

# Latrine availability and associated factors among Religious institution in Northern Ethiopia, 2018

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## Research article

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# Abstract

Background Religious institutions found at the community, not only uphold belief and cultural values but also as a force for positive change and development. Improved sanitation and hygiene is crucial in these institutions to decrease preventable infections due to unsanitary conditions. However, there are no studies among religious institution on availability of latrine. So this study was conducted to assess the latrine availability and associated factors among religious institution in Tigray Region, Ethiopia. Method Institution based cross – sectional study design was conducted in Tigray Region, Northern Ethiopia. Multi-stage sampling was used to sample 385 religious institutions. Data was collected using pre tested, structured questionnaire and observation checklist. Logistic regression was fitted and odds ratio with 95% confidence interval (CI) with p-value less than 0.05 was used to determine the predictors of latrine availability. Analysis was carried out using SPSS 20 TM - software package. Results In this study latrine availability was 32.8%. And was significantly affected by currently saved money towards having a latrine (Adjusted Odds ratio (AOR): 0.32, 95% confidence interval (CI) [0.25, 0.42]), any messages seen, heard or received on sanitation and hygiene (AOR: 0.43, 95% CI [0.38, 0.51]) and place where messages seen, heard, received (AOR: 2.95, 95% CI [1.11, 5.55]). Conclusion Availability of latrine was very low when compared to the national target of 100% among the religious institution and was affected by the currently saved money towards having a latrine, any messages seen, heard or received on sanitation and hygiene and place where the messages receive. Information regarding latrine availability should be provided to the community visiting religious institutions through available channels and practical models promotion.

## Background

Worldwide lack of sanitation is a serious health risk, affecting billions of people around the world, particularly the poor and disadvantaged people around the world [1, 2, 3, 4]. Lack of sanitation facilities compels people to practice open defecation and this increases the risk of transmission of diseases [5, 6]. The disease burden associated with poor water, sanitation, and hygiene is estimated to account for 4.0% of all deaths and 5.7% of the total disease burden in disability-adjusted life year (DALY) in worldwide , principally through diarrheal diseases, schistosomiasis, trachoma, ascariasis, trichuriasis, and hookworm infection [7,8]. About 1.8 million people die every year due to diarrheal diseases and children under the age of 5 years account for 90% of diarrheal deaths. Moreover, 88% of diarrheal diseases are attributed to unsafe water supply, inadequate sanitation, and poor hygiene [9, 10].

In Ethiopia up to 60% of the current disease burden is attributable to poor sanitation where 15% of total deaths are from diarrhea, mainly among the large population of under-five year's children. Children in the country still suffer from diarrheal diseases, respiratory problems, and malnutrition. According to Ethiopian demographic and health survey, the two week prevalence of diarrheal diseases was 12% among under five years children [11,12].

The local religious institutions are often found at the heart of a community, not only upholding belief, cultural values and social tradition, but also as a force for positive change and development. Holy springs

are frequently contaminated with fecal bacteria and different infections are potentially transmitted from an infected person to a healthy one by various routes involving excreta [13]. Study from India showed that possible source of infection for a confirmed case of cholera in a 3-day-old neonate was by holy water given to the baby [14]. So, religious institution might be the point of infection for community served there and also despite concerted efforts by governmental and non-governmental organizations, water and adequate sanitation still remain a challenge like these institutions. The study was conducted to determine latrine availability and factors associated among Religious institution, Tigray region, Ethiopia. Aiming establish baseline information which will be very important for local decision makers knowing the current status and what should be done in the future.

## **Methods**

### **Study design, setting and Participants**

Cross – sectional, religious institution based study design was employed in Tigray Region, Northern Ethiopia from May to June/2018. Source of population were all religious institutions found in Tigray region while the study populations were those religious institutions found in the selected district.

### **Sampling technique and procedure**

Multi-stage probability sampling of four stages was used to select religious institutions. Using simple random sampling technique three zones were selected from the seven zones of Tigray Region and from the selected zones ten districts were sampled. Then, a proportional sample size was allocated according to the number of religious institutions in each district. Then after, religious institutions were questioned consecutively till fulfillment of the sample size. Sample size was determined using single population formula with prevalence estimates of 50%, with a marginal error of 0.05% at 95% confidence level. The total sample size is calculated to be 385. Respondents were heads or delegates of the religious institution but in situations where the head or delegate was not available after two or three visits, other in similar position was questioned and these were selected purposely.

### **Data collection instrument and quality management**

The data was collected using face to face interview with head of the institution and observation. One-week prior to the actual data collection period pretest was done and based on the finding, minor modifications of questions, wordings, phrases was made. During data collection time, a clear introduction that explains the purpose and objectives of the study was provided to respondents. A close supervision, honest communication and on spot decisions was done during data collection.

### **Explanatory Variables**

The study variables were selected after reviewing relevant literatures according to objective of the research and by considering the local context of the study area. The dependent variable was latrine

availability. The independent variables were general characteristics, communication, behavioral and environmental factor.

## Statistical Analyses

Data were coded and entered in to EPI-Info version 7 Software and analyzed using SPSS software version 20. Frequency distribution tables' graphs & narratives were used to present the findings. Frequency distributions, percentages and odds ratios (OR) with 95% confidence level (C.I) was calculate for statistical significance tests between variables and logistic regression model was used to identify predictors of latrine availability of religious institutions.

## Ethical consideration

Ethical approval and clearance was obtained from the Tigray health research institution and official letter from religious leaders. Written informed consent was warranted from all participants.

## Results

### Characteristics of the religious institution

In the present study total of 385 religious institution sampled and 351 of them had been included to the study. From this 285(81.2%) of them were Orthodox Church. Majority of the religious institutions service 288(82.1%) were church/mosque only and fifty four percent of the participants (n=188) found in rural area. Mean age of the institution were 83.2 years with  $\pm$ SD of  $\pm$ 119 [Table 1].

**Table 1: General characteristic of religious institution, Northern Ethiopia, 2017 (n=351)**

Characteristics	Category	Frequency	Percentage
Type of religious institution	Orthodox church	285	81.2
	Muslim mosque	60	17.1
	Catholic church	4	1.1
	Protestant church	2	0.6
Service given in the institution	Church/Mosque only	288	82.1
	Church with holy water	63	17.9
Residence	Urban	159	45.8
	Rural	188	54.2
<b>Characteristics</b>		<b>Mean<math>\pm</math> SD</b>	
Age of the institution		83.2 $\pm$ 119	
Age of the respondent		52.3 $\pm$ 15.26	
Peoples permanently living here		11.6 $\pm$ 36.65	
Estimation of the community served here		1308 $\pm$ 3822	

## **Environmental characteristics**

Of the institutions, 236(67.2%) had no latrine and the majority of the latrine were pit latrines 80(69.6%). Fifty seven percent of the institutions reasons for not having latrine was cost is too high to build latrine, no materials and no external assistance. Around ninety eight percent of the (n=233, 98.7%) institutions from those who didn't have latrine the priests and servant defecate openly. At the time of data collection, 82 (23.4%) latrines were functional. Around one third or 41(35.7%) of the latrines were below 15 meter from the drinking water/holy water/. Seventy six percent of the latrine was in a distance of above 12 meter from the priests serve.

**Table 2: Environmental conditions of religious institutions, Northern Ethiopia, 2017, (n=351)**

Characteristics	Category	Frequency	Percentage
Any type of latrine	Yes	115	32.8
	No	236	67.2
Type of latrine	Pit latrine	80	69.6
	Others	35	30.4
Reasons for not having latrine	Cost is too high, no materials and no external assistance	202	85.47
	Open defecation tradition, habit	19	8.12
	Not thought about it and no one to build latrine	15	6.41
Place of defecation	Open field	233	98.7
	Other	3	1.3
Functional latrine	Yes	82	71.30
	No	33	28.70
Distance of latrine to the closest drinking water /holy water/	Below 15 meter	41	35.7
	15-30 meter	25	21.7
	Greater than 30 meter	49	42.6
Distance of latrine from the room priests serve	Below 6 meter	18	15.7
	6-12 meter	9	7.8
	Above 12 meter	88	76.5
Number of rooms of the latrine	Below 2 rooms	59	51.3
	2-4 rooms	29	25.2
	Above 4 rooms	24	23.5
Clean latrine	Yes	55	47.8
	No	60	52.2
Frequency of cleaning latrine	Daily	42	36.5
	Weekly	35	30.4
	Almost never	38	33.0
Presence of hand washing	Yes	39	33.9
	No	76	66.1
Type of hand washing	Tap only and sink	18	46.2
	Water pot/container and cup	21	53.8
Latrine condition	Need maintenance	80	69.6
	No need maintenance	35	30.4
Reasons for not improving/ changing latrine type	Financial problem/No support	40	50.0
	Personal and space problem	40	50.0
Possible ways encouraging you build a latrine	Full subsidy and Contribution from NGOs	147	62.3
	Community pressure and/or material and labor assistance	89	37.7
Anyone diseased in this institution	Yes	42	12.0
	No	309	88.0
Currently any money saved towards having a latrine	Yes	16	6.8
	No	220	93.2
Institution discussed about building latrine	Yes	113	47.9

	No	123	52.1
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### Behavioral characteristics

Regarding the behavioral condition majority 319(90.9%) of the respondents believe that using latrine can prevent disease and nine out of 10 respondents believe that hand washing can prevent disease. Out of the religious institutions that have hand washing facility with latrine 32(82.1%) was using only water for hand washing. Fifty six percent (n=22) of the community or priest served in the institutions wash their hands after toilet. Half 59(51.3%) of the respondents who have latrine serve their latrine properly.

**Table 3: Behavioral conditions of religious institutions, northern Ethiopia, 2017**

Characteristics	Category	Frequency	Percentage
Do you believe that using latrine can prevent disease	Yes	319	90.9
	No	32	9.1
Do you believe that hand washing can prevent disease?	Yes	320	91.2
	No	31	8.8
Materials used in hand washing	Only water	32	82.1
	water +soap or ash	7	17.9
Wash their hand after toilet (community and priests)	Yes	22	56.4
	No	17	43.6
Serving the latrine properly	Yes	59	51.3
	No	56	48.7

### Communication related factors

Seventy eight percent (n=275) of the respondent seen, heard or received any messages or materials on sanitation and hygiene. Around one-third of (n=90) respondents had received message on building latrine. One hundred twenty five (45.5%) of the respondents heard or observe the messages from community meetings. Three out of ten 103(29.3%) of the sanitation and hygiene message was delivered by health extension workers. Below half of 153(43.6%) respondents prefer radio or/and Television (TV) for health education.

**Table 3: Communication related factors of religious institutions, Northern Ethiopia, 2017**

Characteristics	Category	Frequency	Percentage
Seen, heard or received any messages or materials on sanitation and hygiene	Yes	275	78.3
	No	76	21.7
Kinds of sanitation and hygiene messages have you seen, heard or received	Build a latrine	90	32.8
	Use a latrine/ stop open defecation	58	21.2
	Proper solid, liquid waste management	15	5.5
	Wash hands with soap	65	23.7
	Water and food hygiene	46	16.8
where did you see, hear, receive these messages	Posters or leaflets and newspapers or magazines	55	20.0
	At community meetings	125	45.5
	When visiting a health facility	56	20.4
	On Television and/or Radio	39	14.2
From whom did you hear/ receive these messages	Village chief	82	29.8
	Commune chief/ council	29	10.5
	Government agency other than health	35	12.7
	From health extension works	103	29.3
	From coordinators of church	26	7.4
Preferred channel of communication or mechanisms to get information	Radio or/and TV	153	43.6
	House visit	90	25.6
	Through Church/mosque	63	17.9
	Pictures /posters	45	12.8

### Factors associated with availability of latrine

In order to identify significant variables that were associated with the outcome variable, all significant variables with p-value less than 0.25 in bi-variate analysis were fitted into the final model. The model showed that currently any money saved towards having a latrine (AOR: 0.32, 95% CI [0.25, 0.42]), seen, heard or received any messages on sanitation and hygiene (AOR: 0.43, 95% CI [0.38, 0.51]) and place you see, hear, receive these messages (AOR: 2.95, 95% CI [1.11, 5.55]).

Religious institutions that had not saved money for sanitation and hygiene were 68% times less likely to have latrine than institutions that had saved money. Head of religious institutions that had not seen, heard or received any messages on sanitation and hygiene were 57% times less likely to own latrine than those who had seen, heard or received any messages on sanitation and hygiene. Head of religious

institutions that had receive message from Posters or leaflets and newspapers or magazines were 2.95 times more likely to own latrine than received message by television and/or radio [Table 5].

**Table 5: The main predictors of latrine availability among religious institutions of Tigray Region, Northern Ethiopia, 2018 (n = 351)**

Characteristics	Latrine Availability, n (%)		OR(95%CI )	
	Yes	No	Crude	Adjusted
<b>Possible ways encouraging you build a latrine</b>				
Full subsidy and Contribution from NGOs	12(8.16)	135(91.84)	1.42(0.58-3.45)	NS
Community pressure and/or material and labor assistance	10(11.24)	79(88.76)	1	
<b>Currently any money saved towards having a latrine</b>				
Yes	9(56.25)	7(43.75)	1	1
No	57(25.91)	163(74.09)	0.27(0.09-0.76)	0.32(0.25-0.42)
<b>Institution discussed about building latrine</b>				
Yes	34(30.09)	79(69.91)	1	NS
No	30(24.39)	93(75.61)	0.75(0.42-1.33)	
<b>Seen, heard or received any messages or materials on sanitation and hygiene</b>				
Yes	105(38.18)	170(61.82)	1	1
No	10(13.16)	66(86.84)	0.25(0.12-0.49)	0.43(0.38-0.51)
<b>Kinds of sanitation and hygiene messages have you seen, heard or received</b>				
Build a latrine	26(28.89)	64(71.11)	1.89(0.90-3.97)	
Use a latrine/ stop open defecation	27(46.55)	31(53.45)	0.88(0.41-1.92)	
Proper solid, liquid waste management	8(53.33)	7(46.67)	0.67(0.21-2.17)	
Wash hands with soap	24(36.92)	41(63.08)	1.31(0.61-2.84)	
Water and food hygiene	20(43.48)	26(56.52)	1	NS
<b>where did you see, hear, receive these messages</b>				
Posters or leaflets and newspapers or magazines	17(30.91)	38(69.09)	2.35(1.01-5.50)	2.95(1.11-5.55)
At community meetings	48(38.40)	77(61.60)	1.69(0.82-3.48)	1.95(0.86-3.58)
When visiting a health facility	14(25.00)	42(75.00)	3.16(1.32-7.55)	3.01(1.31-6.55)
On Television and/or Radio	20(51.28)	19(48.72)	1	1
<b>From whom did you hear/ receive these messages</b>				
Village chief	23(28.05)	59(71.95)	2.99(1.21-	

			7.43)	
Commune chief/ council	13(44.83)	16(55.17)	1.44(0.49-4.16)	
Government agency other than health	16(45.71)	19(54.29)	1.39(0.50-3.84)	
From health extension works	39(37.86)	64(62.14)	1.92(0.80-4.56)	
From coordinators of church	14(53.85)	12(46.15)	1	NS
<b>Age of the institution</b>			<b>1.00(1.0-1)</b>	<b>NS</b>
<b>Age of the respondent</b>			<b>1.014(0.99-1.03)</b>	<b>NS</b>
<b>Peoples permanently living here</b>			<b>0.99(0.99-1.00)</b>	<b>NS</b>

**NB: NS indicates non-significance**

## Discussion

The main objective of this study was to assess level of latrine availability and its associated factors in religious institution in Tigray Region. Accordingly, the present study revealed that the overall availability of latrine was 32.8%. The national and regional target for latrine availability is 100% in all setting [15]. However the study reported that three out of ten religious institutions had latrine, so this implies that there is low coverage of latrine among religious institution in the region. This study result was low compared with study done in Ethiopia (which 59% of house hold own latrine) [16] and with EDHS 2016 which showed more than half (56%) of rural households use unimproved toilet facilities [17]. This might be due to the fact that there was no a persistent health education programs carried out to visitors of religious institutions. So, communities who are served there will not perceive that building latrine can prevent from different disease and childhood diarrhea. Also, possible reason could be that heads of the institution did not strongly handle visitors' defecation practice.

This study exposed that religious institution that had saved money for sanitation and hygiene was significantly associated with availability of latrine. This is consistent with study done by world bank which indicates that those without latrines tend to be poorer than those higher on the sanitation ladder and open defecators cite lack of finances," or "don't have money" as key barriers to building latrines or making improvements [18]. So, religious institutions that have saved money for the purpose of latrine construction might employ daily laborer to construct the latrine. A study indicated that latrine promotion programs like community lead total sanitation was least effective in communities where subsidies had already been given to the community members [19]. Thus, institutions saved money for the purpose of latrine construction might own or build latrine.

Head of religious institutions that had not seen, heard or received any messages on sanitation and hygiene were 57% times less likely to own latrine than those who had seen, heard or received any messages on sanitation and hygiene. This could be because institutions receiving message concerning latrine construction were better informed about the importance of building latrine facilities and its utilization through health-promotion programs and community mobilization. If communities visiting religious get information regarding latrine and they might perceive risk of practicing open defecation and has the potential to stimulate and shape communities' behaviors [20].

Religious institutions that had receive message from posters or leaflets and newspapers or magazines were more likely to own latrine than received message by television and/or radio. This could indicate the socio economic of the community, if government and nongovernmental organizations need to educate the community, they should have to use low cost mechanism of transmissions. Generally to increase latrine availability health professionals should sustainably educate on the implementation of the community-led total sanitation and hygiene approach [21].

## Conclusion

Availability of latrine was very low when compared to the national target of 100% among the religious institution and also over half of the available latrines required maintenance. Latrine availability was influenced by the currently saved any money towards having latrine, any messages on sanitation and hygiene received and place where the message received. Information regarding latrine availability should be provided to the community visiting religious institutions through available channels and practical models promotion. Messages focusing on human proper feces disposal should be scale up into the community throughout. Providing enough information about latrine construction and cleanliness through health education is good to improve latrine availability.

## Abbreviations

AOR	Adjusted Odds Ratio
CI	Confidence Interval
DALY	Disability Adjusted Life Year

## Declarations

### Ethics approval and consent to participate

Participation was voluntary. Before the interview, the interviewer explained in detail the content of the questionnaire, informed the participants on confidentiality of their responses and of their free choice to withdraw from the study during the interview or later. A written consent was obtained from all

participants. The study was approved by the Institutional Review Board of the Tigray health research Institute (No: **RMT/0061/2018**).

### **Consent for publication**

“Not applicable”

### **Availability data and material**

The datasets used and/or analyzed during the current study is available from the corresponding author on request.

### **Competing interest**

The authors’ declare that they have no conflict of interest.

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### **Author’s contribution:**

MWA: Conceptualization, Methodology, analysis, writing original draft of the manuscript.

KD: Methodology, review & editing of the manuscript

TT: Methodology, review & editing of the manuscript

All authors have read and approved the manuscript

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