academicJournals

Vol. 8(11), pp. 183-192, November 2016
DOI: 10.5897/JVMAH2016.0504
Article Number: FEC974661288
ISSN 2141-2529

http://www.academicjournals.org/JVMAH

Journal of Veterinary Medicine and Animal Health

*Full Length Research Paper*

# Assessment of public knowledge, attitude and practices towards rabies in Debark Woreda, North Gondar, Ethiopia

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Received 10 July, 2016; Accepted 26 September, 2016

**The study was conducted from November 2015 to April 2016 to assess the knowledge, attitudes and practices (KAP) on rabies and associated risk factors among the community of Debark district, North Gonder, Amhara regional state, Ethiopia. For this cross-sectional study, a simple random sampling procedure was employed to select kebeles. From the list of kebeles, six were randomly selected using lottery method. Then, 70 households were selected and interviewed from each kebeles using systematic random sampling method. A structured questionnaire was used to collect the data through face-to-face interviews among 422 respondents. Then, the data was analyzed using SPSS statistical software version 20. The frequency distribution of both dependent and independent variables were worked out by using descriptive statistics technique (Frequencies, mean, SD and percentage). Association between independent variables and KAP scores on rabies was calculated using Pearson's Chi square. Out of 416 respondents interviewed, 240 (57.7 %%) of them were males and 176 (42.3%) females. 151 (36.3%) of the respondents were between 15 to 29, 153(36.8%) were between 30 to 45 and 112 (26.9%) were >45 years old. The majority of the respondents 391 (94.0%) were Orthodox Christians. Almost all of the respondents indicated that they had previously heard about rabies. Out of this 251 (60.3%) had good level of KAP on rabies. There was strong association between KAP scores and educational level; occupation and sex ($p<0.05$). Generally, these findings indicate that the Debark Woreda community has good knowledge about rabies. However, a need for further awareness creation on the attitude and practice for appropriate prevention and treatment measure. Therefore, Veterinarians and health professionals should prepare and deliver continuous and strategic community awareness programs on prevention and control of rabies in the study area**.

**Key words:** Attitude, debark district, Ethiopia, knowledge, practice, rabies.

## INTRODUCTION

Rabies is characterized by an acute encephalitis illness caused by rabies virus genus *Lyssavirus* in the family of *Rhabdoviridae* that affects virtually all mammals. Infected species invariably die from the disease once clinical signs are manifested (Jackson and Wunner, 2007). It is the most widely recognized example of salivary transmission

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of viruses. Inoculation of infected saliva through the bite of a rabid animal appears to be the predominant mode of rabies. Contamination of broken skin and mucous membrane such as mouth, nasal cavity or eyes by fresh saliva or neurological tissues may also result in infection (OIE, 2013). Rabies virus (RABV) is a highly neurotropic pathogen that typically leads to mortality of infected animals and humans. It is estimated that nearly 55,000 human fatalities occur each year due to RABV (Andrea and Jesse, 2012). Although actual number is likely much higher due to unreported exposures or failure of diagnosis. In the 21$^{st}$ century, rabies remains as one of the most feared and important threats to public health. As a neglected zoonotic disease, rabies is present throughout the world, with many deaths in human beings occurring in Africa and Asia in children younger than 15 years. Rabies is regarded as under-reported in many regions (Fooks, 2005). Dogs are the principal vector for human rabies, and are responsible for more than 99% of human cases. Hence, controlling rabies in dogs, and especially free-roaming (stray) dogs, is the first priority for prevention of human rabies.

The disease causes a severe and long-lasting societal and economic burden and the implications are especially apparent in poverty-stricken developing countries. Shortage of resources and a limited public health infrastructure in many rabies-endemic countries precludes data collection and analysis. Rabies has been successfully controlled in dog population in the America. In both dog and terrestrial wildlife populations, rabies has been successfully eliminated from Western Europe. Thus, rabies can be controlled with sufficient resources (Nottidge, 2005). The demographic characteristics of dogs biting humans and livestock have not been fully elucidated. Besides, the rabies status of dogs biting humans has not been known. It has been a common practice to provide post-exposure vaccines to humans bitten by dogs irrespective of their rabies status. In Ethiopia, rabies is an endemic disease with a the incidence rate of 73% (Eshetu et al., 2012). Unfortunately, individuals who are exposed to rabies virus often see traditional healers for the diagnosis and treatment of the disease. These widespread traditional practices of handling rabies cases are believed to interfere with timely seeking of post exposure prophylaxis (PEP). Rabies victims specially, from rural areas seek PEP treatment after exhausting the traditional medicinal intervention and usually after a loss of life from family members (Deressa et al., 2010).

Community awareness about rabies is very crucial in rabies prevention and control. For efficiently increasing awareness, the knowledge gap among the community should be identified and targeted. Community awareness of all aspects of rabies is generally lacking or limited, such as first aid or management of animal bites, pre- and post-exposure prophylaxis, responsible pet dog ownership, dog population management. Regarding the immediate measures to be carried out after a bite exposure, there is inadequate knowledge of the crucial need to wash wounds with soap and running water and apply antiseptics and where vaccine is available. People may also contact local traditional healers for treatment, thus losing precious time and increasing the danger of infection and death (WHO, 2004). In Debark town elimination of stray dogs and prophylactic vaccination was practiced in October 2015 but was limited to the three kebeles (the smallest administrative unit) of the town. There is lack of accurate quantitative information on rabies both in humans and in animals and little is known about the awareness of the people about the disease to apply effective control measures in Ethiopia. Even if there were reports of death of humans and animals in the study area, no prior studies were undertaken about the prevalence and public awareness towards rabies. Thus, the objective of this study was to assess the level of knowledge, attitudes and practices regarding rabies and associated risk factors among the communities of Debark District.

## MATERIALS AND METHODS

### Study area

The study was conducted from November 2015 to April 2016 to assess the level of knowledge, attitudes and practices towards rabies in Debark district, North Gondar, Amhara regional state, Ethiopia. Debark district has a total of 30 kebeles which are located 830km far from Addis Ababa, the capital city of Ethiopia. The district has latitude of about 13.133$^{o}$N and longitude of about 37.900°E and an elevation ranging from 2712 to 3122 m above sea level (m.a.s.l). The area receives an annual rainfall of ranging from 900 to 1400 mm, which comes from long and short rainy seasons. The average minimum and maximum annual temperature ranges between 6.2$^{o}$C and 20.7°C, respectively with humidity of about 25 to 83.5%. The total human population of the district is estimated about 169835, from which 85594 are male and 84242 are female population. Debark has a livestock population of cattle (380403), equine (27449), shoat (185922), poultry (159612) and dogs (15000) (CSA, 2009).

### Study design and study population

A cross-sectional study design employed to assess the knowledge, attitudes and practices (KAP) on rabies and associated risk factors among the community of Debark district. The study population was household heads or their spouses who had lived in randomly selected kebeles of Debark district (Mikara, Debir, Miligebsa, Kino, Kebele 01 and 02) as permanent residents for more than six months.

### Sample size determination and sampling techniques

The required sample size for this study was estimated by considering 50% of the population knowing about rabies since earlier there is no awareness study on rabies had been conducted in the study area. Thus, the sample size was calculated according to Thrusfield formula by using 95% confidence interval and 0.05 absolute precision (Thrusfield, 2005) as follow:

$$N = \frac{1.96^2 P_{exp}\,(1-P_{exp})}{d^2}$$

Where N = required sample size; Pexp = Expected proportion of population knowing about rabies are 50%; $d^2$ = Desired absolute precision (0.05).

As a result, 384 respondents were selected as study population by adding 10% non-response rate; thus, the total sample size was 422 subjects. A simple random sampling procedure was employed to select kebeles for this study. From the entire primary sampling unite that is, 30 kebeles (lowest administrative structure), six were randomly selected using lottery method. Then, 70 households were selected and interviewed from each kebeles using systematic random sampling method, as there was no significant difference in number of household's. Whenever the selected household was found locked, the next household (on the right side) was substituted automatically for interview. A pretested structured questionnaire consisting of closed ended questions was used for this study. The data were collected via face-to-face interview. The questionnaire was first developed in English and then translated in to Amharic language (native language) for appropriateness and easiness in approaching the study participants.

#### Inclusion and exclusion criteria

Household who live more than 6 months as a permanent resident in the study area were included in this study and household who live less than six months and respondents in the household who cannot communicate and under 15 year were excluded from this study.

#### Data management and analysis

After collecting, the data were cleaned and checked for its completeness. Those incomplete and inconsistent were corrected when possible and removed otherwise. After complete check-up, the data were coded and entered to Microsoft Excel and transport to SPSS version 20.0 statistical packages for windows and analysis made. The frequency distribution of both dependent and independent variables were worked out by using descriptive statistics technique (Frequencies, mean, Standard deviation (SD) and percentage). Association between independent variables and KAP scores on rabies was calculated using Pearson's Chi square. All p values less than 0.05 was considered as statistical significance.

#### Ethical clearance

The study protocol was reviewed and approved by Institutional Review Board of Jimma University Research and Community Service Office. Oral informed consents were obtained from each participant after informing them about the purpose of the study as well as the risks, benefit and rights of the study participants. Only voluntary participants were involved in the study. All the information obtained from the study participants was kept confidential.

## RESULTS

### Socio-demographic characteristics

Four hundred twenty two heads of household were interviewed during the study period of this research. Of these, the data collected from six respondents were found to be incomplete and excluded from the analysis. Only data from 416 households were considered for the analysis. The majority of the respondents were male 240 (57.7%) and were above 15 years of age, of which 36.3 and 36.8% were between 15 to 29 and 30 to 45 years old, respectively, with a response rate of 99.0%.The majority of the respondents 391(94.0%) were Orthodox followed by Muslim 25 (6%). Concerning educational status, 182 (43.8%) of the participants were illiterate, 46 (11.1%) had profession with diploma and above and 113 (27.2%) were in high school and preparatory program (Table 1).

### Community KAP about rabies in study area

Twenty-two questions were asked from each respondent regarding cause, sources, mode of transmissions, clinical signs and prevention practices and treatment measures of rabies. The questions were with multiple choices. Respondents who answered the questions correctly had got one mark and those who selected wrong answers had zero marks. The number of questions for which respondents give correct answer was counted and scored. Then, the scores were pooled together and the mean score was computed to determine the overall KAP of respondents. The respondents who score greater than or equal to the mean value (Mean=13.75, SD=3.15) grouped to good KAP and less than the mean value were grouped as Poor KAP level. As table 2 indicates, out of 416 respondents, 251 (60.3%) and 210 (40.7%) were found to have good and poor KAP towards to rabies.

### Knowledge of participants related to cause and host range

All of the respondents (100%) were familiar with the rabies. It is called as*'Yebed wusha beshata'* and '*lekift*' locally, which mean madness. Out of 416 respondents 143(34.4%) were got the knowledge about rabies through formal way such as radio and television. However 146 (35.1%) and 127 (30.5%) of the respondents had the awareness through informal (such as traditional healers neighbors, friends and relatives) and both (formal and informal) ways, respectively. Sixty-seven (16.7%) of the respondents knew as virus is the cause of rabies. 404 (97.1%) knew that rabies is transmitted from animal to human, 231(55.5%) knew as all mammal can be affected by the disease and 363 (87.3%) were aware of the fact that dog is the most common source of rabies (Table 2).

### Knowledge of participants related to mode of transmission, sign and symptom and treatment

Biting, scratching and saliva contact with open wound

**Table 1.** Socio-demographic information of the study participants in Debark woreda, North Gondar, Ethiopia, during 2015 to 2016.

| Variables | Category | Frequency | Percent |
|---|---|---|---|
| Sex | Male | 240 | 57.7 |
| | Female | 176 | 42.3 |
| Age (in years) | 15-29 | 151 | 36.3 |
| | 30-45 | 153 | 36.8 |
| | >45 | 112 | 26.9 |
| Household size | 1-3 | 158 | 38.0 |
| | 4-6 | 230 | 55.3 |
| | >6 | 28 | 6.7 |
| Educational status | Illiterate | 182 | 43.8 |
| | Primary school | 75 | 18.0 |
| | Secondary school | 113 | 27.2 |
| | Diploma and above | 46 | 11.1 |
| Occupation | Government employee | 43 | 10.3 |
| | Merchant | 76 | 18.3 |
| | Farmer | 236 | 56.7 |
| | Unemployed | 7 | 1.7 |
| | Other | 54 | 13.0 |
| Religion | Orthodox | 391 | 94.0 |
| | Muslim | 25 | 6.0 |

**Table 2.** Knowledge of participants related to cause and host range in Debark Woreda, North Gondar, Ethiopia, during 2015 to 2016.

| Variables | Category | Frequency | Percent |
|---|---|---|---|
| Have you heard rabies before | Yes | 416 | 100 |
| | No | 0 | 0 |
| Source of information | Formal | 143 | 34.4 |
| | Informal | 146 | 35.1 |
| | Mixed | 127 | 30.5 |
| Can dog get rabies | Yes | 416 | 100 |
| Cause of rabies | No | 0 | 0 |
| | Psychological problem | 1 | .2 |
| | Associated with sprit | 31 | 7.5 |
| | Virus | 67 | 16.7 |
| | Starvation & thirst | 264 | 63.5 |
| | I don't know | 52 | 12.5 |
| Spp. Affected by rabies | Dog | 6 | 1.4 |
| | Human & dog | 44 | 10.6 |
| | Human, dog, cattle, equine & shoat | 135 | 32.5 |
| | Wild animals | - | - |
| | All | 231 | 55.5 |

**Table 3.** Knowledge of participants related to mode of transmissions, sign and symptom and treatment of rabies in Debark Woreda, North Gondar, Ethiopia, during 2015 to 2016.

| Variables | Category | Frequency | Percent |
|---|---|---|---|
| Transmit from animal to human | Yes | 404 | 97.1 |
| | No | 12 | 2.9 |
| Mode of transmission | Biting | 99 | 23.8 |
| | Scratching | 10 | 2.4 |
| | Saliva contact with open wound | 5 | 1.2 |
| | All | 302 | 72.6 |
| Common source of rabies | Dog | 363 | 87.3 |
| | Dog & cat | 3 | .7 |
| | Dog &wild candies | 50 | 12.0 |
| Sign and symptom | Stops eating and drinking | 17 | 4.1 |
| | Biting and change in behavior | 68 | 16.3 |
| | Salivation | 15 | 3.6 |
| | All | 316 | 76.0 |
| Incubation period | Immediately | 7 | 1.7 |
| | -40 day | 147 | 35.3 |
| | -90 day | 208 | 50.0 |
| | I don't know | 54 | 13.0 |
| Is rabies fatal | Yes | 412 | 99.0 |
| | No | 2 | .5 |
| | I don't know | 2 | .5 |
| Easily treatable after onset of clinical signs | Yes | 1 | .2 |
| | No | 380 | 91.3 |
| | I don't know | 35 | 8.4 |

were mentioned by 302(72.6%) of the respondents as a mode of transmission. Regarding to sign and symptom of the disease 316 (76.0%) stated that rabid animals stop eating and drinking, further there is notable change in behavior, hydrophobia; paralysis and salivation are common in rabid animals. 380 (91.3%) of the respondents knew that the disease could not easily treatable once clinical signs are manifested and 412 (99.0%) were awarded fatal nature of the disease (Table 3). Of all the respondents 144 (34.6%) had dog; among them 102 (70.8%) vaccinated their dog and 11 (7.6%) castrated their dog. Regarding to castration 254 (61.1%) have knowledge as castration decrease incidence of rabies.

## Practices and attitudes to prevent rabies after suspected animal/dog bite in Debark district

Concerning to immediate action taken after bite, 318 (76.4%) of the participants washed with water and soap and 228 (54.8%) used traditional healer after first aid and 175(42.1%) contacted health center. The attitude on anti-rabies vaccine was positive by 279 (67.1%) of the respondents. Killing of rabid animal was the first choice by 350 (84.1%) of the participants. Killing was also the first option of 235 (56.5%) of the participants to control stray dog. 270 (64.9%) of the respondents revealed that meat of rabid domestic animals will not cause disease during consumption by human (Table 4).

## Factors associated with community KAP on rabies in Debark Woreda

Association between independent variables and KAP scores on rabies was calculated using Pearson's Chi square (Table 5). There was significant association between KAP scores and sex ($p < 0.05$).

The good KAP scores were recorded higher in males 155 (64.6%) than females 96 (54.5%). Educational status had strong significant associated with KAP scores ($p = 0.00$). All respondents with diploma and above education levels had good KAP of rabies. As Table 5

**Table 4.** Practices and attitudes to prevent rabies after suspected animal/dog bite in Debark woreda, North Gondar, Ethiopia, during 2015 to 2016.

| Variables | Category | Frequency | Percent |
|---|---|---|---|
| Do you have dogs | Yes | 144 | 34.6 |
| | No | 272 | 65.4 |
| Do you vaccinated your dog | Yes | 102 | 70.8 |
| | No | 42 | 29.2 |
| Was your dog Castrated/spayed | Yes | 10 | 6.9 |
| | No | 134 | 93.1 |
| Does castration decrease incidence | Yes | 254 | 61.1 |
| | No | 75 | 18.0 |
| | I don't know | 87 | 20.9 |
| Family exposure | Yes | 8 | 1.9 |
| | No | 408 | 98.1 |
| Immediate action after bite | Tie the wound with cloth | 76 | 18.3 |
| | Wash with water and soap | 318 | 76.4 |
| | Apply herbal extract | 16 | 3.8 |
| | I don't know | 6 | 1.4 |
| After 1st aid | Health center | 175 | 42.1 |
| | Traditional healer | 228 | 54.8 |
| | Holly water | 9 | 2.1 |
| attitude to vaccine | Positive | 279 | 67.1 |
| | Negative | 137 | 32.9 |
| Actions taken for rabid animals | Let free | 28 | 6.7 |
| | Tie | 38 | 9.1 |
| | Killing | 350 | 84.1 |
| Measures to control stray dogs | Killing | 235 | 56.5 |
| | Animal birth control | 10 | 2.4 |
| | Aware the owner | 171 | 41.1 |
| Is safe consumption rabid food animal | Yes | 270 | 64.9 |
| | No | 100 | 24.0 |
| | I don't know | 46 | 11.1 |

indicated, there was no significant association ($p>0.05$) between KAP score and age and religion of the respondents. Occupation had statistical significant association with knowledge levels ($p=0.001$); in which government employee has good KAP level (90.7%) than unemployed (57.1%) respondents.

## DISCUSSION

The findings of this study indicated that, all respondents (100%) were aware of rabies and dog are the common source of rabies. In line with current report, Digafe et al. (2015) and Singh and Choudhary (2005) in Gondar Zuria District and rural community of Gujarat, India, indicated that 99.3 and 98.6% of people have heard about rabies before, respectively have previously heard about rabies. Jemberu et al. (2013) also reported high level of awareness (98%) about rabies in Gondar Zone, Ethiopia. However, the current investigation is higher than other reports from Addis Ababa, Ethiopia and India that

**Table 5.** Factors Associated with Community KAP on Rabies in Debark woreda, North Gondar, Ethiopia, during 2015 to 2016.

| Variables | | Good | Poor | $x^2$ | P-value |
|---|---|---|---|---|---|
| Sex | Male | 155(64.6%) | 85(35.4%) | 4.275 | 0.039 |
| | Female | 96(54.5%) | 80(45.5%) | | |
| Age(in year) | 15-29 | 82(54.3%) | 69(45.7%) | 4.429 | 0.109 |
| | 30-45 | 94(61.4%) | 59(38.6%) | | |
| | >45 | 75(67.0%) | 37(33.0%) | | |
| House hold size | 1-3 | 94(59.9%) | 63(40.1%) | 1.719 | 0.633 |
| | 4-6 | 139(60.4%) | 91(39.6% | | |
| | >6 | 18(64.3% | 10(35.7%) | | |
| Educational status | Illiterate | 89(48.9%) | 93(51.1%) | 32.534 | 0.000 |
| | Primary school | 42(46.0%) | 33(44.0%) | | |
| | Secondary school | 78(69.0%) | 35(31.0%) | | |
| | Diploma and above | 42(91.3%) | 4(8.7%) | | |
| Occupation | Government employee | 39(90.7%) | 4(9.3%) | 42.023 | 0.000 |
| | Merchant | 60(78.9%) | 16(21.1%) | | |
| | Farmer | 114(48.3%) | 122(51.7%) | | |
| | Unemployed | 4(57.1%) | 3(42.9%) | | |
| | Other | 34(63.0%) | 20(37.0%) | | |
| Religion | Orthodox | 235(60.1%) | 156(39.9%) | 0.149 | 0.699 |
| | Muslim | 16(64.0%) | 9(36.0%) | | |

reported 83 and 68.7%, respectively (Ali et al., 2013, Ichhupujani et al*.,* 2006). The reason could be due to real difference in incidence of rabies in the areas of study and living status of the community as stated by Digafe et al*.* (2015) as rural community has better communication and information about what is happening in their residential area, including animal disease situations, which may contribute to their high level of awareness. The case of KAP level of the community about 60.3% of the respondents had good level of knowledge, attitude and practices about rabies. Relatively similar result was reported by Tadesse et al*.* (2014) about 64.1% among the community of Bahir Dar town. In contrast to this finding higher KAP level was reported from Sri Lanka (Gino et al*.,* 2009). This difference probably explained by sample size difference and lack of health education programs about rabies in Ethiopia. The source of information for the majority of the participants (34.4%) were formal and (35.1%) was through mixed (both formal and informal) which was higher compared to the report from Bahir Dar town (10.7%) by Tadesse et al*.* (2014) and from Addis Ababa (21.5%) by Ali et al. (2013). This difference may be due to the presence of community based radio station in the study area and radio is the major source of information in the rural area of Ethiopia. Of those respondents, 63.5% had misunderstanding on the cause of rabies; they believed that the disease in dog is caused by starvation and thirst. It was higher when compared with the result obtained from study conducted in and around Dessie town, Ethiopia which was 49.6% (Gebeyaw and Teshome, 2016) and in Bahir Dar town, 39.9% (Tadesse et al*.,* 2014). In addition, current study was lower than the findings of Jemberu et al*.* (2013) which was 86%, from Gondar and Dabat, Ethiopia. This could be due to sample size difference, study area and community awareness difference. Beside this, the higher misunderstanding may arise from the notion of asymptomatic rabies carrier dogs in which stressors like starvation and thirst might induce development of clinical rabies in carrier dogs. However, the notion of asymptomatic rabies carrier dogs by itself is a contentious issue (Zhang et al*.,* 2008; Wilde et al*.,* 2009). Human rabies caused by the classical rabies virus continues to be almost 100% fatal, with no specific treatment available anywhere in the world (WHO, 2013). In the present study, KAP analysis revealed that 99.0% of respondents recognize rabies as danger and a fatal disease. The current finding was in line with the study conducted in Bahir Dar town (94.5%) by Tadesse et al*.* (2014) and New York, USA (94.1%) by Eidson et al.

(2004). However, this result was disagreed with the study reported (30.97%) from Addis Ababa (Ali et al., 2013). This could be due to the high rate of incidence and frequent death of the affected host in the study area.

In the study area, 55.5% respondents knew that the disease could affect all mammals of domestic and wild animals. In contrast to this study, Tadesse et al. (2014) reported a lower result (21.4%) from Bahir Dar. This difference may be due to the availability of different host range in the rural district of our study site. Higher result (71.9%) was also reported in the city of New York, USA (Eidson et al., 2004) which could be due to the educational status and/or awareness of the community. Regarding to public health importance, about 97.1% of the respondents claimed that the disease is transmitted from animal to human, 72.6% of the respondents knew that the mode of transmission of rabies was through by biting, scratching and open wound contact with saliva. This finding was supported by report from Addis Ababa, 75.5% of respondents knew that rabies to be transmitted through animal bite (Ali et al., 2013). A higher result was reported from North Gondar, Ethiopia by Jemberu et al. (2013) about 84% of the participant stated any type of contact (irrespective of the skin condition) with saliva of affected individual could transmit the disease. A few respondents mentioned that rabid equine and donkey can transmits the disease but ruminant could not transmit the disease to human through biting or through their milk and meat during consumption. Inoculation of infected saliva through the bite of a rabid animal appears to be the predominant mode of rabies transmission (Radostits et al., 2007). Contact of infected saliva with broken skin or mucous membrane can transmit the disease (WHO, 2014). About 76.0% of the respondents were aware of common clinical signs of rabies in animals. This finding was in line with Tadesse et al. (2014) and Asabe et al. (2012) reported from Bahirdar, Ethiopia (76.8%) and Nigeria, respectively. In the present study, dog vaccination was practiced by 24.5% of the respondents. In line with this report, dog vaccination practice was generally very low and very nonexistent in rural district of Dabat and was good in Gondar town (Jemberu et al., 2013). In contrast, higher result (36%) was reported in and around Dessie city by Gebeyaw and Teshome (2016). This low level of report for vaccination in study area was claimed by the respondents' due to lack of access and low awareness towards rabies vaccines. Raising awareness about dog vaccination and improving access and affordability of the vaccine should be considered in control of the disease, as dogs are the main reservoir of the disease. Two point six percent of the participant had been castrating their dog and most of them used to castrate through traditional method by removing the testicle. Most of the respondents (61.1%) had awareness as castration decrease the incidence of the disease. Castration (sterilization) is another option for canine population management of male dogs, which has been used in Mexico, Brazil and other countries (Oliveira et al., 2012, Soto et al., 2009). However, sterilization efforts should not focus only on males, as females are also critical target for effective population management (Jackman and Rowan, 2010). More often, however, rabies control programs have attempted to cull dog populations, even though this approach has been shown to be ineffective (Dalla et al., 2010; Morters et al., 2013). Such lethal management strategies require the elimination of 50 to 80% of dogs a year, which is neither financially possible nor ethically acceptable (Rupprecht et al., 2002). Among the immediate action taken after bite, wash with water and soap was reported by most of the respondents (76.4%) in this study. This result is higher compared to the study conducted in Gondar zuria district (30.7%) (Digafe et al., 2015) and in a Rural Community of Gujarat, India (31.1%) (Singh and Choudhary, 2005). The variation may be due to the study area and awareness level of the community. Washing of rabies-infected wounds with soap and water can increase survival by 50% (Radostits et al., 2007). This treatment is cheap, readily available and feasible for all to apply. All the participant 279 (67.1%) had positive attitude for anti-rabies vaccine. This result is higher compared to a study conducted in Bahirdar (42.8%) (Tadesse et al., 2014). This difference could be due to skill and awareness of the community for vaccination.

Low level (42.1%) of preference for health center (for PEP) was observed in this study. Most respondents choose other options like traditional healer (54.8). Similarly, studies conducted in Gondar zuria district, Ethiopia, reported about 62.2% of the study participants had strong beliefs in traditional medicine (Digafe et al., 2015). In Satkhira, Bangladesh, 59% of the dog bite victims first seek treatment from traditional healers instead of visiting the hospitals (Ghosh et al., 2016). A higher (84%) reliance of respondents on traditional treatment was reported from Dabat and Gondar (Jemberu et al., 2013). In contrast to these report, almost all respondents agreed to consult health professional in case of animal bite was reported in Addis Ababa (Ali et al., 2013). The preference for traditional practices might be arise from many factors including easy access to traditional medicine, lack of awareness, long duration of treatment. Reliance on traditional medicines with unproven efficacy is very risky and nothing can be done to save one's life after the first symptoms of the disease occur. After suspected or proven exposure to rabies virus, immediate use of efficient anti-rabies vaccine with proper wound management and simultaneous administration of rabies immunoglobulin is almost invariably effective in preventing rabies (WHO, 2005). Most of the respondents (64.9%) in our study claimed that meat of rabid food animal is safe for consumption. These results were consistent with that reported in Gondar Zuria district by Digafe et al. (2015) which revealed consumption of cooked or boiled meat from

rabid animals was considered as safe by 67.0% of the respondents and about 19% replied even raw meat is safe for human consumption. According to WHO (2014), consumption or preparation of meat from rabid animals is a risk. The consumption of raw meat from an infected animal requires PEP. Cooked meat does not transmit rabies; however, it is not advisable to consume meat from an infected animal (WHO, 2013). Even though the extent of transmission varies, all possible modes of transmission including bite, contact with saliva, and consumption of animal products from infected animal should be avoided. During analysis of KAP with independent variables, the good scores were higher in males (64.6%) than females (54.5%). The same proportion of statistical difference on KAP score of male (53.4%) and female (10.75%) was reported in Bahirdar town by Tadesse et al. (2014) and comparable result was reported from Addis Ababa in male (77.09% moderate and 10.55% good) and female (73.62% moderate and 5.08% good) (Ali et al., 2013). The statistical significant difference (P<0.001) in KAP score between males and females might be due to increased activity of males in their daily life compared with females and better chance of acquiring correct information about rabies. The other factor that identified to be significantly associated with knowledge on rabies was educational status. Statistically significant association (P<0.001) was observed between KAP score and educational levels where by higher levels of educations were associated with higher knowledge scores. All respondents with diploma and above education levels had good KAP of rabies. Numerically, this finding show (51.1%) for illiterates, (69.0%) for secondary school preparatory students, (91.3%) for Diploma and above education level. This finding was also supported by a study conducted in Bahir Dar (Tadesse et al., 2014), from Addis Ababa (Ali et al., 2013) and the studies conducted in Flagstaff, Arizona, USA (Andrea and Jesse, 2012). The possible explanation could be educated person would have better information access and can easily understand the disease. Occupation also another risk factor that has high statistical association with KAP score (p<0.001). High score was recorded in government employee (90.7%) and low score in farmers (48.3%). In line with this finding, a statistically significant association ($\times^2$ =40.971, p<0.001) with the highest knowledge level (9.89%) in employed/professionals and low level (4.94%) among unemployed/ housewife was reported from Addis Abeba by Ali et al. (2013). This result conveys that employment has a direct relation with source of knowledge. The type of occupation could also determine the source of information that relates government employee to formal source of information, which increases their level of knowledge.

## CONCLUSION AND RECOMMENDATIONS

This study showed that rabies was a well-known disease in the study area. The KAP level towards to rabies of the community of Debark woreda found to be good. But still there are some gaps in the community concerning with cause and mode of transmission, host range of the disease, clinical signs of rabies, prevention methods after suspected animal bite and attitude to anti-rabies vaccine. In addition, the respondent said consumption of meat from rabies-infected animal has a less risk of zoonosis. On the other hand, there is a lack of knowledge about what to do after exposure, like immediate visits to health facilities, and use of anti-rabies post exposure prophylaxis, which might be due to lack of awareness creation. Moreover, sex, educational status and occupation of the respondents found to have a significant association with KAP score. Good KAP score has found related to educational status and employment that implies most of the illiterate of the rural area and farmers, spend their life with a variety species of animals, are prone to the disease easily. Therefore, based on the aforementioned conclusion the following recommendations are forwarded:

1. Veterinarians and health professionals should prepare and deliver continuous and strategic community awareness programs on prevention and control of rabies in the study area.
2 Governmental organizations like Federal Ministry of Health, Federal Ministry of Livestock and fishery resource and University of Gondar should work in cooperation with information sources like radio and television programs to give an information which will enhance the awareness level of the community.
3. The Amhara Regional Health Bureau should also design accurate and urgent Community based rabies education program with emphasis on mode of transmission, clinical signs and immediate benefits of wound management and need for Anti-rabies vaccine following dog bite.
4. The Amhara livestock and fishery resource Bureau should register the dog population of the region and prepare a legislation that will enforce the owners to vaccinate their animals.

## Conflict of Interests

The authors have not declared any conflict of interests.

## ACKNOWLEDGEMENTS

We would like to thank Jimma University for the grant provided to us to do this research. We also thank Debark Woreda Livestock and Fishery Resource Office for its cooperation and active participation in data collection process. Finally, we acknowledge participants of this study.

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