

## Assessment of Community's Knowledge, Attitude and Practice towards Prevention and Control of Rabies in and Around Adigrat Town, Tigray Regional State, Ethiopia

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### Abstract

To assess the community awareness, knowledge and practice towards rabies, a cross sectional study was conducted from November 2018 to December 2020 in Adigrat town, Tigray region, northern Ethiopia. Multistage sampling techniques was conducted for selection of sampling units and data were collected from 384 household through face to face interview using a semi structured and validated questionnaire. Chi square test was employed to assess the association of independent variable with knowledge; attitude and practices (KAP) score. Out of 384 participants interviewed, 50.3% were urban and 70.6% were male respondents. About 67.7% of participants were aware about rabies. However, there were misunderstanding about the causes, transmission and prevention of rabies. Overall KAP score revealed that 61.5% of the respondents had a good KAP, whereas 39.5% was found to have poor KAP score. During analysis of KAP with independent variables, chi square analysis revealed that KAP score was significantly ( $p=0.014$ ) associated with gender being higher in males (65.3%) than females (51.8%), the association of education level with overall KAP about rabies revealed statically significant difference ( $p = 0.047$ ), The respondent who were at secondary school education level were found to be better (57.5%) than illiterate (42.9%) in KAP score. KAP score was significantly ( $p = 0.000$ ), associated with occupation thus being higher in unemployed (77.7%) followed by government employed (76.6%). On the other hand poor KAP score were seen in house wives and the association of religion with overall KAP about rabies also revealed statistically significant difference ( $p = 0.000$ ). Generally there is a difference among the society on the level of awareness and receptiveness of rabies to apply control measures among different group of respondents. Therefore, practicing standardized and strategic health procedures and increasing awareness of the community by training about the disease should be considered for controlling and preventing rabies.

**Keywords:** Adigrat; Assessment; Attitude; Knowledge; Rabies; Practices

### Abbreviations

KAP: Knowledge, Attitude and Practices; PEP: Post-exposure Prophylaxis; RNA: Ribo Nuclie Acid; SD: Standard Deviation; SPSS: Statistical Package for Social Science; WHO: World Health Organization

### Introduction

Rabies is one of a fatal disease that affects both animal and human. Rabies is a viral disease which can be transmitted by the bite from a rabid animal [1]. It infects the central nervous system, causing encephalopathy and ultimately death. This virus single strand-

ed RNA virus and categorized under family group of Rhabdoviridae genus *Lyssavirus* [2]. The main threat to the human being and domestic animals in the most of the country are mainly wild animals which are also considered as a large and uncontrollable reservoir of sylvatic rabies [3].

In the entire globe, canine, especially dog is the principal vector in transmitting rabies to human. The reservoir hosts for transmission of this virus to human are either wild animals or dogs [4]. Rabies virus is found in the saliva of the biting rabid animals. Transmission mostly occurs by bite from animal which enable to inoculate virus into scratched wound. Inoculated virus into the wound cannot enter the blood system but it move to brain and may result in encephalitis after taken up at a nerve synapse. This virus may stay at the site of bite for a longer period before gaining access to the nervous system or the virus may immediately enter the nervous system.

The risk of developing encephalitis may increase more highly, if high density nerve endings found in the region of the bite. Sometimes, infection of rabies virus by accidental infection can happen other than bites that inoculate the virus into mucous membrane or open wounds [2].

It is impossible to treat rabies once the clinical signs of the disease develop [5]. Prior the virus invades the nervous system; it is possible to prevent a person exposed to the virus from getting sick, through vaccination which is called post-exposure prophylaxis (PEP) if it is timely recommended. This is done through vaccination and/or use of immunoglobulins [6,7]. The primary measure to control and prevent human from rabies are through controlling rabies in dogs, and especially free-roaming (stray) dogs [7]. The major strategy help for successes of rabies control is mass vaccination of dogs. It is believed that, vaccinating up to 70% of the dog population will eradicate rabies of dog and which is also helpful in eliminating human rabies [8].

Next to Asia, Africa is the continent largely affected by rabies in the world [9]. With a high incidence rate, rabies is an endemic disease in Ethiopia [10]. In Ethiopia rabies has been reported from several species of domestic and wild animals. However, most report from this country suggests that reservoir and responsible animal for human infection in the country are dogs [5]. The best and the very crucial way to control and prevent rabies are through creating awareness of community about this disease [12]. To efficiently develop awareness, the knowledge gap among the community should

be identified and targeted. Therefore, the objectives of this thesis are to assess the community awareness of rabies and to assess the society's feelings and practice towards rabies.

## Materials and Methods

### Study area

The study was conducted from November 2018 to December 20 in Adigrat town and its surrounding area, Ethiopia. Adigrat town is placed 898 kilometers north of Addis Ababa which it lies in cold semi-arid zone at altitude of 2,457 meter above sea level. According to central statistical agency Adigrat town has a total populations of 57,000 of whom 26,010 are men and 31,578 women. The average maximum and minimum temperature of the area vary between 24.1°C - 24.2°C and 4.9°C - 7.8°C respectively. The annual rainfall ranges between 400 and 600 mm, with most of the rain falling in the rainy season which is from June up to September [13].

### Study design

Cross-sectional study was conducted using structured questionnaire by face to face interview to 384 randomly selected respondents to assess the public awareness and practices about the rabies disease. The questionnaire was designed to collect information about the respondents' knowledge of the rabies disease, treatment and prevention practices as well as household information.

### Sample population

The study participants were chosen from in and around Adigrat town community. A total of about 384 respondents were surveyed.

### Sampling technique and sample size determination

A multi-stage sampling technique was employed for the selection of the sampling units. From the entire study, population in the study area thirteen kebeles (the smallest administrative unit) was selected by simple random sampling methods. Then, the household in the selected kebeles was further selected using a systematic random sampling technique. Finally, from all the eligible respondents in a household, only one was selected randomly for the interview. The questionnaires included items regarding their level of KAP with respect to rabies management and control, household information, and pet care. Sample size was determined using Cochran's sample size formula for categorical data [14]:

$$n = \frac{(t)2 \times P(q)}{d^2} = \frac{(1.962)^2 \times 0.5(1-0.5)}{(0.05)^2} = 384$$

Where t is the value for selected alpha level of 0.025 in each tail = 1.96.

(p), (q)- is the estimate of variance = 0.25,

d- Is the acceptable margin of error = 0.05.

**Data management and analysis**

After collecting, the data were cleaned and checked for its completeness and entered into Microsoft Excel 2010 spread sheet. The data generated were analyzed using the Statistical Package for Social Science (SPSS) Version 20. The descriptive statistics was used for calculating frequency and percentage of both dependent and independent variable. Chi square was used for calculating the association between independent variables and dependent variable (KAP scores) of community regarding rabies. For assessing the community knowledge, attitude and practices (KAP) about rabies each respondent were asked for seventeen questions regarding cause, sources, mode of transmissions, clinical signs and prevention practices. The questions were multiple choices question with close ended. Respondents who answered the questions correctly had got one mark and zero for incorrect or do not know responses. Then, the responses for which respondents give correct answer was counted and scored. This score was then pooled together and the mean score was computed to determine the overall KAP of respondents. Respondents who score greater than or equal to the mean value (Mean = 9.95, SD = 2.542) were grouped to good KAP and coded as 1 whereas, the respondent who scored less than the mean value were grouped to poor KAP level and coded as 0. A 95% confidence interval of the p values was used to describe statistical significance associations. The association is judged as significant when p- value is less than 0.05.

**Ethical considerations**

All individuals involved participated in the study and ready to give the required information were communicated to provide us with relevant information. Volunteer participants, from whom their verbal consent was obtained, were interviewed. Following detailed discussion about the objectives of the study with each participant, the face-to face interview was conducted.

**Results**

**Result of socio-demographic characteristics of the respondent**

A total of 384 community members were interviewed during the study period and all participants responded to the questioner.

Majority of the respondents which are about 274 (71.4%) were males and 110 (28.6%) were females. Regarding the educational status of respondents, 13.3% had secondary education, most respondents (55.2%) had secondary school education and the others 25.5% were in higher education. With regards to the occupation, most of the respondents 135 (35.22%) were merchants and 92 (24.0%) were unemployed. From the whole respondents or participants in this study, 313 (81.5%) had dogs while 71 (18.5%) respondents had no dogs (Table 1).

Variables	Items	Frequency	Percentage (%)
Age	Male	274	71.4
	Female	110	28.6
Age	15-30	282	73.4
	31-46	49	12.8
	More than 46	53	13.8
Educa-tional level	Illiterate	8	2.3
	Informal	14	3.7
	Primary School	51	13.3
	Secondary school	212	55.2
Occupation	Higher Educa-tion	98	25.5
	Government employed	47	12.2
	Unemployed	92	24.0
	Farmers	39	10.2
	Merchant	135	35.2
	House Wife	9	2.3
House-hold size	Others	62	16.1
	1-3	82	21.3
	4-6	193	50.3
Religion	More than 6	109	28.4
	Muslim	27	7.0
Dog own-ership	Christian	357	93.0
	With Dog	313	81.5
Residence	Without dog	71	18.5
	Urban	193	50.3
	Peri-urban	191	49.7

**Table 1:** Socio-demographic features of respondents.

**Result of knowledge of communities’ on rabies**

According to the current study the majority (67.7%) of respondent were aware about the disease. Most of the respondents (50.6%) described virus as causes of the disease in dogs and (16.9%) claimed as case is spiritual while about 14.8% of respondents were uncertain on the cause of rabies. About 60.1% of respondents mentioned bite and saliva as a means of transmission, while 53 (13.8%) of the perceived any type of contact with saliva of rabid individual as source of infection. More than half of the respondents (55.5%) stated that dog only can transmit rabies to human. On the other hand 77.3% of the participants believed that vaccination of dogs could prevent the disease (Table 2).

Questions	Number of respondent	Percentage (%)
<b>Awareness on rabies</b>		
Yes	259	67.5
No	125	32.5
<b>Cause of rabies</b>		
Virus	19	50.6
Starvation and thirsty	2	5.2
Spiritual	6	16.9
Bacteria	3	9.4
Protozoa	1	3.1
I don’t know	5	14.8
<b>Species affected by rabies</b>		
Dogs only	33	8.6
Dogs and human	91	23.7
Human and other domestic animal	260	67.7
<b>Means of transmission</b>		
Bite only	89	23.2
Contact with Saliva only	53	13.8
Bite and Saliva	231	60.1
Infected meat and others	11	2.9
<b>Animals transmit rabies to human</b>		
Dog only	213w	55.5
Dog and cat	76	19.8
Other domestic animal	95	24.7

<b>Sign of the disease</b>		
Salivation	75	19.53
Sudden change in behavior	34	8.85
Both	275	71.61
<b>Ever get training on rabies</b>		
Yes	109	28.4
No	275	71.6
<b>Is rabies fatal?</b>		
Fatal	312	81.2
Not Fatal	21	5.5
I don’t know	51	13.3
<b>Is rabies prevented by dog vaccination</b>		
Prevented	297	77.3
Not prevented	33	8.6
I don’t know	54	14.1

**Table 2:** Knowledge of respondents on rabies.

**Result of attitudes and practices of the respondents regarding rabies disease**

The study result indicated that about 61.7% of respondents kill the animal after being rabid. The study also showed that more than 80.0% of respondents those peoples exposed to rabies used post exposure vaccination and majority of them claimed (85.9%) visiting health center as immediate action for bitten man. About 36.2% of participant claimed that there was dog vaccination in the study area (Table 4).

Questions	Number of respondent	Percentage (%)
<b>Action for rabid animals</b>		
Tie	102	26.7
Killing	238	61.7
Do nothing	4	11.7
<b>Immediate Action for bitten man</b>		
Visit health center	330	85.9
Apply herbal extract	21	5.5
Holly water	18	4.7
Washing	9	2.3
Do nothing	6	1.7

PEP prevent the disease		
Yes	308	80.2
No	35	9.1
I don't know	41	10.7
Did you know vaccination		
Yes	269	70.0
No	115	30.0
Availability of vaccine in your vicinity		
Always available	139	36.2
Sometimes	168	43.7
Not available	77	20.1
Have you ever heard dog bite in your community		
Yes	282	36.2
No	102	26.6

Table 3: Attitude and Practice of the respondents.

Questions	Number of respondents	Percentage (%)
Did you vaccinate your dog		
Yes	197	71.1
No	116	29.9
Dog management Practice		
Let free	35	11.2
Keep in door	278	88.8
Have you registered your dog		
Yes	181	57.8
No	132	42.2
Do you house your dog		
Yes	244	77.3
No	71	22.7

Table 4: Attitude and practice of dog owner respondents.

### Result of factors associated with respondents KAP on rabies

Association between socio-demographic and KAP scores on rabies was assessed using Pearson's chi square (Table 5). There was significantly association between KAP score with occupation ( $\chi^2 = 34.027, p < 0.000$ ) the good score was government employed highest in occupation variable, educational status was significantly associated with KAP scores ( $\chi^2 = 9.635, p < 0.047$ ) with highest good

score in higher education, in sex ( $\chi^2 = 6.048, p = 0.014$ ) being higher in males than females. And there was also significant association of religion with KAP scores ( $\chi^2 = 18.875, p = 0,000$ ) being higher in Christians than Muslims. There were also insignificant associations of residence ( $\chi^2 = 1.793, p = 0.181$ ), age ( $\chi^2 = 3.896, p < 0.143$ ), house hold size ( $\chi^2 = 0.325, p = 0.850$ ), Dog ownership ( $\chi^2 = 3.212, p = 0.073$ ) with KAP scores.

Variables	Number and percentage of respondent			
	Good (61.5%)	Poor (38.5%)	$\chi^2$	p. value
Residence				
Urban	125 (64.8)	68 (35.2)	1.793	0.181
Peri-urban	111 (58.1)	80 (41.9)		
Sex				
Male	179 (65.3)	95 (34.7)	6.048	0.014
Female	57 (51.8)	53 (48.2)		
Age				
15-30	165 (58.5)	117 (41.5)	3.896	0.143
30-46	34 (69.4)	15 (30.6)		
More than 46	37 (69.8)	16 (30.2)		
House hold size				
1-3	51 (62.2)	31 (37.8)	0.325	0.850
4-6	116 (60.1)	77 (39.9)		
More than 6	69 (63.3)	40 (36.7)		
Educational level				
Illiterate	6 (66.7)	2 (33.3)	9.635	0.047
Informal	6 (42.9)	8 (57.1)		
Primary School	30 (58.8)	21 (41.2)		
Secondary school	122 (57.5)	90 (42.5)		
Higher Education	72 (73.5)	26 (26.5)		
Occupation				
Government employed	36 (76.6)	11 (23.4)	34.027	0.000
Unemployed	71 (77.2)	21 (22.8)		
Farmers	24 (61.5)	15 (38.5)		
Merchant	72 (53.3)	53 (46.7)		
House Wife	0 (0.0)	9 (100)		
Others	33 (53.2)	29 (46.8)		
Religion				

Muslim	6 (22.2)	21 (77.8)	18.875	0.000
Christian	230 (64.4)	127 (35.6)		
<b>Dog ownership</b>				
With dog	199 (63.6)	114 (36.4)	3.212	0.073
Without dog	37 (52.1)	34 (47.9)		

**Table 5:** Community's KAP in relation to socio demographic of characteristics.

### Discussion

The present study has shown that the importance of rabies in the study area. This study revealed that as majority of the community in and around Adigrat is familiar with general information on rabies. This is similar with study conducted in Indian community which was 68.7% in a survey of knowledge, attitudes and practices about animal bite and rabies [15]. In addition, others study carried out in a different area of Ethiopia also reported a high level of community awareness on rabies [10,16,17]. This may be due to rabies is considered as endemic and well known disease for a longer of period of time in Ethiopia. In addition, yearly rabies controls campaign in the country and news report from different governmental and social media about rabies outbreaks may contribute to high level of community awareness on rabies in Ethiopia. However, the current finding was lower than the study carried out in Singh of Gujarat India which was 98.6% [18]. There is also, higher study report than the current finding in different location of Ethiopia which includes Zuria District of Gondar Ethiopia [19], in North Gondar Ethiopia [20] and in Jimma zone Dedo district [21] reported as 99.3%, 100% and 100% community awareness on rabies, respectively.

However many different opinion relating with the cause, effect and way of transmission of the virus were reported in the current findings. Almost half of (50.6%) the participants of this study knew that the cause of rabies is a virus. This report is higher when compared with others study [21,22]. This difference may be because of updated information a gained by health workers, veterinarian and media in the study area. Frequent dogs vaccination campaign against rabies in the study area may also contribute to community knowledge about the cause of Rabies. This study also revealed that, most of the respondent reported the major way of transmission of the disease is bite, but, a few people (13.8%) also believed that,

any contact with saliva or animal or human infected can be help as a source of transmission. It is known that, the major and common mode of rabies virus transmission through inoculation with rabies virus infected saliva after a bite with rabid animal [23]. Most of the respondent, reported that both bite and saliva can transmit the rabies. This is similar with other study who reported that the disease can be acquired through broken mucous membrane and skin contacted with infected saliva with rabies virus [12].

This study reported 67.7% participant reported that rabies is the disease of both human and other domestic animal. This is in line with report of 71.9% in the USA city of New York [24]. In contrary, a lower finding from Bahir Dar town (21.4%) and Dedo district Jima zone was reported (57.7%) [25,29]. The reason for may be due to finding of different host animals, status and difference in level of awareness and educational in the community.

About 55.5% participant of this study mentioned dog as the main cause of threat for most fatal human rabies. Similar with current study there is also other report that mention domestic dogs as the main reservoir host of rabies and it is the main way of rabies infection to humans and other animals [26-28]. The participant of study also revealed the second important animal as source of rabies for human case is cat. In addition the respondent in this study claimed rabies in other domestic animals such as cattle, equine, sheep and equines is a case for human being. The same result was also reported in other study [29]. In most of the world part, primarily in Africa and Asia, the case for human rabies 85 to 95% is due to dog bite [30-32].

In the current study, among interviewed participant only a few respondents 2.3% reported a practice of first aid of washing the wound using soap and water for bitten human. This result is very small when compared with others study conducted in Dedo district (49.6%), Debark district (76.4%) [20] and Gondar zuria district (30.7%) of Ethiopia [19] and in a rural society of Gujarat, India (31.1%) [18]. The difference can be attributed to the difference related with the awareness status of the community and lack of training on the practice related the early disease treatment at home. Literature report indicated that washing of wounds infected by rabies with water and soap can reduce death by 50% [21].

In the current finding, 80.2% of respondent prefer going to health center for post exposure vaccination after bitten and 85.9% of the participant claimed that it PEP should be given rapidly

after bitten. In the same manner, report from the study conducted in Bahir Dar town reported 55.7% participant chosen immediate post exposure vaccination [25]. The World Health Organization (WHO) also mentioned immediate wound washing with soap and water and immediate vaccination after bite or contact with a suspected animal for rabies can increase chance of survival almost up to 100% of [12].

In the current study related with knowledge, attitude and practice (KAP) result showed that 61.5% of the participant claimed a good KAP score. This result is in parallel with the others study carried out in Ethiopia revealed KAP score of 64.1% among the society of Bahir Dar town [25] and 60.3% in community of Debark District, North Gondar [20]. However, the current result is higher when compared with research conducted in Dedo district which is 51.9% [21]. This difference could be happen because of the difference in study area, difference in sample size, level of training and difference of awareness in the society on the rabies. During analysis of chi squares significant association observed between KAP score in case of gender as it is being higher in males participant (65.3%) than females (51.8%) participant ( $\chi^2 = 6.048$ ,  $p = 0.014$ ). Similar statistical significance difference observed on KAP score of male (64.6%) in females (54.5%) were reported in Debark District in males [20], in Addis Ababa male moderate (77.09%) and good (10.55%), female moderate (73.62%) and good (5.08%) [33], in Dedo district Jimma in males (71.4%) and in females (25.8%) and in Bahirdar town that male (53.4%) and female (10.75%) was reported [25]. The significant statistical difference in KAP score among males and females participant is attributed to the difference due to male's participation in the daily life activity when compared with females and higher chance of getting appropriate and right information through different training, social media, and higher chance participating in conferences and campaign on rabies.

Additionally, significant statically difference association was observed with education level with overall KAP ( $\chi^2 = 9.635$ ,  $P = 0.047$ ). The participants at secondary school education were showed to be higher in KAP score (57.5%) than illiterate (42.9%). This result was also comparable with a study carried out in Dedo district of Jimma Zone [21]; in Bahir Dar [25]; in Addis Ababa [33] and also showed similar result with the studies done outside of Ethiopia in Flagstaff, Arizona, USA [34]. It is confirmed that educated people believed to be familiar with knowledge of rabies,

than illiterate [35]. The possible definition for this might be those educated individuals have better understanding easily on knowledge of disease and have easy access information on the disease.

The analysis of chi-square KAP score showed significantly difference associated with occupation which is higher in employee of government (77.7%) than unemployed (76.6%) ( $\chi^2 = 34.027$ ,  $p = 0.000$ ) while analysis of KAP with independent variables. However, in case of house wives poor KAP score was observed in this study (0.0%). This finding different from the research conducted in Ambo town [36]. The difference might be existing among these groups due to academic knowledge between government employee and unemployed. Most of the time government employees have more chance of getting information from Medias like newspaper, social media, television and radio. Due to staying in the house for longer period of time house wives they do have less chance of getting information and training and less chance of participating in the campaigns on the disease.

## Conclusion and Recommendations

The results of the current study showed that, some participant revealed low levels of knowledge, attitude and practice towards prevention and control of rabies which should be addressed by concerned bodies and others key stakeholders. Even though majority of the participant have showed better KAP towards rabies, short of knowledge was observed relating with mode of infection, control and prevention on rabies which could be due to less status of information and training on the rabies. Higher community knowledge is especially important in case successful prevention and control of rabies through vaccination of dog, confining in the house of the dog and eradication of stray dogs. Generally there is a significant, difference in the community on the level of rabies related awareness and readiness to rabies control actions among different group in the society of participant of this study. Hence, boosting awareness of the community by training about the rabies should be considered for controlling ad prevention the disease and regular intervention should conducted at controlling of the disease and vaccination of dogs must be practiced to control and eliminate the rabies.

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