

Institutional Delivery Service Use and Associated Factors among Mothers in Lemo District of Hadiya Zone, Southern Nation Nationality People Region: A Cross-Sectional Study

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Abstract

Introduction: Institutional delivery takes place in hospitals or health centres by skilled birth attendants. Key strategies in reducing maternal and child death. The service which lowers in developing country including Ethiopia as well as in the study area. The aim of this study to determine institutional delivery service use and associated factors among mothers who gave birth in the last 12 months.

Methods: A community-based cross-sectional study was conducted from March-April 2019 among mothers who gave birth in the last 12 months. Multistage stratified cluster sampling was used to get 634 total sample sizes. A pre-tested semi-structured questionnaire was used to collect quantitative. Data capturing was done using Epi-data version 3.1 Software. Then, for analysis exported to the statistical package for Social Science Version 26 (SPSS). Bivariate and multivariate regression analysis was performed for those factors that showed a statistically significant association. At a p-value of 0.05, statistical significance was announced.

Results: Out of the 634 participants; about 42.5% (95%CI, 21.8, 30.5) of mothers used health institutions for delivery services. Institutional delivery service use was affected by the mother's level of education. Mothers who were able to read and write (AOR=8.3, 95%CI: 4.3-16.0), urban residence (AOR=2.9, 95%CI: 1.3-6.4), good knowledge towards delivery and pregnancy complications (AOR=2.1 95%CI: 1.2-3.0), governmental workers (AOR=2.3, 95%CI: 1.2-4.4), wealth status of highest income mother (AOR=3.5, 95%CI: 2.0-5.9) and Antenatal Care Visit (ANC) (AOR=3.5, 95%CI: 2.0-6.3) were found to be substantially linked to institutional delivery service use.

Conclusion: Institutional delivery service use by mothers was low. Lack of formal education, lower antenatal care visits, poor knowledge towards institutional delivery services and lower socioeconomic status of the respondents were factors associated with lower use.

Keywords: Institutional delivery service use; Mothers; Lemo district; Hadiya; Ethiopia

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Introduction

Institutional Delivery (ID) is a delivery that took place in hospitals or health centers by skilled birth attendants (Medical doctors, public health officers, midwives, or nurses) [1]. Globally, around three hundred thousand mothers die from complications of pregnancy and childbirth. Sub Saharan Africa (SSA) and Southern Asia accounted for 85% of the global burden of maternal deaths [2].

Appropriate delivery care is crucial for both maternal and prenatal

health and increasing skilled attendants at birth is a central goal of the Safe Motherhood (SMH) and child survival movement [3]. In Low and Middle-Income Countries (LMIC), despite the great public health efforts, the majority of women still deliver by the assistance of Traditional Birth Attendants (TBA) or relatives at home [4].

Giving birth in a health facility is associated with lower maternal mortality; that is due to a greater certainty that the pregnant woman will be able to access all the relevant services much easier than if she had received skilled assistance at home. An important

component of efforts to reduce health risks to mothers is increasing the proportion of deliveries in the health facilities [5].

The major causes of maternal deaths are due to direct causes like haemorrhage, infections, obstructed labor, unsafe abortion, and high blood pressure. The most feared complication that occurs usually after the mother has given birth is severe bleeding which occurs when a mother gives birth at home without skilled birth attendants [6].

Among Sub-Saharan African (SSA) countries about 510 maternal deaths per 100,000 live births which account for sixty-two (62%) of the world's total maternal death and adult lifetime risk of maternal mortality in women from sub-Saharan Africa was the highest at 1 in 38 [7]. Ethiopia is one of the SSA which accounts for 412 maternal deaths per 100 000 live births [8]. Maternal deaths in Ethiopia represent 21% of all deaths to women age 15-49 [9].

Data shows that skilled care before, during, and after childbirth saves the lives of women and newborn babies [10]. However, a large number of deliveries in LMICs occur at home. Most obstetric complications occur during the time of delivery and cannot be predicted, but can be prevented with proper medical care at a health facility. Therefore, for the strategies of health facility delivery to be effective, it is essential to understand the factors that influence individual and household factors to use health institutions for delivery [11].

This low performance is despite the Health Sector Transformation Plan (HSTP) of Ethiopia aims to reduce maternal mortality from 420/100,000 LB to 199/100,000 LB and increase deliveries attended by skilled health personnel to 90% by 2020. But these targets will never be met unless institutional delivery services are properly utilized and factors that affect institutional delivery are identified to take appropriate measures [12].

Therefore, this study was attempted to determine factors associated with institutional delivery service use by employing a community-based cross-sectional study design in Lemo district Hadiya zone, Southern Ethiopia; additionally, the findings will be used as a guideline for those interested in researching related topics.

Materials and Methods

Study setting

This study was conducted in Lemo district which is one of the ten districts in the Hadiya zone of southern, Ethiopia. Which are located 232 km south-north of Addis Ababa, the capital city of Ethiopia, and 198 km from the regional capital of Hawassa. Lemo district is bordered on the south by the Kembata tembaro zone, on the Southwest by Duna and Soro, on the west by Gombora, on the northwest by Misha, on the Northeast by Ana Lemo, and on the southeast by Shashogo district. The district is administratively structured into 35 Kebeles (32 Rural and 3 Urban). The estimated total population of the district is 153,469 in 2018 from these 76,060 (49.56%) are males and 77,409 (50.44%) are females and an estimated 15,181 women are in reproductive (15-49) age groups and the total House Holds (HHS) of the district is 32,055.

Mothers who gave birth in one year in Lemo district were 5218. The health infrastructure in the district comprised 7 health centers, 35 health posts, 5 rural drug vendors, and six private clinics. Concerning human resources, there are 177 all types of health professionals, 63 rural, 3 urban health extension workers, and 59 supportive staff in the district [13].

Study design and period

A community-based cross-sectional study was used in Hadiya zone in Lemo district from March-April 2019

Source population

All mothers who gave birth in the last 12 months in Lemo district, Hadiya zone, Southern Ethiopia.

Study population

All Mothers who gave birth in the last 12 months before the study in the selected Kebeles and who fulfilled inclusion criteria in the study.

Sample size determination

The sample size was calculated using single population proportion formula, considering the following assumptions and taking Institutional delivery service use 51.1% which was a study conducted in North West Ethiopian, Where n =the desired sample size P =prevalence of Institutional delivery service use=51.1% (which was taken from a study conducted which was a study conducted in Benishangul-Gumuz Region in Goba Woreda,2018) $Z_{1\alpha/2}$,Critical value at 95% confidence level (1.96) d =the margin of error=5% $n=(1.96)^2 (0.511 (1-0.511))/(0.05)^2=384$. Finally by considering design effect 1.5 and 10% for non-response rate, the final sample size (n) was $384 \times 1.5+(10\% \times 576)=634$.

Sampling procedure

By using the multistage cluster sampling technique considering Kebeles as a cluster; First, all the Kebeles in the district were stratified into urban and rural. The district has 35 Kebeles (32 Rural and 3 Urban). Next; the sample size was assigned by using probability proportionally for each stratum based on their population size. Then, 1 out of 3 urban and 10 out of 32 rural Kebeles were selected by using a simple random sampling technique from each stratum based on the recommendation of WHO guideline "Tools for assessing the operationality of district health systems"[14]. Since every family folder has monthly updated Households (HHs) information including vital events, their unique Households identity number, family folder registration, and immunization registration book obtain in health post from health extension worker` were used for identification of eligible households in selected Kebeles.

The sampling frame was formed based on their household's identity number for each Kebeles. Finally, a mother who gave birth within one year period at every 3rd households by using the formula of $Kth (interval)=N/n$ for each selected kebele based on N (total listed mothers) and selected by using a systematic random sampling technique to obtain 634 mothers from eligible households for the study. Lastly, the 1st mother was selected

by randomly or lottery method. Sample size proportionally calculated for each Kebeles as follows (Figure 1).

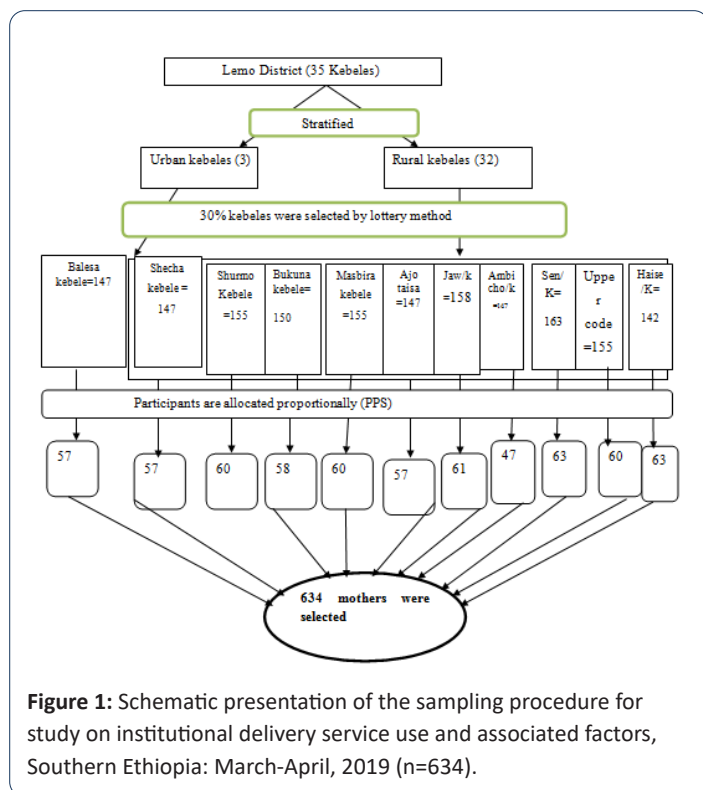


Figure 1: Schematic presentation of the sampling procedure for study on institutional delivery service use and associated factors, Southern Ethiopia: March-April, 2019 (n=634).

Study variables

Dependent variables: Institutional delivery service use (1: Yes, 0: No)

Independent variables: Socio-demographic and economic factors: maternal age, wealth status, marital status, occupation of women and her husband, educational status of women and her husband, and residence. Knowledge and attitude related factors: knowledge on delivery and pregnancy complications and mothers attitude towards institutional delivery service. Obstetrics factor: Parity, ANC visits, and birth plan. Health service-related factors: Distance from health facility, maternal waiting room, and previous birth at health institution.

Data collection procedures

House number of mothers was selected by data collectors and supervisors assigned for Kebeles. The data collection was conducted for the whole day. The selected participants were informed by data collectors as she was selected to participate in the study. If the selected participant was interested, consent was obtained and the data were collected. All the mothers, interviewed, their last child born within the one year in selected Kebeles, interviewed in their home. On the first visit, data collectors interviewed study participants if the mothers were unavailable then revisiting was arranged at least three times during data collection. The intensive supervision was done by the principal investigator and supervisors, then, they were checked the data for completeness, accuracy, and consistency throughout the data collection period. Also, overall supervision was done by

principal investigators.

Inclusion criteria

Mothers who gave birth 12 months before the day of the data collection period.

Exclusion criteria

Mothers who were critically ill or with other disabilities that may hinder communication during the data collection time.

Operational definitions

Institutional delivery service use: Refers to using delivery services in health centres or hospitals [15].

Knowledge: Knowledge about institutional delivery service use was measured by the participants' responses to seven knowledge-related questions related to institutional delivery service use. Correct responses were given a value of "1" and incorrect responses were given "0." Then that scored 50% and above has good knowledge while those that scored less than 50% have poor knowledge [16].

Household wealth status: Using the EDHS (Ethiopian Demographic Health Survey) questionnaire, Household assets ownership of the following Household resources: radio, television, electricity, bicycle, motorcycle, car, type of floor, type of wall material, type of roof material, toilet facilities, farmland, and of domestic animals such as cattle, sheep, goats, and mule were assessed and wealth index was computed by using principal component analysis. The wealth status was categorized into three groups and ranked from lowest to highest tertile [17].

Attitudes: Factors related to intuitional delivery service use measured by six questions and summed score of related attitude items on 5-point Likert's and as summed score 60% and above is considered as the influences of attitude on institutional delivery increased and as the scores below 60% the influences of attitude on institutional delivery service use decreased.

Data quality assurance

Data quality was assured before, during, and after the data collection process.

Before data collection: Data collection tools were translated from English to Hadiyisa and back to English to assure consistency and a pre-test was carried out 5% of the total sample size in Soro district of Hadiya zone to make necessary adjustments after obtaining informed consent. The questionnaire was checked for its clarity; understanding ability, uniformity, and completeness of the questions. Important amendments and logical flow of ideas were maintained based on the pre-test result. Additionally, training was given for data collectors and supervisors Reliability of the data collection tools was checked by using Cronbach's alpha value at the cut-off point for composite variables. The result was found for knowledge 0.79 and attitude 0.74.

During data collection: There was close day-to-day supervision in the data collection process. Collected data was checked for completeness and consistency by the supervisors and principal investigator each day.

After data collection: The supervisors and the principal investigator together was rechecked the completeness and consistency before transferring it into computer software. Non-overlapping numerical code was given for each question and the coded data entered into Epi data version 3.1 prepared templates then cleaning data during the preparing of templates, during data entry, and after data entered. Finally, data entry was done by two data clerks, and the consistency of the entered data was cross-checked by comparing the two separately entered data.

Data processing and analysis

First, data were checked by the principal investigator for completeness and consistency. Each completed questionnaire was assigned a unique code and entered into Epi-data version 3.1 software. Then data were exported to SPSS version 26 for analysis. The two composite variables (Knowledge assessed parts and attitude measured parts) were computed and dichotomized based on measurements.

The family wealth status was constructed using the Principal Component Analysis (PCA) method by considering locally available household assets and the family wealth status were into three tertiles. It was used for socio-economic variables involved in measuring the wealth status of households. The assumptions of factor analysis/PCA were checked to conduct data reduction. Bartlett's test of sphericity was checked and it was taken as significant at $p < 0.05$ to conduct factor analysis. Sampling adequacy for factor analysis/PCA checked with Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and the results in this measurement accepted at $p\text{-value} > 0.5$. Varimax rotation was employed during factor extraction to minimize the cross-loading of items on many factors. At the end of the principal component analysis, the wealth index was computed as a continuous scale.

The outcome variables institutional delivery service use was recorded to the dichotomous outcome either they used or not used the health institution. Uni-variate analysis such as simple frequencies, proportions, and summary statistics were used to describe the study population concerning relevant variables presented in tables and figures. Bi-variate analysis and crude odd ratio with 95% confidence interval was carried out to identify variables that are significantly associated with outcome variables by using logistic regression.

A multi-collinearity test was done to check between independent variables were inter-correlated using Variance Inflation Factor (VIF) and a value of > 10 was considered for diagnosing Multi-collinearity whereas there were no variables correlated. The goodness-of-fit of the model was checked by Hosmer and Lemeshow significance value of more than 0.05 was used to characterize a logistic regression model as the best fit. Variables with $p\text{-value} < 0.25$ in bivariate analysis were considered as candidates for multiple logistic regressions and they were entered into a multivariate regression model to identify the important determinants by controlling possible confounding effects.

Backward Logistic regression was used to identify a variable that has the largest contribution to the model which was used

$p\text{-value} < 0.05$ to show statistical significance and odds ratio with 95% confidence interval to measure the strength of association. Then multivariate logistic regression analyses were performed for those factors that showed a statistically significant association in bivariate analysis and investigate independent predictors by controlling for possible confounders. Finally, variables whose $p\text{-value}$ less than 0.05 ($p < 0.05$) in logistic regression were considered as statistically significant associations with institutional delivery service use.

Results

Characteristics of respondents

Out of 634 respondents expected to participate in the study, 609 respondents were interviewed making a response rate of 96.1%. The mean age of the respondents was 27.5 and $SD \pm 7.1$ years. The majority 296 (48.6%) of the respondents were housewives and out of 544 respondents husbands 270 (50%) were farmers and 205 (33.7%) of them are in the middle wealth status. Regarding their ethnicity and residents' majority 541 (88.8%) of the respondents were Hadiya in ethnic and 555 (91.1%) respondents were rural resident. The majority, 190 (31.2%) of the respondents educational level was able to read and write, 544 (89.3%) were married and 205 (33.7%) were in the middle wealth status. Out of 544 married respondents, 192 (35%) respondents' husbands completed primary educational level (**Table 1**).

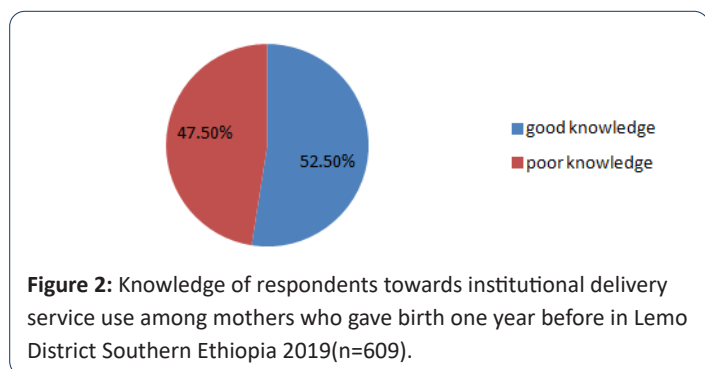
Variables	Categories	n (%)
Age in year	<20	64 (10.5)
	20-30	410 (67.3)
	>30	135 (22.2)
Marital status of respondents	Married	544 (89.3)
	Divorced	34 (5.6)
	Widowed	31 (5.1)
Educational status of respondents	Unable to read and write	178 (29.2)
	Read and write only	190 (31.2)
	Primary education	150 (24.6)
	Secondary and above	91 (15)
Educational status of husband	Unable to read and write	99 (18)
	Read and write only	10 (20)
	Primary education	192 (35)
	Secondary and above	144 (27)
Residence of respondents	Rural	555 (91.1)
	Urban	54 (8.9)
Ethnicity	Hadiya	541 (88.8)
	Kembata	27 (4.4)
	Gurage	18 (3.0)
	Others*	23 (3.8)
Occupational status of respondents	Housewife	496 (81)
	Government employee	92 (15)
	Others**	21 (4)
Wealth status of mothers	Lowest	203 (33.3)
	Middle	205 (33.7)
	Highest	201 (33)

Occupational status of husbands	Farmer	440 (81)
	Governmental employee	90 (17)
	Others***	14 (2)

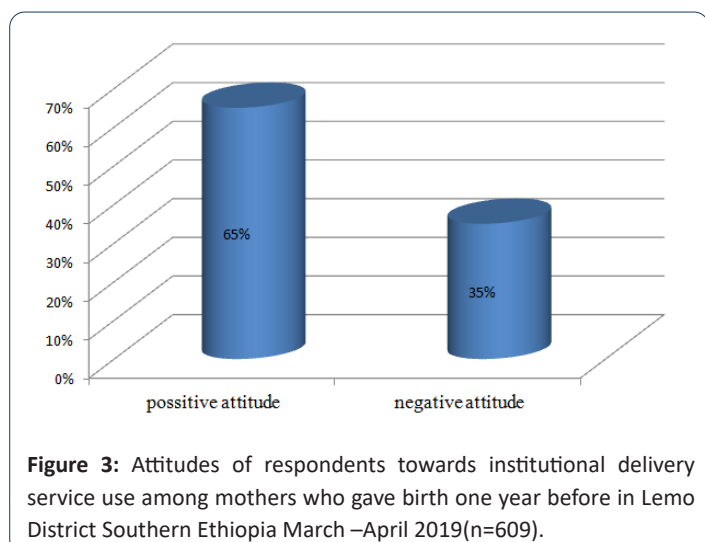
Note: Others*=Silte, Amhara, Wolaita, Oromo, Halaba; Others=**Private employee and merchants; Others=*** Private employee, merchants, and farmers

Table 1: Socio-demographic characteristics mothers who gave birth one year before in Lemo Woreda Southern Ethiopia, March-April, 2019 (n=609).

In this study, the knowledge of respondents towards institutional delivery service use assessed with seven questions, and the respondents who answer greater than or equal to 50% of the questions correctly was labelled as good knowledgeable towards institutional delivery service use and as poor knowledgeable for those who were score below 50%. Based on these findings, the majority of respondents 320 (52.5%) had good knowledge and 289 (47.5%) have poor knowledge (**Figure 2**).



Factors related to institutional delivery service use measured by six questions and summed score of related attitude items on 5-point Likert scale and as summed score 60% and above is considered as the positive attitude towards institutional delivery service use and as the scores below 60% negative attitude towards institutional delivery service use. Based on these findings, the majority of respondents 396 (65%) had a positive attitude and 213 (35%) had a negative attitude towards institutional delivery service use (**Figure 3**).



The majority of the respondents 393 (64.5%) had visited a health facility for ANC follow-up for the last pregnancy. Regarding the place of ANC follow up 319 (81.2%) of the respondents visit on health center and more than half 349 (57.3%) of the study participants were given greater than three live births. Less than half 256 (42%) of the respondents gave previous birth (other than last delivery) in the health institution. Concerning use of institutional delivery service 259 (42.5%) mothers gave their last delivery at HF and 286 (47%) of them attended by skilled birth attendants (**Table 2**).

Table 2: Obstetric history of respondents in Lemo district, Southern Ethiopia, March-April, 2019 (n=609).

Variables	Categories	n (%)
ANC visit	Yes	393 (64.5)
	No	216 (35.5)
Number of ANC visit	1-3	133 (33.8)
	≥ 4	260 (66.2)
Use of institutional delivery service	Yes	259 (42.5)
	No	350 (57.5)
Birth attendants	Health professional	286 (47.0)
	Traditional birth attendants	162 (26.6)
	Family	138 (22.7)
	Others*	23 (3.8)
Number of births	1-3	260 (42.7)
	>3	349 (57.3)
Place of ANC visit N=393	Health center	319 (81.2)
	Hospital	32 (8.1)
	Others**	42 (10.7)
Planned pregnancy for the last delivery	Yes	269 (44.2)
	No	340 (55.8)

Note: Others*= Relatives and friends, others**= Health posts and clinics

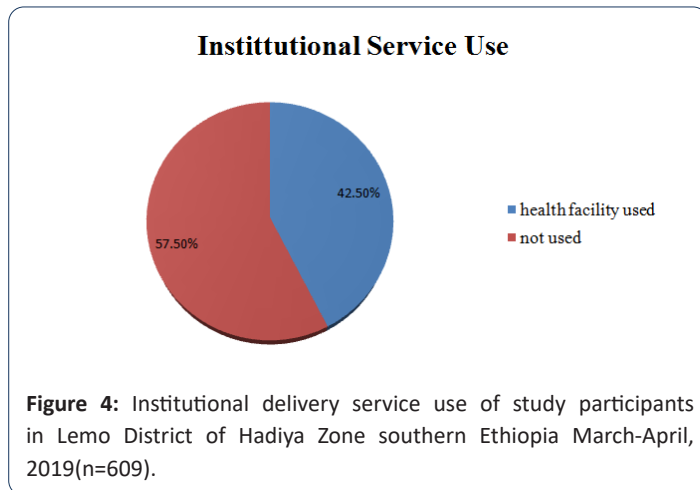
Majority of the respondents 378 (62.1%) travel/walk <30 minutes to reach the health facility and more than half of the respondents 477 (78.3%) have information about the maternal waiting room. Among them, 193 (32%) of respondents used the maternal waiting room. About 193 (31.7%) of the respondents used ambulance for transportation to the health facility and 256 (42%) of mothers gave previous birth (other than last delivery) in the health institution (**Table 3**).

Variables	Categories	n (%)
Travel time to reach a health facility	≥ 60 minutes	378 (62.1)
	≤ 60 minutes	231 (37.9)
Had information about the maternal waiting room	Yes	477 (78.3)
	No	132 (21.7)
Use of maternal waiting room	Yes	193 (32)
	No	416 (68)
Transport used	Ambulance	193 (75.0)
	Taxi	39 (15.0)
	Foot	27 (10.0)
Previous birth was in the health institution (before last delivery)	Yes	256 (42)
	No	353 (58)

Table 3: Health service-related factors among mothers who gave birth one year before in Lemo District Southern Ethiopia, March-April, 2019 (n=609).

Prevalence of institutional delivery service use

Of the total 609 respondents, 259 (42.5%) gave birth at health facilities with 95%CI [21.8, 30.5] the mean age of the respondents was 27.5 and SD \pm 7.1 (Figure 4).



Age, educational status, marital status, travel time of respondents from their home to the health facility, residence, knowledge towards delivery and pregnancy, educational status of respondents husband, Anti-Natal Care visit (ANC), occupation of mother, number of ANC visit, and wealth status of the respondents were analyzed in multivariable regression, but only ANC visits the health facility, occupation of the mother when employed, the urban residence of mothers, higher wealth status of mother's household, good knowledge towards delivery and pregnancy complications and able to read and write, primary educational status and secondary and above educational status

were significantly associated with institutional delivery service use in multivariable logistic regression analysis.

Participants who were able to read and write were [AOR 95%=8.3, 95%CI 4.3-16.1], whose educational status of primary education was [AOR=8.1, 95%CI 4.2-15.6] and those who were secondary and above educational status were [AOR=14.1, 95%CI 6.7-33.0] times more likely to give birth at health institution as compared to those who were unable to read and write.

Respondents whose residence in urban were [AOR 3.3, 95%CI 1.5-7.5] times as likely to give birth at health institutions compared to their rural counterparts.

Knowledge about the complication of pregnancy and delivery was found to be a predictor of institutional delivery. Participants who have good knowledge about institutional delivery were [AOR 2.1, 95%CI 1.2-3.0] times more likely to deliver in health institutions compared to those participants who have poor knowledge towards institutional delivery.

Occupation of the mother was also associated by institutional delivery mothers who were governmental employee was [AOR=2.3, 95%CI 1.2-4.4] times more likely to give birth at health institution as compared to others.

ANC visit during pregnancy was found to influence institutional delivery service use. Women who visit the health facility for ANC were [AOR=3.5, 95%CI 2.0-6.3] times more likely to deliver at health institutions compared to their counterparts who do not visit health facilities during pregnancy. As compared to lowest mothers in the wealth status, mothers with wealth status of highest were (AOR=3.5, 95%CI=2.0-5.9), more likely to deliver in the health institution (Table 4).

Variable	Categories	Institutional delivery service use			
		Yes	No	COR (95%CI)	AOR (95%CI)
Respondents educational status	Unable to read and write	20 (3.3%)	158 (25.9%)	1	1
	Read and write Only	94 (15.4%)	86 (14.1%)	8.6 (4.9-14.9)	8.3 (4.3-16.0)*
	Primary education	92 (15.1%)	81 (13.3%)	8.9 (5.1-15.5)	8.1 (4.2-15.6)*
	Secondary education	53 (8.7%)	25 (4.1%)	16.7 (8.6-32.5)	14.1 (6.7-33.0)*
Occupation of respondent	Housewife	129 (21.2%)	167 (27.4%)	1	1
	Government employee	45 (7.4%)	47 (7.7%)	1.3 (0.8-2.2)	2.3 (1.2-4.4)*
	Others	85 (14.0%)	136 (22.3%)	1.2 (0.8-1.7)	1.5 (0.9-2.4)
Residence	Rural	227 (37.3%)	328 (53.9%)	1	1
	Urban	32 (5.3%)	22 (3.6%)	2.9 (1.6-5.3)	3.3 (1.5-7.5)*
Knowledge towards delivery and pregnancy complications	Good	136 (22.3%)	153 (25.1%)	1.4 (1.0-1.9)	2.1 (1.2-3.0) *
	Poor	123 (20.2%)	197 (32.3%)	1	1
ANC visit	Yes	179 (29.4%)	214 (35.1%)	1.4 (1.0-1.9)	3.5 (2.0-6.3)*
	No	80 (13.1%)	136 (22.3%)	1	1
Household status (wealth index)	Lowest	76 (12.5%)	127 (20.9%)	1	1
	Middle	65 (10.7%)	140 (23%)	1 (1.5-1.6)	1.2 (0.7-2.1)
	Highest	118 (19.4%)	83 (13.6%)	2.3 (1.5-3.5)	3.5 (2.0-5.9)*

Note:*=p- value <0.05, are significantly associated variables, Model fitness (Hosmer and Lemeshow) significance Test=0.712, classification power =78.3 Nagelkerke R square=0.54

Table 4: Results of multivariable logistic regression analysis on factors independently associated with institutional delivery service use among mothers who gave birth one year before the date in Lemo district, Southern Ethiopia, March-April, 2019 (n=609).

Discussion

In this study, institutional delivery service use among mothers who gave birth one year before the date of the study was 42.5%. This finding was lower than the findings of other previous studies conducted in the Benishangul-Gumuz region in Guba woreda 51.1% [18], in Dejen Woreda Ethiopia 71.7% [19], in Woldia Amhara region Ethiopia 48.3% [2] and Bale zone North-West of Ethiopia 47% [20].

This difference might be due to the socio-economic and accessibility of the service difference. This finding was also consistent with a community-based study of 38% in rural districts of Wolaita and Dawro zones, Southern Ethiopia, [21]. On the other hand, it was higher than findings from in Liban district, Guji zone, Oromia Region 13.9% [22], in Affambo district of Affar Region 22.4% [15], in Liben zone, Somali Region, eastern Ethiopia, 30.4% [23], in zone 3 of Afar regional state 16.7% [24], Sidama zone, South West Ethiopia 26.8% [25]. This difference might be due to the difference in an intervention that has been taking place by Health extension workers and women development army in mobilizing pregnant mothers for maternal health service use, time gap, socio-demography difference, socio-cultural difference, and sample size.

Different studies confirmed that the probability of giving birth at health facilities could be affected by several factors including the mother's demographic and socioeconomic characteristics, availability and quality of health services, and residence of mothers [14].

In this study, mothers who can read and write were 8 times more likely to give birth at health institutions as compared to mothers who were unable to read and write. This study agreed with the study in Bose Woreda, Oromia regional state, Central Ethiopia [26] and a study conducted out of our country in Malawi [27]. This may be because education may increase female awareness and mothers to know what is right and beneficial to them. This may result in the increased decision-making power of the mothers. In this study also, mothers who were at the educational level of secondary and above were fourteen times more likely to use institutional delivery service than mothers who cannot read and write. This finding is consistent with that of a study conducted in Arsi zone, Oromia region, Ethiopia [28]. This is because education may enhance female autonomy. Increasing mothers' ability to make decisions regarding their use of institutional delivery services. Education increases knowledge of delivery care, thus increasing the demand for use of institutional delivery service.

This study found that the mother's residence was associated with institutional delivery service use. Mothers who live in urban were 3.3 times more likely to give birth as compared to their rural counter parts. This is in agreement with the study conducted in Guba woreda, Bale zone Ethiopia and Sekela district, West Gojam, Ethiopia respectively [20,21]. The reason for these findings might be because in urban areas proportion of mothers with education is higher, accessibility of the services with minimal distance and transport, and mothers could have better decision making autonomy, good knowledge of pregnancy and delivery

complications, better access to information than rural mothers, less affected by the negative consequences of cultural beliefs and norms that hinder mothers from accepting institutional delivery as normal and safe the effect of different media that urban mothers are exposed to.

Knowledge of the mothers about pregnancy and delivery complications was found significantly associated with delivery service use. Mothers who had good knowledge were about two times more likely to deliver in health institutions than mothers who had poor knowledge. This finding was similar to the study done in Banja district, Awie zone, Ethiopia, and in Asosa district in Asosa zone Ethiopia respectively [29,30]. The possible explanation probably, adequate information exchange from health extension workers, health professionals from prior delivery, and high exposure to media.

In this study compared to the lowest wealth status of mothers, mothers with wealth status of highest were 4 times more likely to give birth at a health institution. This finding was consistent with the data from Affambo district Afar region and another country Nigeria [15,30] respectively. This may be because Households in the highest wealth Tertile have better material and financial assets that enable them to afford institutional delivery services without difficulty and lowest tertile mothers are more likely to be illiterate, may be busy with other lively hood and do not care about ANC which in turn influence use of IDS.

This study also showed that mothers who visited ANC during their last pregnancy were about four times more likely to deliver in health facilities than mothers who did not visit ANC. It is consistent with studies done In Bahir Dar, Amhara region, Ethiopia [31], Dejen woreda Gojam zone, Amara Region, Ethiopia [19] and In Assosa district, Benshangul Gumuz Regional State, West Ethiopia [30]. This is probably because health professionals give mothers more information on the availability of institutional delivery services and mothers can understand and comprehend the information when they attend ANC visits during their pregnancy.

Finding also showed mothers who were governmental employee were two times more likely to use institutional delivery as compared to others (merchants, farmers, and private business) because these women are had better educational status than others (merchants, farmers, and private business) in most of the cases and influenced about institutional delivery use. This finding was alike to another study in Pawe district, Benshangul Gumuz, Western Ethiopia [18].

In this current study, marital status, place of ANC, other socio-economic characteristics like the occupation of the respondent's husband did not show significant association with institutional delivery service use, but in another similar study, there was a significant association with institutional delivery. This probably because the study participants in this current study were similar concerning their socio-economic characteristics. There was also no association between mothers who gave birth last year before the study period with a previous birth and other factors like birth planned and several live births.

Conclusion

Low (42.5%) institutional delivery service use was observed in the study area. Factors such as ANC visits to the health facility, Occupation of the mother when employed, the Urban residence of mothers, Higher wealth status of mother's household, good Knowledge towards delivery and pregnancy complications and able to read and write, primary educational status, and secondary and above educational status was a predictor of institutional delivery services use.

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Authors Contributions

YM participated in the study design, undertook the field study, analyzed data, and wrote the manuscript.

NA participated in the study design, revision of the manuscript, and facilitation of administrative issues.

SG participated in the study design, revision of the manuscript, and facilitation of administrative issues. All the authors have also read the manuscript and approved it to submit for publication.

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Ethics Approval and Consent to Participate

The study was approved by Jimma University, institutional review board (JUIRB). Permission was obtained from the SNNPR health bureau, Hadiya zone health department, and Lemo district health office before the study. Written consent was obtained from the office and submitted to the head of the health center and local authorities. Participants were informed clearly about the purpose and benefit of the study and written informed consent was obtained from them. The participant who provided written consent was enrolled for the study and the confidentiality of responses was maintained throughout the research process by giving code for the participant. They were informed well that they have full right to refuse to participate and/or draw from the interview at any time if they have any problem.

Consent

The author and institutions listed here agreed to be listed and acknowledged. Confidentiality of the information was also assured and collected anonymously.

Availability of Data and Materials

The datasets used and/or analyzed during the current study are available from the corresponding author upon request.

Competing Interests

The author declares that they have no competing interests.

Disclosure of Potential Conflicts of Interest

The disclosure of relationships and interests allows a more complete and open mechanism, leading to an accurate and impartial review of the work. All writers must not feel that there is any conflict.

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