

# Assessment of Knowledge, Attitude and Practice towards rabies and associated factors among household heads in Mekelle city, Ethiopia

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## SUBJECT AREAS

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## KEYWORDS

*Attitude, Community, Knowledge, Practice, Rabies*

## Abstract

**Background:** Rabies has a worldwide distribution in continental regions of Africa, Asia and the Latin America. Globally, the case fatality rate is 100% once a clinical sign is developed. Poor public awareness towards rabies is one of the major obstacles in any prevention and control scheme of the diseases. The aim of this study was to assess knowledge, attitude and practice (KAP) about rabies and associated factors among household heads in Mekelle city, Northern Ethiopia, 2016.

**Methods:** A community based cross sectional study was conducted from October to November 2016 with a total of 633 study participants. Data were collected using a pre-tested structured questionnaire in Enderta district, Tigray regional state, Ethiopia. Data was entered to EPI-Info 3.5.4 and coded, cleaned and analyzed using SPSS version 20 software. Bivariable and multivariable analysis was done to identify factors associated with knowledge, attitude and practice about rabies. Variables having  $p < 0.05$  was considered as statistically significant at 95%CI.

**Results:** Of 633 study participants, 357 (56.4%) were females and 239 (37.8%) were 18-35 years old. Among the study participants, 56.1% (95%CI=52.2, 59.9), 56.2% (95%CI=52.4, 60.1) and 61.3% (95%CI=57.5, 65.1) had good level of knowledge, attitude and practice on the prevention and control of rabies respectively. Being female (AOR=1.50, 95%CI=1.05, 2.13), dog owner (AOR=1.68, 95%CI=1.17, 2.41) and participants who had training on rabies (AOR=2.22, 95%CI=1.53, 3.21) were found to have good knowledge. Married participants (AOR=2.19, 95%CI=1.16, 4.16), participants who owned dog (AOR=2.64, 95%CI=1.80, 3.86) and those encountered dog bite (AOR=2.24, 95%CI=1.23, 4.10) were found to have positive attitude towards rabies. Similarly dog ownership (AOR=11.85, 95%CI=7.16, 19.6) was found to be associated with good practice.

**Conclusion:** This study showed that more than half of the respondents had good knowledge, attitude and practice about the prevention and control of rabies. Key words: Attitude, Community, Knowledge,

Practice, Rabies

## Background

Rabies is one of the oldest viral disease caused by the species of rabies virus which belongs to the Mononegavirales order, Rhabdoviridae family and Lyssavirus genus [1]. It is a single-stranded, negative-sense lyssavirus (genotype 1) with a genome size of approximately 12 kb. Rabies is progressively fatal and incurable viral encephalitis caused by a lyssavirus infection [2].

Human Rabies is transmitted through a bite, or scratch from a rabid animal but it can be prevented

through prompt administration of post-exposure prophylaxis (PEP) to victims of bites by rabid animals and infection can be eliminated at source through sustained mass vaccination of reservoir populations [3, 4].

Rabies affects any mammal mainly carnivores and insectivorous bats and the case fatality rate in cases that develop clinical signs is nearly 100%. Globally, rabies is responsible for more than 61,000 (5) human deaths and approximately 15 million people receive rabies post exposure prophylaxis every year (6). More than 95% of the global deaths occur in Asia and Africa and Africa contributes to 43% of the human deaths due to rabies [7]. About 98% of the human rabies cases occur in developing countries that possess large number of dogs, many of which are stray [8]. Estimates of human mortality due to endemic canine rabies in Asia and Africa annually exceed 31000 and 24000 respectively [9].

In Ethiopia rabies is highly endemic, with an estimated 10,000 deaths annually, which makes it to be one of the worst affected countries in the world and dogs are the principal source of infection for humans [10]. The available information on rabies in Ethiopia is largely based on passive reports to Ethiopian Public Health Institute (EPHI) zoonosis laboratory, the only rabies diagnostic laboratory in the country [11]. There is lack of accurate quantitative information on rabies both in humans and animals and little is known about the awareness of the people about the disease to apply effective prevention and control measures in Ethiopia [12].

Knowledge, attitude and practice (KAP) studies have been widely used around the world for different applications in public health based on the principle that increasing knowledge will result in changing attitude and practice to minimize disease burden [13]. In Tigray, like the other areas of Ethiopia, there are high numbers of home and street dogs. Despite of this, regular vaccination and follow up to the dogs is not being given [14]. In addition to this there is no study conducted on KAP of rabies prevention and control in Mekelle city. Therefore the aim of this study was to fill the gap on the availability of data regarding status of KAP on prevention and control towards rabies among household heads in Mekelle city, Northern Ethiopia.

## Methods

### Study area

The study was conducted in Mekelle city, Tigray Region, Northern Ethiopia. Mekelle city is the capital city of Tigray Region and it is found about 783 km far from Addis Ababa. According to the projected census of 2007 Ethiopian Fiscal Year, the city had a total population of 340,589. The city is divided into seven administrative sub cities namely: Hawelti, Hadnet, Ayder, Semen, Kedamay weyane, Adihaki, and Quiha.

### Study design and study period

Community based cross-sectional study was conducted from October to November 2016.

### Sample size determination

The sample size was calculated using single population proportion formula assuming the proportion of knowledge level 83%, attitude level 52.3%, and practice level 67% [8] with 5% margin of error, 95% confidence level, and 1.5 design effect.

The calculated sample size were

Knowledge level=217, Attitude level=383 and Practice level=340

Therefore, the larger sample size among the knowledge, attitude and practice is taken as appropriate which is 383, then multiplying by design effect was  $383 \times 1.5 = 575$ , adding none response rate 10% =

58, then the final sample size was 633.

#### Sampling procedure

Mekelle city has seven sub cities namely Hawelti, Hadnet, Ayder, Semen, Kedamay weyane, Adihaki, and Quiha. Among the seven sub cities, two were selected using simple random sampling technique (lottery method), namely Kedamay weyane and Ayder. Kedamay weyane and Ayder sub cities has four and five kebelles respectively. Two kebelles for each sub city (total four kebelles) were selected for the study by lottery method (Figure 1).

The selected kebelles were *Harya* and *Walita* from Kedamay weyane sub city and *Gunibet 20* and *Seritse* from Ayder sub city. Therefore, the total sample size was proportionally allocated to the four kebelles based on six months living in the kebelles (Figure 1). Therefore the study participants was household heads, the first household was selected randomly between 1-13 using lottery method, then the first household to be included in the sample was the fifth household, then every 13<sup>th</sup> households was selected.

Figure 1: Sampling procedure for assessing knowledge, attitude and practice about rabies and associated factors among household heads in Mekelle city, Northern Ethiopia, 2016

#### Data collection procedure

A pre-tested structured questionnaire was used. The questionnaire was initially prepared in English and translated in to local language (Tigrigna) and again retranslated back to English to check for any inconsistencies or distortions in the meaning of words and concepts. Face to face interview was the technique of data collection. For administering the interview four diploma nurses as data collectors and one health officer as supervisor, were recruited.

#### Data quality control

A structured questionnaire was pre-tested on 5% sample size outside of the study area, in Enderta District, for consistent understanding of the survey tool and modifications were done accordingly. Close supervision was undertaken during data collection. Questionnaire was checked for completeness and consistency before data entry by the principal investigator.

#### Data processing and Analysis

All collected data were entered to EPI-info version 3.5.4 and exported to SPSS version 20 statistical software for analysis. Data were coded and cleaned for completeness and consistency. Descriptive and Bivariate analyses were computed to see the frequency distribution and to test whether there was association between dependent and independent variables respectively. Binary logistic regression model was used for analysis. Factors associated with knowledge, attitude and practice of rabies at bivariate binary logistic regression analysis were identified and variables with p-value of 0.20 and less were fit to logistic model for multivariable analysis to determine relative prediction level of independent variables to the outcome variable. P-value less than 0.05 were considered as statistically significant at adjusted crude odds ratio reported.

#### Ethical consideration

Ethical clearance was obtained from the Ethical Review Board of Institute of Public Health, College of Medicine and Health Science, University of Gondar. Official permission was obtained from Tigray Regional Health Bureau, Mekelle Zone, Kedamay weyane and Ayder sub cities. Oral informed consent was obtained from each study participant to confirm willingness for participation after explaining the objective of the study. Confidentiality of the information was maintained throughout by excluding

names and keeping their privacy during the interview, by interviewing them alone. Participants had the right to withdraw at any time from the interview.

#### Operational definition

Good knowledge: respondents who scored points at mean and above for the knowledge questions prepared were referred to be having good knowledge otherwise not.

Positive attitude: respondents who scored points at mean and above for the attitude questions were referred to be having positive attitude otherwise not.

Good practice: respondents who scored points at mean and above for the practice questions were referred to be having good practice otherwise not.

## Results

### Socio-demographic and economic factors

A total of 633 household heads were interviewed in this research, which yields a response rate of 100%. More than half 357 (56.6%) of the interviewed participants were females. Regarding age group, the age of the respondents range from 19 to 80 with a mean age of  $42.3 \pm 13.8$  and the majority 271 (42.8%) of participants age were between 36-55 years old (Table 1).

Table 1: Socio-demographic and economic factors of respondents towards rabies among household heads in Mekelle city, Northern Ethiopia, 2016.

Variables	Frequency	%
Age		
15-35	239	37.8
36-55	271	42.8
56-75	116	18.3
>75	7	1.1
Sex		

Male	276	43.4
Female	357	56.6
Ethnicity		
Tigre	576	91
Amahara	78	9
Marital status		
Married	365	57.7
Unmarried	116	18.3
Divorced	92	14.5
Widowed	60	9.5
Educational status		
Do not read and write	45	7.1
Read and write	89	14.1
Primary school complete	188	29.7
Secondary school complete	162	25.6
Higher education	149	23.5
Religion		
Orthodox-Christian	540	85.3
Muslim	78	12.3
Catholic	15	2.4
Occupation		
Government employee	140	22.1
Private employee	130	20.5
Merchant	133	21
House wife	88	13.9
Farmer	26	4.1
Student	39	6.2
Unemployed	77	12.2
Household size		
1-3	327	51.7
4-6	264	41.7
>6	42	6.6
Average monthly income in birr		

<1000	165	26
1000-2000	187	29.5
>2000	281	44.5

#### Access to health information and Environmental factors towards rabies

Among the study participants, about 267 (42.2%) of respondents heard information regarding rabies from informal sources, such as traditional healers, neighbors, friends, schools and relatives and 107 (17%) of study participants heard from formal (Radio/TV, newspaper and Books/magazines) (Table 2).

Table2: Access to health information and Environmental factors towards rabies among household heads in Mekelle city, Northern Ethiopia, 2016

Variables	Frequency	%
Dog ownership		
Yes	256	40.4
No	377	59.6
Family exposure to dog bite		
Yes	89	14.1
No	544	85.9
Has get training/awareness about rabies		
Yes	208	32.9
No	425	67.1
Source of information about rabies		
Formal (News paper, TV/radio)	107	17
Informal	267	42.2
Mixed Source	187	30
Governmental rabies vaccine campaigns	54	9
Main reservoir/source of rabies		
Dog	624	98.6
Cat	147	23.2
Other domestic animals	160	24.5

#### Household heads knowledge, attitude and practice about rabies in Mekelle city

Twenty three questions (8 knowledge, 7 attitude and 8 practice) were asked for each respondent regarding cause, sources and mode of transmissions, attitude, practice and prevention and control measures about rabies. The questions were in a type of a response of either choosing the correct answer (had got one mark) or wrong answer (had got zero mark) for each question. The number of questions for which the respondent gave correct responses was counted and scored. This score was then pooled together and the mean score was computed to determine knowledge, attitude and practice of respondents. Respondents who score greater than or equal to the mean value (Mean=5.5, SD=1.96) grouped to good knowledge and less than the mean value poor knowledge level,

respondents who score greater than or equal to the mean value (Mean=4.6, SD=1.36) grouped to positive attitude and less than the mean value negative attitude level, respondents who score greater than or equal to the mean value (Mean=1.9, SD=1.6) grouped to good practice and less than the mean value poor practice level.

#### Knowledge of participants towards rabies

This study revealed that 555(87.8%) of respondents had heard information about rabies (Table 3). About 470 (74.2%) of respondents said that rabies affect all warm blooded animals including human, 423 (66.8%) of participants said that dog rabies vaccine could be obtained from authorized governmental institutions (Table 3).

Table 3: Computed knowledge variables of participants to ward rabies among household heads in Mekelle city, Northern Ethiopia, 2016 (n=633)

Variables	Frequency
Heard about rabies disease	
Yes	555
No	78
Rabies affect all warm blooded animals including human	
Yes	470
No	163
Dog rabies vaccine could be obtained from governmental institutions	
Yes	423
No	210
Rabies prevented by vaccination	
Yes	442
No	178
I don't know	13
Rabies treated by Post Exposure Prophylaxis	
Yes	428
No	184
I don't know	21
Almost 100% fatal nature of rabies	
Yes	289
No	344
Wash dog bite wounds with soap and water	
Yes	382
No	251
Your family are at risk of getting rabies if the dog is not vaccinated	
Yes	507
No	126

#### Attitude towards rabies

This study revealed that 525 (82.9%) of respondents said that stray dogs are dangerous and 360 (56.9%) were willing to register their pets. About 536 (84.7%) of respondents were annoyed with stray dogs. Majority 557 (88%) were said rabies prevented by health education and 315 (49.8%) respondents believed holly water cure rabies (Table 4).

Table 4: Computed attitudes toward rabies among household heads in Mekelle city, Northern Ethiopia, 2016 (n=633)

Variables	Frequency	%
Stray dogs are dangerous		
Yes	525	82.9
No	108	17.1
Rabies is a problem in your kebele		
Yes	244	38.5
No	389	61.5
Holly water can treat rabies disease		
Yes	315	49.8
No	318	50.2
Rabies can be effectively prevented by killing stray dogs		
Yes	394	62.2
No	239	37.8
Rabies prevented by educating people		
Yes	557	88
No	76	12
Willing to register pets		
Yes	360	56.9
No	273	43.1
Annoyed with stray dogs		
Yes	536	84.7
No	97	15.3

#### Practice of participants towards rabies

This study showed that, 383 (60.5%) of participants have contact with dogs and cats and 351 (60.5%) participants have hand washing habit after touching dogs and cats (Table 5). Among 89 respondents who had ever been bitten by a dog or who had a family member ever bitten by a dogs, only 69 (77.5%) went to health institution after bite as followed by 11 (12.3%) went to holly water (Table 5).

Table 5: Computed practice variables toward rabies among household heads in Mekelle city, Ethiopia, 2016

Variables	Frequency
Your family members touch dogs and cats	
Yes	383
No	250
Your family members wash their hands after touching the dog, cat	

Yes	351
No	282
Would you inform authorities if you were bitten by dog	
Yes	82
No	7
Vaccinated your dog	
Yes	195
No	51
Do you have dog vaccination certificate of your dog	
Yes	151
No	44
Ever been bitten by a dog	
Yes	89
No	544
When you get bit where did you go first	
Stay at home	0
To health institution	69
To holly water	11
To traditional Healers	9
Measure taken to control stray dogs	
Aware the owner	45
Killing	81
Animal birth control	14
Incarceration	106
Care your dog on	
Housed in cages	179
Tied outside the house	38
Free living inside the house	21
Free to roam around	8

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Knowledge, Attitude and Practice related to rabies

According to the study 56.1% (95%CI=52.2, 59.9), 56.2% (95%CI=52.4, 60.1) and 61.3%

(95%CI=57.5, 65.1) of participants had good knowledge, positive attitude and good practice towards rabies respectively, as shown in figure 2.

Figure 2: Knowledge, attitude and practice towards rabies among household heads in Mekelle city,

Northern Ethiopia

Factors associated with knowledge

Variables including sex, occupation, dog ownership, training, monthly income, educational status and exposed family to dog bite with p-value less than 0.2 in bivariate analysis were entered in to multivariable binary logistic regression analysis model (Table 6).

The multivariable analysis result of this study declared that sex, occupation, dog ownership, training and monthly income had statistically significant association with knowledge about rabies at 5% level of significance.

Table 6: Factors associated with knowledge towards rabies among household heads in Mekelle city,

Northern Ethiopia, 2016 (n=633)

Variables		Knowledge		COR 95% CI
		good n(%)	poor n(%)	
Sex	Male	140(50.7%)	136(49.3%)	1
	Female	215(60.2%)	142(39.8%)	1.47(1.07, 2.02)
Educational status	Not read & write	22(48.9%)	23(51.1%)	1
	Read & write	41(46.1%)	48(53.9%)	0.89(0.44, 1.83)
	Primary	103(54.8%)	85(45.2%)	1.27(0.66, 2.43)
	Secondary	99(61.1%)	63(38.9%)	1.64(0.85, 3.19)
Occupation	Higher education	90(60.4%)	59(39.6%)	1.60(0.82, 3.12)
	Government employee	86(61.4%)	54(38.6%)	1.81(1.03, 3.18)
	Private employee	76(58.5%)	54(41.5%)	1.60(0.91, 2.83)
	Merchant	73(54.9%)	60(45.1%)	1.39(0.79, 2.43)
	House wife	50(56.8%)	38(43.2%)	1.50(0.81, 2.77)
	Farmer	10(38.5%)	16(61.5%)	0.71(0.29, 1.76)
	Student	24(61.5%)	15(38.5%)	1.82(0.83, 4.00)
Average monthly income birr	Unemployed	36(46.8%)	41(53.2%)	1
	≤1000	99(60%)	66(40%)	1
	1001-2000	94(50.3%)	93(49.7%)	0.67(0.44, 1.03)
Dog ownership	>2000	162(57.7)	119(42.3%)	0.91(0.61, 1.34)
	Yes	164(64.1%)	92(35.9%)	1.74(1.25, 2.40)
Exposure fam. to dog bite	No	191(50.7%)	186(49.3)	1
	Yes	61(68.5%)	28(31.5%)	1.85(1.15, 2.99)
Training/awareness rabies	No	294(54%)	250(46%)	1
	Yes	145(69.7%)	63(30.3%)	2.36(1.66, 3.35)
	No	210(49.4)	215(50.6%)	1

Note: Superscript indicates statistical significance \*p-value < 0.05  
Factors associated with attitude

Variables including marital status, educational status, household size, dog ownership, exposure family to dog bite, monthly income and knowledge with p-value less than 0.2 in bivariate analysis were entered in to multivariable binary logistic regression analysis model (Table 7).

The multivariable analysis result of this study declared that marital status(married) educational status, household size, dog ownership and family exposure to dog bite had statistically significant association with attitude about rabies at 5% level of significance (Table 7).

Table 7: Factors associated with attitude towards rabies among household heads in Mekelle city,

Northern Ethiopia, 2016 (n=633)

Variables		Attitude		COR 95% CI
		positive	negative	
Marital status	Married	215(58.9%)	150(41.1%)	1.43(0.83, 2.48)
	Unmarried	53(45.7%)	63(54.3%)	0.84(0.45, 1.57)
	Divorced	58(63%)	34(37%)	1.71(0.88, 3.30)
	Windowed	30(50%)	30(50%)	1
Educational status	Not read & write	33(73.3%)	12(26.7%)	1
	Read & write	57(64%)	32(36%)	0.65(0.29, 1.43)
	Primary	123(65.4%)	65(34.5%)	0.69(0.33, 1.42)
	Secondary	85(52.5%)	77(47.5%)	0.40(0.19, 0.83)
Average monthly income birr	<_1000	100(60.6%)	65(39.4%)	1
	1001-2000	114(61%)	73(39%)	1.02(0.66, 1.56)
	>2000	142(50.5%)	139(49.5%)	0.66(0.45, 0.98)
House hold size	1-3	191(58.4%)	136(41.6%)	1.87(0.98, 3.59)
	4-6	147(55.7%)	117(44.3%)	1.68(0.87, 3.22)
	>6	18(42.9%)	24(57.1%)	1
Dog ownership	Yes	182(71.1%)	74(28.9%)	2.87(2.05, 4.02)
	No	174(46.2%)	203(53.8%)	1
Exposure fam. to dog bite	Yes	69(77.5%)	20(22.5%)	3.09(1.83, 5.23)
	No	287(52.8%)	257(47.2%)	1
Knowledge	Good	141(50.7%)	137(49.3%)	1.49(1.09, 2.05)
	Poor	215(60.6%)	140(39.4%)	1

Note: Superscript indicates statistical significance \*p-value < 0.05

Factors associated with practice

Variables including marital status, educational status, age, household size, knowledge, attitude, dog ownership and family exposure to dog bite with p-value less than 0.2 in bivariate analysis were entered in to multivariable binary logistic regression analysis model (Table 8).

The multivariable analysis result of this study declared that dog ownership and exposure family to

dog bite had statistically significant association with practice about rabies at 5% level of significance (Table 8).

According to this study, educational status, age, household size, knowledge and attitude were not significantly associated with practice about rabies in the multivariable analysis (Table 8).

Table 8: Factors associated with practice towards rabies among household heads in Mekelle city,

Northern Ethiopia, 2016 (n=633)

Variables		Practice		COR 95% CI
		good	poor	
Educational status	Not read & write	33(73.3%)	12(26.7%)	1
	Read & write	52(58.4%)	37(41.6%)	0.51(0.23, 1.12)
	Primary	113(60.1%)	75(39.9%)	0.55(0.27, 1.13)
	Secondary	107(66%)	55(34%)	0.71(0.34, 1.48)
	Higher education	83(55.7%)	66(44.3%)	0.46(0.22, 0.95)
Age	18-35	149(62.3%)	90(37.7%)	0.28(0.03, 2.33)
	36-55	169(62.4%)	102(37.6%)	0.28(0.30, 2.33)
	56-75	64(55.2%)	52(44.8%)	0.21(0.02, 1.76)
	>75	6(85.7%)	1(14.3%)	1
	House hold size	1-3	193(59%)	134(41%)
4-6		163(61.7%)	101(38.3%)	0.50(0.24, 1.07)
>6		32(76.2%)	10(23.8%)	1
Dog ownership	Yes	233(91%)	23(9%)	14.5(9.02, 23.3)
	No	155(41.1%)	222(58.9%)	1
Exposure fam. to dog bite	Yes	83(93.3%)	6(6.7%)	10.8(4.65, 25.3)
	No	305(56.1%)	239(43.9%)	1
knowledge	Good	152(54.7%)	126(45.3%)	1.64(1.19, 2.27)
	Poor	236(66.5%)	119(33.5%)	1
Attitude	Positive	142(51.3%)	135(48.7%)	2.13(1.54, 2.95)
	Negative	246(69.1%)	110(30.9%)	1

Note: Superscript indicates statistical significance \*p-value < 0.05

## Discussion

In Ethiopia studies are limited in assessing the knowledge, attitude and practice of community household heads towards rabies. Therefore, the goal of this study was to contribute an evidence based findings in filling this gap.

This study revealed that, the total mean score for practice, attitude and knowledge was 61.3%, 56.2% and 56.1% respectively.

Of the 633 respondents, 88.2% had heard about rabies before exposure. This suggests that victims are aware of the presence of rabies in their area. Majority (88.9%) of the victims had heard about rabies from informal sources (family, friends and neighbors). This finding is similar with study conducted in Tanzania [13]. This suggests that there is a way of dissemination of information about rabies in the community.

This study showed that 79% of household heads had vaccinated their dogs. This finding is similar with study conducted in Indonesia (74%) [18] and Sri lanka (76%) [15]. However, this result is higher than study conducted in Kenya (35%) [16], Jima (4.8%) [17], Gondar 42% [18] and Dessie town (35.8%) [19]. This may be attributed to a number of factors that include availability of animal vaccines, the study time and have good sharing information among people who own dogs on how to prevent the disease.

This study showed that 56.1% (95%CI=52.2, 59.9) household heads had good knowledge about rabies, which was lower than studies conducted in Sri-lanka(89.6%) [15], Indonesia (82.6%) [20], Guatemala (82%) [21], Tanzania (96%) [13], Addis Ababa (83%) [8], Bahir-Dar (60.1%) [10], Gondar (90.8%) [18] and Deberetabur (65.1%) [9]. The possible reasons for this observed difference could be due to socio-economic and cultural differences.

This study showed that 56.2% (95%CI=52.4, 60.1) household heads had positive attitude about rabies, which was lower than study conducted in Indonesia (96%) [20]. This difference probably might be explained by the lack of health education about rabies in the study site.

Moreover, attitude of the current finding is greater than the study conducted in Bahir-Dar (42.8%) [8], Addis Ababa (52.3%) [8] and Deberetabur (40.6%) [9]. This finding may be due to willingness of dog owners to vaccinate their pets and believe on mass vaccination program as a way of prevention and control of rabies. Additionally this may be due to time difference which could bring a difference on awareness of study participants.

This study revealed that female household heads were 1.5 times more likely (AOR=1.5, 95%CI=1.05, 2.13) to have good knowledge towards rabies as compared to male household heads. This finding was similar with study conducted in Addis Ababa [8] and Jima town [17]. This could be due to the reason that females get awareness about rabies from house to house by urban health extension workers, women development army, giving health education in health institution and better chance of acquiring correct information about rabies.

This study showed that governmental employee household heads were almost two times more likely (AOR=1.96, 95%CI=1.03, 3.73) to have good knowledge towards rabies as compared to those unemployed household heads. This may be due to the reason that employees are more educated

than unemployed. This study's finding was lower than a study conducted in Tanzania [13] and Nigeria [22]. This may be due to the difference of socio economic status of study participants.

Those who have dogs in their household were 68% more likely (AOR=1.68, 95%CI=1.17, 2.41) to have good knowledge toward rabies as compared to those didn't had dogs. This finding was in line with a study conducted in Tanzania [13]. The possible justification for this finding could be, those who have dogs got good information about rabies in the time of vaccination, on how to care dogs and prevent rabies exposure.

This study showed that having secondary school educational level (9-12 grade) and higher education (diploma and above) were 58% and 73% less likely (AOR= 0.42, 95%CI=0.18, 0.97) to have positive attitude towards rabies as compared to those who do not read and write. This finding was lower than the study conducted in Tanzania [13], Namibia [23] and Nigeria [22]. This might be due to variation on level of awareness towards rabies.

Those who have dogs were 11.85 times more likely (AOR=11.85, 95%CI=7.16, 19.6) to have good practice toward rabies prevention as compared to those didn't had dogs. This study is in line with the study conducted in Tanzania [13]. Those communities have got good awareness about rabies in the time of vaccination, care of dogs, and this may help them to have good practice about rabies prevention and control.

## Conclusions

This study showed that more than half of the study participants had good knowledge, attitude and practice about rabies. Variables like governmental employee, dog ownership and those got training/awareness about rabies found to have significance association with knowledge.

Variables like being married, secondary school and higher education (diploma and above) completed, dog ownership, family exposure to dog bite and households size were significantly associated with attitude. Whereas, dog ownership and family exposure to dog bite, were significantly associated with practice.

## Abbreviations

AOR=Adjusted Odds Ratio; **CI**=Confidence Interval; **COR**=Crude Odds Ratio; **EPHI**=Ethiopian Public Health Institute; **KAP**=Knowledge, Attitude and Practice; **PEP**=Post Exposure Prophylaxis

## Declarations

Ethics approval and consent to participate

All procedures performed in this study were in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. Ethical clearance was obtained from the Ethical Review Board of Institute of Public Health, College of Medicine and Health Science, University of Gondar. Official permission was obtained from Tigray Regional Health Bureau, Mekelle Zone, Kedamay weyane and Ayder sub cities. Confidentiality of data and the scientific honesty during write up was considered.

Consent for publication

The authors gave their consent for publication of this original research work.

Availability of data and material

The authors ensure the availability of data and material of this research work and are ready to provide when requested.

Competing interests

The authors declare no competing interests

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This study was not funded by any party.

#### Authors' contributions

WGH conceived the study idea and designed the analysis. BAD, KFM, GGG performed the data management and analysis. GGG write up the manuscript. GGM and KAR participate in data analysis. WGH and GGG review the manuscript for final submission. The authors agree to be accountable for all aspects of the work related to the accuracy or integrity of any part of the work, and have read and approved the manuscript.

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Figures

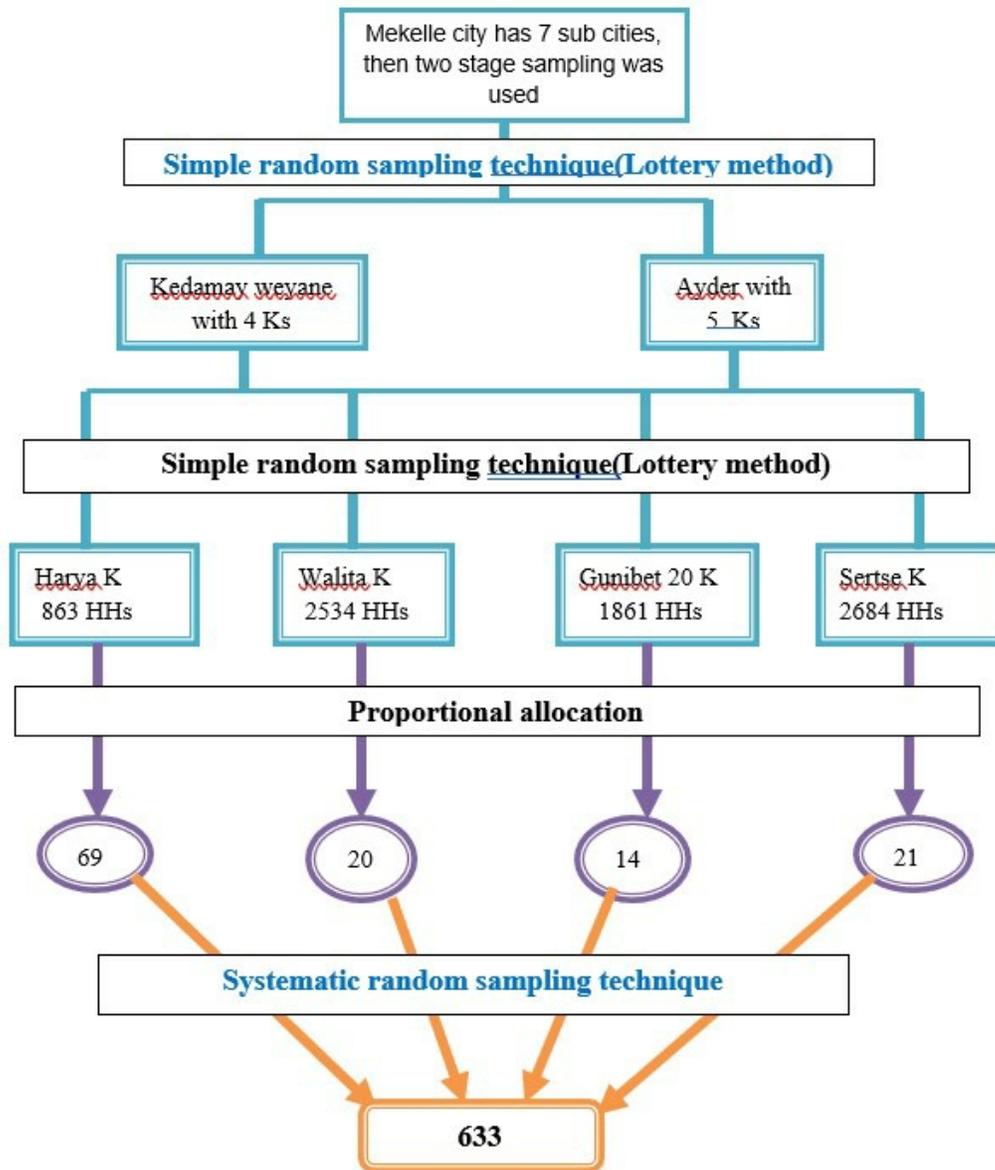


Figure 1

Sampling procedure for assessing knowledge, attitude and practice about rabies and associated factors among household heads in Mekelle city, Northern Ethiopia, 2016

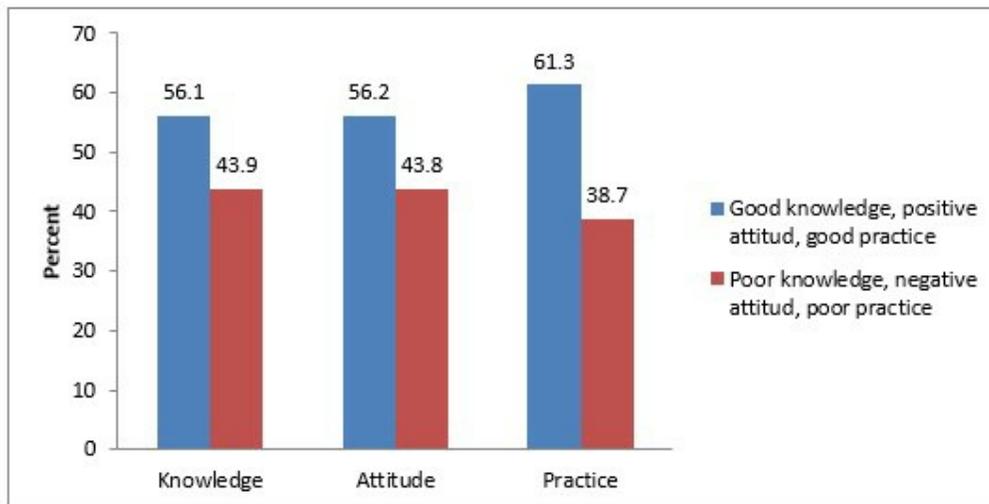


Figure 2

Knowledge, attitude and practice towards rabies among household heads in Mekelle city,  
Northern Ethiopia