

Assessment of Knowledge, Attitude and Practice (KAP) on Rabies Among Residents in and Around Asella Town, Arsi Zone, Ethiopia

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Abstract: Rabies is a fatal neglected viral zoonosis which causes encephalitis in all warm-blooded animals and humans. However, it can be prevented via vaccination and community awareness. A community-based cross-sectional study was conducted from November 2021 to April 2022 to assess the community's current knowledge, attitude and practice (KAP) on rabies at Asella administrative town and its surroundings. The data was collected using the questionnaire survey and a retrospective record review of three years of data was also performed to determine the status of humans exposed to rabies infection in the study area. A systematic random sampling technique was employed to select households and a face-to-face interview was made with 100 respondents. The data were then analyzed using SPSS statistical software version 20, descriptive statistics were performed and Pearson's chi-squares were used to interpret the results. The majority of the current participants were male and about 40% were between 30-40 years in their age category. Our study result indicated that 82% of the participants had information about rabies. There was a statistical difference in their information source ($p \leq 0.05$) where the majority of the respondents mentioned more than three different sources such as radio, newspaper, media, family members etc. However, only 58% of the participants knew the zoonotic importance of the disease. The result also showed that 23% and 12% of current participants mentioned regular dog vaccination as the best method for rabies control in animal and human populations, respectively. Most (96%) participants did not vaccinate their dogs due to a lack of knowledge. The present study depicted majority of the individuals who were vaccinated with a post-exposure antirabies vaccine from September 2019 to May 2022 were lies in the age group of <15 years. However, there were no statistical differences ($p > 0.05$) in exposure to rabies between both sexes and among different age groups in our study. Therefore, further study with a larger sample size and geographic area is needed to be conducted in the study area.

Key words: Asella • Animals • Humans • Rabies • Vaccination

INTRODUCTION

Rabies is one of the oldest viral diseases caused by the species of rabies virus which belongs to the Mononegavirales order, Rhabdoviridae family and Lyssavirus genus [1]. Rabies is derived from the Latin rabere, "to rage or to rave", rabid; rabere possibly may have earlier origin in the Sanskrit *rabhas*, for "violence" [2]. The Greeks adopted their own word, Lyssa meaning "madness", for rabies;" [3] and also according to Chernet and Nejash [4], the name Rhabdo comes from the Greek word and it identifies the characteristic bullet or rod-shape of the virus. It is a single-stranded, negative-sense lyssavirus (genotype 1) with a genome size of approximately 12 kb. Rabies causes incurable viral encephalitis and it is progressively fatal [5].

This disease affects all warm- blooded mammals including human and has been threatening the lives of mankind for more than 4,000 years [6, 7]. Globally, it is estimated that at least 55,000 people die of rabies each year [8, 9]. The virus affects virtually all mammals and infected species invariably die from the disease once clinical signs are manifested [10]. Rabies is a fatal disease that is considered as re-emerging zoonosis throughout much of the world [11].

Rabies has been acknowledged as a threat to human wellbeing since ancient times, either as a direct consequence of disease or as a secondary casualty of affected animals. In the middle ages, the disease was accepted as a curse, in classical times a punishment imposed by the gods [12]. Rabies satisfies all the World Health Organization (WHO) criteria for diseases that are

a priority for control and, unlike many other emerging zoonosis (such as West Nile virus), safe and effective animal and human vaccines are widely available for its prevention and control. Despite this, rabies remains a neglected disease that is poorly controlled throughout much of the developing world, particularly Africa and Asia, where most human rabies deaths occur [13].

More than 3 billion people, about half the world's population, are living in countries/territories where dog rabies still exists and are potentially exposed to rabies. Canine rabies remains common in Africa, Asia, the Middle East and Latin America. There are an estimated 55,000 human deaths annually from rabies worldwide [14], with about 31,000 in Asia and 24,000 in Africa average more than 95% of human deaths were recorded in these continents. However, it is agreed that the disease is grossly under-reported, both in dogs and in human and the extent of under reporting may also be on the increase due to a variety of factors [15].

Ethiopia being one of the developing countries is highly endemic for rabies. Approximately 10,000 people are estimated to die of rabies annually in Ethiopia which makes it to be one of the most affected countries in the world [16]. Dogs are the principal source of infection for humans and livestock. In Ethiopia, many households own dogs usually for guarding property. Although there are no formal studies, it is estimated that there is one owned dog per five households nationally [17].

Rabies is transmitted only when the virus is introduced into bite wound or onto mucus membranes. The transmission is based on the severity of the bite and on the amount of the virus in the saliva. The incubation period of rabies is based on the amount of virus inoculated and the site of inoculation. In most cases, clinical sign is appear in 15-25 days occasionally delayed to a year [18].

Most affected animals undergo behavioral changes. In the early stage there are behavioral change and dilation of pupil are seen. As a disease progress rabid animal may roam for a long distance, biting inanimate or animals, change in voice, drooling of saliva, dropped lower jaw, sexual excitement, high stepping gait, kicking, lameness and other [19,20]. The clinical sign in human are pain at wound site, behavioral changes, headache at early, fever and extreme sensitivity to light and sound, hydrophobia, dilation of the pupil, increased salivation and ascending paralysis from site of exposure [20-23].

In Ethiopia 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 PEP. Rabies victims especially from rural areas seek PEP treatment after exhausting the traditional medicinal intervention and usually after a loss of life from family members [24, 25].

Laboratory diagnosis and surveillance for animal and human rabies are severely constrained in much of the developing world where rabies is endemic [26]. The true disease burden and public health impact of rabies remain underestimated due to the lack of simple, sensitive and cost-effective laboratory methods for rabies [27]. This may be one of the important reasons why rabies remains a neglected zoonotic disease in many developing countries in Asia and Africa [28].

Public awareness and an increase of knowledge about rabies disease, first aid measures after dog bites, increased knowledge about dog behavior and how to avoid getting bitten by dogs are suggested methods to prevent rabies in humans [29, 30]. Knowledge, attitude and practices (KAP) studies have been used widely to enhance community knowledge and thus change attitude and improve practices that may aid in disease prevention and control [31, 32]. Despite the endemic nature of rabies in Ethiopia, little is known about level of community awareness in Ethiopia in general and little information in and around Asella town in particular. However, for efficiently increasing awareness, the knowledge gap among the community should be identified and targeted. Thus, this KAP study aimed at generating information that will help to identify knowledge gaps and act as baseline data for evaluation of community awareness; thereby helps in planning and implementation of rabies control programs.

MATERIALS AND METHODS

Study Area: The study was conducted from November 2021 to April 2022 to assess the level of knowledge, attitudes and practices towards rabies in and around Asella town. Asella is the capital city of the East Arsi zone of the Oromia regional state and is located at a distance of 175 km from Addis Ababa in the southeast direction. The town is characterized by mild subtropical weather with maximum and minimum temperatures of 18°C and 5°C respectively. The annual rainfall ranges from 1300 to 1500 millimetres. Topographically, Asella town is located on the high land rising over 2,400 meters above sea level. The area has a bimodal rainfall occurring from March to April (short rainy season) and July to October (long rainy season). According to the Arsi Planning and

Development Office [33], the area is densely populated, with a livestock population of 85,893 cattle, 57,118 sheep, 10,725 goats, 7841 horses, 15,642 donkeys, 517 mules and 35,489 poultry. The farmers in the area practice a mixed crop-livestock farming system.

Study Design: A Community based cross-sectional questionnaire survey and retrospective record review were conducted to assess the knowledge, attitude and practice (KAP) about rabies in and around Asella town. The questionnaire was semi-structured with both open and closed-ended questions and the details of individuals who participated in the interview were incorporated. Knowledge of the disease, treatment and prevention practices were also included in the questionnaire.

Study Population: The study was conducted on community living in and around Asella town which is systematically randomly selected. The study population comprises community representatives of different age groups, both genders, from different occupations and educational backgrounds.

Sample Size Determination and Sampling Technique: There was no previous study report from our study area; hence, the desired sample size was calculated using 5% desired level of precisions at 95% confidence level. According to the formula described by Arsham [34], a total of 100 respondents were recruited in to the study and interviewed.

$$N = 0.25/SE^2 \\ 0.25/0.0025 = 100$$

where: N= Sample size, SE (Standard Error) at 5% precision and 95% confidence level.

The study was conducted in and around Asella, East Arsi zone of Oromia region and for the selection of the sampling units a multistage sampling technique was employed. The Asella administrative town was selected purposively based on accessibility of dogs (assuming Asella administrative town has a large dog population among districts in the east Arsi zone). From fourteen (14) Kebeles of Asella administrative town, three (3) Kebeles, namely Walkesa, Dosha, Gora Silingo and from Tiyo district two (2) Kebeles namely Burka Chilalo and Denkeka Konicha were randomly selected. For assessing the community knowledge, attitude and practices (KAP) about rabies we have decided to recruit equal number of

households; hence, twenty (20) households from each of the selected Kebeles. Finally households were selected using systematic random sampling technique and the 20 households from each Kebeles were directly visited and participated in the interview. In this interview, representatives of the community (residents) from urban and peri-urban of Asella administrative town were included and only one family member was interviewed per selected household.

Data Collection Procedure: Data was collected by face-to-face interview by using a semi structured and pre-tested questionnaire. Once the households were identified, household visit was conducted and each respondent (one family member per household) asked to respond for about twenty five questions regarding cause, sources, mode of transmissions, clinical sign, prevention practices and treatment measures. Furthermore, actions for rabid animal, rabies fatality, feeling if infected by rabies, preferred actions taken for bitten human, immediate action (first aid) for bitten human, time for anti-rabies vaccine in human after exposure, whether rabies is preventable by vaccination of dog and eliminating stray or confining dogs helps to prevent rabies or not were asked. The questions were multiple choices question with both open and close ended. The questionnaires were first prepared in English and translate to Afaan Oromo and Amharic for appropriateness and easiness in approaching the study participants. Before the interviewing process, the participants were briefed about the purpose of the study and asked for their consent. Only voluntary participants were involved in the study and all the information obtained from the study participants were kept confidential. The respondents were those who lived at least 6 months in the household as permanent residents in the study area and were included in the study based on their willingness and informed consent provision. However, those family members who are under 18 years old were excluded from the study.

Retrospective Study: A retrospective study was conducted to determine the status of community exposure to rabies infection based on case reporting data and provision of post-exposure antirabies vaccine. For this purpose, three years of retrospective data (a record from September 2019 to May 2022) was collected from Asella Town Medical Hospital. From the data, several individuals who reported their exposure to rabies infection (those who had bitten and or had direct or indirect contacts with suspected hosts, especially dogs) and had been vaccinated in a post-exposure antirabies vaccine

were screened by their age group, gender and year of exposure by reviewing the hospital records.

Ethical Considerations: Ethical clearance for the study was obtained from college of veterinary medicine, Haramaya University and Asella Regional Veterinary Laboratory. 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.

In retrospective data collection the study protocol was also ethically reviewed and approved by the Departmental Research and Ethical Committee of Asella Regional Veterinary Laboratory and concerned healthcare facility offices including Asella town hospital administration were officially communicated by a letter obtained from CVM, HU. Data were collected after obtaining written consent and confidentiality was maintained throughout the study by using codes.

Data Management and Analysis: After collection, the data were cleaned checked for completeness and entered into Microsoft Excel 2010 spreadsheet. The data generated were analyzed using the Statistical Package for Social Science (SPSS) Version 20. Descriptive statistics was used for calculating the frequency and percentage of both dependent and independent variables. Chi-square and p-value were used for calculating the association between the independent variable and dependent variable (KAP) about rabies. The association is judged as significant when the p-value is less than or equal to 0.05 at a 95% confidence interval (95% CI).

RESULTS

Socio Demographic Character of the Participants:

A total of 100 community representatives were interviewed during the study period and all respondents (100%) were responded to the questionnaires. The majority of the respondents in this study were males 60 (60%). The highest (40%) of participants were within the age range of 30-40 years. The majority of the respondents (33.9%) attended tertiary education. With regard to occupation, majority of the respondents (39 %) had no specific professional works as they were students of different levels, house wives, merchants etc.) These and other socio demographic characters of the participants are summarized in Table 1.

Table 1: Socio-demographic information of the study participants in and around Asella town

Variable	Category	Frequency	Percentage%
District	Dosha	20	20.0
	Burka Chilalo	20	20.0
	Denkeka Konicha	20	20.0
	Gora Silingo	20	20.0
	Walkesa	20	20.0
Sex	Female	40	40.0
	Male	60	60.0
Age	>40	36	36.0
	18-29	24	24.0
	30-40	40	40.0
Education	No Formal Education	13	13.0
	Primary	23	23.0
	Secondary	23	23.0
	Tertiary?	41	41.0
Occupation	Farmer	32	32.0
	Health Profession	11	11.0
	Other	39	39.0
	Teacher	7	7.0
	Veterinarian	11	11.0
Total		100	100.0

Knowledge of Respondents in Relation to Natural Host

Range and Transmission of Rabies: In this study majority (82%) participants had heard about rabies from more than three different sources such as parents, neighbors, school, radio, newspaper and etc. However, there were statistically difference ($p=0.04$) in their sources of information on rabies among different education levels at the study area (Table 2). And almost all 99% of respondents knew the susceptible hosts for rabies. Moreover, more than half of the respondents (58%) mentioned as rabies can affect human and other domestic animals. This was statistically significant ($p=0.006$) among different education levels. About 73% of respondent replied that human being acquire rabies from biting and many other routes (inhalation, contact with saliva either intact or open skin, eating rabid animal meat, skin scratch).

Regarding clinical signs of rabies 84% of respondents knew the clinical sign of rabies. (Table 2). Regarding on prognosis 48% and 34% of respondents mentioned that rabid people always die and recover successfully, respectively. 83% of respondents believe that rabid dog always dies. There was statistically difference ($p<0.05$) on knowledge of transmission of rabies between animals, clinical sign and prognosis of rabid people among different education level at the current study area (Table 2).

Table 2: Respondents' knowledge test on rabies by education level

Variable	Category	no formal education	Primary	Secondary	Tertiary	Total (%)	X ² (P value)
Do know rabies?	Yes	10(12.2)	21(25.6)	17(20.7)	34(41.5)	82(82)	1.9(0.58)
	No	3(16.66)	2(11.1)	5(27.7)	8(44.4)	18(18)	
From where have you learnt about rabies	Newspaper and radio	0	5(26.31)	9(47.36)	5(26.31)	19(19)	29.33 (0.040)
	Radio	0	5(50)	4(40)	1(10)	10(10)	
	parents, newspaper and school	0	1(12.5)	1(12.5)	6(75)	8(8)	
	From Many sources	10(22.22)	10(22.22)	4(8.88)	21(46.66)	45(45)	
	Don't know	3(16.66)	2(11.11)	5(27.77)	8(44.44)	18(18)	
Susceptible host of rabies	Know	13(13.33)	23(23.23)	23(23.23)	40(40.40)	99(99)	1.45 (0.690)
	Don't know	0	0	0	1(100)	1	
Hosts affected by rabies virus	only Dog	0	3(50)	2(33.33)	1(16.66)	6(6)	18.304 (0.006)
	Dog, cattle and human	4(11.11)	10(27.77)	14(38.88)	8(22.22)	36(100)	
	Dog and Many others	9(15.51)	10(17.24)	7(12.06)	32(55.17)	58(58)	
Rabies transmit in animals	biting alone	3(15.78)	5(26.31)	7(36.84)	4(21.05)	19(19)	13.437 (0.037)
	Bite and skin scratch	5(13.88)	11(30.55)	10(27.77)	10(27.77)	36(36)	
	Biting and Many others ways	5(11.11)	7(15.55)	6(13.33)	27(60)	45(45)	
How human acquire rabies?	Only by dog bite	5(50)	2(20)	2(20)	1(10)	10(10)	11.030 (0.087)
	Bite, inhalation and skin scratch	4(23.52)	5(29.41)	5(29.41)	3(17.64)	17(17)	
	Bite and Many others ways	8(10.95)	16(21.92)	13(17.8)	36(49.3)	73(73)	
Do you know clinical sign of rabies?	Yes	10(11.9)	21(25)	18(21.42)	35(41.66)	84(84)	2.018 (0.569)
	No	3(18.75)	6(37.5)	5(31.25)	2(12.5)	16(16)	
What are the clinical sign of rabies?	Aggressiveness and salivation	5(20)	6(24)	10(40)	4(16)	25(25)	22.29 (0.007)
	Aggressiveness, salivation and run over long distance	4(14.8)	9(33.33)	5(18.51)	9(33.33)	27(27)	
	Aggressiveness & Many others	1(3.12)	6(18.75)	3(9.37)	22(68.75)	32(32)	
	Don't know	3(18.75)	2(12.5)	5(31.25)	6(37.5)	16(16)	
Prognosis of Rabid Dog	Always die	10(12.04)	21(25.3)	18(21.68)	34(40.96)	83(83)	3.445 (0.75)
	Recovery	3(18.75)	2(12.5)	5(31.25)	6(37.5)	16(16)	
	Do not know	0	0	0	1(100)	1(1)	
Prognosis Of Rabid People	Always die	8(16.66)	14(29.16)	11(22.91)	15(31.25)	48(48)	20.616 (0.002)
	Recover successfully	0	5(14.7)	6(17.64)	23(67.64)	34(34)	
	Do not know	5(27.77)	4(22.22)	6(33.33)	3(16.66)	18(18)	
Total	13	23	23	41	100		

Community Attitudes and Practices Regarding Rabies:

Out of total participants, 48% of them believed that killing of stray dog, restriction of dog movement and vaccination of dog were the usual way of rabies control methods in animal population (Table 3). Regarding the preferred measures and supports given for individual bitten by rabid dog, majority of the participants (40%) mentioned washing the wound with water and soap as an immediate action (first aid) experienced. Regarding the control method of rabies in human population, more than half, 64%, of participants replied that applying different methods (post-exposure prophylaxis, regular vaccination of people at risk, public education, regular vaccination and restriction of stray dog movement) are effective methods. However, 45% of the respondents did not take any measure on their dogs after the dogs bite human (agreed to freely release dogs) (Table 3).

Majority of our respondents, 60%, had 5-10 years of experience in keeping dog and about 89% of them had been kept a dog only for a security purpose and 85% of the total respondents kept their dog freely (release to anywhere). All most all (96%) participants did not vaccinate their dog. About 47% of the respondents

mentioned the main reason for not vaccinating their dogs is due to lack of knowledge on rabies vaccine. The community attitudes and practices regarding rabies are summarized in Table 3 and 4.

Status of Human Exposure to Rabies at Study Area:

The study was conducted to determine status of rabies and assesses the knowledge, attitude and practices of residents in and around Asella. A retrospective data of the last three years (from September 2019 to May 2022) indicated the number of people suspected for rabies and vaccinated with a post exposure antirabies vaccine was decreasing. The data collected from public healthcare facilities showed a total of 406, 274 and 157 individuals were vaccinated with post exposure antirabies in 2019, 2020 and 2021/22, respectively (Fig. 1).

The present study depicted majority of the individuals who vaccinated with a post exposure antirabies vaccine during the period of September 2019 to May 2022 were lies in the age group of <15 years. However, there were no statistical differences (p>0.05) in exposure to rabies between both sexes and among different age groups at our study area (Table 5).

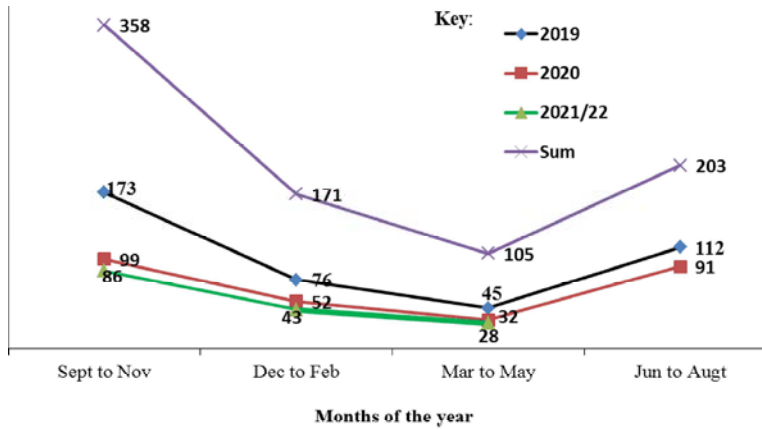


Fig. 1: Number of people vaccinated with a post exposure antirabies vaccine from September 2019 to May 2022, in Arsi zone.

Table 3: Respondents' attitude and practice tests on rabies by education level

Variable	Category	no formal educ.	Primary	Secondary	Tertiary	Total	X ² (P value)
usual rabies control method in animal population	Killing of stray dog	7(43.75)	3(18.75)	4(25)	2(12.5)	16(16)	36.543 (0.000)
	Vaccinating dog	1(4.35)	8(34.78)	8(34.78)	6(26.08)	23(23)	
	Restricting dog's movement	4(30.76)	2(15.38)	4(30.76)	3(23.07)	13(13)	
	All	1(2.08)	10(20.83)	7(14.58)	30(62.5)	48(48)	
What do you do with a dog's biting people (fate)	Killing	2(22.22)	4(44.44)	3(33.33)	0	9(9)	49.468 (0.000)
	Nothing (released)	11(24.44)	14(31.11)	13(28.88)	7(15.55)	45(45)	
	Isolate for 10 days	0	0	0	15(100)	15(15)	
	Vaccinate & release	0	5(16.12)	7(22.58)	19(61.29)	31(31)	
First aid provided to individual bitten by a dog	Washing a wound with salt solution	0	0	1(33.33)	2(66.66)	3(3)	44.48(0.000)
	Washing a wound with water and soap	0	5(12.5)	14(35)	21(52.5)	40(40)	
	Washing a wound with holly water	11(45.8)	7(29.2)	4(16.6)	2(8.33)	24(24)	
	All	2(6.1)	11(33.33)	4(12.1)	16(48.5)	33(33)	
How you control rabies in human?	Regular vaccinating of dog	0	3(25)	6(50)	3(25)	12(12)	15.336 (0.018)
	Eliminating stray dog & movement restriction	7(29.16)	7(29.16)	2(8.33)	8(33.33)	24(24)	
	Applying different methods	6(9.37)	13(20.3)	15(23.43)	30(46.87)	64(64)	
Reason for not vaccinating dogs	Difficult in catch	4(33.33)	4(33.33)	2(16.66)	2(16.66)	12(12)	28.757(0.004)
	Lack of information(when &where)	5(15.15)	13(39.39)	8(24.24)	7(21.2)	33(33)	
	Lack of knowledge	5(10.63)	4(8.5)	10(21.27)	28(59.57)	47(47)	
	Not accessing vaccine	1(16.66)	2(33.33)	3(50)	0	6(6)	
	Expensive (fee)	0	0	0	2(100)	2(2)	
Total	13(13)	23(23)	23(23)	41(41)	100(100)		

Table 4: Respondents' practices in different districts of the study area

Variable	Category	District					Total	X ² (P value)
		Dosha	Burka Chilalo	Denkeka Konicha	Gora Silingo	Walkesa		
For how long keeping dog (by year)	<5	0	2(22.22)	1(11.11)	5(55.56)	1(11.11)	9(9.00)	11.65 (0.17)
	>10	5(16.12)	5(16.12)	6(19.35)	7(22.58)	8(25.8)	31(31.00)	
	5-10	15(25)	13(21.66)	13(21.66)	8(13.33)	11(18.33)	60(60.00)	
Purpose for keeping dog	Pet	5(45.45)	1(9.09)	2(18.18)	2(18.18)	1(9.09)	11(11.00)	5.52 (0.238)
	Security	15(16.85)	19(21.34)	18(20.22)	18(20.22)	19(21.34)	89(89.00)	
Dog kept by tying	Yes(tied)	5(33.33)	1(6.66)	3(20)	2(13.33)	4(26.66)	15(15.00)	3.9 (0.417)
	Free/release	15(17.65)	19(22.35)	17(20)	18(21.17)	16(18.82)	85(85)	
Have you vaccinated your dog	Yes	0	1(25)	1(25)	2(50)	0	4(4)	3.65 (0.456)
	No	20(20.83)	18(18.75)	19(19.79)	18(18.75)	20(20.83)	96(96)	
Total		20(20.00)	20(20.00)	20(20.00)	20(20.00)	100(100)		

Table 5: Proportion of individuals suspected and vaccinated with a post exposure antirabies vaccine by gender and age from September 2019 to May 2022, in Arsi zone

Variable	Category	Year			Total (%)	X ² (P value)
		2019 (%)	2020. (%)	2021/22(%)		
Gender	Female	174(46.4)	122(32.5)	79(21)	375(44.8)	2.56 (0.28)
	Male	232(50.2)	152(23.6)	78(16.8)	462(55.2)	
Age by years	<15	238(45.2)	186(35.4)	102(19.4)	526(62.8)	8.38 (0.08)
	15-45	111(52)	60(28)	42(19.7)	213(25.4)	
	>45	57(58.2)	28(28.6)	13(13.3)	98(11.7)	
Total	406	274	157	837		

DISCUSSION

In the present study, the majority of respondents heard about rabies, susceptible hosts, clinical signs and how rabies is transmitted from dog to human and identified that rabies could be prevented by avoiding dog bites and confining dogs. Despite a good level of knowledge of these diseases and preventive measures, these were poorly practiced among dog owners. Only 15% of pet owners tied up their dogs during the whole day. The remaining 85% of dog owners reported that their dogs were untied and free to cohabit with family and forage widely. Likewise, only 4% of pet owners in the present study vaccinated their dog. This finding is very less than study conducted in Indonesia (74%) [35], Gondar (42%) [36], mekelle (79%) [37] and SriLanka (76%) [38]. This may be attributed to a number of factors that include low health promotion particularly on rabies, unavailability of animal vaccines, the study time and poor information sharing in this study area.

There were statistically difference ($p < 0.05$) in attitude and practice on rabies among different education level of participants. Higher knowledge and practice was seen in higher (tertiary) educated participants. Community awareness about rabies has significant role in rabies prevention and control [4, 39]. Knowledge, attitudes and practices (KAP) studies have been used widely to enhance community knowledge and thus change attitude and improve practices that may help in disease prevention and control [31]. The possible reason could be that educated person would have better information access and can easily understand the disease. The study confirmed that the community had lower knowledge, attitude and practice concerning the management of dog and prevention of rabies. My findings suggested that the gap in the knowledge about vaccination of dog and attitude and practice of rabies control and prevention could be considered as a potential risk factor for the rabies elimination programs in the study area.

The result of the present study revealed that rabies is an important disease of both humans and animals in the study area. The study indicates almost all, (82%), of the participants had heard about rabies from more than three different sources. This suggests that respondents are aware of the occurrence and zoonotic importance of rabies in the area. This study is in line with the study conducted in Asella, Arsi zone by Abera *et al.* [40], Addis Ababa Ethiopia [41] and in Mekelle by Hagos *et al.* [37] who reported 83.4%, 83% and 88.2% knowledge on rabies, respectively. The current finding is however, lower than the result of studies reported from different areas in Ethiopia [36, 42, 43] and other countries [44] in the rural community of India which reported 100, 99.3, 100 and 98.6%, respectively. This finding was higher when compared with the findings reported by Ichhpujani *et al.* [45], who reported 68.7% knowledge of rabies in a survey of knowledge, attitudes and practices about animal bites and rabies in the general community in India and Zimbabwe, it was reported that 70% of the households were aware of rabies [46]. This variation might be associated with differences in awareness of the community between different study areas.

Almost all (99%) of respondents knew the susceptible hosts for rabies. In present study more than half of the respondent (58.0%) mentioned as rabies can affect human and other domestic animals which is in agreement with the study conducted in Dedo district of Jimma zone, (57%) [39] and Debark Woreda, North Gondar, Ethiopia, (55.5%) [43]. However, Guadu *et al.* [47] reported a lower result (21.4%) from Bahir dar town and higher result (71.9%) was also reported in the city of New York, USA [48]. The possible reason for this could be due to the availability of different host range, level of awareness and educational status of community.

Our study also depicted about 73% of the respondents knew human acquire rabies not only from rabid dog biting but also through many other sources such as inhalation, contact with saliva of rabid animal

either intact or open skin, ingesting meat of rabid animal or exposure to skin scratch. This was agreement with most common way of transmission for rabies (90%) is bite of infected animals like dogs and cats, Chhabra and Ichhpujani [49]. However, rabies cannot transmit by licking of intact skin scratch [50] it cannot cross intact skin. Also lower result of rabies transmitted by bite and saliva was reported study conducted in Hawassa, Munesa and Dedo district by Yergashewa *et al.* [51], Abdela and Teshome [39] and Abdella *et al.* [52] with 52.2, 21.3 and 51.9% respectively. This difference might be associated with difference in awareness of the community between different study areas. Some of the respondents reported killing and avoiding (not eating) the body of animals bitten by suspected rabid animals fearing that rabies is transmitted through an animal's carcass. But, rabies virus is inactivated by heating and therefore eating cooked meat or pasteurized milk is not considered as an exposure. However, drinking unpasteurized milk or unprotected cutaneous contacts with a carcass (for example, during butchering and dressing) are considered exposures [53].

In a current study regarding the clinical signs of rabies, 84% of respondents knew the clinical signs of rabies. The most common signs and symptoms mentioned by 25, 27 and 32% were aggressive and salivation, aggressive, salivation and running over long distances and aggressive and money other (stop eating and drinking, biting, change in behaviour, salivation and paralysis, respectively. This is supported by other [4, 19, 20] clinical signs of rabies including aggression, biting inanimate objects, salivation, running over long distances, stopping eating, change in behaviour, hydrophobia, coma and paralysis. This finding was higher when compared with studies conducted in Bahir-dar town and Hawassa town which was 42 and 76.8% reported by Guadu *et al* [47], Yergashewa *et al.* [51] respectively. There were statistically difference ($p=0.007$) on clinical sign of rabies among different education level of respondents. Higher knowledge of rabies clinical sign was seen in higher education level than illiterate.

In this study regarding on prognosis of rabid people 18% of respondents does not knew the fate of rabid people. 48% and 34% of respondents replied that rabid people always die and recover successfully respectively. 83% of respondents believe that rabid dog always dies. While successful recovery of rabid dog replied by 16% of respondents. Similar study conducted in Gonder Zuria and Hawassa town reported that 10% and 33.2% in animals and humans respectively [36], 27.5% [51] rabies

treated after onset of clinical sign. There were statistically difference ($p=0.002$) on knowledge of prognosis of rabid people among different education level of participants. While the virus affects virtually all mammals and infected species invariably die from the disease once clinical signs are manifested [10]. Rabies is incurable (100% fatal) once the clinical signs of the disease appear [17]. However, it is possible to prevent a person exposed to the virus from getting ill to rabies by neutralizing virus with antibodies before the virus invades the nervous tissue. This is done through vaccination and/or use of immunoglobulin's, so called post-exposure prophylaxis (PEP) [54, 55]. Additionally, the higher fatality reported in animals suggests that the study participants have better knowledge in identifying rabies in animals than in humans. So increasing public awareness of the prognosis of rabies in humans and animals was vitally important in the study area.

Among immediate action taken for bitten human 40% participants wash the wound with water and soap as immediate action (first aid), whereas, 3 and 24% wash the wound with salt solution and apply herbal extract (wash with holy water) respectively. The 40% finding in this study higher compared to study conducted in Gonder zuria district (30.7%) [36], in Jimma town (7%) [56] and in a rural Community of Gujarat, India (31.1%) [44]. Also this finding is lower compared to study conducted in Munesa (49.3) [39] and in Bahir-dar (70.8%) [47]. The variation may be due to the study area and awareness level of the community.

In this study, a small number (24%) of the respondents preferred to take treatment services from the local healers or apply herbal products and holly water over the wound. when compared to study conducted in Gondar zuria district, Ethiopia, which reported 62.2% preference for traditional medicine [36], study in Mekelle city which reported (49.8%) respondents believed holly water cure rabies [37] and study in Debark district which reported 54.8% preference for traditional medicine [43].

Furthermore, a higher (84%) reliance of respondents on traditional treatment was also reported from Dabat and Gondar [57]. The preference for traditional practices might be arise from many factors including easy access to traditional medicine, lack of awareness, long duration of treatment. Dependence 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. The use of such a practice was always life-threatening, not recommended and could not replace the standard first aids. The use of soap and water and PEP

around the bite could prevent human rabies [58]. This treatment is cheap, readily available and feasible for all to apply. Literature report indicated that washing of rabies infected wounds with soap and water can increase survival by 50% [59]. Therefore, the study suggested that awareness and educational programs were required in the communities to control rabies.

Killing of stray dog, vaccination, restriction of dog movement and applying different methods (post exposure prophylaxis, increasing public awareness) were the usual way of rabies control in the study area. This study was in line with study conducted in Hawassa town, Yergashewa *et al.* [51] reported (91.2%) rabies controlled by regular vaccination of dogs and Dedo district of Jimma zone reported that 71.1% rabies controlled by killing of stray dogs. The most common rabies prevention and control method were killing of stray dog [60], regular vaccination of dogs [61], post exposure prophylaxis Yousaf *et al.* [23] and public education [53].

Status of Rabies in Asella Medical Hospital: Human rabies exposure cases registered for anti-rabies post exposure prophylaxis at Asella medical hospital during 2019 and 2022 were reviewed in this retrospective cross-sectional study. The current study findings indicated that the numbers of people treated with post exposure antirabies vaccine due to the bite of rabid or rabid suspected dogs/animals were decreased from time to time during the last three years period (2019-2021/2022), because it was 406 in 2019, but in 2021/22 it was decreased to 157.

In general 837 numbers of people treated with post exposure anti-rabies vaccine during last three years in the study area. The actual number of rabies exposure cases might be more than this figure as there is weak registration and reporting of cases. Even I could not have data regarding the status of the exposed cases after being vaccinated and some data was not properly registered. There was no death reported during the first arrival, but I could not get data after the cases went back their home, there is no strong follow up and tracing system. This shows that human rabies exposure is still among major public health problems in spite of the availability of anti-rabies post exposure prophylaxis that is believed to break transmission besides to save the exposed cases.

Among the total (837) rabies suspected human cases majority (62.8%) were children less than 15years age. This indicated that children are more prone to rabies disease and reason for this might be due to the fact that children's

have more proximity to domestic animals and children usually handle and play with domestic animals, including dogs and cat. In addition, nearly all Ethiopian children especially in rural settings play in the streets and stay in the field to control sheep, cattle and other animals. These all increase the risk of children being bitten by dogs and other animals. Children's Don't know, access to safe effective post-exposure vaccination and for the reason that they don't have access and knowledge to wash a wound with soap and water for 15 minutes that can extensively reduce the risk of getting infected with the virus, that's why the majority of the Children die from rabies. This is in agreement with a study in Ethiopia [17] which reported that the most fatal cases (42%) were from the age group 0-14 category and the least (15.54%) were recorded in 50 years and above age category. The WHO data reported that most (30% to 50%) of the victims of rabies reported from Africa and Asia were children [14].

As on the result of exposed humans the highest incidence of bites has been occurred during spring and summer. That strongly agrees with the study conducted in northwestern Amhara, Ethiopia [62] (39%) and (29.4%) respectively. This is mainly related to the breeding season of dogs.

CONCLUSION AND RECOMMENDATION

In general, rabies was considered as the disease of both a veterinary and public health importance in the study area. All most all (82%) respondents had heard about rabies previously and 58% of respondents knew that rabies can affect animal and human. This is good knowledge. However, knowledge gap was observed regarding clinical sign of rabies, mode of transmission, management and vaccination of dog, prognosis of rabid animals and people and first aid practice of bitten wound. All most all (96%) dog owners were not vaccinated their dogs. Increasing community knowledge is particular needed regarding wound washing after animal bite as first aid and seeking post-exposure prophylaxis other than traditional and spiritual healer. This study also demonstrates the need for awareness creation to the community regarding dog vaccination and implementation of dog vaccination with proper management. Education level was statistically significant of knowledge, attitude and practice of rabies in the study area. Therefore, continuous and strategic community awareness programs are very critical to prevent human cases in the current study area.

Based on the above conclusion the following recommendations were forwarded;

- Asella health office administration and eastern Arsi Zone regional health Bureau should Enable Preventive dog vaccination and PEP more often to be available at veterinary clinic and health facilities respectively.
- The Oromia 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.
- Raising public awareness programs. After a bite from a rabid animal, provide information to communities such as vaccinating your pets against rabies, immediately washing your wound with water and soap and seeking anti-rabies vaccination (PEP).
- Veterinary and health professionals should give due attention to increasing rabies awareness and prevention measures in the communities
- It is preferable to conduct research on the prevalence of rabies in humans and dogs in and other wild animals in the area.

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