (+SD) age of the respondents was 38.08 (+ 4.407) years. The majority of participants were belonged to Oromo 458 (91.6%) by ethnicity and protestant 219 (43.8%) by religion. About, 444 (88.8%), 229 (45.8%), and 190 (38%) of the mothers were married, has no education, and were farmers respectively. Also, 213 (42.6%) participants' husband's occupations were a farmer (Table 1).

#### 3.2. Obstetric and Health Service Related Factors

Of the participants, almost half (48.2%) of them were aged

from 26 to 35 in their last pregnancy. About 95% and only 32 (6.4%) of the study participants were multiparous and have encountered a history of abortion in their previous pregnancies respectively. Of which, the majority 211 (42.2%) of the respondents were Para two and only about 9 (1.8%) of them were Para five and above.

About 258 (51.6%) of the respondents attended ANC visits in their last pregnancy. Out of those mothers who attended ANC during their last pregnancy 61 (12.2%) of them attended only one time, 40 (8.2%) attended two times, 157 (60.8%) mothers attended three and above times. Of those who have attended ANC visits in their last pregnancy, about 254 (98.45%) had got advice on the place of delivery during ANC visit and also all of them who had visited ANC in their last pregnancy has been informed about complication during pregnancy. Also, about 249 (49.8%) of the mothers had health education on maternal health (Table 2).

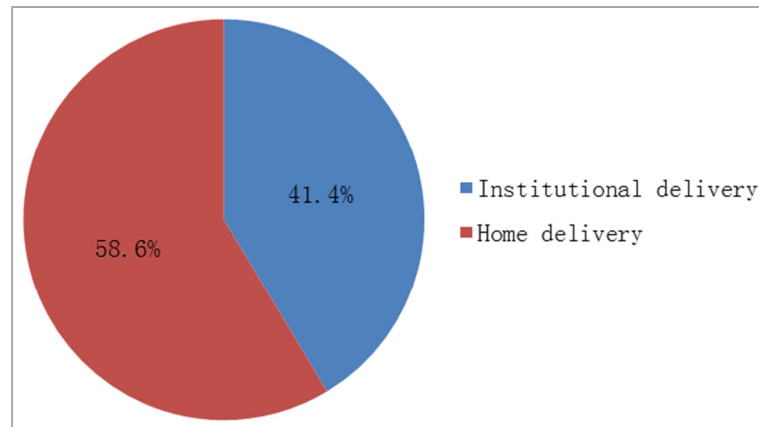
**Table 2.** Obstetric and health service related factors of the study participants among mothers who gave birth in the last one year in Nejo Rural district, West Wollega zone, Western Ethiopia, September 2019 (N=500).

Variables	Categories	Frequency	Percent
Age at last pregnancy	15-25	9	1.8
	26-35	241	48.2
	36-49	250	50
Parity	Para 1	25	5
	Para 2	211	42.2
	Para 3	192	38.4
	Para 4	63	12.6
	Para 5 and above	9	1.8
Abortion	Yes	32	6.4
	No	468	93.6
ANC visit	Yes	258	51.6
	No	242	48.4
Frequency of ANC visit (N=258)	1 time	61	12.2
	2 times	40	8.2
	>3 times	157	60.8
Advice on place of delivery during ANC visit (N=258)	Yes	254	98.45
	No	4	1.55
Informed about complications during pregnancy at ANC visit (N=258)	Yes	258	100
	No	0	0
Health education on maternal health	Yes	249	49.8
	No	251	50.2

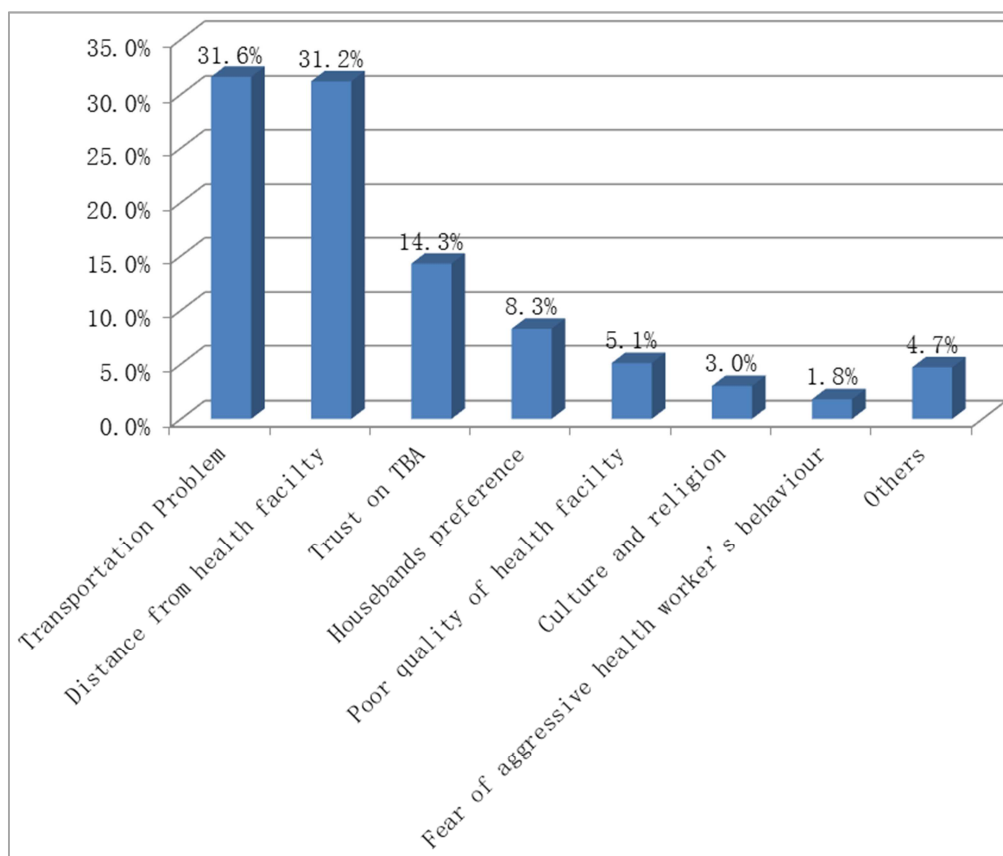
#### 3.3. Magnitude of Institutional Delivery

Of the participants, 207 (41.4%) of them gave birth at health institutions and 293 (58.6%) gave their last birth at home (Figure 1). Of those who gave birth at home, 32.2%,

20.8%, and 5% were assisted by traditional birth attendants, mother-in-law, and neighbors respectively. Transportation problems (31.6%) and distance from a health facility (31.2%) were the majorly reported reasons among those who gave birth at home (Figure 2).



**Figure 1.** Proportion of institutional delivery and home delivery among mothers who gave birth in the last one year in Nejo Rural district, West Wollega zone, Western Ethiopia, September 2019 (N=500).



**Figure 2.** Reasons for home delivery among mothers who gave birth in the last one year in Nejo Rural district, West Wollega zone, Western Ethiopia, September 2019 (N=293).

### 3.4. Predictors of Institutional Delivery

To identify predictors of institutional delivery, bi-variable and multivariable logistic regression analyses were conducted. Variables such as; marital status of the mother, educational status of the mother, occupational status of the mother, husband's occupation, ANC visit/s, frequency of ANC visit/s, advice on the place of delivery, and health education on maternal health were the candidate variables on binary logistic regression for multivariable logistic regression

analysis at p-value < 0.25 (Table 3).

After adjusted for potential confounders, variables such as educational status of the mother, husband's occupation, frequency of ANC visit/s, and health education on maternal health were statistically associated with institutional delivery in multivariable logistic regression analysis at p-value < 0.05 (Table 3).

The results showed that mothers who attended more than secondary school were 12 [AOR=12.0 and 95% CI=4.5-26.20] times higher odds compared to those with no

education. Respondents whose husbands' occupation was government employees and merchants were 6.9 [AOR=6.9 and 95% CI=2.2-21.5] and 7.6 [AOR=7.6 and CI=2.3-24.6] times higher odds compared to those whose husbands were farmers respectively. Whereas, mothers whose husbands' occupations were engaged in private work were almost 91% [AOR=0.09 and CI=0.02-0.47] less likely to give delivery at

an institution than their counterparts. Respondents who had three times & above ANC visits were 2 [AOR=2.1 and 95% CI=0.00-0.006] times higher odds compared to those who had only one ANC visit. Mothers who had health education on maternal health were 6.2 [AOR=6.2 and 95% 8.12-39.1] higher odds compared to those mothers who had no health education (Table 3).

**Table 3.** Predictors of institutional deliveries among mothers who gave birth in the last one year in Nejo Rural district, West Wollega zone, Western Ethiopia, September 2019 (N=500).

Variables	Institutional Delivery		OR [95% CI]	
	Yes	No	COR	AOR
Mother's marital status				
Married	202	242	0.12 (0.04-0.39)	0.62 (0.03-13.4)
Divorced/Widowed	5	51	1	1
Mother's educational status				
No education	27	202	1	1
Primary school	25	84	0.23 (0.01-0.77)	0.4 (0.19-3.22)
Secondary school	100	6	0.20 (0.02-0.48)	9.4 (0.23-4.21)
More than secondary school	55	1	0.42 (0.00-0.12)	12.0 (4.5-26.20)**
Mother's occupation				
Farmer	56	134	1	1
Government employer	84	38	0.002 (0.00-0.02)	0.43 (0.13-1.45)
Merchant	62	43	0.24 (0.08-0.70)	0.81 (0.64-1.89)
Student	47	36	0.02 (0.01-0.09)	3.23 (0.52-2.64)
Husband's occupation				
Farmer	64	149	1	1
Government employee	52	16	9.8 (3.75-26.06)	6.9 (2.2-21.5)**
Merchant	85	35	15.7 (5.13-48.21)	7.6 (2.3-24.6)**
Private work	53	46	0.63 (0.01-0.27)	0.09 (0.02-0.47)**
ANC Visit/s				
Yes	180	78	0.05 (0.03-0.08)	1.32 (0.13-13.1)
No	27	215	1	1
Frequency of ANC Visit/s (N=258)				
One times	3	58	1	1
Two times	34	6	0.66 (0.14-0.35)	0.03 (0.00-1.13)
Three times & above	142	15	0.19 (0.05-0.79)	2.1 (0.00-0.006)**
Advice on place of delivery (N=258)				
Yes	180	74	0.05 (0.03-0.08)	7.81 (0.81-74.9)
No	2	2	1	1
Health education on maternal health				
Yes	195	54	0.05 (0.13-0.19)	6.2 (8.12-39.1)**
No	12	239	1	1

COR: Crude Odd Ratio, AOR: Adjusted Odd Ratio, \*\*P-value <0.05, and 1=reference.

## 4. Discussions

The results of this study showed that institutional delivery service utilization was 41.4% and the majority of the mothers gave birth at home. This finding agrees with the result of the Ethiopian Mini Demographic and Health Survey (EMDHS) of 2019 which revealed that institutional delivery service utilization in the Oromia region was 40.9% [26]. But it was higher than the national and Oromia region EDHS result of 2016 which was 26% and 19% respectively [7]. The possible reasons for the discrepancy could arise from the time difference between the current study and other studies in EDHS of 2016 which were conducted before almost 4 years because there could be better improvements in accessing and utilizing the service since then.

The finding of this study relatively agrees with a cross-

sectional study conducted in Zambia, which showed institutional delivery service utilization was 42.8% and is slightly lower than a study from Tanzania showing the rate of utilization of health facilities for childbirth was 46.7% [27, 28]. The finding of this study was less than the result of a study conducted in Jimma town in 2018, where institutional delivery was reported to be 74.4% [18]. The possible explanation for this finding could be because mothers living in urban areas have a better awareness and knowledge about the importance of institutional delivery and there was better accessibility of health institutions for ANC & delivery services.

The main reasons reported for home deliveries were; transportation problems (31.6%) and distance from a health facility (31.2%). The results of this study were consistent with studies conducted in Boset woreda of Oromia region, Kambata Tembaro district in southern Ethiopia, and in

Kassala state of Sudan [29-31].

The educational status of the mothers had a significant association with institutional delivery service utilization. Mothers who attended more than secondary school was 12 times higher odds compared to those with no education. Supporting findings of the study conducted in the Sekela district of North-West Ethiopia indicated that mothers who attended above secondary school were 12 times more likely to utilize institutional delivery services than those with no education [32]. This finding was also similar to the results of EDHS, 2016, studies conducted in the North Gonder zone, Bangladesh, and Zambia [7, 33, 34, 27]. The possible reasons might be due to having formal education creating a chance to read and search for better health information and on the impacts of not using health institutions for delivery.

Husbands' occupational status had also a significant association with the utilization of institutional delivery service. In this study mothers whose husbands' occupation was government employees were almost 7 times more likely to give birth at health institutions compared to those whose their husbands were farmers. The result from the study conducted in Benishangul Gumuz is supportive of this study's result were mothers whose husbands' occupation was government employee were 5.2 times more likely to deliver at health institutions than whose husbands were farmers [35]. The finding of this study also agrees with the study result from Bangladesh [34]. This could be due to the reason that people working in government organizations are usually educated and have better opportunities to access information and to empower their wives to deliver at health institutions compared to farmers.

Concerning ANC visits, this study revealed that 51.6% of the mothers attended ANC follow-up for their last pregnancy, and the frequency of ANC visits of three times and above was significantly associated with institutional delivery service utilization. Also, about 60.8 of the mothers attended ANC visits three times and above for their recent pregnancy. The finding was higher than study conducted in Lume woreda, East shewa zone, and study from Arbaminch [19, 23]. Surprisingly this finding is similar to the result of a study from Jimma town in which 62.5% of the mothers attended ANC visits three times and above [18].

One focus of focused antenatal care follow-up recommended by WHO is that pregnant mothers should have at least four times ANC follow-up and also counseling of the pregnant woman about pregnancy-related danger signs, delivery, and postnatal complications in line with health education on maternal health. In this study mothers who had health education on maternal health were 6 times more likely to deliver at health institutions than those who didn't who had no health education. This finding is similar to the study conducted by Teklehaymanot and Negussie [36]. This might be because health education on maternal health creates better awareness about the health of women during pregnancy, childbirth, and the postpartum period and also it improves the decision-making ability of the mothers and their husbands on their health-related issues.

This study was not without limitations. Hence, this study might be unable to ascertain the causal relationship of the outcome variable and independent variables due to the cross sectional nature of the study. Besides this, the qualitative research method was not applied to deeply explore and triangulate the findings with what has been conducted by the method utilized for clear justifications.

## 5. Conclusions and Recommendations

The study found that institutional delivery service utilization at the study area was low and the majority of the mothers gave birth at home. Although the current finding was higher than the national and Oromia region mini-EDHS result of 2016 which was 26% and 19% respectively, it was below the health sector transformation plan of the country that was planned to make home delivery free in which this indicator is the most important indicator in modeling Keble, woredas and finally to transform woredas as a main goal of the health sector plan. Mothers' educational statuses, husbands' occupations, frequency of antenatal care visits, and health education on maternal health were important predictors of institutional delivery service utilization.

Maternal health improvement strategies which focus on improving the accessibility of health institutions where the community can access near to the place where they live are mandatory. Ambulance services should not be restricted to taking pregnant mothers from health centers only for referral but also should be extended deep into the households in the rural area where access to transportation is a problem. Government should also improve infrastructure access including the road in hard-to-reach areas that is one of the main set back forcing mothers in the rural district not to utilize institutional delivery services. Health education programs should be designed and implemented to address all women's and their husband's and should not wait for pregnant women to come to health institutions and all health extension workers should get better midwifery training to conduct deliveries at health posts as currently second-generation health extension programs have been implemented and recommend them to conduct delivery at health post level unless no referral linkage is needed. Generally, women empowerment, on ensuring them to receive ANC visits according to the standard in the study area could increase institutional delivery service utilization. In addition to this, further studies needed to be conducted to determine the economic evaluation of institutional delivery services from the consumer's perspective.

## Author Contributions

All authors made substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; took part in drafting the article or revising it critically for important intellectual content; gave final approval of the version to be published; and agree to be accountable for all aspects of the work.



## Disclosure

The authors declare that they have no competing interests.

## Acknowledgements

Researchers would like to acknowledge all participants of the study and administrative structures at a different hierarchy of the study setting for their due cooperation and involvement.

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