

# Institutional Delivery Service Utilization and Associated Factors in Rural Communities of Central Gondar zone, Northwest Ethiopia

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## Research

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# Abstract

**Introduction:** Institutional delivery has been considered as one of the important strategies to improve maternal and child health, and significantly reduces birth related complications however it is still low in developing countries though there are some improvements. Hence, the aim of this study was to assess the prevalence of institutional delivery service utilization and associated factors among women who gave birth in Central Gondar zone, North West Ethiopia.

**Methods:** A community-based cross-sectional study was conducted from September to December 2019. A multistage systematic sampling technique was used to select a total of 1,394 study participants. Data were collected from women who gave birth during the past one year by using structured and pretested questionnaire. Binary logistic regression was performed to identify factors at 95% confidence level.

**Results:** The prevalence of institutional delivery service utilization was 58.17 % (95%CI: 55.57%, 60.77%). Multivariable logistic regression showed that women age ( $\geq 35$  years) (AOR= 1.43; 95% CI 1.04,1.96), having a family size of less than five (AOR= 4.61; 95% CI 3.34,6.34), husbands educational status of primary school (AOR= 1.64; 95% CI 1.19,2.24), middle level household wealth index (AOR= 1.78; 95% CI 1.25,2.54), rich level household wealth index (AOR= 2.01; 95% CI 1.42,2.86), having family discussion (AOR= 4.05; 95% CI 2.74,5.97), antenatal care visit during their recent pregnancy (AOR= 1.86; 95% CI 1.16,2.97), distance from the nearby clinic ( $\leq 30$  min) (AOR= 2.92; 95% CI 1.53,5.58), decision power about place of delivery (AOR= 2.50; 95% CI 1.56,4.01) and bad behavior of health workers (AOR= 0.27; 95% CI 0.19,0.39) were significantly associated with utilization of institutional delivery service.

**Conclusion:** Institutional delivery service utilization was low in the study area. Women age ( $\geq 35$  years), having a family size of less than five, educational status of husband (primary), household wealth index (middle and rich), family discussion, antenatal care visit, distance from the nearby clinic ( $\leq 30$  min), decision power about place of delivery and bad behavior of health workers were predictors of institutional delivery. This study implies that strengthening family discussion and up taking antenatal Care services in regular ways are few of the suggested recommendations.

## Plain English Summary

A community based cross sectional study was conducted to assess the prevalence of institutional delivery service utilization and associated factors among women of rural communities who gave birth during the past one year.

Indeed a sample of 1,394 women who gave birth during the past one year completed the Questionnaire. Then statistical analysis carried out to identify variables that are associated with institutional delivery service utilization. The results indicated that women age ( $\geq 35$  years), having a family size of less than five, husbands educational status of primary school, middle level household wealth index, rich level household wealth index, having family discussion, antenatal care visit during their recent pregnancy,

distance from the nearby clinic ( $\leq 30$ min), decision power about place of delivery and bad behavior of health workers were significantly associated with utilization of institutional delivery service.

The findings suggested that executing appropriate interventions especially strengthening family discussion and up taking antenatal Care services in regular ways might help to improve institutional delivery service utilization.

## Introduction

Worldwide, there is a need for immediate action to meet the ambitious 2030 sustainable development goals (SDGs), and ultimately to eliminate preventable maternal mortality [1]. Nearly all (99%) maternal mortality occurs in sub-Saharan African countries [2]. Despite a number of Sub-Saharan African countries halved their maternal mortality level since 1990, there are the most off-track achievements of continent based maternal deaths, where rural women remain the highest burden compared to those urban women accordingly [3].

Timely use of maternal health services is a key strategy for reducing maternal mortality. Institutional delivery with the help of skilled health personnel in an enabling environment and effective referral system can prevent complications of delivery and mortality [4-6].

According to the mini-Ethiopian Demographic Health Survey (EDHS) 2019 the proportion of institutional delivery in the rural areas of Ethiopia was still lower than other sub-Saharan Africa (SSA) countries which are 61% [7-10]. According to the 2019 mini-EDHS report, the proportion of institutional delivery at national level was 48% and in the rural area it accounted only 40% [11]. The progression of maternal mortality ratio in Ethiopia were accounts 412 deaths per 100,000 live births [12].

However, the aim of practicing institutional delivery is to protect the life of women and their babies to encourage efforts and to reduce life threatening conditions by improving care and healthy under health professional support and supervision [13].

The proportion of institutional delivery in Ethiopia significantly varies across the residence. According to the mini- EDHS 2019, and the Central Statistics Agency (CSA), 70% of women reside in urban settings used to deliver in health facilities whereas 40% of women reside in rural areas delivered in health facilities.

Even though the Ethiopian Federal Ministry of Health has applied different approaches to increase institutional delivery service utilization by improving access and strengthening facility based maternal services, the proportions of institutional delivery service utilization is still lower [9] than the SSA [8].

The percentage of institutional delivery service utilization in Ethiopia is one of the lowest in the world. The Amhara regional state (ANRS) where this study was conducted, institutional delivery service utilization is low (54.2%) as compared to the Health Sector Transformation Plan (HSTP) of Ethiopia [9].

Understanding factors that affect institutional delivery service utilization is important in order to improve health services delivered to pregnant women to replace home delivery by institutional delivery, and as a result reduce maternal morbidity and mortality that are related to pregnancy and child birth.

## Methods

### Study design and setting

A community based cross sectional study was conducted among women in 15 rural kebele (the smallest administrative units of Ethiopia) of Central Gondar zone, ANRS, Northwest Ethiopia, from September to December, 2019. Central Gondar zone is found in ANRS and its capital city, Gondar is located 727Kms away from Addis Ababa, the capital city of Ethiopia. According to the 2007 census, the Zone has a population of 2,288,442 inhabitants of whom 462,952 were women of reproductive age. According to the 2019 Central Gondar zone health department report, there were 14 districts (2 urban and 12 rural), 75 health centers and 9 hospitals in the zone.

### Sample size

The sample size was calculated for both objectives and then we have taken the largest samples. Accordingly, sample size calculation for the first objective i.e. to determine the Prevalence of institutional delivery service utilization was calculated using single population proportion formula;

$$n = z (a/2)^2 p (1-p) / d^2$$

n = Sample size

$Z_{a/2}$  = 1.96 standard score corresponding to 95% CI

d = 0.05

p = 0.34 (Proportion of institutional delivery service utilization) [14]

$$n = z (a/2)^2 p (1-p) / d^2$$

$$n = (1.96)^2 0.34(1-0.34) / (0.05)^2 = \mathbf{345}$$

n = 345, since there is design effect we multiply by 2 then it will be 690 with 10% non-response rate, it will give 759.

Whereas the sample size calculation for the second objective by using significant factors like ANC visit, knowledge of pregnancy complications, Educational status and Attitude were considered and calculated from previous study conducted on institutional delivery service utilization among women of rural Ethiopia [15, 16] using EPI INFO STAT CALC with, 95% confidence interval, 80% power, 5% margin of error, design

effect of 2 and 10% non-response rate was 1,394 which is larger than samples from single population proportion formula. Hence, the total final sample size was 1,394 women who gave birth in the last 12 months.

## Sampling procedure

Whenever two or more eligible women were found within the same household, just one of them were selected randomly and included in the study. All women who gave birth in the past 12 months within the randomly selected rural kebele were included in the study. Women who were seriously ill or unable to speak were excluded from the study. The list of eligible women was obtained from registration books of the respective kebele' health extension workers.

## Data collection tool, procedure, and quality control

A structured questionnaire was used to collect data which was developed by reviewing literatures [17-25] and conducting pilot test (or field test) to make the questionnaire valid and clear. The questionnaire was initially prepared in English and translated to the local language Amharic and back translated to English by language experts to see the consistency.

The questionnaire was pretested on 70 women (5% of the entire sample size) in the rural communities of West Gojjam zone, Bahir Dar Zuria districts which has similar context with the study area.

The data were collected by ten diploma graduate nurses and supervised by three BSc graduate public health officers. Two days training was given for the data collectors and supervisors about the objectives and data collection process by the Principal investigator. The data were checked for accuracy and consistency daily.

## Study variables

The outcome variable of the study was institutional delivery service utilization which was defined as coded as "Yes" if women reported that they gave their most recent birth (within the last one year) at health institution, and "No" if otherwise.

The independent variables of the study includes basic socio-demographic information like (age, marital status, educational status, and occupation of mothers; educational status, and occupation of the husband; family size, and wealth index of households, family discussion, and community organization discussion), Health related information, and supervision system, source of information, predisposing and enabling factors which impede institutional delivery service utilization behavior of women(distance from health facilities, supervision by the health care providers, decision power about place of birth), need related factors(status of pregnancy i.e. wanted or unwanted pregnancy, ANC follow-up, visiting health

facilities during complications), characteristics of health delivery system and Courtesy of health service providers.

Wealth index was constructed using a principal component analysis (PCA) after having data on household assets, which included a durable asset list, recording the land and animals owned and observing housing materials. Finally, different important family asset factors were summed up to categorize individuals into wealth tertiles (poor, medium, rich).

## Data processing and analysis

The collected data were checked for completeness, consistency, and missing values; coded and entered, using Epi Data version 3.1 and cleaned and analyzed using STATA software version 14.1.

Using descriptive methods, the data was summarized, prevalence of institutional delivery service utilization was determined and odds ratios (OR) were obtained using logistic regression. The data obtained from individuals in each household are pooled to create a single large data set then the studies use the number of individuals institutional delivery service utilization analyzed as the statistical n value, which is we assume the data gathered at each kebele to be an independent measurement so that we can use simple logistic regression by ignoring clustering [26]. The effect of different variables on institutional delivery service utilization was explored using crude and adjusted odds ratios. After checking the correlation of independent variables, significance was determined using crude and adjusted odds ratios with 95% confidence intervals. To determine the association between the different predictor variables with the dependent variable, first bi-variable analysis between each independent variable and outcome variable was investigated using a binary logistic regression model and then all variables having p-value < 0.2 in the bi-variable analysis were suggested as a criterion for variable selection for inclusion into a multivariable model. So that all variables with a p-value of < 0.2 in the bi-variable were analyzed for multi-variable logistic regression.

Adjusted Odds Ratios (AOR) with 95% Confidence Intervals (CI) was calculated to show the presence and strength of associations. A variable with p-value of less than 0.05 in the multivariable logistic regression model was considered as statistically significant.

## Ethical consideration

Ethical approval for the study was obtained from the institutionalized review board, university of Gondar with a ref.no O/V/P/RCS/05/1048/2019 on a date of March 4 2019. Official letter that explains the objectives of the study was written to the respected Amhara public Health Institute.

The Amhara public Health institute wrote a letter to zonal health department. The zonal health department was wrote a letter for each selected district health office. The selected district health office in turn wrote a letter for the study kebeles for cooperation. The objectives and the benefits of the study were

explained for the study subjects. Written consent was obtained from each participant. The right of the participants to withdraw from the study whenever they want to do so was respected. Anonymous questioner was used to protect the identity and confidentiality of the information obtains from individual participants.

## **Results**

### **Socio demographic Characteristics of the respondents**

A total of 1,389 women who gave birth in the last 12 months were interviewed with 99.6% response rate. Majority of the respondents 855 (61.56%) were in the age group of 25–34 years with a mean (SD) age of  $30 \pm 0.15$  years. The study revealed that 1,254 (90.28%) of the study subjects were married, and housewives in occupation and 1,105(79.55%) had no formal education. The study also revealed that, 767 (55.22%) of the husbands had no formal education (Table-1).

Table 1  
Socio-economic and demographic characteristics of women in Wogera and East Dembiya District, North West Ethiopia, 2020

Variables		Number	Percent
Age	18–24	170	12.24
	25–34	855	61.56
	35 and above	364	26.21
Religion	Orthodox	1378	99.21
	*1Other(Muslim, Catholic)	11	0.79
Ethnicity	Amhara	1368	98.5
	Other(Tigrie,Oromo)	21	1.5
Educational status of the respondent	Unable to read and write	1,105	79.55
	Elementary/Primary	210	15.12
	Secondary school and above	74	5.33
Occupation	Housewife	1,254	90.28
	*2Other	135	9.72
Marital status	Currently Married	1,254	90.28
	Currently not Married	135	9.72
Household/family size	1–4	532	38.30
	5 and above	857	61.70
Educational status of the husband(n=1,254)	Unable to read and write	767	55.22
	Elementary	469	33.77
	Secondary school and above	18	1.30
Wealth status	Poor	465	33.48
	Medium	461	33.19
	Rich	463	33.33

\*1Other (Muslim, Catholic) ; \*2Other (Petty trade/Student/Laborer)

## Health information and supervision system

This study found that 1,198 (86.25%) of the respondents heard health related message including institutional delivery service utilization within the last three months, 969 (70%) had a family discussion on health issue, and 1,129 (81.28%) were frequently supervised by the HEWs and other HWs (Table-2). The study also indicated that HEWs were the main source of message about institutional delivery service utilization for the last three month for 61% of the respondents (Figure-1).

Table 2  
Health information and supervision system in Wogera and East Dembiya District, North west Ethiopia, December 2020

Variables		Number	Percent
Family discussion on health issue	Yes	969	69.76
	No	420	30.24
Community organization discussion	No org.	181	13.03
	Yes	706	50.83
	No	502	36.14
Frequent supervision by the HDA	Yes	745	53.64
	No	644	46.36
Frequent supervision by the HEW and other HW	Yes	1129	81.28
	No	260	18.72
Heard health related message for the last three month	Yes	1198	86.25
	No	191	13.75

\*1Other (school adolescent, NGO staff, church/mosque, poster/flyer/leaflet, community event, community discussion, family discussion, clinic/hospital, traditional leader/TBA)

## Institutional delivery service utilization

The study revealed that 808 (58.17 %; 95% CI: 55.57%, 60.77%) of the respondents delivered their last child at health institution with the support of skilled birth attendants and 1,121(80.71%) of the respondents intended to give birth for the next pregnancy at health facility (Table-3).

Table 3

Utilization of institutional delivery and ANC by women in Wogera and East Dembiya District, North west Ethiopia, 2020

Variable		Number	Percent
At least one ANC attendant	yes	1219	87.76
	No	170	12.24
Frequency of ANC	None	170	12.24
	1 time	232	16.70
	2-3 time	536	38.59
	4 or more	451	32.47
Place of birth for the last baby	Health facility	808	58.17
	Home	581	41.83
Place of birth for the last baby were the place intended to deliver	Yes	1173	84.45
	No	216	15.55
Intended place for the last baby were(No=216)	Health facility	166	76.9
	Home	50	23.1
Intended to give birth for the next pregnancy	Health facility	1121	80.71
	Home	268	19.29
Means of transportation for referral case	Own transport	431	31.03
	Public transport	65	4.68
	Ambulance	875	62.99
	*1Other	18	1.30
Able to afford transport cost	Yes	842	60.62
	No	547	39.38
Distance of health facility from home	<=30min	90	6.5
	>30min	1299	93.5
Happy by the services given at health facility	Yes	995	71.63
	No	394	28.37

\*1other=local ambulance,horse

## Reasons for home delivery

Women who did not deliver at health facilities (n = 581) were asked to state their reasons for that. Results in Figure-2 showed that the reason for 531 (91.39%) of respondents for delivering at home was sudden onset of labour, two-thirds (69.53%) of these women stated lack of transportation, (62.13%) long distance to a health facility, (60.75%) bad behavior of health workers, (59.21%) influence of TBA and (5.16%) poor belief of modern medicine (Figure-2).

Family influence was the most dominant impeding factors for institutional delivery among respondents who delivered at home (Figure-3).

## Factors Associated with institutional delivery service utilization

In the bivariate analysis, variables such as age of the respondent, educational status of the respondent, family size, educational status of husband, household wealth index, family discussion, frequently supervised by HEW/HW, ANC Follow up, distance from the nearby clinic (mins), status of birth, decision power about place of delivery and bad behavior of health workers were found to have a p-value <0.2 and a candidate for multivariable logistic regression for their significance at p-value < 0.05.

After controlling for the effects of potentially confounding variables using multivariable logistic regression model, women age ( $\geq 35$  years), family size (<5), educational status of husband (primary school), household wealth index (middle and rich), family discussion, ANC follow-up, distance from the nearby clinic (<30min), decision power about place of delivery and bad behavior of health workers were found to be statistically significant predictors of institutional delivery service utilization.

The odds of giving birth at health institution were more than four-and half folds (AOR = 4.64 [95% CI 3.37, 6.40]) among women who had a family size of less than five as compared to those women who had a family size greater than or equal to five. The odds of institutional delivery was 1.43 times more likely (AOR = 1.43 [95% CI 1.04, 1.96]) among women whose age was  $\geq 35$  years compared to women age of 25-34 years. Husbands' educational status was appeared to be associated with deliveries at health institution. Women whose husband educational status was primary were more than one-and half fold to give birth at health institution (AOR = 1.63 [95% CI 1.19, 2.24]) than those women whose husband educational status was unable to read and write.

Women with a household wealth status of rich and who had a family discussion for their health status in relation to their current pregnancy were two (AOR=2.01[95% CI1.42, 2.86]) and four 4.046 (AOR = 4.046; 95% CI: 2.744, 5.967) folds to give birth at health institution compared to women with a household wealth status of poor and who did not have a family discussion, respectively.

Women who attended ANC visit for their current pregnancy, and who spent less than or equal to half an hour to walk to health facility were near to two (AOR = 1.859; 95% CI: 1.164, 2.969), and almost three (AOR = 2.918; 95% CIL 1.526, 5.581) folds to give birth at health institution compared to women who did not attend ANC visit and who spent greater than half of an hour, respectively.

The odds of giving birth at health institution was two-and half folds (AOR = 2.50 [95% CI 1.56, 4.01]) among women who has a decision power about place of delivery than those who hasn't a decision power about place of delivery.

However, the odds of giving birth at health institution was 73% (AOR = 0.270; 95% CI: 0.186, 0.391) less likely among women who perceived that the health workers at health facility showed bad behavior and were not available all the time compared to women who perceived that the health workers at health facility did not show bad behavior and were available all the time (Table-4).

Table 4

Bivariable and multivariable analysis of factors associated with institutional delivery service utilization in Central Gondar zone, Amhara regional state, Northwest Ethiopia 2020.

Variable		Institutional delivery		COR(95%CI)	AOR(95%CI)	P-value
		Yes	No			
Age of the respondent	18-24	95	75	0.97 (0.69, 1.35)	0.65(0.41,1.01)	0.06
	25-34	484	371	1	1	
	>=35	229	135	1.30 (1.01, 1.67)*	1.43(1.04,1.96)*	0.028
Educational status of the respondent	Can't read and write	600	505	1	1	
	Primary school	152	58	2.21(1.59, 3.05)*	1.48(0.98,2.23)	0.065
	Secondary school and above	56	18	2.62(1.52, 4.51)*	1.26(0.65,2.43)	0.498
Family Size	<5	426	106	4.10(3.88,6.43)*	4.61(3.34,6.34)*	0.000
	>=5	382	475	1	1	
Educational status of husband	Can't read and write	349	418	1	1	
	Primary school	346	123	3.37(2.62, 4.32)*	1.64(1.19,2.24)*	0.002
	Secondary school and above	12	6	2.40(0.89, 6.45)	1.05(0.32,3.49)	0.935
House hold Wealth index	Poor	193	272	1	1	
	Middle	331	130	3.59(2.73, 4.72)*	1.78(1.25,2.54)*	0.001
	Rich	284	179	2.24(1.72, 2.91)*	2.01(1.42,2.86)*	0.000
Family discussion	Yes	715	254	9.90(7.55,12.98)*	4.05(2.74,5.97)*	0.000
	No	93	327	1	1	
Frequently supervised by HEW/HW	Yes	685	444	1.72(1.31,2.25)*	0.79(0.54,1.18)	0.252
	No	123	137	1	1	
ANC Follow up	Yes	750	469	3.09(2.20, 4.33)	1.86(1.16,2.97)*	0.009
	No	58	112	1	1	
Distance from the nearby clinic	<=30 min	77	13	4.60(2.53, 8.37)*	2.92(1.53,5.58)*	0.001

(mins)	>30 min	731	568	1	1	
Status of birth	Planned	629	416	1.39(1.09,1.78)*	1.28(0.92,1.8)	0.146
	Unplanned	179	165	1	1	
Decision Power about place of delivery	Yes	136	45	2.41(1.69,3.44)*	2.50(1.56,4.01)*	0.000
	No	672	536	1	1	
Bad behavior of health workers	Yes	142	273	0.24(0.19,0.31)*	0.27(0.19,0.39)*	0.000
	No	666	308	1	1	

\*=P-value<0.05

## Discussion

Institutional delivery care service could reduce the health risks of women and increase the proportion of babies' delivered in a safe and clean environment under the supervision of health professionals. This study has attempted to identify the proportion of women with institutional delivery service utilization and associated factors among women who gave birth in the last 12 months prior to the study in 15 rural community of Central Gondar zone, Northwest Ethiopia.

The current study showed that the proportion of institutional delivery service utilization was 58.17% (95% CI: 55.6%, 60.7%) in the Zone. This finding is consistent with the study conducted in Pawi district(Ethiopia), Kenya, rural Zambia and sub-Saharan Africa where the proportion of women who gave birth on health facilities were 60.5%, 61%, 62.2% and 57% respectively [7, 13, 27, 28].

Nonetheless this proportion was better as compared to the national and regional estimates of Ethiopia [11].The current proportion was also better as compared to a community based study done in Kersa district, Eastern Ethiopia [29] and a systematic review conducted in Ethiopia[30].The performance was still below the Health Sector Transformation Plan (HSTP) of Ethiopia in which the plan set to increase institutional deliveries attended by skilled health personnel to 90% [31]. The reason for these differences might be due to the current study was conducted after introducing strong follow-up and supportive supervision strategies on maternal healthcare services in Ethiopia [32]. Conversely, the findings of the current study are lower than studies conducted in other parts of Ethiopia: Mana district, Bench Maji, and Debre Berhan in Ethiopia in which the institutional delivery utilization was 86.4%, 78.3% and 80.2% respectively [33-35].This difference could be due to difference in socio-cultural factors, awareness and knowledge of facility birth, health education and accessibility of health facility in relation to socio-demographic characteristics[13]. This finding implies that there should be great emphasis on the improvement of accessibility of health facilities integration with the community to increase institutional delivery service utilization in the study area.

The current study showed that women whose husbands' attended primary education were more than one and half fold to give birth at health institution than those women whose husband were unable to read

and write. This finding was also consistent with studies done in other parts of Ethiopia (Mana and Enderta district) and India [33, 36, 37]. Husbands with better education may have better access to health related information that can help them decide their wives deliver at a health facility. Educated husbands are more likely to discuss with their wives on issues, including pregnancy and labour, may give to their wives' freedom to decide the place of delivery, may insist and support the wives to have a health facility delivery [38]. This implies that strengthening husband education at the local level via adult education program will help to increase the utilization of institutional delivery service since in most of the rural community in the Ethiopia context, husbands were the most influential and major decision maker of the house hold activity including health service utilization.

Women who have ANC follow-up during their recent pregnancy were more likely to deliver in health institution than those who didn't. This result was in-line with studies conducted in Pawi district, rural area of Hadya zone, Enderta district, and Bahir Dar in Ethiopia, and Nigeria [13, 36, 39-41]. ANC can provide an opportunity to promote the benefit of skilled attendance at birth and health facility based delivery. During ANC visits women are counseled about the benefit of institutional delivery, risk of home delivery, birth preparedness and complication readiness that can promote women to deliver at health facility with the help of skilled birth attendants [42-44]. This implies that ANC is an intervention that a pregnant woman receives from organized health care services. The purpose of antenatal care is to prevent or identify and treat conditions that may threaten the health of the fetus/newborn and/or the women, and to help a woman approach pregnancy and birth as positive experiences. To a large extent antenatal care can contribute greatly to this purpose and can in particular help provide a good start for the newborn child. Therefore it is expected to strengthening the antenatal care services for every pregnant women in order to have institutional delivery services for every pregnant.

The odds of institutional delivery service utilization were higher among women from rich households compared to women from the poor households.

The finding is in agreement with the analysis of 2016 Ethiopian demographic and health survey [45], and studies conducted in Mana district of south west Ethiopia [33], Ghana [46], and Uttarakh [47]. Women from better wealth status house hold can cover transportation and other expenses to bring and keep families at a health facility. Besides, women who want to stay at health facility during the last few days of pregnancy period for delivery service need to cover the charge of the service they need for the families who may come with them and who stay at home. This finding suggests that the health facility in collaboration with the large community need to have the establishment of enough waiting home for the maternity including for the family members who might be goes with the pregnant women. For such activity there should be improvement of community awareness and readiness by providing continuous health education during different devising strategies to improve women's wealth status, and strengthening resource allocation habit may enhance institutional delivery service utilization.

Our study also showed that women decision power about place of delivery were mentioned as influencing factors for institutional delivery service utilization of women, which is consistent with previous studies

conducted in different areas of Ethiopia [13, 48-50]. This finding implies that promoting the decision making power of women for health service utilization shall to be given a great emphasis by the health sector.

Respondents age in the current study showed that a positive linear relationship with institutional delivery. This finding is in agreement with a study conducted in Assosa district [50]. This may be due to women who have a pregnancy at the age of adult were not have a feeling of fear to go to health facilities to give birth[50]. This finding suggests that there should be awareness creation programme for the age group of teenage pregnancy on the utilization of institutional delivery in the regular way. This means that the accessibility and availability of institutional delivery services including the awareness creation program need to consider the group of individual who might not have formal marital status within the community.

The influence of traveling time (distance) spent to reach nearby health institutions was the other important factor that was identified by the current study. Women who had to walk thirty minutes or less to reach to the health institution were more likely to give birth at health institution than those who had to travel for greater than thirty minute. This finding is in line with those of other similar studies done in Ethiopia and other developing countries [33, 51]. It might be related to easily accessible health institutions may increase the chances of women to use it during prenatal periods and at a time of delivery. ANC services and health educations was easily accessible for women whose residence was near to the facility. Furthermore, women who resided to the nearby health facilities had no problem of transportation to attend the institutional delivery service and able to early manage any pregnancy related problems at any time[13]. This finding may suggest that making health institutions closer to and easily accessible by the communities is very crucial in order to enable more women to give birth at the health institutions.

The current study showed that having a family discussion on health issue including institutional delivery service utilization at the house hold level were more than four folds to give birth at health facility as compare to their counterparts. This is supported by a finding from Tanzania[52]. This implies that family level discussion on health issue trajectories including institutional delivery service utilization will make them to consider health facilities as best sources of delivery care to ensure safety and pleasant outcomes. This suggests as an educational venue that a family could potentially benefit from as far as discussing and deciding about place of delivery is concerned. Therefore, family level discussion on health issue is very important to increasing institutional delivery service utilization. So making family level discussions about delivery and other aspects of health matters should be encouraged with in a family level to enhance institutional delivery service utilization.

On the other hand, the current study showed that the smaller the family size a woman have, the more the possibility that she would be going to give birth at health facility. This finding is in line with a study conducted in East Bellesa district [53]. That means, having a family size of smaller is one of the possibly reason for a woman to have a freedom in a decision of a place where to give birth which makes a woman to feel free about the home activity when they go at health facility. This may again imply that beyond feeling free of the home activity, then she would tend to be at health facility in the waiting home

for the last week of pregnancy before birth that resulted in a trend association with institutional delivery service utilization.

## **Strengths And Limitations**

Since this study is community based in the rural area, it could reflect the actual experience of women in the community during the study period which could be the strengths of this study.

The potential limitations of this study were that the study is limited to rural women, didn't consider the role of husband contribution for institutional delivery service utilization, the perception of women on institutional delivery and the level of community readiness on the promotion of institutional delivery were not addressed.

## **Conclusion**

Institutional delivery service utilization among rural women in the 15 communities of central Gondar zone had better achievement as compared to the national and regional estimates, but it is still below the HSTP.

Therefore, strengthening ANC follow-up as per the minimum recommendation by the WHO will have a positive impact on pregnant women to give birth at health institutions. Promoting husbands' education at the local level via adult education program will be helpful to encourage women to deliver at health institutions. Improving and strengthening family level discussion, and empowering women for being a decision maker in making a choice for a place of delivery is likely to enhance the utilization of institutional delivery service.

Furthermore, it is also crucial to increase the level of community readiness on the promotion of institutional delivery service utilization by taking level matched educational intervention. Policy makers have to focus on the level of community readiness in the promotion of institutional delivery.

## **Abbreviations**

ANC- Ante Natal Care

ANRS-Amhara National Regional State

AOR-Adjusted Odds Ratios

BSC-Bachelor of Science

CI-Confidence Intervals

CSA-Central Statistics Agency

EDHS-Ethiopian Demographic Health Survey

HEW- Health Extension Workers

HSTP-Health Sector Transformation Plan

HW- Health Workers

PCA-Principal Component Analysis

SDG-Sustainable Development Goals

SSA -Sub-Saharan Africa

## **Declarations**

### **Ethics approval and consent to participate**

Ethical approval for the study was obtained from the institutionalized review board, university of Gondar. Official letter that explains the objectives of the study was written to the respected administration and zonal health office. The zonal administration and zonal health office successively were wrote a letter to review kebele for cooperation respectively. The objectives and the benefits of the study were explained for the study subjects. Written consent was obtained from each participant. The right of the participants to withdraw from the study whenever they want to do so was respected. Anonymous questioner was used to protect the identity and confidentiality of the information obtains from individual participants.

### **Consent for publication**

Not-applicable

### **Availability of data and materials**

The datasets generated and/or analyzed during the current study are available at University of Gondar, College of medicine and Health Science, Institute of Public Health in hard and soft copy repository [[www.UoG.edu.et](http://www.UoG.edu.et)]. In addition the data are available from the authors upon reasonable request and with permission of the principal investigators (Adane Nigusie- E-mail [adane\\_n@yahoo.com](mailto:adane_n@yahoo.com)).

### **Competing interests**

The authors declared that they have no competing interest.

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There is no received grant from any fund agency.

## Authors' contributions

AN conceived and designed the study, participated in the data collection, performed analysis and interpretation of data and drafted the paper and revised the manuscript. TA, MY and LD assisted with the design, approved the proposal, and revised drafts of the paper, prepared and revised the manuscript. All authors read and approved the final manuscript.

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## Figures

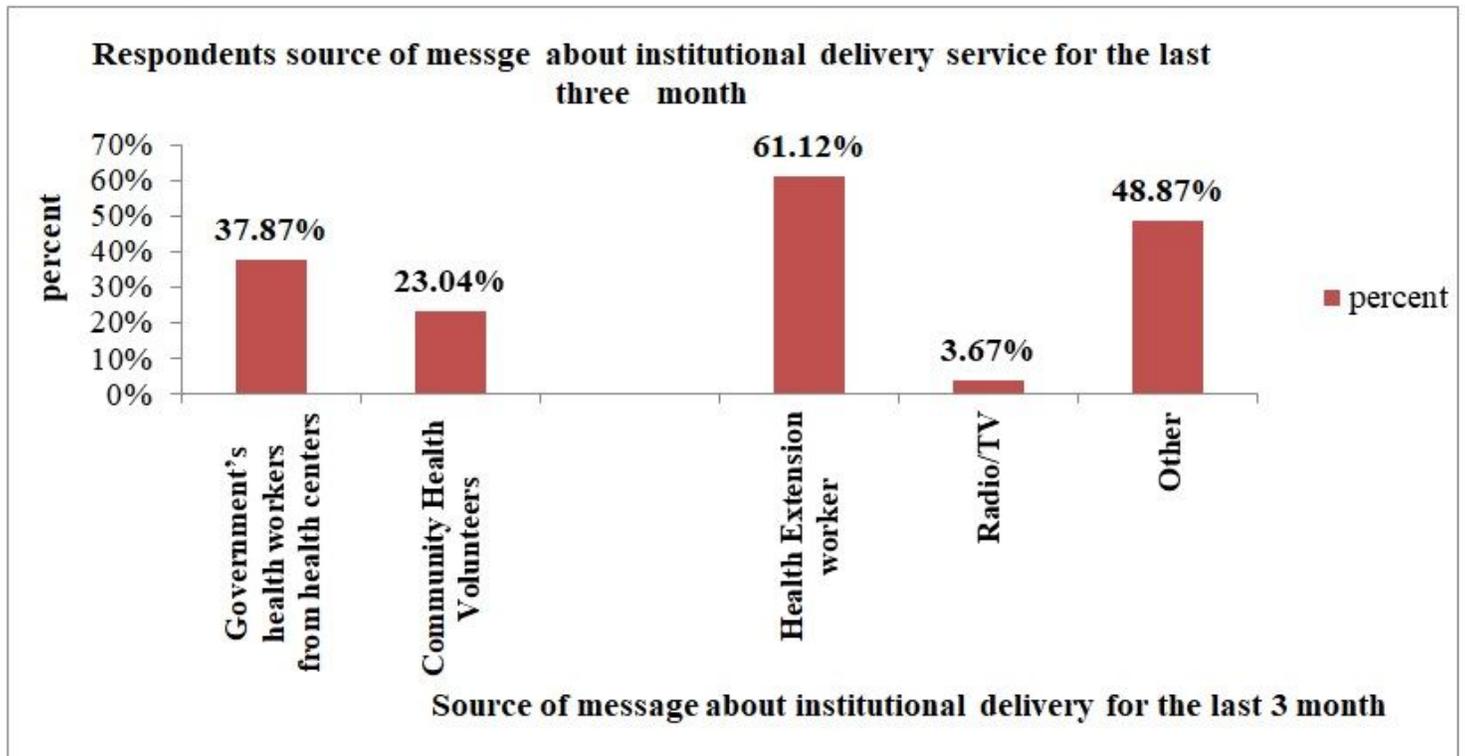
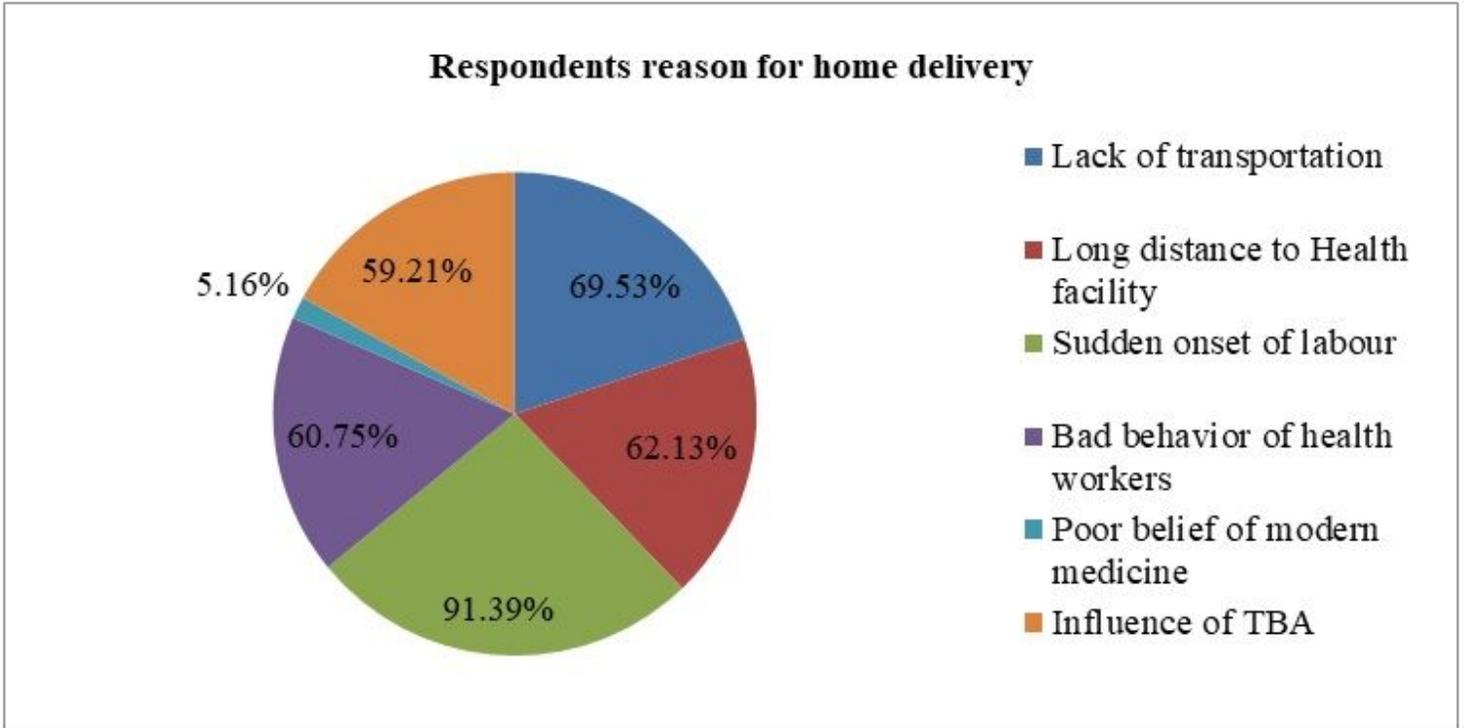


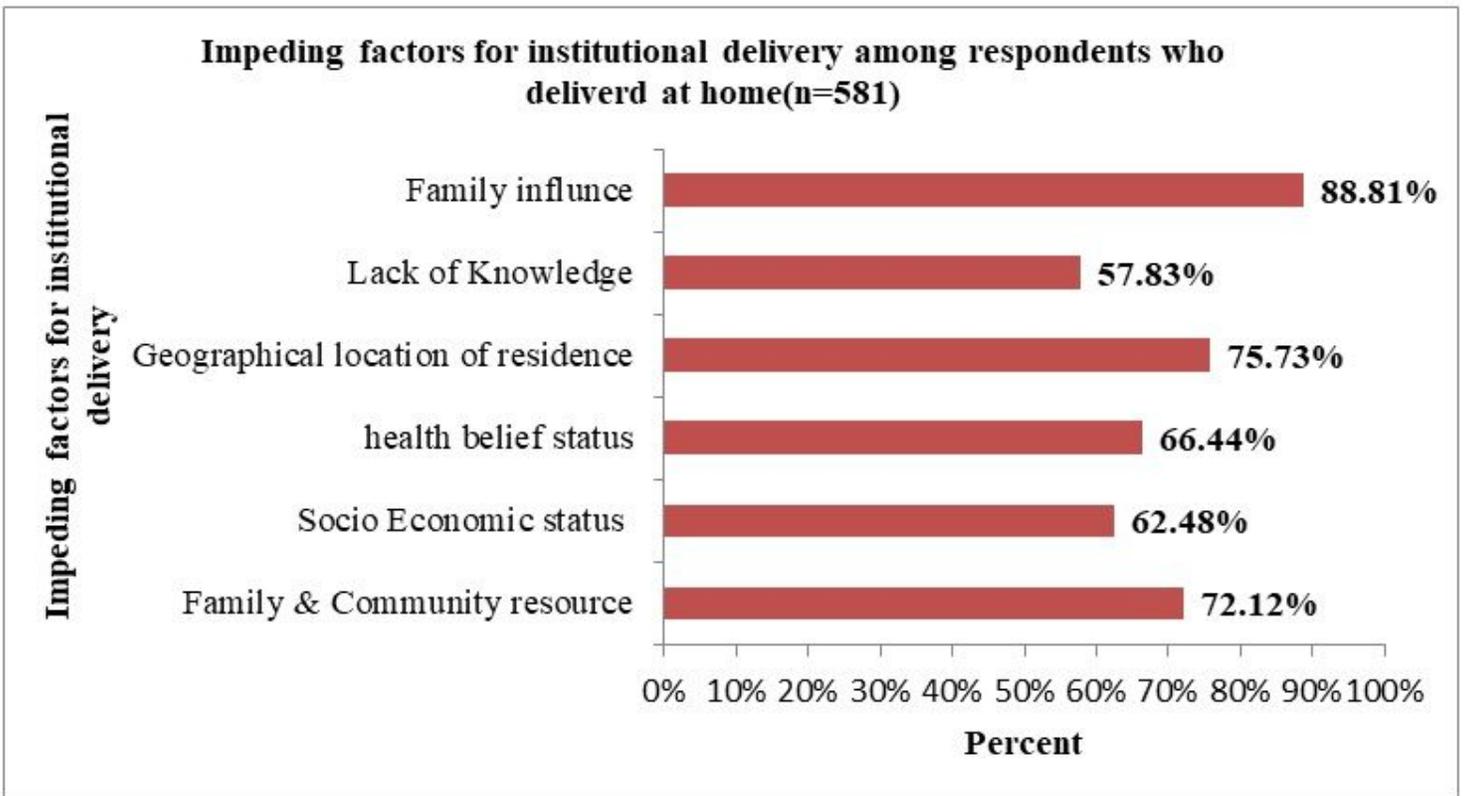
Figure 1

Respondents source of message about institutional delivery for the last 3 month, Central Gondar zone, North West Ethiopia, 2020. \*Other (school adolescent, NGO staff, church/mosque, poster/flyer/leaflet, community event, community discussion, family discussion, clinic/hospital, traditional leader/TBA)



**Figure 2**

Respondents reason for home delivery Central Gondar zone, North West Ethiopia, 2020.



**Figure 3**

Impeding factors for institutional delivery among respondents who delivered at home, Central Gondar zone, North West Ethiopia, 2020.