



# Magnitude of Safe Delivery Services Utilization and Associated Factors Among Women of Childbearing Age in Egela Sub-Woreda, Tigray, Northern Ethiopia

Andemariyam Yohannes<sup>1</sup>, Teshome Gobana<sup>2</sup>, Fitsum Araya<sup>3</sup>, Nigusse Obse<sup>4</sup>

<sup>1</sup>Department of Biomedical Sciences, College of Health Sciences, Samara University, Samara, Ethiopia

<sup>2</sup>Department of Biomedical Sciences, College of Health Sciences, Jimma University, Jimma, Ethiopia

<sup>3</sup>Department of Gynecology & Obstetrics, College of Health Sciences, Jimma University, Jimma, Ethiopia

<sup>4</sup>Department of Biomedical Sciences, Adama Hospital Medical College, Adama, Ethiopia

## Email address:

anduyo2002@gmail.com (A. Yohannes), niguse11@gmail.com (N. Obse)

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**Abstract:** In Ethiopia, the levels of maternal and infant mortality and morbidity are among the highest in the world. Community based studies about safe delivery service utilization are not enough. As per the few studies done, professional assisted delivery is low in the country and particularly in Tigray region where the study was conducted. Community based cross sectional both quantitative and qualitative study were conducted in subworeda Egela, Northern Ethiopia on assessment of safe delivery service utilization and associated factors in mothers of childbearing age. The data for the quantitative method was collected using a pretested structured questionnaire on a sample of 380 mothers. The qualitative data were collected by FGDs with mothers of childbearing age, with the administrative bodies in the Subworeda and health professionals. The data were entered and analyzed using SPSS 16.0 and the appropriate statistical methods was used in the presentation, test of significant associations of variables at CI of 95%. The study revealed that 10.3% of the women deliver in health institution. 25% of the urban and 6.3% of the rural women deliver at health institutions. The socio-demographic variables s, obstetric factors, ANC attendance, TT vaccination & distance of health institution, were significantly associated with institutional delivery. In general this study revealed that the proportion of births delivered in the health institutions were unsatisfactory. The socio-demographic, obstetric and health service factors like distance of health institution were determinant factors. Therefore, establishing centers for emergency obstetric care other than the health center in accessible areas, providing health education for women of childbearing age by focusing on the Multi-para are the possible solutions should be recommended.

**Keywords:** Safe Delivery, Maternal and Infant Mortality and Morbidity, Professional Assisted Delivery, Women of Childbearing Age

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## 1. Introduction

Maternal death is death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration of pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental causes [1]. Globally, more than half a million women die every year because of complications related to pregnancy and childbirth. Of that half a million, 95% are

from developing nations [2], with about a half occurring in Sub Saharan Africa while about 187,000 occur in Asia [3].

In Ethiopia the levels of maternal and infant mortality and morbidity are among the highest in the world [4]. Maternal mortality ratio is estimated at 673/100,000 live births [1, 5]. In Tigray MMR 505-576 per 100,000 live births based on community survey in 2001 [6]. Tigray has shortage of skilled birth attendants and has low utilizations of obstetrics care. The rural women have poor access to basic emergency obstetric care and comprehensive emergency care [7].

Proportion of deliveries attended by skilled health care personnel, around 1990 and around 2006 in Sub-Saharan Africa was 42 and 47 percent respectively [8].

In developing countries the proportion of births attended by skilled birth attendants increased from 42% to 53% over the decade from 1990 to 2000. Studies had been done in Ethiopia by different investigators on roles of socio-demographic factors on utilization of maternal health care services [5] and utilization of maternal health care services in Ethiopia [9]. Those studies assess the magnitude and main factors that deter mother from using maternal health care services.

However, the fact that the factors; cultural, beliefs and attitudes, access to the health care giving institutions and other factors that interfere maternal delivery service utilization are different in different communities, conducting more community based study is very crucial to undertake necessary interventions by the concerned bodies accordingly. Therefore, this study will contribute by availing the current magnitude of utilization of safe delivery service and factors that affect it in the study area.

## 2. Methods & Materials

### 2.1. Study Area

Community based cross-sectional study was conducted in

Subworeda Egela, which is located around 190 kms far from the capital city of Tigray Regional State, Mekelle to the North West with total population of 46,462.

### 2.2. Sampling and Sample Size Determination

#### 2.2.1. Quantitative Data

The sample size was determined by considering delivery service utilization in the region to be 12.7% [10]. The actual size for the study is computed using one population proportion formula as indicated below.

Thus, the sample size was

$$n = \frac{(Z \alpha/2)^2 \times P(1-p)}{d^2} \quad (1)$$

$n = 172$  plus 10% non - response rate & design effect of 2

Total = 380 sampled women were included

Stratified multistage sampling method was used for quantitative data collection by dividing the Sub-Woreda into Urban and Rural kebeles. Pre tested interviewer administered questionnaires was used to collect data from respondents.

#### 2.2.2. Qualitative Data

A total of 4 focus group discussion (FGDs) were conducted for qualitative data.

Sampling Frame for Qualitative Data

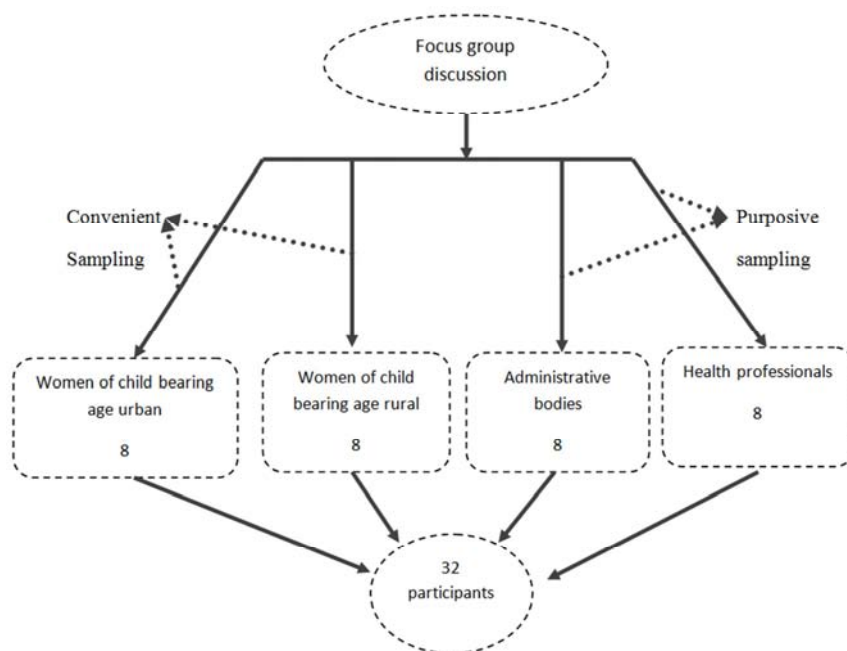


Figure 1. Schematic representation of sampling frame for qualitative data collection.

#### 2.2.3. Data Collection and Analysis

Data were fed and analyzed using SPSS 16.0, descriptive analysis, bivariate and multivariate logistic regression was used to test significant associations of variables using Odds Ratio at 95% CI. The results of the analysis were discussed along with results of the quantitative study.

## 3. Result

Majority of the respondents 93.2% were housewives. The mean age for the respondents was 30.37 (S.d.  $\pm$  7.565). About 78.9% of the respondents were rural and 21.1% were urban. The educational status of the respondents was 67.1% and 32.9% for illiterate and literate, respectively. (Table 1)

**Table 1.** Socio-demographic Characteristics of Respondents in Egela (sub-woreda) Tigray Region, Northern of Ethiopia July –August 2011 (n=380).

Socio-demographic characteristics		Frequency N= 380	Percent (%)
Age during interview	15-19	19	5.0
	20-24	86	22.6
	25-29	67	17.6
	30-34	78	20.5
	>35	130	34.2
Religion	Orthodox	378	99.5
	Muslim	2	0.5
Ethnicity	Tigrie	376	98.9
	Amara	4	1.1
Residency	Rural	300	78.9
	Urban	80	21.1
Mother's educational status	Literate	124	32.1
	Illiterate	256	67.9
Higher grade attended	Read and write	8	6.3
	1-8	105	83.3
	9-12	11	10.3
Husband Edu. Status	Literate	221	58.2
	Illiterate	159	41.8
Husband edu. Level	Read and write	39	17.5
	1-8	158	70.9
	9-12	20	9.0
	12+	1	0.4
	Other	5	2.2
Marital status	Single	2	5
	Married	184	48.4
	Diseased husband	18	4.7
	Separated	166	47.7
	Divorced	10	2.4
Mother occupation	House wife	354	93.2
	Merchant	25	6.6
	Other	1	0.3
Husband occupation	Farmer	310	81.6
	Merchant	50	13.2
	Civil servant	19	5.0
	Other	1	0.3
Family size	1-2	20	5.3
	2-4	116	30.5
	>5	244	64.2
Monthly income	<100	46	12.1
	100-499	298	78.4
	>500	36	9.5

The overall utilization of safe delivery service in subworeda Egela was 10.3%. About 87.1% of the respondents had duration of labor <12 hour, and 12-24 and >24 were the duration of labor for the other 9.5% and 2.6% of the respondents, respectively. Utilization of ANC

in the study area according to WHO standard is 12.4%. The greater part of the respondents (40.5%) had travelled less than one hour to reach the health institution. The rest 34.5% and 25% travelled 1-2 and >2 hours, respectively (Table 2).

**Table 2.** *Obstetric, Delivery Characteristics and Traditional Harmful Practices of the Respondents in Egela (sub-woreda), Tigray Region, Northern Ethiopia, July – August, 2011 (n=380).*

Variables		Frequency N=380	Percent (%)
Age during delivery	15-19	68	17.9
	20-24	65	17.1
	25-29	80	21.1
	30-34	73	19.3
	>35	94	24.7
	<12	331	87.1
Duration of labor	12-24	36	9.5
	>24	10	2.6
	I don't remember	3	0.8
	<1	154	40.5
Time spend to travel	1-2	131	34.5
	>2	95	25
Place of delivery	Home	38	10.3
	Health institution	342	89.7
Parity	1	66	17.4
	2-4	179	47.1
	≥5	135	35.5
Gravidity	1	58	15.3
	2-4	166	43.7
	≥5	156	41.1
ANC attendance	Yes	222	58.4
	No	158	41.6
N° of ANC visits	One	29	7.6
	Two	59	15.5
	Three	75	19.7
	Four and above	47	12.4
TT vaccination	Yes	205	53.9
	No	175	46.1
Complication of labor	Yes	39	10.3
	No	341	89.7
Assistance during delivery			
Health professional		1	0.3
TBAs		9	2.4
Relatives		205	53.9
Neighbor		122	32.1
No one		5	1.3
Abdominal massages	Yes	43	11.3
	No	337	88.7
Reason for utilization			
Health problem		19	4.7
Fear there might be pain		20	5.0
Other		1	0.3

In bivariate analysis mothers whose ages were 35 years and above were less likely to utilize safe delivery service than women whose age was 15-19 years (OR=0.09, 95% CI=0.028, 0.28). On the other hand, mothers that were at the age of 20-24 were slightly more to deliver at health institution than the women at 15-19 years (OR=0.18, 95% CI=0.58, 0.60).

About 6.3% of the rural and 25% of the urban participants delivered in health institution. The rural participants were

less likely to deliver in health institution than the urban counter parts (OR=0.203, 95% CI=0.102, 0.403).

Regarding the level of education of the literate participants, utilization of safe delivery tends to increase as the level of education increases. Therefore, participants with read and write and elementary level of education were less likely to deliver at health institution than participants that had secondary level of education (OR=0.82, 95% CI=0.007, 0.92) and (OR=0.09, 95% CI=0.025, 0.365), respectively. (Table 3).

**Table 3.** Association of Socio-demographic Factors of Respondents with Preference to Safe Delivery Services Utilization in Egela (Sub-woreda), Tigray, Northern Ethiopia June – August, 2011.

Variables		Place of delivery				Crud OR (95% CI)
		HI		Home		
		N	%	N	%	
Age at interview	15-19	10	14.7	58	85.3	1.00+
	20-24	12	18.5	53	81.5	0.12 (0.03,0.40)*
	25-29	4	5.0	76	95	0.18 (0.58,0.60)*
	30-34	6	8.2	67	91.8	0.57 (0.04,0.50)*
	>35	7	7.4	87	92.6	0.09 (0.028,0.28)*
Religion	Orthodox	39	10.3	339	89.7	1.00+
	Muslim	0	0	2	100	0.0 (0)
Ethnicity	Tigrie	37	9.8	339	90.2	1.00+
	Amara	2	50	2	50	0.109 (0.015-0.798*
Residency	Rural	19	6.3	281	93.7	0.203 (0.102,0.403)*
	Urban	20	25	60	75	1.00+
Mother's Educational status	Literate	23	18.5	101	81.5	1.00+
	illiterate	16	6.2	240	93.8	3.416 (1.73-6.73)*
Higher grade attended	Read and write	1	12.5	7	87.5	0.82 (0.007,0.926)*
	1-8	15	14.3	90	83.7	0.095 (0.025,0.365)*
	9-12	7	63.6	4	36.4	1.00+
Marital status	Single	1	50.0	1	50	0.64 (0.04,1.08)
	Married	11	6.0	173	94.0	1.00+
	Diseased husband	5	27.8	13	72.2	0.165 (0.05,0.54)*
	Separated	22	13.3	144	86.7	0.416 (0.195,0.887)*
	Divorced	0	1	10	100	1.027 (0)
Mother's occupation	House wife	30	8.5	324	91.5	1.00+
	Merchant	9	36.0	16	60.0	6.07 (2.47,14.91)*
	Other	0	0	1	100	0 (0)
	Farmer	20	6.5	290	93.5	0.19 (0.06,0.59)*
Husband occupation	Merchant	14	28.0	36	72	1.08 (0.33,3.59)
	Civil servant	5	26.3	14	73.7	1.00+
	Other	0	0	1	100	0 (0)
Family size	1-2	1	5.0	19	95.0	0.58 (0.07,4.63)
	2-4	18	15.5	98	84.5	2.05 (1.04,4.05)*
	>5	20	8.2	224	91.8	1.00+
	<100	6	13.0	40	87.0	0.34 (0.11,1.03)
Monthly income	100-499	22	7.4	276	92.6	0.18 (0.07,0.41)*
	>500	11	30.6	25	69.4	1.00+

\* = Significant results

+ = Reference category

About 14% of the respondents who attended ANC and 5.1% of the respondents who did not utilize ANC deliver in health institution. On the other hand 86% of the respondents who utilized ANC and 94.9% of the respondents who did not utilize ANC deliver at home. When we come to the tetanus vaccination

of the respondents, women who had TT vaccination were seen to deliver at health institutions than those who had not. Thus, the respondents who had TT vaccination were more liable to utilize safe delivery service than the respondents who had not (OR=0.26, 95% CI=0.12, 0.60). (Table 4).

**Table 4.** Association of obstetric factors of respondents with preference to safe delivery services utilization in Egela (Sub-woreda), Tigray, Northern Ethiopia, June – August, 2011 (n=380).

Variables		Place of delivery				COR. 95% CI
		Health center		Home		
		N	%	N	%	
Age during delivery	15-19	10	14.7	58	85.3	1.00+
	20-24	12	18.5	53	81.5	0.31 (0.52,3.28)
	25-29	4	5.0	76	95.0	0..30 (0.09,1.02)
	30-34	6	8.2	67	91.8	0.51 (0.17,1.51)
	>35	7	7.4	87	92.6	0.46 (0.16,1.29)
Gravidity	1	11	19.0	47	81	3.08 (1.25,7.57)*
	2-4	17	10.2	149	89.8	1.50 (0.68,3.32)
	>5	11	7.1	145	92.9	1.00+
Parity	1	12	18.2	54	81.8	3.11 (1.23,7.81)*
	2-4	18	10.1	161	89.9	1.56 (0.68,3.60)
	>5	9	6.7	126	93.3	1.00+
Distance of health institution	0-1	28	18.2	126	81.8	1.00+
	2-4	5	3.8	126	96.2	0.17 (0.06,0.47)*
	>5	6	6.3	89	93.7	0.30 (1.31,8.29)*
Husband outlook	Positive	37	10.5	315	89.5	0.64 (0.13,3.02)
	Negative	2	15.4	11	84.6	1.00+
	I don't know	0	0	15	100	0
Complications	Yes	5	11.6	38	88.4	1.17 (0.43,3.18)
	No	24	10.1	303	89.9	1.00+
ANC attendance	Yes	31	14.0	191	86	3.04 (1.35,6.81)*
	No	8	5.1	150	94.9	1.00+
TT vaccination	Yes	31	15.1	174	84.9	0.26 (0.12,0.60)*
	No	8	4.6	167	95.4	1.00+
Complication history	Yes	2	6.2	30	93.8	1.00+
	No	25	9.0	253	91.0	1.53 (0.34,6.78)
	Beginner	12	17.4	57	82.6	3.26 (0.68,15.52)
Fear of problems	Yes	30	11.3	236	88.7	0.67 (0.30,1.47)
	No	9	7.9	105	92.1	1.00+

\* = Significant values

+ = Reference category

The net effect of each variable on the status of use of safe delivery was measured by entering variables that have a statistically significant association in the bivariate regression analysis to multivariate regression analysis model. However, only two of the variables were statistically significant. The

results of the multivariate analysis show that monthly income and women's level of education were the independent predictors of utilization of safe delivery service utilization. (Table 5)

**Table 5.** Adjusted for socio-demographic and obstetric factors determining preference of place of delivery of respondents in Egela (Sub-woreda), Tigray, Northern Ethiopia, June-August, 2011 (n=380).

Variables		Place of Delivery				COR (95% CI)	AOR (95CI)
		HI		Home			
		N	%	N	%		
Age at interview	15-19	10	14.7	58	85.3	1.00	1.00
	20-24	12	18.5	53	81.5	0.12 (0.03,0.40)*	0.43 (0.08,2.07)
	25-29	4	5.0	76	95	0.18 (0.58,0.60)*	0.58 (0.08,4.30)
	30-34	6	8.2	67	91.8	0.57 (0.04,0.50)*	1.68 (0.17,14.46)
	>35	7	7.4	87	92.6	0.09 (0.02,0.28)*	0.34 (0.02,4.22)

Variables		Place of Delivery				COR (95% CI)	AOR (95CI)
		HI		Home			
		N	%	N	%		
Ethnicity	Tigrie	37	9.8	339	90.2	1.00	1.00
	Amara	2	50	2	50	0.10 (0.01-0.79)*	2.38 (0.16,33.73)
Residency	Rural	19	6.3	281	93.7	0.203 (0.102,0.403)*	1.06 (0.15,7.25)
	Urban	20	25	60	75	100	1.00
Mom. Edu. Status	Literate	23	18.5	101	81.5	1.00	1.00
	illiterate	16	6.2	240	93.8	3.416 (1.73-6.73)*	0
	Read and write	1	12.5	7	87.5	0.82 (0.007,0.926)*	0.08 (0.008,1.02)
Higher Gr. Attended	1-8	15	14.3	90	83.7	0.095 (0.025,0.365)*	0.06 (0.01,0.27)*
	9-12	7	63.6	4	36.4	1.00	1.00
	0-1	28	18.2	126	81.8	1.00	1.00
Distance of HI	1-2	5	3.8	126	96.2	0.17 (0.06,0.47)*	0.53 (0.11,2.47)
	>2	6	6.3	89	93.7	0.30 (1.31,8.29)*	0.37 (0.03,3.60)
	Yes	31	14.0	191	86	3.04 (1.35,6.81)*	1.00 (1.12,8.32)
ANC attendance	No	8	5.1	150	94.9	1.00	1.00
	Yes	31	15.1	174	84.9	0.26 (0.12,0.60)*	2.33 (0.56,9.55)
TT vaccination	No	8	4.6	167	95.4	1.00	1.00
	Single	1	50.0	1	50	0.64 (0.04,1.08)	0
Marital status	Married	11	6.0	173	94.0	1.00	1.00
	Diseased husband	5	27.8	13	72.2	0.165 (0.05,0.54)*	2.27 (0.24,21.53)
	Separated	22	13.3	144	86.7	0.416 (0.195,0.887)*	0.83 (0.21,3.19)
	Divorced	0	0	10	100	1.027 (0)	0
	House wife	30	8.5	324	91.5	1.00	1.00
Mother's occu	Merchant	9	36.0	16	60.0	6.07 (2.47,14.91)*	0.52 (0.43,6.37)
	Other	0	0	1	100	0 (0)	0
Husband occu	Farmer	20	6.5	290	93.5	0.19 (0.06,0.59)*	1.03 (0.09,11.64)
	Merchant	14	28.0	36	72	1.08 (0.33,3.59)	1.08 (0.09,5.37)
	Civil servant	5	26.3	14	73.7	1.00	1.00
	Other	0	0	1	100	0 (0)	0
	1-2	1	5.0	19	95.0	0.58 (0.07,4.63)	0
Family size	2-4	18	15.5	98	84.5	2.05 (1.04,4.05)*	2.57 (0.83,7.92)
	>5	20	8.2	224	91.8	1.00	1.00
Monthly income	<100	6	13.0	40	87.0	0.34 (0.11,1.03)	0.13 (0.01,1.23)
	100-499	22	7.4	276	92.6	0.18 (0.07,0.41)*	0.22 (0.05,0.82)*
	>500	11	30.6	25	69.4	1.00	1.00

**Note.** Mom. Edu. = Mothers educational status

Husband/mother Occu. = Husband or maternal educational status

HI= health institution

\*= Significant values

+ = Reference category

## 4. Discussion

The utilization of institutional delivery service in the sub-woreda was 25% for urban and 6.3% for rural. And the overall magnitude of utilization of safe delivery in Egela is about 10.3%. The remained 89.7% of the women give birth at home. This finding is higher than the Ethiopian demographic and health survey (EDHS, 2005) in which the

utilization for nationally and for Tigray region were 6% and 6.1% [10], respectively. The reason for better utilization could be due to the efforts exerted to increase utilization of safe delivery within the last five years. In addition, this could be due to the organized tasks done in the sub-woreda to improve utilization of institutional delivery as indicated by the FGD participants. This finding is a little bit lower than the result for delivery service utilization indicted by health

and health related indicators 2006/2007 prepared by ministry of health [11]. However, it is consistent with the other studies done in 2010 & 2008 [5, 12]. Possibly the reason for this could be the annual report prepared by the Ministry of Health (MOH) is institution based report. On the contrary, our study was community based, thus looking this much difference is likely.

Women's age during interview was found to be important indicator of utilization of safe delivery services. The utilization of safe delivery service increases as we go down from higher age to lower age. The participants whose age was >35 were less likely to deliver at health institution than the participants whose age was 15-19 (OR=0.09, 95% CI: 0.028, 0.28). Women who were at higher age had the experience to deliver at home and may reduce their tendency to deliver at health institution. This result is consistent with other studies done on maternal health care seeking behaviors [10, 13].

The results of the current study revealed that utilization of safe delivery service is significantly influenced by residency. Women who reside in rural areas were 0.2 times less likely to deliver at health institution than those who reside in urban (OR=0.20, 95% CI: 0.102, 0.403). This study is in line with finding in North Gonder zone although a little bit lower, where the rural women were 0.03 times less likely to deliver at health institution than the urban [14] and others [5, 15]. The reason may be the urban women are nearest to media, health institution and relatively economically better than the rural counterparts [16]. The result of this study showed to better result in institutional delivery than the study done in north Gonder zone. This may be due to the time gap the studies done and the efforts being undertaken by the government to meet the MDGs 5.

Educational status had shown to be independent predictor of place of delivery while the effects of other variables were controlled in the multivariate logistic regression model. Those participants whose educational levels were elementary school were less likely to deliver at health institution than secondary school level (AOR=0.06, 95% CI: 0.01, 0.27).

Maternal occupation was seen to affect institutional delivery service utilization. Merchant women were six times more likely to deliver at health institution than women who were housewives (OR=6.07, 95% CI: 2.47, 14.91). This is consistent with other study done in Metekel Zone [12].

Husband occupation was significantly associated with utilization of institutional delivery service. Women who had partner farmers were less likely to deliver in health institution than those women whose husband was civil servants (OR=0.19, 95% CI: 0.06, 0.59). This study were supported by the another study, where women who had partner skilled worker had about 1.8 times higher odds of with professional assistance than women who were not skilled professional (5).

Family size had showed significant association with place of delivery. the women who had 2-4 family were about two times more likely to deliver at health institution than those who have >5 family size (OR=2.05, 95% CI: 1.04, 4.05).

This study was in line with other studies done in developing countries [15, 17].

Monthly income of the women also showed statistically significant association with place of delivery. Thus, the women whose monthly income was 100-499 were about three times less likely to deliver at health institution than those women whose monthly income was  $\geq 500$  (OR=0.18, 95% CI: 0.07, 0.41). This variable was to be the independent predictor of place of delivery. The respondents whose monthly income was 100-499 were less likely to deliver at health institution than those participants whose income >500 birr (AOR=0.22, 95% CI: 0.05, 0.82) (10).

Distance of the health institution was also another determinant factor for utilization of safe delivery services. The women who reside 1-2 and >2 hours far from the health institution on foot were less likely to deliver in health institution than those who reside less than 1 hour far from the HI on foot (OR=0.17, 95% CI: 0.06, 0.47) and (OR=0.30, 95% CI: 1.31, 8.29). This finding was supported by other findings [15, 18, 19].

Antenatal care (ANC) visit positively predicts use of safe delivery services and it is more effective in preventing adverse pregnancy outcome if continued throughout the pregnancy [5, 14, 15]. The more the exposure the women have for the health institution, the more the probability of utilizing. The FGD participants explained that there were health education programs during ANC attendance time; this might also contribute for better utilization of the institutional delivery than those who did not attend. Similarly, TT vaccination and institutional delivery was seen being significantly associated in our study. The participants who had TT vaccination were more likely to utilize safe delivery service than those who did not. The above explained reason for ANC may as well describe for TT vaccination too.

## 5. Conclusion and Recommendation

In conclusion, this study demonstrated that utilization of safe delivery service is inadequate in the area as clearly depicted in the results during the period of five years preceding the survey. The most important factors influencing utilization of safe delivery service were demographic and socio-cultural in characteristics..

The main reasons given by the FGD participants for not attending ANC were fear of injections, distant health facility and work overload. Other barriers found to be important of safe delivery service were distance of health institution from home, absence of road and ambulance services as clearly stated by the FDG participants.

As women's education is an important factor for the institutional delivery, improving education among girls, beyond the primary school, needs to be strongly encouraged and aware of the women the institutional delivery is cost free.

Since pregnancy related complications are the main reasons for utilization of health facilities, community awareness program must focus on the danger signs during



pregnancy and childbirth.

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