

Institutional Delivery Service Utilization and Associated Predictors among Mothers Who Gave Birth in the Last Two Years in Pastoralist Hammer District, Southern Regional State, Ethiopia

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ABSTRACT

Institutional delivery service utilization is critical in prevention of maternal death. However, proportion of women utilizing Institutional delivery service in country in general and in southern nation in particular is very low. Reduction of maternal death is global priority particularly in developing countries including Ethiopia, where maternal mortality is one of the highest in the world. Low institutional delivery utilization in pastoralist areas of Ethiopia caused by different factors. To assess institutional delivery utilization and associated factors among mothers who gave birth in the last two years in pastoralist, Hammer district, South Omo Zone, Ethiopia. Communities based cross sectional study with internal comparison were conducted. All women residing in the area at least for five months and who had delivered in the last two years were included in the study. Only 23.4% of the mothers gave birth to their last baby in the health facility. Residential set up (AOR=2.485, 95% CI: 1.325,4.659), maternal education (AOR=0.237, 95% CI: (0.09,0.622)), age at first pregnancy (AOR=1.83, 95% CI: 0.77,4.348), ANC follow up (AOR=0.062, 95% CI: 0.019,0.201) and total number of live birth (AOR=22.3, 95% CI: (2.75,181.59)) had significant associations with institutional delivery service utilization ($p<0.5$).

Institutional Delivery is unacceptably low in the study area. To make impact, there is need of integration of high impact intervention to tackle factors hindering institutional delivery in this pastoralist community and maximize strategies to increase qualities of ANC, maternal education and birth space.

Keywords: Institutional delivery; Utilization; Place of delivery

INTRODUCTION

Globally, 287,000 mothers die from complications of pregnancy and child birth. For the definition purpose Institutional delivery as used in this paper is any delivery that occurred in a modern health facility and was assisted by medically trained professionals such as medical doctors, nurses and midwife/auxiliary midwives. Institutional delivery service utilization is one of the key and proven interventions to reduce maternal death. It ensures safe birth, reduce both actual and potential complications and maternal death and increase the survival of most mothers and newborns. But most deliveries in developing countries occur at home without skilled birth attendants [1-6]. Many low and middle income countries tried their best to optimize key and effective

maternal health interventions to improve maternal health [7]. But the progress made in reducing maternal deaths was very far from the Millennium Development Goal (MDGs) targets. It was very slow in African and South Asian countries [3,4,8]. Sub-Saharan Africa and southern Asia accounted 85% of the global burden of the maternal death, yet this geographic area has only 11% of the world's population [9-11]. The proportion of birth attended by skilled health workers varies across the regions. Nearly all births in developed countries, 61.9% in less developed countries, 35.3% in the least developed countries and 33.7% births in eastern Africa were attended by skilled health personnel [9]. Maternal mortality remains major challenges to health system worldwide. In Ethiopia institutional delivery service utilization at national level was very low, only 10% nationally, 6.2% in SNNPR of births were assisted

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by skilled health care provider [10]. The Millennium Development Goals (MDGs) were adopted to reduce Maternal Mortality Ratio by three fourth (3/4) by 2015. While, the progress towards achieving MDG is not on track and is too slow to meet the set target in most African countries [1-3]. Home delivery is common in many developing countries including Ethiopia, 42% of women in malawi [4], 69% in Nepal [6], 70% in northern Nigeria [8], 74% in Pakistan [12], 87.6% in eastern Burma [13]. Similarly 95% of women in SNNPR they give birth at home. Home delivery mostly prolongs labor and is a recipe for Obstetric Fistula [14]. The 2011EDHS report showed that Maternal Mortality Ratio in Ethiopia is 676 per 100,000 live births [5,10,15]. The justification for this maternal death could be unavailability and low use of the available modern health services in most of women in Ethiopia [5,15]. According to South Omo Zone health department 2015/2007 EC. Annual administrative performance report of Hammer, Dasenech, Salamago and Gngangatom achieved low institutional delivery. Factors affecting institutional are poorly understood and there is no previous research study conducted in pastoralist of Hammer woreda. The government of Ethiopia committed to improve maternal health with a target of reducing Maternal Mortality Ratio (MMR) to 267 per 100,000 live births through multi-pronged approaches including provision of free delivery services [16].

MATERIALS AND METHODS

Study Area and Period

This study was conducted in Hammer district of South Omo Zone (SOZ), south Ethiopia. Hammer is located 750 km south of Addis Ababa, 525 km south west of Hawassa. Hammer district have two urban and thirty six rural pastoralist kebeles. The district has 3 health center, 38 health post, 3 private clinics, 2 drug stores. According to 2007 census projection in 2016 the district has the following population profile. Total population 74,968 of which 17, 468 women were in reproductive age in 2014. With regard to man power there are 7 health officers, 23 clinical nurses, 8 lab technician, 3 sanitarian, 6 druggist, 8 midwives and 41 Health Extension Workers in the district.

Study Design

Community based cross sectional study with internal comparison was conducted to identify the factors for utilization of Institutional Delivery service among women of reproductive age group who had at least one birth in the last two years.

Population

Source population: All child bearing age women who gave birth in the past two years (From October 2014 to November 2016) preceding the study in the district.

Study population: Sampled from source population and all child bearing age women who have gave birth within the two years duration both facility and home delivery in the selected kebeles (the smallest administrative unit) were selected.

Sample population: Sample of child bearing age was women who gave birth in the past two years preceding the study in the kebele.

Inclusion and exclusion criteria

All child bearing age women with having birth in the last two years' duration preceding the study and all child bearing age women who are critically ill condition or unwilling to participate.

Sample Size Determination

Sample size determined by using single population proportion formula. The following assumptions were used to have representative sample for the factors a 6.2% population proportion (taken from EDHS 2011, SNNPR) since no previous study done in the area.

Sample size determined by using single population proportion formula, by considering the following assumptions:

- CI=95% n=sample size, z=1.96
- Margin of error (d)=3% (since Institutional Delivery utilization is low in the area),
- p=6.2% (EDHS 2011, SNNPR)
- $n=z^2 * p(1-p)/d=(1.96)^2 * 0.062(1-0.062)/(0.03)^2=248$
- Multiplied by 1.5 for the design effect given=372 with 7% non-response rate final total of 398 study population

Sample size for the second objective: Case=Health facility, Control=Home delivery and sample size was calculated by using Epi info software (Table 1).

The sample size calculated from first objective 398 was taken as the sample size for the study because it is greater in number and expected to show better association.

Sampling Technique

Multi stage sampling technique was used to select study subjects. Hammer district has 36 kebeles, 9 kebeles were selected by using simple random technique (lottery methods). Mothers who gave birth in the past two prior to the study were taken from registrations in the health post in nine kebeles. All eligible women were listed in checklist. Then, proportional distribution of the sample size for each selected kebeles was done. Finally, mothers were selected by systematic random sampling methods. If women identified as critically ill, in the selected household, the next household located in the right direction with eligible women were selected based on list prepared from health post.

Data Collection Tools and Procedures

Socioeconomic and health related data were collected on mothers like: Age, marital status, family income, place of residence, educational status, occupation, educational status of husband, occupation of husband, age difference between mothers and

Table1. Showed sample size calculation summary.

Factors	Study in	Expected frequency of exposure in the control group	CI 95%	Study power 80%	OR	Ratio of ill to Not ill (1:8)	Sample size	
Education	-48	74.30%	95%	80%	5.7	37:296	296	$37 \times 100/16.7=266$
ANC	-48	72.30%	95%	80%	6	33:264	294	$33 \times 100/16.7=198$

husband, Institutional Delivery service utilization, distance from health facility, family size, presence of radio, obstetrics variables such as age at first pregnancy, ANC (Antenatal Care) visit, parity, gravidity, knowledge towards the ANC and delivery service in the health facilities in face to face interviews using interviewers administered structured questionnaires by house to house visit. The structured questionnaire was originally prepared according to the objective of the study (developed from different literatures and Ethiopian Demographic and Health Survey (EDHS)) and translated into the local language (Hammer). Sections that showed any discrepancies were revised. Six students, who completed grade 12 educations, were recruited for data collection. Data collectors and supervisors were trained mainly on the objective of the study, how to conduct face to face interview and how to keep confidentiality of the information. Then data were collected by using a face-to-face interview after pre-testing in a similar setting of the study area.

Data Processing, Analysis and Quality Assurance

After the collection of all the necessary data, it was checked for completeness and consistency. Then it was coded on prearranged code. Data were entered and cleaned on Epi Info version 3.5.1 and data were exported to SPSS 20.0 for analysis. Data analysis was done by using SPSS version 20.0 software. Univariate analysis was done by using frequency, percentage, table and charts. The associations between dependent and independent variables were assessed by using Odds Ratio (OR) and 95% CI. The relative contributions of each selected variable to the outcome of interest are assessed using bivariate and multivariate analysis. The variable with p-value of <0.25 with 95% CI were chosen analyze to multivariate analysis.

Data quality assurance

All of the data collectors and supervisors were trained for 2-days. The questionnaire were initially prepared in English and then translated to local Hammer language and then back to English were used to collect data. Before data collection, the structured questionnaire was pre-tested in kako and Alduba kebeles to check the questionnaire consistence. A total of 20 mothers were interviewed 10 mothers from kako kebele and 10 mothers from Alduba kebele. After the pre-test, discussions were conducted with data collectors and supervisors, made revision on questionnaires. Data were checked in the field to insure that all the information were properly collected or recorded. Data were collected by grade 12 students who could speak Amharic and hammer languages. The data collection process was supervised by Health officers who complete first degree and had experience in supervision.

Study Variables

Socio-demographic variables: Maternal age, Maternal education, Parental education, Ethnicity, religion, traditional beliefs, women autonomy, residence, community networks in HDA.

Socio-economic: Information availability, health knowledge, household wealth,

Cultural: Belief, attitude

Health facility, obstetrics and reproductive health characters: Distance to facility, transportation to facility, type and quality of health service, birth complications, Antenatal Care visits, intention to deliver at health facility, age at first pregnancy age at first marriage, Parity, Gravidity.

Pastoralist: Community that practice herding as the primary economic activity of a society.

Institutional Delivery (ID) service utilization: It is expressed as the proportion of women who were in need of Institutional Delivery service who actually receive the care within a given period of time in a health facility.

Recently delivered women: Women who had a delivery within the period of two years preceding the period of data collection.

Maternal death: It is the death of women while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental causes.

Knowledge: At least three of the accepted danger signs mentioned

Settled residence: A settlement pattern refers to the way that buildings and houses are distributed in a rural settlement.

Attitude: The established ways of responding to situations that have learned, based on the beliefs, values and assumptions through behavior.

Ethical Considerations

The study protocol were reviewed and approved by Arbaminch University Ethical Review committee, letter of permission was obtained from South Omo Zonal health department and Hammer district health office. The purpose of study, potential risk and benefits and the rights of participants were in detail explained for the study subjects. Verbal consent was obtained from each study subject after explanation about the study. To ensure confidentiality, researchers kept the collected information in strict secret and accessed by the research teams only. Furthermore, all records were coded and also not taken the name of participants.

RESULTS

Out of 398 women 397 have been participated in the survey which making the response rate 99.75%. Table 2 indicated: The majority of the participants 131(33%) were in the age group of 30+ years and the least of the participants 13(3.3%) were being 15-19 years old. Of the total respondents, 257(64.7%) were followers of traditional religion followed by protestant religion 88(22.2%) [17-20]. Regarding marital status of the participant, the majority, 364(91.7%) of the respondents were found to be married. 278(70%) mothers reported that their husbands were pastoralists. The majority of the respondents 339(85.4%) Not settled permanently set up. About 236 (59.4%) of the respondents were not educated, 36(9.1%) of mothers have attended secondary and above grades. With regard to household average monthly income 270(68%) reported to earn less than 1000 Ethiopian birr [21,22].

Obstetric Characteristics of the Respondents

The age at which first marriage and pregnancy begins can have a major impact on the health of both mother and child. In this study, the mean (\pm Standard Deviation (SD)) age at first marriage and at first pregnancy were 14.2 ± 2.5 years and 18.3 ± 2.45 respectively [23]. Sixty seven percent (67%) of participant married at the age of ≤ 18 years and fifty eight percent (58%) of the mothers had got their first pregnancy at their early age (≤ 18 years). Of the total number of pregnancies, 72.8% had five and less number of

Table 2. Socio-demographic Characters of women in Hammer district, southwest Ethiopia, April, 2016.

Characters	Frequency	Percent	
Age in years (N=397)	15-19	13	3.3
	20-24	87	21.9
	25-29	131	33
	30+	166	41.8
Religion (N=397)	Orthodox	52	13.1
	Protestant	88	22.2
	Traditional	257	64.7
Marital status (N=397)	Divorced	7	1.8
	Married	364	91.7
	Separate	7	1.8
	Widowed	19	4.8
Residential set up	Settled permanently	58	14.6
	Not settled permanently	339	85.4
Ethnicity	Hammer	278	70
	Erbore	25	6.3
	Karo	22	5.5
	Others*	72	18.2
Educational status of mothers	Illiterate	236	59.4
	Grade 1-8	125	31.5
	Grade 9 and above	36	9.1
Estimated household income (N=397)	Less than 500	69	17.4
	500-1000	205	51.6
	Greater than 1000	123	31

Note: *Bena, Ari, Konso, Wolayta, **Daily laborer

pregnancies only 69.5% of mothers had got Antenatal Care services for current birth. 88.8% of mothers responded that behavior of health workers providing ANC services were good [24]. Out of 397 respondents only 48% were visited by Health Extension Workers (HEWs) at home in the last pregnancy. Sixteen (4.1%) of mothers make decision on healthcare utilization by themselves, 261(65.7%) by both and 120(30.2%) decision taken by male partner. With regard to place of delivery, 304(76.6%) of respondents delivered at home and 93(23.4%) of mothers delivered at health institution (Table 3) [25,26].

Among mothers who have attended ANC services during last pregnancy were found to be more likely to use health institution for child birth (AOR=0.062, 95%CI: 0.019, 0.201). Figure 1 has shown that out of 186 ANC users, 90 women attended Institutional Delivery, whereas only 3 women attended Institutional Delivery [27-29].

Out of the total 397 women who gave birth in the last two years, 23.4% of them have delivered in health facilities. Figure 2 showed (3.3% at hospitals, 20.1% at health centers), while the others 76.6% have delivered at home (69.8% at home, 6.8% at health post) (Figure 3) [30].

Factors associated with Institutional Delivery service utilization

In order to identify factors associated with Institutional Delivery service utilization bivariate and multivariate analysis were applied. Variables with p-value of ≤ 0.25 in bivariate analysis were included

in multivariate analysis [31]. Crude and adjusted odds ratio were calculated by considering level of significance 95%. After controlling for confounders, the association between selected variables and Institutional Delivery service utilization was analyzed. Residential set up, educational level of mother, age at pregnancy, ANC visit, final decision on Institutional Delivery (ID), preference for burial of placenta, number of live birth were found to have statistically significant association with Institutional Delivery service utilization (Table 4). Mothers who are live in settled permanently were 2.485 times more likely to deliver at health institution than not settled permanently (AOR=2.485, 95%CI: 1.325,4.659) [32,33]. Mothers with no education were less likely to delivery at health institution as compared with grade 9 and above education (AOR=0.237, 95%CI: (0.09, 0.622)). Regarding age at first pregnancy mothers with age 18 years and above were more likely to deliver at health institution than with age less than 18 years (AOR=1.83, 95%CI: 0.77,4.348). Mothers who had no ANC visit at pregnancy were less likely to deliver at health institution when compared with mothers who had ANC visit (AOR=0.062, 95%CI: 0.019, 0.201) [7,34-36]. Concerning final decision making on institutional mothers who made decision on ID with husband were found to be 1.73 times more likely to deliver at health institution than decide by their self (AOR=1.73, 95%CI: (0.764, 3.9)). Mothers who prefers for burial of placenta around home were less likely to deliver at health institution than with preference (AOR=22.3, 95%CI: (2.75, 181.59)). Mothers who delivered for the first time were 37.9 more likely to deliver at health institution than mothers with five and more live birth (AOR=37.9, 95%CI: (9.7, 148.1)) [37,38].

Table 3: Obstetric and other Characteristic variables in Hammer district, southeast Ethiopia, April 2016.

Characters		Frequency	Percent
Age at marriage	<18 years	266	67
	>18 years	131	33
Age at first pregnancy	<18 years	230	57.9
	>18 years	167	42.1
Number of pregnancy/Gravity	One	17	4.3
	4-Feb	228	57.4
	≥ 5	152	38.3
Outcome of last pregnancy	Live birth	378	95.2
	Still birth	19	4.8
Total number of live birth/Parity	Five and less	315	79.3
	Six and more	82	20.7
ANC visit in last pregnancy	Had at least one ANC	276	69.5
	Had no ANC	121	30.5
Knowledge on danger signs of pregnancy	Yes	160	40.3
	No	237	59.7
Final decisions on ID	My Self	16	4.1
	My Husband	261	65.7
	Both wife and husband	120	30.2
Place of delivery for last child	Home	304	76.6
	Institutional	93	23.4
Assistance at home delivery	Traditional Birth Attendants (TBAs)	161	58.5
	Relatives/Friends	63	22.7
	Neighbors	51	18.3

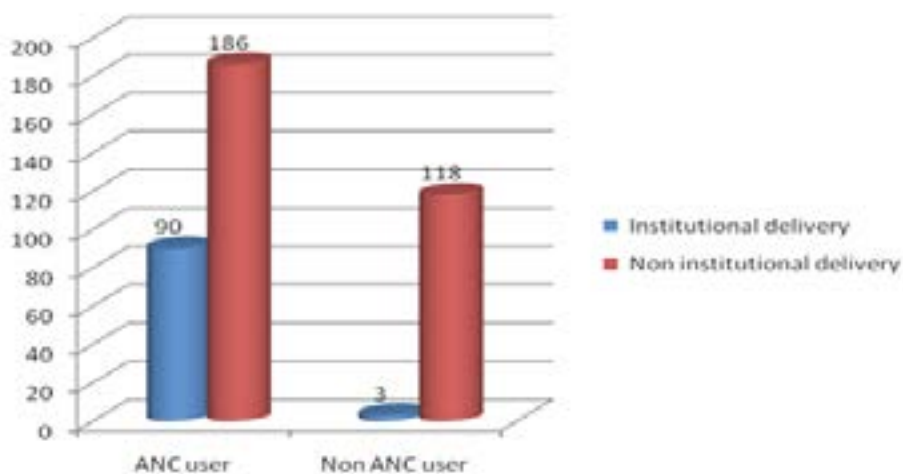


Figure 1. Place of last delivery categorized by ANC service use during pregnancy.



Figure 2. Place of delivery for last child.

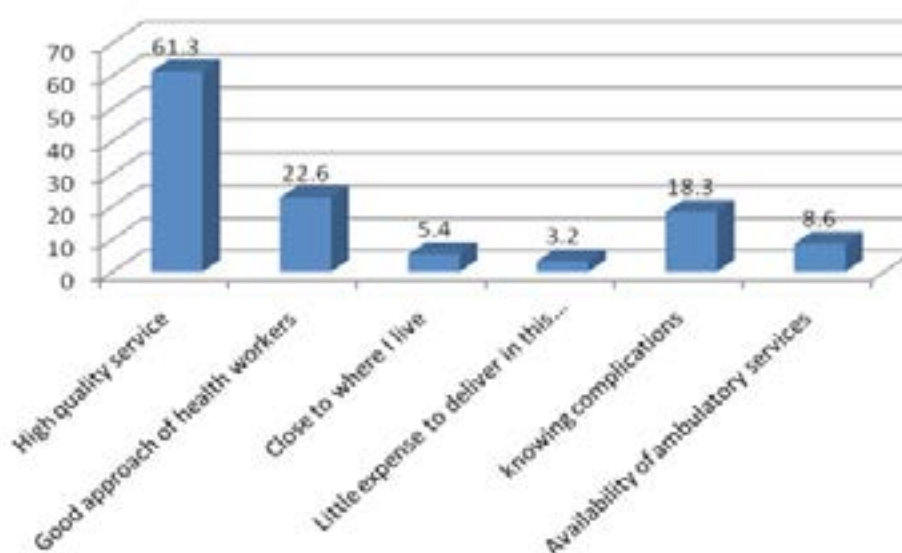


Figure 3. Reasons for Institutional Delivery (ID).

Table 4. Factors Associated with ID in Hammer district, South Omo Zone south Ethiopia, April, 2016.

Explanatory Characters	Institutional Delivery (ID)		Crud OR (95%CI)	Adjusted OR (95%CI) (AOR)	P-value
	Yes	No			
Residence					
Settled permanently	26	32	1	1	
Not settled permanently	67	272	3.299(1.842,5.906)	2.485(1.325,4.66)	<0.0001
Educational status of mothers					
Illiterate	23	213	0.461(0.217,0.978)	0.237(0.09,0.622)	
Grade 1-8	49	76	0.077(0.035,0.17)	0.67(0.29,1.55)	0.03
Grade 9 and above	21	15	1	1	
Age at pregnancy					
Less than 18 years	48	218	1	1	<0.0001
18 years and above	45	86	0.42(0.261,0.678)	1.83(0.77,4.348)	
ANC at last pregnancy					
Had no ANC visit	3	118	0.053(0.016,0.17)	0.06(0.019,0.201)	<0.0001
Had at least one visit	90	186	1	1	
Final decision on place of delivery					
Both mother and Husband	51	69	5.57(1.13,23.779)	1.73(0.764,3.9)	
Husband	40	221	1.267(0.277,5.789)	0.59(0.314,1.116)	<0.0001
Self	2	14	1	1	
Preference for burial of placenta around home					
Yes	1	74	29.6(4.055,216)	22.3(2.75,181.59)	0.004
No	92	230	1	1	
No of live birth/Parity					
One	13	4	41.7(11.6,149.48)	37.9(9.7,148.1)	
Two-Four	69	159	5.56(2.831,10.93)	4.233(2.11,8.478)	0.01
>or=5	11	141	1	1	

DISCUSSION

This study is community based study in randomly selected kebeles. It examines factors affecting mother's preferences of place of delivery. This study showed that Institutional Delivery service utilization in the study area was very low (23.4%). This finding was greater than EDHS 2011 for southern (SNNPRS), it was 6.2% [17]. The reason for the difference may be that the government had committed to enhance Institutional Delivery service in the region as well as in the district such as advocacy workshops at different levels,

making any pregnancy related services including delivery free of charge, distributing ambulances and integrating maternal services to Health Development Army (HAD) [39]. In this time gap, since 2011 there could be improvement in accessing and utilizing the service. The study also revealed that the finding was much lower than other studies done in Afar region, Dupiti and Asayta towns in which Institutional Delivery service utilization rate was 54.2% [18]. Concerning residential set up mothers living in rural areas were less likely to give birth at health institution than urban mothers

[19,20]. EDHS 2011 revealed that large difference exist in many key health indicators in relation to residential set up showing that living in rural area in unsettled manner were a barrier to seek a modern health care. The possible explanation might be has better chance for health information, accessibility for health facility, low exposure for traditional beliefs. Mothers who had educational level of secondary and above were more likely to utilize Institutional Delivery service than mothers who had no education [40-43]. This finding was consistent with previous studies which showed that educational status of mothers to be the most significant associated factors for utilization of Institutional Delivery [19-22]. Education may enhance female autonomy, thus increasing mother's ability to make decision regarding their utilization of Institutional Delivery services. It also increases the knowledge of delivery care. Since educated mothers are more likely to be aware of difficulties during pregnancy and child birth, as a result they are more likely to use Institutional Delivery service. Regarding age at first pregnancy was observed statistically significant which is consistent with previous studies. The possible explanation might be Negative attitude towards health seeking behaviors, Prone to different cultural beliefs. In this study ANC had significant association with Institutional Delivery [44]. This study is consistent with studies done in different parts of Ethiopia which revealed that receiving early and on time ANC advice will prepare mothers for child birth and encourage them to give birth in health institutions [23-25]. This may be 68.3% respondent were unable to read and write so ANC follow up had great effect in changing in attitude and behavior of the women, it might make illiterate women acquirer new knowledge and health information. Decision making was an important factor on place of delivery [45]. Mothers who made decision on Institutional Delivery service utilization with their husbands were more likely to give birth at health institution. This finding consistence with study done. There is a growing awareness of need to involve men in all stages of delivery. Men need to be targeted as key elements in improving Institutional Delivery service utilization [26,27]. Women who were preferred to bury placenta around home were less likely utilize Institutional Delivery services which is contrarily to health facilities where placenta is discard by placenta pit. This finding was consistence with study done in [28]. The reason may be that placenta should be buried in the dry soil so that the child would not suffer from any cold or cough at later. Also community may believe that placenta must be buried in certain manner for a woman to continue bearing children [46-48]. Regarding number of a live birth mothers with five and more live birth were 41.7 times less likely to deliver at health institution than mothers with one live birth. There are numerous explanations for this predictor. Women who has one child or few number of children had motivated and interested to utilize maternal health service than those mothers with more than five children because of social as well as economic factors [29]. Regarding other variables of place of delivery our findings did not reveal any supporting evidence age and marital status to show statistically significant between dependent and independent variables. These findings could be because of difference in research methodology, sample size and others that might not be accounted in this study [49,50].

LIMITATIONS OF THE STUDY

The effect and temporal relationship was unable to established due to the cross sectional nature of the study. Also, the recent study conducted in pastoralist district that may not represent agrarian district.

CONCLUSION

This study has revealed that Institutional Delivery by mothers in the area is very low, 23.4%. Residential set up, maternal education; age at first pregnancy, ANC visit, final decision made on Institutional Delivery, preference on burial of placenta and number of live birth were found to be factors that affect Institutional Delivery. Governmental and non-governmental organization efforts should focus on design of interventions to tackle barriers for Institutional Delivery utilization. Furthermore, women education and empowerment is very critical issues on improvement of health facility delivery.

DECLARATIONS

Author's Contributions

The authors participated in the preparation of the study design, data collection, analysis and interpretation of data. Authors read and approved the final manuscript.

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