Knowledge on Obstetric Fistula and Related factors in Women of Reproductive age in the Southeastern Zone of Tigray, Ethiopia, 2020, Crosses sectional Study

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Abstract
Background: Around one million girls and women worldwide are currently living with fistula. Fewer than 20,000 women are treated with obstetric fistula each year. Lack of Knowledgeon obstetric fistula is a common obstacle to seeking fistula treatment.

Objectives: To determine knowledge on obstetric fistula and its associated factors among reproductive age women in south eastern zone of Tigray, 2020.

Methods:A cross-sectional community-based Study was conducted in the southeastern zone of Tigray. A multi-level sampling technique was implemented to select the total number of participants. Two districts were randomly selected and from these districts 14 kebels were randomly selected and the calculated sample size (605) was allocated proportionally to each selected kebele. Data were collected in face-to-face interview using a structured questionnaire from February 26th to March 24th, 2020 after ensuring that all ethical requirements were met. The collected data were entered into Epidata version 4.2 and then exported to SPSS version 20 for analysis. Bivariate and multivariate analyzes were used to examine the relationship. Odds ratios with 95% confidence intervals and P values < 0.05 were used to determine statistical association.

Result:Overall, about 42.15% of the respondents had a good knowledge of obstetric fistulas. The frequently mentioned risk factors, symptoms and preventive mechanisms of obstetric fistulas were female genital mutilation (78.7%), urinary incontinence (77.5%) and avoidance of early marriage and pregnancy (79.8%).The major determinant factors identified to knowledge on obstetric fistula were, level of education(above secondary) [AOR (95%CI=2.7(1.189-6.24)], having history of modern family planning use [AOR (95%CI=2.22(1.14-4.34)], institutional delivery (for the index child)[AOR (95%CI=2.3(1.1-4.99)] and prior information about obstetric fistula[AOR (95%CI=6.1(2.65-14.1)].

Conclusion:In this study majority of reproductive age women in the study area had poor Knowledge regarding obstetric fistula. Several interventions like health education and information should be implemented to enhance the Knowledge of the community towards obstetric fistula.

Keywords: Obstetric fistula, Knowledge, Reproductive

Introduction
Obstetric fistula is an abnormal passage between the vagina and the bladder or rectum that can develop after prolonged and blocked labor and lead to persistent urinary or fecal incontinence [1].Obstetric fistula can appear between the bladder and vagina, between the rectum and vagina, or both, causing uncontrolled leakage of urine and / or feces [2].

The most common type of obstetric fistula is the vesico-vaginal fistula (VVF) which makes up 79% of the cases, but there are also cases of recto-vaginal fistula (RVF) 1-8% and combined (VVF and RVF) 1- 23%. Obstetric fistula is associated with numerous risk factors that appear to be avoided. This condition is related to young status in childbirth, equality, prolonged labor, and home birth [3].

In developed countries, surgery and radiation therapy are the main risk factors for the situation, while birth complications are the main risk factors in developing countries, fistula also occur in other parts of the world where fertility is high, women's economic status is low, and obstetrics are poor, like in Afghanistan, Pakistan, Bangladesh and parts of India [4].

Around one million girls and women worldwide currently suffer from obstetric fistula. Less than 20,000 women are treated with obstetric fistula each year. Obstetric fistula is a disease of poverty [5]. Obstetric fistulaoccurs in all developing countries, particularly in the northern half of sub-Saharan Africa from Mauritania to Eritrea and in the developing countries of the Middle East and Asia [6].

Obstetric fistula prevention strategies are divided into primary prevention strategies (with an emphasis on contraception), secondary prevention strategies (ensuring that women have access to qualified care at delivery), and tertiary prevention strategies (early screening for fistula for the most vulnerable women). Fistula are both treatable and preventable the success rates of obstetric fistula surgery in the literature are between 70 and 90 percent for simple fistula and between 30 and 60 percent for complex or complicated fistula cases and the decision to continue using this day every year for comprehensive Gather knowledge and step-up measures to end obstetric fistula [7].

A resolution of the General Assembly of September 25, 2015 (Sustainable Development Goal) states under Goal 3.7: Ensure universal access to sexual and reproductive health services by 2030, including family planning, information and education as well as the integration of reproductive health into national strategies and programs [8].

Obstetric fistulais a concern for doctors in developing countries, and their knowledge and risk factors appear inadequate. It is necessary to adequately educate women during their prenatal clinic visits about the risk factors for obstetric fistula and where to find treatment for this challenge [9].

Obstetric fistula is considered to be the most worrying morbidity affecting women after childbirth. The medical consequences of a fistula are incontinence, infection, and possibly infertility. The social consequences of the fistula are isolation, abandonment, shame and vulnerability [10].

Knowledge is the ability to directly recognize and perceive, feel or pay attention to events [10].A lack of Knowledge regarding symptoms of obstetric fistula is a common barrier to finding a fistula treatment; many women with obstetric fistula do not know what fistula is, that their condition is treatable, or where they can be treated. Women with a fistula and members of their community can also be misinformed about the causes of the fistula. In some communities the fistula is viewed as a curse or punishment from God [11].

The occurrence of obstetric fistula is closely related to a lack of Knowledge (misperception) of the risk factors of an obstetric fistula. The majority of respondents directly linked obstetric fistula to errors by hospital staff or problems with procedures that are not other risk factors, and this perception reduces health behaviors.

Many women do not know how to prevent obstetric fistula. If such women develop obstetric fistula during childbirth, it will also be difficult for them to receive treatment as they may not even know it can be treated [12].

A lack of knowledge about the presence of an obstetric fistula prevents treatment [13].While obstetric fistula has likely been a burden to women since the beginning of time, there is very little research proportionally. There is an urgent need for rigorous and ethical research in obstetric fistula [14].

Methods
Study Setting
The regional state of Tigray is one of the nine regional states of Ethiopia that are located in northern Ethiopia. The capital of Tigray is Mekelle City, which is 781 km from Addis Ababa. The southeast zone is one of the zones in the Ethiopian region of Tigray. It bordered the South Zone to the south, the Amhara region to the southeast, the Central Zone to the northeast, the Eastern Zone to the north, and the Afar region to the east. Because the zone was created after the 2007 census, it is difficult to find accurate data on the zone's population. The estimated population according to the 2007 census conducted by the CSA was 392,142, of which 21,125 or 5.39% were urban residents [15].The southeastern zone includes four districts known as Endrta, HintaloWejerat, Samre, and DeguaTemben, and a total of 87 Kebeles health centers and around 73 health posts. The study was conducted in the southeast zone of Tigray from February 26 to March 24, 2020.

Participants
The study population was selected women of reproductive age who live in the southeastern zone of Tigray and who meet the inclusion criteria. All reproductive-age women who were mentally stable, those available at the time of data collection, women who were not seriously ill were included, while reproductive-age women who are health professionals or health care professionals were excluded became.

Sample size determination and sampling technique

The sample size was calculated using a single population proportion formula with the assumptions: the prevalence of obstetric fistula knowledge was 50%, 95% of the confidence interval (1.96), 5% of the tolerated sampling error, 5% of the non-response rate, 1.5 design effect, then the final sample size was 605. A multi-level random sample was used to select the total of 605 study participants. There are four districts in the southeastern zone of Tigray, namely Endrta, DeguaTemben, Saharti Samre and HintaloWejerat. For this study, two districts were selected at random. There are 87 kebeles in each selected district, so it is difficult to include all; instead, 40% of the total kebeles were randomly selected. In each kebele there was a list of households in which women of childbearing age lived. This list was used as a sampling frame to use a simple random sample. Then the calculated sample size (605) was distributed proportionally to each selected kebele.

Study Variables
Dependent Variable
Dependent Variable:
• Knowledge on obstetric fistula

Independent Variables
• Socio-Demographic factors (Age, marital status Religion, women education, occupation, age of marriage and residence).
• Obstetric factors (history of contraceptive use, history of induced abortion history of pregnancy, history of ANC, site of previous delivery).
• Other factors (presence of health center, history of birth related complication, Knowledge on risk of complication, media exposure).

Definition of terms
• **Knowledge:** Is a characteristic, outlook or understanding of an individual towards obstetric fistula.
• **Good Knowledge on obstetric fistula:** Participants who scored mean score or above were assigned as they have good Knowledge on obstetric fistula.
• **Poor Knowledge on obstetric fistula:** Participants who scored less than the mean score was considered as having poor Knowledge on obstetric fistula.

Data collection tools and techniques
For data collection a structured face to face questionnaire English version was adapted after review of different literatures and modified depending on the local situation and the research objective. Initially it was developed in English and it was translated to Tigrigna by an individual who was native to Tigrigna language. And it was translated back to English language by another individual in order to maintain its consistency. The questionnaire contained questions on socio demographic characteristics, source of health-related information, History of contraceptive use, obstetric history, questions on risk factors, presentation and prevention of obstetric fistula. Three diploma midwife and four BSc level health

professionals were recruited and trained as data collectors and 2 BSc level midwives were recruited& trained as supervisors. Eligible participants were approached and requested to consent voluntarily to participate into the study. Upon consenting, a study number with a code was assigned for identification. Inclusion into the study was done by using proportion from the selected kebeles and then randomly select until the required sample size was achieved using face to face structured questionnaire. We have selected 12 kebeles randomly from the two districts and then random sampling technique was used to recruit households. List of house hold contains reproductive age a woman was used as sampling frame that is available with health extensions workers in each kebeles. The first house hold was selected by lottery method. For those who were two or more eligible reproductive age women in one house hold lottery method was used to select one of them.

Data Quality Assurance and Control
The data collection instrument was pretested for accuracy of responses, language transparency, correctness of data collection tools, estimate the time required and the necessary amendment was considered based on it prior to the actual data collection. It was carried out one week proceeding to the actual data collection period, in five percent of non-study participants that fulfill the inclusion criteria. In addition, the data collectors were trained for one day on the techniques of data collection. The training also included importance of disclosing the possible benefit and purpose of the study to the study participants before the start of data collection. Maintaining confidentiality of the participants throughout the whole process of data collection was discussed and ascertained during the training. The researcher was checked for completeness and consistency of questionnaires filled by the data collectors to ensure the quality of the data, and also visit the data collectors as many times as possible to check whether he/she collect the data appropriately. The researcher was also appraising the data during the data analysis stage to verify the completeness of the collected data.

Data Processing and Analysis
After data collection, Epi data version 4.2 was used for input and then exported to SPSS version 20 for analysis. A binary logistic regression model was used to determine the factors associated. Those variables that were clinically important and had a P <0.25 in the bivariate analysis were the candidate variables for the final multivariable binary logistic regression model. The crude and adjusted measures of the effect-odds ratio were determined to be 95% CI and P <0.05 was used to declare statistical significance. The goodness of fit of the final model was assessed using the Hosmer and Lemeshow goodness test and multicolinearity was checked. Finally, the result was presented using tables, figures and texts.

Result
Socio-Demographic Characteristics of Respondents
In this study, 605 women of childbearing age were interviewed and the response rate was 100%. The mean age and standard deviation

of respondents were 30.7 and +9.313 (ranging 15-49 years) respectively. The results showed that the majority (39%) of respondents were found aged >= 35 years. Regarding the religion of the participants, most of them (90.6%) were Orthodox followers. In terms of ethnicity, all (99.2%) of them were Tigrians. Regarding the educational status of the participants, the majority (47%) of them had no formal education. The result showed that the majority (34%) of the respondents were housewives. Of the total respondents, 390 (64.5%) were rural residents(Table 1).

Table 1: Socio-demographic characteristics of respondents in south eastern zone of Tigray, Ethiopia 2020, (N=605).

Variable	Category	Frequency	Percentage
Age	15-24	194	32%
	25-34	179	29%
	>=35	235	39%
Religion	Orthodox	548	90.6%
	Muslim	57	9.4%
Marital status	Married	367	60.7%
	Single	180	29.8%
	Divorced	58	9.6%
Ethnicity	Tegaru	600	99.2%
	Others	5	0.8%
age during marriage	<15	113	18.7%
	15-19	312	51.6%
	20-24	180	29.7%
Educational level	Not educated	286	47%
	Primary education	80	13%
	Secondary education	130	21.5%
	Above secondary	106	18.5%
	House wife	207	34%
Occupation	Farmer	122	20%
	Student	100	16.5%
	Merchant	77	12.7%
	Government employee	99	16.8%
Monthly income	<1000 birr	371	61.3%
	1000-2000 birr	139	23%
	>2000 birr	95	15.7%
Residence	Urban	215	35.5%
	Rural	390	64.5%
Note: Others* in ethnicity refers to Amhara and Afar			

Obstetric factors

388 (64%) respondents were informed of obstetric complications, and of the total respondents, 138 (35.3%) had a history of abortion. Regarding the birth control history of the respondents, the majority (40.6%) of them used injections. Regarding antenatal care (ANC), the majority (73.4%) of respondents had a history of services. Of the total (390) participants, the majority (61.9%) of them had an institutional delivery for their last child(Table2).

Table 2: Obstetric factors among reproductive age women in south eastern zone of Tigray, Ethiopia, 2020

Variable	Category	Frequency	percentage
Heard obstetric complication(N=605)	YES	388	64%
	NO	217	36%
History of induced Abortion(N=391)	YES	138	35.3%
	NO	253	64.7%
History of birth complications(N=391)	YES	182	46.5%
	NO	209	53.5%
Contraceptive history(N=605)	YES	319	52.7%
	NO	286	47.3%
Types of contraceptive use(320)	Injection	130	40.6%
	Pill	70	21.9%
	Implant	95	29.7%
	IUCD	25	7.8%
Ever been pregnant(N=605)	YES	389	64.3%
	NO	216	35.7%
Age during first pregnancy (N=391)	15-19 years	204	52.2%
	20-24	154	39.4%
	25-29	33	8.4%
No of pregnancy(N=391)	1-3 times	224	57.3%
	4-7 times	104	26.6%
	8-11 times	63	16.1%
History of ANC (N=391)	YES	287	73.4%
	NO	104	26.6%
Place of delivery(N=391)	Institution	242	61.9%
	Home	149	38.1%

Other factors for Knowledge on obstetric fistula

Four hundred eighty-nine (80.8%) of the respondents were responsible for visiting a healthcare facility themselves. All in relation to the householder, the majority (57%) of them were their husbands.

In terms of distance to visit healthcare facilities, the majority (65.1%) of them walked more than 30 minutes (Table3).

Table 3: Other factors of respondents among reproductive age women in south eastern zone of Tigray, Ethiopia 2020

Variable	Category	Frequency	Percentage (%)
Who is responsible for you in deciding to visit health facility?	Participant	489	80.8%
	Husband	78	12.9%
	Mother	38	6.3%
Who is the head of house? (N=605)	Participant	150	24.8%
	Husband	345	57%
	Father	110	18.2%
House hold head education (N=455)	Not educated	201	33%
	Primary education	130	21.5%
	Secondary education	70	11.6%
	Above secondary	54	8.9%
Time taking to reach health facility(605)	<=30 minute	211	34.9%
	>30 minute	394	65.1%

source of health-related information (N=605)	Radio	202	33.4%
	Television	67	11%
	HEWs	187	30%
	Health facility	149	24.6%

## Knowledge on risk factors, prevention and symptoms of obstetric fistula

Over all, the knowledge of reproductive age women on obstetric fistula was 42.15 %(38%-46%) (Figure1).Women of childbearing potential who have ever heard of obstetric fistula were 368 (60.8%). The result shows that the majority (78.7%) of women of childbearing age indicated female genital mutilation as a risk factor for obstetric fistula. And the most commonly reported (77.5%) symptom of obstetric fistula was urinary incontinence. In addition, the majority (79.8%) of respondents mentioned that avoiding early marriage and pregnancy is among the most important preventive components of obstetric fistulas(Table4).

Table 4: Knowledge on obstetric fistula among reproductive age women in south eastern zone of Tigray, Ethiopia 2020

Variable	Category	Frequency	Percentage (%)
Have ever heard obstetric fistula?(N=605)	YES	368	60.8%
	NO	237	39.2%
Early marriage	Yes	488	80.7%
	No	117	19.3%
FGM	Yes	476	78.7%
	No	129	21.3%
Home delivery	Yes	373	61.7%
	No	232	38.3%
Closely spaced pregnancy	Yes	298	49.3%
	No	307	50.7%
Unsafe Abortion	Yes	221	36.5%
	No	384	63.5%
Obstructed labour	Yes	286	47.3%
	No	319	52.7%
Injury during surgery and assisted delivery	Yes	323	53.4%
	No	282	46.6%
Urinary incontinency is symptom of OBF	Yes	469	77.5%
	No	136	22.5%
Fecal incontinency is symptom of OBF	Yes	440	72.7%
	No	165	27.3%
Vulvar irritation is symptom of OBF	Yes	202	33.4%
	No	403	66.6%
Avoiding early marriage and pregnancy OBF	Yes	483	79.8%
	No	122	20.2%
Avoiding unsafe abortion prevents OBF	Yes	352	58.2%
	No	253	41.8%
Using contraceptive prevents OBF	Yes	404	66.8%
	No	201	33.2%
Avoiding FGM prevents OBF	Yes	331	54.7%
	No	274	45.3%

ANC service can prevent OBF	Yes	340	56.2%
	No	265	43.8%
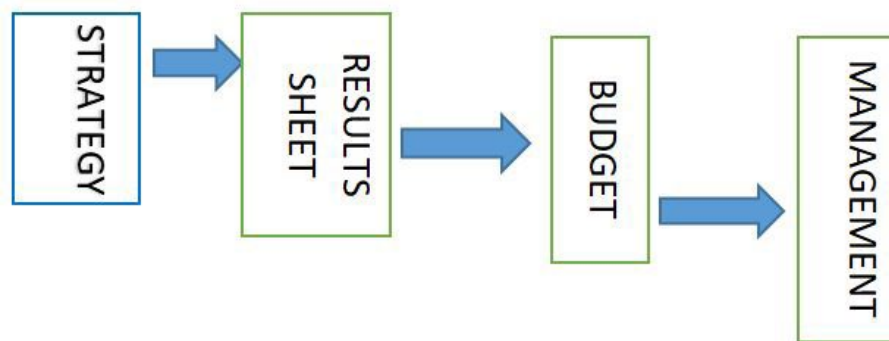
Figure 1: the status of reproductive age women's Knowledge on obstetric fistula in south eastern zone of Tigray, Ethiopia 2020, (N=605).

Associated factors on Knowledge on Obstetric Fistula

Binary logistic regression was done to identify significant factors with the Knowledge on obstetric fistula then those factors with p-value of less than 0.25 during bivariate analysis had been taken to multivariable analysis. The variables significantly associated in bivariate analysis were, educational level, Residence, Distance to health facility, Pregnancy history, History of ANC for index pregnancy, prior information about obstetric complication, history of birth complication, place of delivery(for the index child), prior information about obstetric fistula and history of modern family planning use. The multivariable binary logistic regression analysis showed the following finding. Educational level, place of delivery for the index child, History of contraceptive useand prior information about obstetric fistula were independently associated with Knowledge on obstetric fistula. Reproductive age women who had above secondary educational level were 2.7 times more likely to have good Knowledge on obstetric fistula as compared to those reproductive age women who were not educated [AOR(95%-CI=2.7(1.189-6.24)].women who had history of institutional delivery (for the index child) were 2.3 times more likely to have good Knowledge on obstetric fistula as compared to those who had had experience of home delivery[AOR(95%CI=2.3(1.1-4.99)].More over reproductive age women who had history of modern contraceptive use were 2.22 times more likely to have good Knowledge as compared to those who had not [AOR (95%CI=2.22(1.14-4.34)].Reproductive age women who had prior information about obstetric fistula were found to be 6.1 times more likely to have good Knowledge on obstetric fistula as compared to those who had not [AOR (95%CI=6.1(2.65-14.1)](Table5).

Table 5: Associated factors on Knowledge on Obstetric Fistula among reproductive age women in south eastern zone of Tigray, Ethiopia 2020.

Variable	Category	Awareness on Obstetric fistula		COR(95%CI)	AOR(95%CI)
		Good	Poor		
Educational level	Not educated	46(18%)	240(68.6%)	1	1
	Primary education	50(19.6%)	30(8.5%)	8.7(4.25-11.74)*	1.2(.295-1.334)
	2dry Education	78(30.6%)	52(14.9%)	7.8(3.028-13.49)**	2.2(.877-5.48)
	Above Secondary	81(31.8%)	28(8%)	15(9.475-19.119)**	2.7(1.189-6.24)*
Residence	Urban	128(51%)	87(24.9%)	3.047(2.158-4.3)**	1.68(.823-3.432)
	Rural	127(49%)	263(75.1%)	1	1
Distance to health facility	<=30 minute	119(46.7%)	92(26.3%)	2.5(1.743-3.46)**	0.935(.467-1.87)
	>30 minute	136(53.3%)	258(73.7%)	1	1
Have you ever been pregnant	YES	171(67.1%)	218(62.3%)	1.233(.878-1.730)	1.32(0.29-3.22)*
	NO	84(32.9%)	132(37.7%)	1	1
History of ANC	YES	152(88.4%)	135(61.6%)	4.73(2.76-8.114)**	0.937(.42-2.1)
	NO	20(11.6%)	84(38.4%)	1	1
Ever heard obstetric complication	YES	225(88.2%)	163(46.6%)	8.6(5.57-13.293)**	1.6(.761-3.201)
	NO	30(11.8%)	187(53.4%)	1	1

History of birth complication	YES	89(51.7%)	93(42.5%)	1.45(.978-2.171)	0.91(.523-1.58)
	NO	83(48.3%)	126(57.5%)	1	1
place of delivery-(index)	Institution	149(86.6%)	93(42.5%)	8.8(5.247-14.68)**	2.3(1.1-4.99)*
	Home	23(13.4%)	126(57.5%)	1	1
History of FP use	YES	187(73.3%)	132(37.7%)	4.542(3.195-6.456)**	2.22(1.14-4.34)*
	NO	68(26.7%)	218(62.3%)	1	1
Prior information About OF	YES	238(93.3%)	130(37.1%)	23.7(13.8-40.563)**	6.1(2.65-14.1)**
	NO	17(6.7%)	220(62.9%)	1	1

Note:*=significant at p-value<0.05, **=significant at p<.001 &1=reference

Discussion

Community based cross-sectional study was carried out to assess the Knowledge status on obstetric fistula and associated factors among reproductive age women living in south eastern zone of Tigray regional state.

According to this study around 42.15%(95%CI=38%-46%) participant had good Knowledge on obstetric fistula which was lower than the finding from the study done in Kenya (43) and Nigeria(10)which were (53%) and 57.8%respectively. The difference could be that the two previous studies were conducted at facility level where the participants may have shared similar health related information, while our study was community based where there is varying access to information. This study showed that about 60.8 %(95%CI=57%-65%) of respondents had prior information about obstetric fistula and this finding was higher as compared to a study conducted in Asella Oromia region which was 53%(17).This difference could be due to difference in study year, there is expected to increase Knowledge on obstetric fistula from time to time. This difference may be due to difference in socio-demographic characteristics of respondents. The frequently mentioned risk factors, symptoms and preventive mechanisms of obstetric fistulas were female genital mutilation (78.7%), urinary incontinence (77.5%) and avoidance of early marriage and pregnancy (79.8%).

This study shows there is significant association between women's Knowledge on obstetric fistula and their level of education; women who have above secondary level of education were 2.7 times [AOR (95%CI=2.7(1.189-6.24)] more likely to have good Knowledge on obstetric fistula as compared to those reproductive age women who were not educated. This finding was supported by the study conducted in Amhara region Dabat district [17]. Thosewho delivered at health institution were 2.3 times [AOR (95%CI=2.3(1.1-4.99)] more likely to have good Knowledge on obstetric fistula as compared to those who had history of home delivery. This could be due to health education given during delivery, and post-natal. This finding was consistent with the study which was conducted in Amhara region [18].Reproductive age women who had history of modern contraceptive use were 2.22 times more likely to have good Knowledge on obstetric fistula as compared to those who had not [AOR (95%CI=2.22(1.14-4.34)],

This may be explained by the fact that using modern contraceptive brings knowledge about obstetric fistula.

Reproductive age women who had prior information about obstetric fistula were found to be 6.1 times more likely to have good Knowledge on obstetric fistula as compared to those who had not [AOR (95CI=6.1(2.65-14.1)]. This might be justified as; having prior information about something can form one's Knowledge, so those who ever heard about obstetric fistula have better Knowledge.

Conclusions and Recommendation

The study result suggests majority of reproductive age women in the study area had poor Knowledge regarding obstetric fistula. The frequently mentioned risk factors, symptoms and preventive mechanisms of obstetric fistulas were female genital mutilation, urinary incontinence, and avoidance of early marriage and pregnancy. Moreover, level of education, place of delivery for the index child, history of modern contraceptive use and prior information about obstetric fistula were significant predictors for Knowledge of reproductive age women regarding obstetric fistula.

Abbreviations

ACSH-Ayder comprehensive Specialized Hospital, AOR-Adjusted odds ratio, COR-crude odds ratio, CI-Confidence interval, CS-Cesarean section, CSA-Central Statistical Agency,EDHS-Ethiopia Demographic health survey, FGD-Focused Group Discussion,N-GOs-None Governmental Organizations, OF-Obstetric Fistula, SBAs-Skilled Birth Attendants, SPSS-Statistical package for social science, SSA-Sub-Saharan Africa, TBAs-Traditional Birth Attendants, VVF-Vesico- Vaginal Fistula, WHO-World Health Organization

Declarations Appreciate
Ethical Consideration

Before the actual data collection letter of permission was obtained from Mekelle University, health Science College and school of Nursing to Tigray health bureau and then to south eastern zone Districts health Bureaus, the objective of the study was explained to the study participants. Privacy and confidentiality of the study participants were maintained by using study codes on data doc-

uments without identifiers on the study instruments except serial numbers. Furthermore, the study participant involvement was based on their willingness.

Acknowledgments

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