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Factors affecting the usage of maternal health care services at Dita woreda in the case of Zada town, Gamo Gofa zone, South Ethiopia

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Abstract
Although using all maternal health care services play a principal role for further improvement, of maternal and child health, the current prevalence and determinants of maternal care services usage have not been explored in the study area. Hence, this study aimed to assess the prevalence and determinants of maternal health care services usage to fill the existing information gap in the study area. Community based cross sectional study design and a sample of 240 women was selected by simple random sampling technique. Descriptive analysis was used to estimate the prevalence and potential predictors were selected by using chi-square test of association between status of maternal health care usage and predictors. Binary logistic regression model was used to identify the determinants of maternal health care usage. From a descriptive analysis, out of 240 sampled women, antenatal and institutional delivery care services utilization in the study area were 55%, 52.5%, respectively. It was found that educational level of women and their husbands, income of family, awareness about maternal health care services, access of health care services, birth order, exposure to media, occupation of women and their husbands, age of mothers, perception on the professional quality and waiting time for the services were the determinants of both antenatal and institutional delivery care services utilization. Therefore, to increase maternal health care services utilization: expanding access of health care services, improving education of women and their husbands, creating awareness and providing training for health workers to increase their skill are highly recommended in this study.

Keywords: maternal health care, antenatal care, institutional delivery care, binary logistic regression, odds ratio

Introduction: Background

Maternal health during their pregnancy and delivery is vital for the mothers and their children. According to WHO, maternal health refers to the health of women during pregnancy, childbearing and the post-delivery period. It encompasses the health care dimensions of family planning, preconceptions, prenatal, and postnatal care in order to ensure a positive and fulfilling experience in most cases and reduce maternal morbidity and mortality (WHO, 2015) [1]. Maternal health care service is considered as one of the cornerstones for safe motherhood. All women need access to antenatal care (ANC) in pregnancy, skilled care during childbirth, and care and support in the weeks after childbirth. Maternal mortality is a challenging problem in the world and about 830 women die every day from pregnancy or childbirth related complications. It was estimated that roughly 303,000 women died during and following pregnancy and childbirth in 2015; of these deaths 99% were occurred in developing countries. More than half of these deaths occurred in sub-Saharan Africa (Alkema *et al*, 2016) [2] and Ethiopia is one of the major contributors to the poor maternal health status (Babalola, 2009) [3]. Maternal mortality ratio of Ethiopia fell gradually from 1,040 deaths per 100,000 live births in 1996 to 353 deaths per 100,000 live births in 2015 (Atlas, 2017) [4].

Maternal health and newborn health are closely linked. It was estimated that approximately 2.7 million newborn babies died in 2015 (UNICEF, 2013) [5] and an additional 2.6 million are stillborn (Blencowe *et al*, 2016) [6]. It is particularly important that all births are attended by skilled health professionals, as timely management and treatment can make the difference between life and death for both the mother and the baby. The Ethiopia Demographic and Health Survey (EDHS) results showed that 62%, 28%, and 17% of women who gave birth in the five years preceding the survey received antenatal, delivery and postnatal care, respectively at country level (DHS, 2016) [7].

Although maternal mortality worldwide dropped by about 44% between 1990 and 2015, as part of the Sustainable Development Goals, the target is to reduce the global maternal mortality ratio to less than 70 per 100 000 live births between 2016 and 2030. Ethiopia has also developed a five-year plan from the 2015/16 to 2019/20 to reduce maternal mortality ratio from 420 per 100,000s live birth to 199 per 100,000 live births (Ministry of Health, 2015) [8]. This goal was proposed to address the existing burden of maternal mortality which did not change significantly with the existing initiatives. As a strategy to achieve these goals the initiative has emphasized on the key role that the presence of ANC, skilled attendant at delivery and postnatal care on improving maternal health outcomes (National Planning Comission and the United Nation in Ethiopia, 2014) [9].

Previous empirical studies have found that the use of maternal health services is related to demographic, cultural, and socio-economic factors. Hence, according Mahari and Eshetu (2013)

[10], the major factors identified as determinants of maternal health care services in Ethiopia were mothers' education, mothers' employment status, birth order, husbands'/partners' education and household economic status. A Study conducted in Bangladesh showed that husbands' education and birth order is another factor which affects utilization of maternal health care services (Kamal, 2009) [11]. It was also reported that knowledge of pregnancy complications, educational status, and religion of women were found to be significantly associated with ANC, delivery and postnatal health care service seeking behaviors (Kifle *et al*, 2017) [12].

Although using all maternal health care services play a principal role for further improvement of maternal and child health, the current prevalence and determinants of maternal care services usage have not been explored in the study area. Hence, this study aimed to assess the prevalence and determinants of maternal health care services usage to fill the existing information gap in the study area.

Methods

Study Area and Population

The study was conducted at Zada Town which is found in Dita woreda, Gamo Gofa zone which is southern part of Ethiopia. Dita is bordered on the south by Arba Minch Zuria and Bonke, on the west by Deramalo, on the north by Kucha, and on the east by Chencha. Zada town is located about 60 kilo meter south of zonal town, Arba Minch. Based on the Census conducted by Central Statistical Agency (2007) [13] Zada town has a total population of 2972, of which 1381 were men and 1591 were women. The target population for this study was 1002 women of reproductive age (15–49 years) who gave at least one live birth in their most recent pregnancy preceding the survey and who were the usual residents of the Zada town.

Study design and method of data collection

A community based cross-sectional study design was used among women of reproductive age in Zada town. Before data collection, training was given to all enumerators on how they collect data based on the design of the study. Primary data were collected using face-to-face interview by structured questionnaire guided interview on status of maternal health care utilization (i.e. ANC and institutional delivery care) and socio-economic and demographic variables. The questions were prepared in English and translated to local language, gamogna. The community leaders were used for familiarizing the area for data collectors and support during data collection process.

Sampling techniques and sample size determination

A single stage simple random sampling method was adopted to select household from the study area. Finally, eligible women of reproductive age in the selected households were asked to participate in the study. When two or more women were in a household, only one of them was randomly asked to participate, to avoid intra-class correlation. A sample size of 218 was determined using the formula for single population proportion(Cochran, 1977) [14] based on the assumptions: in the absence of the previous prevalence data on the population under study area, and to obtain the maximum sample size, proportion of nonuser of maternal health care service (p) was assumed to be 0.5. Moreover, at 5% margin of error and 95% confidence coefficient with 10% contingency for non-response (22), a total sample size of 240 women were considered.

Variables considered in the study

Dependent variables

Dependent variables for the study were the indicators of maternal health services usage; these were ANC and institutional delivery care. These variables were dichotomous and coded as 1 if the women had not checked by a trained health professional (a doctor, nurse, or midwife) at least once during pregnancy in their most recent pregnancy preceding the survey for ANC and if the women were not attended by a trained health professional during their delivery for institutional delivery (i.e. non-user) and 0 otherwise for both indicators (i.e. User). The determinants of each of these indicators of maternal health care services usage were assessed separately.

Independent variables

The independent variables were socio-economic and demographic and the choice of these variables was guided by literatures on the determinants of utilization of maternal health services. They were: mother's age, educational level of women, educational level of husband, religion of women, marital status of mother's, occupation of women's, occupation of husbands, average monthly income of family (in Ethiopian birr), awareness about maternal health care services, exposure to media, birth order of child, intended pregnancy, access to maternal health services, perception on availability of qualified professionals, availability of ethical health professionals and waiting time for services.

Method of data analysis

Binary logistic regression model

The linear regression model is a valuable tool for quantifying the effects of several explanatory variables on one dependent continuous variable. For situations where the dependent variable is qualitative, however, other methods have been developed. One of these is the binary logistic regression model, where the dependent or response variable is dichotomous (binary), such as presence or absence of an attribute (success or failure) (Agresti, 2007) [15]. It assumes that the dependent or outcome variable Y is dichotomous and value of the outcome variable Y_i (i=1,2…,n) follows a Bernoulli distribution, that is, Y_i takes either the value 1 with probability of success P_i, and the value 0 with probability of failure 1-P_i, where P_i represents the conditional probability of $Y_i = 1$ given the independent variables, that is $P_i = P(Y_i = 1|X)$ and $X = (X_1, X_2, ..., X_p)$. The dependent variables considered in this study were dichotomous as 1 if status of antenatal and institutional delivery care of maternal health is non-user and 0=user. Thus, to examine the net effect of the predictors on the response variables, that is utilization of antenatal and institutional delivery care service were coded as 1=non-user, 0=user, binary logistic regression model was used. In fitting binary logistic regression model, potential predictors were selected by using chi-square test of independence between utilization of maternal health care services and predictors.

Those predictors that showed p-value less than 0.25 were taken to the model to identify the determinants of antenatal and institutional delivery care service utilization. A cutoff value of 0.25 is supported by literature since more traditional levels such as 0.05 can fail in identifying variables known to be important(Mickey RM GS., 2013) [16]. For binary response variable Y, binary logistic regression model with logit link function has the form:

$$\log it(P_i) = \log(\frac{P_i}{1-P_i}) = \beta_o + \beta_1 X_{i1} + \beta_2 X_{i2} + ... + \beta_p X_{ip}$$

Where, P_i = the probability that the i^{th} woman to be non-user of antenatal and institutional delivery care services, Y_i = the observed status of antenatal and institutional delivery care usage for the i^{th} woman, X_1, X_2..., X_p are set of independent variables and $\beta_0, \beta_1, ..., \beta_p$ are unknown binary logistic regression parameters to be estimated by using maximum likelihood estimation method (Hosmer, 2000) [17]. After the model is fitted the next important step is checking the model adequacy. Hence, the overall goodness of fit of the model was tested by using likelihood ratio test and Hosmer and Lemeshow test, but the results were not included in the paper. Finally, the importance of each of the explanatory variables was assessed by carrying out statistical tests of the significance of the coefficients via Wald test statistic (Hosmer, 1997) [18].

Moreover, descriptive analysis was also employed to estimate the prevalence of antenatal and institutional delivery care usage in the study area.

Results

Descriptive Analysis

The data used for the study were obtained from a random sample of 240 women of reproductive age (15-49 years) in Zada town, Gamo Gofa zone in the southern part of Ethiopia. These data were entered, cleaned and explored for outliers, missing values and any inconsistencies and then analyzed using SPSS version 20. It was found that from a total of 240 sampled women, 132(55%) of women were checked by a trained health professional (doctor, nurse, or midwife) at least once during pregnancy while 108(45%) were not checked (Figure 1). Regarding institutional delivery, 114(47.5%) of mothers were not attended by trained health professional during their delivery while 126(52.5%) of mothers were attended by trained health professional during their delivery (Figure 2).

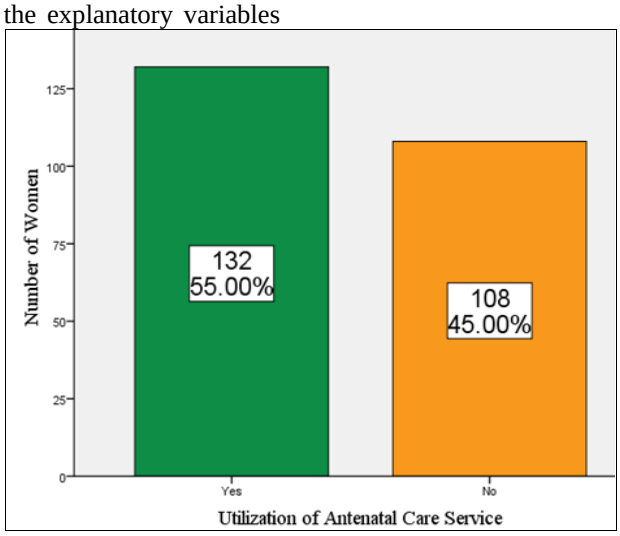

Fig 1: Simple bar graph of Utilization of Antenatal care service

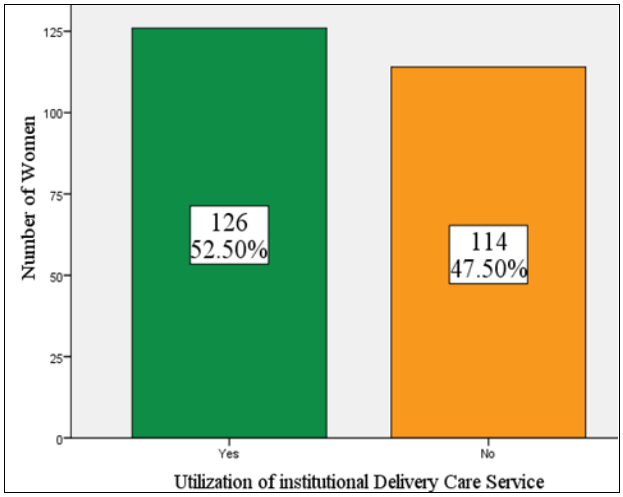

Fig 2: Simple bar graph of Utilization of institutional delivery care service

Table 1 shows count and percentage of women who utilized both antenatal and institutional delivery maternal health care services by socio- economic and demographic variables in Zada town. Among 240 sampled women, 44(18.3%) and 48(20%) of them were in the age group of 15-24 and 25-34 years who were utilized ANC service, respectively. With respect to institutional delivery care users, 58(24.2%) and 40(16.7%) of women were in the age group of 15-24 and 25-34 years, respectively. Regarding marital status, 47.9% of married and 7.1% of unmarried women were utilized ANC service. Concerning the educational level of women, 5.8% were uneducated, 19.8% were attended primary school and 30% attended secondary and above education who were utilized ANC. Similarly, 12.5% were uneducated women, 14.2% attended primary school and 25.8% were attended secondary school and above education who were users of institutional delivery care. About 4.2%, 19.2% and 31.7% of women had average monthly income of family below 1000, 1001-2000 and 2000 and above Ethiopian birr were utilized ANC service, respectively. Utilization of institutional delivery care service seemed to increase with increase in average monthly income of family as observed on usage of ANC care service. About 3.3%, 10.8%, 34.2% and 6.7% of mothers whose husbands occupation was farmer, merchant, governmental employee and laborer, respectively were used antenatal care service. About 36.7% of mothers who attended ANC during their pregnancy had exposure to media while 18.3% had no exposure to media.

Regarding women awareness about maternal health care services, about 29.6% and 31.2% of women who attended ANC during pregnancy and gave birth in health institutions respectively were aware of the services while 25.4% and 18.3% of women had no awareness about maternal health care services that were utilized ANC and delivery care, respectively. Of those who used ANC among 240 women, 43% of them responded that health professionals were qualified and 15% replied that care givers were not qualified. About 30.8% of mothers who used institutional delivery care indicated that health professionals were not qualified and 21.7% said the professionals were qualified.

Furthermore, 37.9% and 17.1% of women who used ANC reported that health workers had professional ethics and had no professional ethics, respectively. With respect to institutional delivery care service, 28.3% and 24.2% of women responded that health professionals had ethics and had no professional ethics were used institutional delivery care service, respectively. About 24.6%, 24.2% and 6.2% of women had waited for the service less than 1 hour, 2-3 hours and more than 3 hours respectively were used ANC service. In the case of institutional delivery care, 20.8%, 19.6% and 12.1% of women had waiting for the service less than 1 hour, 2-3 hours and more than 3 hours respectively were used institutional delivery care service.

Table 1: Count and Percentage of Women Who Were Used ANC and Institutional Delivery Care by Independent Variables Among 240 Sampled Women (Zada Town, Gamo Gofa Zone, Southern Ethiopia, 2017)

Independent Variables	Categories	Indicator of Maternal Health Care Usage		Independent Variables	Categories	Indicator of Maternal health care usage	
		User of ANC	User of Delivery care			User of ANC	User of Delivery care
		Count (%)	Count (%)			Count (%)	Count (%)
Age Group of Women	15-24	44(18.3)	58(24.2)	Average monthly income of family	<1000	10(4.2)	13(5.4)
	25-34	48(20.0)	40(16.7)		1001-2000	46(19.2)	40(16.7)
	35-49	40(16.7)	28(11.7)		>2000	76(31.7)	73(31.4)
Religion of Women	Orthodox	62(25.8)	50(20.8)	Awareness about Maternal Health Care	No	61(25.4)	44(18.3)
	Protestant	64(26.7)	63(26.2)		Yes	71(29.6)	82(31.2)
	Muslim	6(2.5)	13(5.4)				
Marital Status of Women	Married	115(47.9)	98(40.8)	Exposure to Media	No	44(18.3)	30(12.5)
	Unmarried	17(7.1)	28(11.7)		Yes	88(36.7)	96(40.0)
Educational level of Women	Uneducated	14(5.8)	30(12.5)	Birth order	Once	48(20.0)	39(16.2)
	Primary	46(19.2)	34(14.2)		Twice	35(14.6)	36(15.0)
	Secondary and above	72(30.0)	62(25.8)		Three times	25(10.4)	29(12.1)
					Four times and above	24(10.0)	22(9.2)
Educational level of Husbands	Uneducated	16(6.7)	11(4.6)	Intended pregnancy	No	50(20.8)	45(18.8)
	Primary	50(20.8)	25(10.4)		Yes	82(34.2)	81(33.8)
	Secondary	32(13.3)	39(16.2)	Access to Maternal Health Care Service	No	24(10.0)	10(4.2)
	College and Above	34(14.2)	51(21.2)		Yes	108(45.0)	116(48.3)
Occupation of Women	Housewife	16(6.7)	24(10.0)	Perception on Availability of Qualified Health professionals	No	36(15.0)	74(30.8)
	Merchant	41(17.1)	46(19.2)		Yes	96(40.0)	52(21.7)
	Government Employee	75(31.2)	56(23.3)	Availability of Ethical Health Professionals	No	41(17.1)	58(24.2)
Occupation of Husbands	Farmer	8(3.3)	12(5.0)		Yes	91(37.9)	68(28.3)
	Merchant	26(10.8)	47(19.6)	Waiting Time for Services	< 1 hour	59(24.6)	50(20.8)
	Government Employee	82(34.2)	49(20.4)		2-3 hours	58(24.2)	47(19.6)

	Laborer	16(6.7)	18(7.5)		>3 hours	15(6.2)	29(12.1)

Binary Logistic Regression Analysis

From chi-square test of association, the independent variables, religion of women and intended pregnancy showed no association with utilization of antenatal and institutional delivery care services (p-value>0.25, result not shown here). However, the age of women, religion of women, marital status of women, educational level of women, educational level of husband, occupation of women, average monthly income of family, husbands occupation, awareness about maternal health care services, exposure to media, birth order of child, access to maternal health care services, perception on availability of qualified health professionals, availability of ethical health professionals and waiting time for services were potential predictors of both utilization of antenatal and institutional delivery care services(P-value<0.25, result not shown here). Those predictors were incorporated in binary logistic regression model to identify the determinants of utilization of ANC and institutional delivery care services. During the binary logistic regression analysis, the dependent variables were categorized as non-user or user of ANC and institutional delivery care services. Table 2 presents the estimates (estimated parameters, odds ratios (OR), p-values and 95% confidence intervals (CI) for odds ratio) from binary logistic regression model of non-use of both ANC and institutional delivery care services.

Among the potential independent variables explored, educational status of mothers, husbands educational level, husbands occupation, birth order of child, age of women, marital status of mothers, occupation of women, average monthly income of family, awareness about maternal health care services, exposure to media, perception on availability of qualified health professionals, access to maternal health care services and waiting time to get services were statistically significant factors that affected utilizing of both antenatal and institutional delivery care services at 5% level of significance. Thus, educational level women and their husband were found to reduce the odds of non-utilization of both antenatal and institutional delivery care services. When all the other independent variables controlled, the odds of being non-user of ANC service was about 95% (OR: 0.051, 95 CI%: 0.02, 0.132) less for women with secondary and above educational level than uneducated women. With respect to institutional delivery care, women with secondary and above educational level were 75.2% less likely (OR: 0.248, 95 CI%: 0.089, 0.688) to be non-user of institutional delivery care service than uneducated women.

Regarding marital status of mothers, married women were less likely to be non-user of both ANC and institutional delivery care services compared to unmarried women. Hence, those married women were 93.3% and 81.5% less likely to be non-user of ANC and institutional delivery care services than unmarried women, respectively. The occupation of women and their husband had statistically significant effect on the non-utilization of both antenatal and delivery care services. The odds being non-user of both antenatal and delivery care services was less for occupation of women (OR: 0.062, 95% CI: 0.014, 0.283) and their husband (OR: 0.156, 95% CI: 0.076, 0.320) was government employee compared to occupation of women and their husband were housewife and farmer, respectively. It was also found that those mothers who were aware of maternal health care services were 56.4% less likely to be no-user of ANC service than mothers who were not aware of maternal health care services (OR: 0.436, 95% CI: 0.217, 0.878).

Moreover, the significant determinant of usage of both antenatal and institutional delivery care services amongst the independent variables was average monthly income of family. Hence, those women with average monthly income of family was higher than 2000 Ethiopian birr were 96.8% and 84.1% less likely to be non-user of antenatal and delivery care services compared to women with average monthly income of family was less than 1000 Ethiopian birr, respectively.

Likewise, birth order of the child showed a positive effect on non-utilization of both antenatal and institutional delivery care. Hence, for those mothers with fourth and higher birth orders, the odds of being non-user of antenatal care and delivery care services were 14.56 (OR:14.56, 95%CI: 3.42,61.98) and 3.28 times (OR:3.28, 95%CI: 1.475, 7.239) higher than women with first birth order, respectively. Similarly, the odds of being non-user of ANC was 3.367 times (OR: 3.367, 95%CI: 1.11, 10.22) higher for those women with third birth order than women with first birth order. However, there was no significant difference in the likelihood of being non-users of institutional delivery care for women with birth order twice and three times compared to those women with first birth order.

Regarding the waiting time to get ANC service, the estimated odds ratios were 2.88 (95% CI: 1.13,7.355) and 3.95 (95% CI: 1.277,12.23) for women with waiting time for the services were 2-3 hours and more than 4 hours compared to women with waiting time for the service was less than 1 hour, respectively. Concerning institutional delivery care service, the estimated odds ratio was 5.257 (95% CI: 2.728,10.12) for women with waiting time for the services was more than 4 hours compared to women with waiting time for the service was less than 1 hour. This implies that the long waiting time for the services was associated with a reduced use of antenatal and institutional delivery care services.

Table 2: Binary logistic Regression Model Estimates for Non-use of ANC and Institutional Delivery Services (Zada Town, Gamo Gofa Zone, Southern Ethiopia, 2017)

Predictors	Categories	Indicators of Maternal health care services							
		Antenatal care				Institutional Delivery			
		$\hat{\beta}$	exp($\hat{\beta}$)	95% CI	p-values	$\hat{\beta}$	exp($\hat{\beta}$)	95%CI	p-values
Age Group of Women	15-24 (ref)								
	25-34	-2.21	0.109	(0.036,0.337)	0.000*	-3.46	0.031	(0.008, 0.129)	0.000*
	35-49	-0.98	0.374	(0.11, 1.262)	0.113	-1.87	0.153	(0.043, 0.545)	0.004*
Marital Status of Women	Unmarried (ref)								
	Married	-2.70	0.067	(0.019, 0.238)	0.011*	-1.69	0.185	(0.083, 0.413)	0.000*
Educational Level of Women	Uneducated (ref)								
	Primary	-2.96	0.052	(0.022, 0.120)	0.000*	-1.41	0.243	(0.106, 0.558)	0.001*
	Secondary and above	-2.97	0.051	(0.02, 0.132)	0.000*	-1.39	0.248	(0.089, 0.688)	0.007*
Educational level of husbands	Uneducated(ref)								
	Primary	-0.32	0.727	(0.275, 1.918)	0.519	-1.47	0.231	(0.083, 0.640)	0.005*
	Secondary	-2.53	0.08	(0.025, 0.258)	0.000*	-1.49	0.226	(0.081, 0.627)	0.004*
	College and above	-2.59	0.075	(0.026, 0.219)	0.000*	-1.82	0.161	(0.058, 0.448)	0.000*
Occupation of women	Housewife (ref)								
	Merchant	-1.21	0.299	(0.081, 1.102)	0.070*	0.69	2.00	(0.781, 5.123)	0.149
	Government employee	-2.77	0.062	(0.014, 0.283)	0.000*	-1.86	0.156	(0.076, 0.320)	0.000*
Occupation of husbands	Farmer(ref)								
	Merchant	-1.37	0.254	(0.107, 0.600)	0.002*	-1.67	0.188	(0.070, 0.509)	0.001*
	Government employee	-3.10	0.046	(0.019, 0.110)	0.000*	-1.89	0.152	(0.060, 0.382)	0.000*
	Laborer	-1.27	0.281	(0.135, 0.586)	0.001*	-1.57	0.208	(0.067, 0.645)	0.007*
Average monthly income of family	<1000(ref)								
	1001-2000	-2.29	0.101	(0.014, 0.749)	0.025*	-1.27	0.281	(0.109, 0.724)	0.009*
	>2000	-3.45	0.032	(0.005, 0.215)	0.000*	-1.84	0.159	(0.053, 0.482)	0.001*
Awareness about maternal health care	No (ref)								
	Yes	-0.83	0.436	(0.217, 0.878)	0.020*	-1.19	0.304	(0.097, 0.949)	0.040*
Exposure to Media	No (ref)								
	Yes	-1.07	0.344	(0.14, 0.842)	0.020*	-1.11	0.330	(0.180, 0.604)	0.000*
Birth order	Once (ref)								
	Twice	-0.23	0.791	(0.181, 3.462)	0.756	0.53	1.698	(0.810, 3.560)	0.161
	Three times	1.214	3.367	(1.11, 10.22)	0.032*	0.69	1.987	(0.902, 4.375)	0.088
	Four times and above	2.678	14.56	(3.42, 61.98)	0.000*	1.188	3.280	(1.475, 7.239)	0.004*
Access to Maternal health care	No (ref)								
	Yes	-0.99	0.373	(0.146, 0.952)	0.039*	-2.10	0.123	(0.058, 0.259)	0.000*
Availability of qualified professional	No (ref)								
	Yes	-1.07	0.343	(0.161, 0.732)	0.006*	-1.04	0.355	(0.159, 0.795)	0.012*
professional ethics of health workers	No (ref)								
	Yes	-0.55	0.576	(0.267, 1.239)	0.158	-1.04	0.355	(0.201, 0.626)	0.000*
Waiting time for services	< 1 hour (ref)								
	2-3 hours	1.057	2.88	(1.13, 7.355)	0.027*	0.28	1.320	(0.561, 3.100)	0.526
	>3 hours	1.374	3.95	(1.277, 12.23)	0.017*	1.66	5.257	(2.728, 10.13)	0.000*
Constant		0.941	2.563		0.100	1.548	4.70		0.000*

***Note*:** Values within parenthesis represent 95%CI for odds ratio where * represent significant p-valued at 5% and ref denotes reference category.

Discussion

The use of ANC and institutional delivery care services remains some of the important strategies in reducing maternal and child morbidity and mortality (Gabrysch and Campbell, 2009) [19]. Therefore, this study was aimed to investigate the prevalence and determinants of utilization of antenatal and institutional delivery maternal health care services in Zada town, Goma Gofa zone in the southern part of Ethiopia. This study showed a moderate coverage of ANC utilization which accounted about 55% among 240 sampled women. This finding is consistent with the report from North east Wollega zone (Terfasa *et al*, 2017) [20] and Tigray region (Tsegay *et al*,

2013) [21], Ethiopia where 57.5% and 54% of mothers had at least one ANC visit during their pregnancy, respectively. However, the prevalence of ANC utilization in this study was lower to a report of EDHS 2016 at country level (62%) (DHS, 2016) [7]. The prevalence of institutional delivery care utilization was found to be 47.5% in this study which was higher than (17%) in the EDHS 2016 which might indicate some progress in the study area (DHS, 2016) [7]. Never the less, the prevalence of institutional delivery care utilization (47.5%) in this study was less than that of Sodo town (62.2%), Southern Ethiopia (Hailemichael *et al*, 2013) [22], Addis Ababa (82.3%), Ethiopia (Central Statistical Agency II, 2012) [23] and Biharamulo district, Tanzania (56%) (Mageda and Mmbaga, 2015) [24]. The possible reason might be related to the fact that the population in the current study had limited access to and quality of delivery care services as it is a rural town.

In this study the age of women found to have an influencing factor for utilization of attending ANC and institutional delivery services. Mothers with the age group of 25-34 years were less likely to be non-user of ANC and delivery service than mothers with age group of 15-24years. This results concord with the finding from Dejen Woreda (Desta *et al*, 2016) [25] and Sidama zone, Ethiopia (Rodamo, 2015) [26].

One of the factors that were found to had a positive influence on the utilization of both antenatal and institutional delivery care maternal health services were educational status of women and their husbands. These findings is in-line with many other studies by Mehari and Wencheko (2013) [10], Kamal (2009) [11], Kifle *et al* (2017) [12], Ahmed *et al* (2010) [27] and Mengesha *et al* (2017) [28]. This positive relationship might be due to the fact that educated women and husbands have knowledgeable and awareness on the importance of maternal health services.

This study also identified the average monthly income of family was significantly associated with the non-utilization of both antenatal and institutional delivery care maternal health services. Women who were from a higher average monthly income of family are less likely be non-user of both antenatal and institutional delivery care services than those who were from the lower average monthly income of family. This result is consistent with other studies done by Ahmed *et al* (2010) [27] and Arthur (2012) [29]. The possible reason might be women with high income can afford payment fee for the services and even they can own TV and radio so that they have a possibility of exposure to media to be aware of maternal health care services. Moreover, it was also found that the utilization of ANC and institutional delivery services among women who had awareness about maternal health services was higher than women with no awareness. The finding of this study is in-line with the report from Menit-Shasha district, Ethiopia (Wolderufael, 2018) [30] and Gambia (Jallow *et al*, 2012) [31]. The obvious reason for this was those women who had awareness about maternal health care services were more likely to utilize ANC and institutional delivery services.

Moreover, this study confirmed that women who had no access to maternal health service were much less likely to experience ANC and institutional delivery service. This result was also concurrent with the findings from Menit-Shasha district (Wolderufael, 2018) [30].

Conclusions

The main objective of this study was to assess the prevalence and determinants of utilization of antenatal and institutional delivery services in Zada town, Gamo Gofa zone in the southern part of Ethiopia. The prevalence of utilization of maternal health care services in the study area (ANC(55%) and institution delivery care (52.5%)) was less as compared to WHO recommendation where every woman should use ANC at least for four times and give birth in heath institutions by trained professionals.

From the empirical result, it can be concluded that educational status of mothers, husbands educational level, husbands occupation, birth order of child, age of women, marital status of mothers, occupation of women, average monthly income of family, awareness about maternal health care services, exposure to media, perception on availability of qualified health professionals, access to maternal health care services and waiting time to get services were factors affecting the utilization of both antenatal and institutional delivery care services. Hence, those women with no education, women married to husband with no education, women who were housewives and married to farmers, women with higher birth order, women with low average monthly income, women who had no awareness about maternal health care services and exposure to media, women with longer waiting time for the service and women who perceived the quality health professionals to be low quality were more likely to be non-user of both antenatal and institutional delivery care services.

Therefore, improving education of women and their husband, expanding health centers to the community, creating awareness about maternal health care services, improving the efficiency of health institutions with respect to waiting time and strategy should be designed by health offices and NGOs to train and enhance the capacity of health workers were highly recommended to increase utilization of maternal health care services in this study.

Ethical considerations and consent to participate

The study was carried out after getting permission from the ethical clearance committee of Statistics Department, College of Natural Sciences, Arba Minch University. All the study participants were verbally informed that the participation in the study has no incentives or direct benefits. Participants' involvement in the study was on the voluntary basis.

Availability of data and materials

The dataset supporting conclusions of this article is available by contacting authors.

Competing Interests

The authors declare that they have no competing interests.

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Authors' Contributions

TTH and BBA designed the study, analyzed the data, drafted the manuscript and critically reviewed the article. All authors read and approved the final manuscript.

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