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Assessment of respondents' knowledge, attitudes, and practices toward rabies and associated risk factors in Shone Town, Southern Ethiopia

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ABSTRACT

Importance: Rabies is a neglected tropical viral disease most often transmitted through the bite of an infected animal.
Objective: This study assessed the level of knowledge, attitudes, and practices of the Shone Ttown community toward rabies.
Methods: A survey-based cross-sectional study was conducted in Shone town, Ethiopia, from November 2022 to April 2023. Woreda was selected purposefully, while Kebeles and the study populations were selected by simple random sampling. Four hundred and sixteen respondents were interviewed using a semi-structured questionnaire.
Results: All respondents had heard about rabies from different sources, with the majority hearing from informal sources (62%). Approximately 51.9%, 0.7%, and 47.4% of individuals were aware of saliva contact, rabid animal bites, and both as means of transmission, respectively. The survey showed that 64.4% of participants knew the 100% fatal nature of rabies once the clinical signs developed, and 35.6% did not. Approximately 51.4% of respondents agreed that killing stray dogs was an effective method for rabies prevention. In this study, 72.6% of the respondents had contact with pets, and 36.8% of the interviewees had vaccinated their dogs. Only the educational level ($p = 0.03$) was associated with knowledge of the transmission route. Age ($p = 0.04$) and educational level ($p = 0.01$) had a statistically significant association with knowledge of the risk of not vaccinating dogs.
Conclusions and Relevance: A lack of formal education in the communities, low levels of education, and the majority of respondents acquiring their knowledge from unofficial sources are important contributors to the low levels of awareness.

Keywords: Knowledge; practices; rabies; respondents

INTRODUCTION

Rabies is a neglected tropical disease (NTD), accounting for more than 80% of human cases and primarily affecting poor and vulnerable communities [1]. The lyssavirus of the Rhabdoviridae family, which causes rabies, is a fatal infection that is endemic in developing countries, with a

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Conflict of Interest
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death rate of more than 95% in infected humans in Asia and Africa [2]. Rabies is a virus carried by animals, primarily carnivores, such as canids [3]. Rabies infects all warm-blooded animals, with domestic dogs being responsible for up to 99% of rabies virus transmission to humans in endemic areas. The most common transmission routes for rabies are any bite, scratch, or other incident in which saliva, cerebral or spinal fluid, tears, or nervous tissues from a suspected or known rabid animal or person enter an open wound, are transplanted into, or come into contact with the mucous membrane of another animal or person [4].

Rabies virus infections occur most commonly when a rabid animal bites an animal or a person [5]. The virus then invades the central nervous system, resulting in acute and fatal encephalomyelitis [6]. In addition to its animal and public health significance, rabies has significant economic importance globally, with the economic burden of dog-mediated rabies estimated at US$ 8.6 billion annually [7]. Vaccination, wound care, and injection of rabies immunoglobulin are examples of preventive methods. In many developing countries, however, where canine rabies causes the majority of human cases, deaths occur primarily due to a lack of access to affordable biological agents needed for effective postexposure prophylaxis. Reducing the number of human deaths from rabies must begin by eliminating canine rabies. The feasibility of eliminating canine rabies in Africa is predicated on understanding and counteracting the many reasons that canine rabies control has failed there. Domestic dog vaccination offers a cost-effective strategy for preventing and eliminating human rabies mortality, and it is epidemiologically and practically feasible to eradicate canine rabies through the mass vaccination of domestic dogs [8].

The WHO established the "Zero by 30" global strategy to eradicate endemic rabies globally by 2030 by preventing human deaths caused by dog-mediated rabies [9]. Although widespread vaccination is the most well-known and effective strategy, much still can be done to make it even more effective. Economic, cultural, social, educational, and technological issues must also be considered, particularly in Asia and Africa, where the rabies burden is significant, including Ethiopia [10].

Ethiopia ranks fourth worldwide and has the second-highest rabies mortality rate in Africa after Nigeria [11]. The disease has been ranked first among the top five zoonotic diseases (rabies, anthrax, brucellosis, leptospirosis, and echinococcosis) in Ethiopia by a panel of experts from human, animal, and environmental health [12,13]. Owing to a large dog population that is poorly managed, rabies has been the most common disease in Ethiopia for many centuries [14]. It is primarily a disease of dogs in the country because access to suspected domestic canids and pets is not controlled indoors or by immunization. In the past two decades, several animal rabies cases have been confirmed in Addis Ababa, the capital city of Ethiopia, with the majority confirmed in dogs [15].

Understanding community perceptions of the cause, mode of transmission, symptoms, treatment, and possible intervention measures of rabies is a crucial step toward developing strategies aimed at controlling the disease, determining the level of implementation of planned activities in the future, and encouraging responsible pet ownership, routine veterinary care and vaccination, and professional continuing education [16]. Poor public awareness of rabies is one of the challenges to disease prevention and control in Ethiopia, including the study area. Therefore, the objectives of this study were as follows:

- To assess the level of knowledge, attitudes, and practices of Shone town communities toward rabies in the Shone town, Hadiya Zone, southern Ethiopia, and

❖ To identify factors associated with community knowledge, attitudes, and practices regarding rabies in the study area.

METHODS

Ethical statements

The purpose of the survey was explained to the participants, and the best practices for veterinary care were followed. The verbally informed consent procedure described in the consent and study protocols with reference number WSU 41/22/2241 were both approved by the Wolaita Sodo University of Research Ethics and Review Committee.

Study area

The survey was conducted in Shone town, which is the administrative center of Badewacho Woreda. Badewacho Woreda is located in the Hadiya Zone of the Southern Nations, Nationalities, and People Regional State. The Kambata Tembaro zone exists between Badewacho and the other Woredas of the Hadiya zone. Hence, Badewacho Woreda has a unique geographic feature: it does not share a boundary with any other Woredas of the Hadiya zone. Geographically, Badewacho woreda is located between 07° 03′ 20″ N and 07° 16′ 08″ N latitude and 037° 53′ 02″ E and 038° 06′ 02″ E longitude. The woreda is bounded by the Alaba zone in the north, Siraro Woreda of the Oromiya region in the east, Kedida Gamela Woreda in the Kambata Tembaro zone, and Damot Gale and Damot Pulasa woreda of the Wolaita zone in the south. The area is 354 km southwest of Addis Ababa, the capital city, along the road from Addis Ababa through Shashemane to Wolaita Sodo. The woreda is also 123 km and 97 km from Hawassa, the regional capital city, and Hosanna, the zone capital town, respectively (**Fig. 1**) [17].

Study population

The study population consisted of residents of Shone town with different sociodemographic characteristics. Shone town has six kebeles, and the study included both sexes, respondents above the age of seventeen, and households that had been residents of the area for at least four months, with different occupations and marital statuses. In addition, the target populations were interviewed with specific questions related to the assessment, knowledge, attitudes, and practices of the community regarding rabies. The total population of Shone town was estimated to be 40,063 according to report of Ethiopia statistical service in 2021 [18].

Study design

A cross-sectional questionnaire-based study design was conducted by collecting data through sem-structured questionnaires.

Sample size determination and sampling technique

Shone town was selected purposefully, while the kebeles and study populations were chosen by simple random sampling. The sample size was determined based on the formula developed by Yamane [19], assuming a 95% confidence interval and a 0.05 sampling error. The population size = 40,063; the sampling error (e) = 0.05.

$n = N/1 + (N\ [e]^2) = 40{,}063/1 + 40{,}063\ (0.05 \times 0.05) = 40{,}063/1 + 40{,}063 \times 0.0025 = 396$,
n = number of people groups exposed to pet or other domestic animal bites. Four hundred twenty respondents were selected for the study to increase precision.

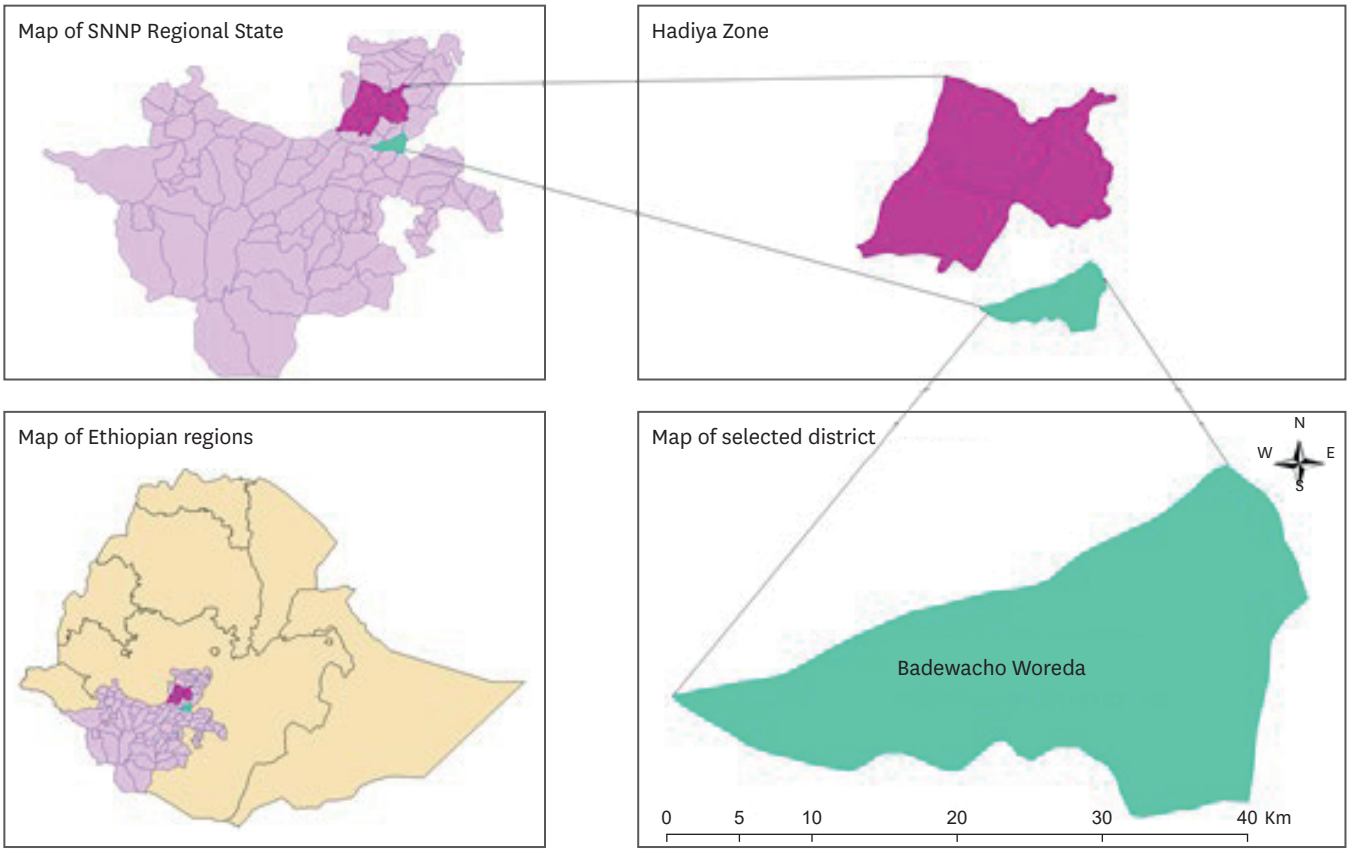

Fig. 1. Map of the study area.
SNNP, the Southern Nations, Nationalities, and People.

Sampling procedures

Face-to-face interviews were carried out using semi-structured and pretested questionnaires. Before the pretesting and survey, the questionnaires were translated into the local language (Hadyisa) and national language (Amharic) and then back-translated to English to ensure validity. A semi-structured questionnaire was pretested on 21 respondents (5% sample size) outside of the study area, in Limu District, for a consistent understanding of the survey. Close supervision was undertaken during data collection. The questionnaire was checked for completeness and consistency before formal data collection. The questionnaire contains levels of knowledge, attitude and practice with respect to rabies management and control, household information, and pet care. The questions to assess knowledge and practice required a response of either "yes" or "no" or other choices for each question. For attitude questions, however, the Likert scale method with a three-point scale (agree, neutral, and disagree) was used to allow the study participants to express how much they agree or disagree with a particular statement. Animal vaccination will be defined as having been immunized (oral or parenteral) one year before the survey.

Method of data collection

A semi-structured questionnaire was designed to collect information about the respondents' knowledge, attitudes, practices on rabies disease. Forty questions (17 knowledge, seven attitudes, nine practices, and seven demographics) were asked of each participant regarding the cause, sources, mode of transmission, attitude, practice, and prevention and control

measures of rabies. Of the 40 semi-structured questions, 37 were the closed-type, and the rest were open-ended. Respondents above the age of seventeen and households that had been residents of the area for at least four months were included. The study participants were asked for their consent orally and interviewed face-to-face in their homes by instilling a semi-structured questionnaire through a handful of house-to-house surveys of residents in all six kebeles of Shone town.

Data management and analysis

The collected raw data were stored, coded using the Microsoft Excel spreadsheet program, and analyzed using STATA statistical software version 14. Descriptive statistics, such as frequency, distribution, and percentages, were used to summarize the data. Logistic regression analysis was conducted using respondents' knowledge of the transmission methods and the risk of not vaccinating the dogs as an outcome or dependent variable against each demographic characteristic. The variables with a p-value ≤ 0.25 in univariable analyses were selected for multiple logistic regression analyses. The final multiple logistic regression models were built using a backward elimination approach. The odds ratio was used to measure the association or strength between possible risk variables. At a 95% confidence level, a p-value of 5% indicated the presence of a significant association.

RESULT

Sociodemographic characteristics

Four hundred and twenty respondents were interviewed to assess their knowledge, attitudes, and practices regarding rabies and associated risk factors in Shone Town. Among the data collected, four incomplete responses were excluded from the analysis, and the remaining data were analyzed. Of the 416 respondents, 52.6.1% and 47.4% were males and females, respectively. Respondents older than 65 years accounted for 4.3%; those aged between 51 and 65 years accounted for 16.3%; those aged 31–50 years accounted for 32.2%, and those 18–30 years accounted for 47.1% (**Table 1**).

Knowledge of interviewees regarding rabies

All respondents interviewed had heard about rabies from different sources, with 258 (62%) from non-mass media, followed by both mass media and traditional sources. The respondents were familiar with the local name 'Wisha gereechiso jabo' or 'Wisha machaso jabo' by Hadiysa or 'Yebade wusha bashita' in the national language Amharic. Approximately 31.7% of respondents knew that the virus was the cause of rabies, whereas the remaining 68.3% of respondents thought it was starvation and other causes. All respondents knew that all warm-blooded animals, including humans, could be infected with rabies, with dogs being the main source. Of the interviewees, 11.33% did not know of the transmission methods, and 63.33% did not know the risk of not vaccinating dogs. Of the participants, 51.9%, 0.7%, and 47.4% knew that the bite of a rabid animal, saliva contact, and saliva contact and the bite of a rabid animal were the modes of transmission.

The majority (80.3%) of interviewees knew of the clinical signs, and some respondents (19.7%) did not. Of the respondents, 64.4% were aware of the lethal behavior of rabies, and the rest (35.6%) were not. The majority (64.4%) of the participants knew about the almost 100% fatal nature of rabies once the clinical signs developed. Most respondents (86.3%) washed dog-bite wounds with soap and water.

Table 1. Sociodemographic characteristics of the participants

Variables	Category's	No. of respondents	Frequency (%)	95% CI
Sex	Male	219	52.6	47.81–57.42
	Female	197	47.4	42.57–52.18
Age (yr)	18–30	196	47.1	42.34–51.94
	31–51	134	32.2	27.87–36.87
	51–65	68	16.3	13.08–20.23
	> 65	18	4.3	2.73–6.77
Marital status	Single	157	37.7	33.18–42.51
	Married	251	60.3	55.53–64.94
	Divorced	8	1.9	0.96–3.80
Occupation	Unemployed	51	12.3	9.4–15.79
	Self-employed	184	44.2	39.50–49.06
	Civil servant	53	12.7	9.85–16.31
	Student	70	16.8	13.51–20.75
	Farmer	58	13.9	10.92–17.63
Educational status	No formal education	37	8.9	6.50–12.05
	Primary education	101	24.3	20.38–28.65
	higher education	104	25.0	21.05–29.40
	Secondary education	174	41.8	37.15–46.64
Family member	1–3	113	27.2	23.08–31.66
	4–6	95	22.8	19.03–27.13
	> 6	208	50.0	45.19–54.80
Live with pets animals	Live without pets	130	31.3	27.34–34.71
	Live with a pet	286	68.8	55.03–71.23

CI, confidence interval.

Attitude of respondents to rabies

Of the participants, 73.1% had a positive attitude toward stray dog danger, while 16.6% did not. Approximately 78.4% of the respondents agreed that rabies is a problem for the community, and 91.1% did not agree that holy water can treat rabies disease. Approximately 51.4% of respondents agreed that killing stray dogs was an effective method of rabies prevention. All interviewees (100%) agreed that educating society would significantly improve rabies prevention (**Table 2**).

Practices of respondents with rabies

Of the total respondents, 72.6%, 32%, and 21% had contact with pets, a habit of washing their hands after touching pets, and a history of being bitten by dogs, respectively. All the respondents perceived that they should go to the hospital if bitten by a pet animal. More than half of the respondents practiced killing to control stray dogs. Regarding vaccination, 36.8% vaccinated their dogs and had vaccination certificates (**Table 3**).

The respondents' perceptions of the different risk factors for transmission were assessed. Approximately 64.38% and 61.93% of the female and male interviewees, respectively, were unaware of the pathways of rabies transmission. Regarding the level of education, 35.63%, 38.46%, 41.58%, and 24.32% of the respondents with higher, secondary, primary, and no formal education, respectively, did not know the transmission routes of the diseases. Univariable and multivariable logistic regression analyses were performed. The risk factors with *p*-values of less than or equal to 0.25 in univariable logistic regression were subjected to a multivariable logistic regression model, and the final model was developed using the backward elimination technique. The final multivariable logistic regression model was developed, and the educational level ($p = 0.03$) was the only risk factor independently associated with knowing transmission ways (**Table 4**).

Table 2. Attitude of respondents to rabies

Opinion's	Category's	No. of respondent's	Frequency (%)
Stray dogs are dangerous	Agree (+ve attitude)	304	73.1
	Neutral (no opinions)	69	16.6
	Disagree (–ve attitude)	43	10.3
Is rabies an issue in your Kebele for your community?	Agree (+ve attitude)	326	78.4
	Neutral (no opinions)	49	11.8
	Disagree (–ve attitude)	41	9.9
Rabies can be effectively prevented by euthanizing (killing) stray dogs.	Agree (+ve attitude)	214	51.4
	Neutral (no opinions)	114	27.4
	Disagree (–ve attitude)	88	21.2
Do you believe holy water can treat rabies disease?	Agree (–ve attitude)	37	8.9
	Disagree (+ve attitude)	379	91.1
Celebrating World Rabies Day every year on September 28 has its own role in reducing rabies disease in animals and people.	Agree (+ve attitude)	311	74.8
	Neutral (no opinions)	102	24.5
	Disagree (–ve attitude)	3	7
Rabies can be prevented by educating people about the disease.	Agree (+ve attitude)	416	100.0
	Disagree (–ve attitude)	0	0
Willing to register pets?	Agree (+ve attitude)	308	74.0
	Neutral (no opinions)	108	26.0

Table 3. Practices of respondents on rabies disease

Question	Category's	No. of respondent's	Frequency (%)
Do any of your family members touch your dog or cat?	Yes	302	72.6
	No	114	27.4
Do you wash your hands after touching the dog or cat?	Yes	133	32.0
	No	283	68.0
Have you ever been bitten by a dog?	Yes	73	21.3
	No	343	78.7
What measures do you take to control stray dogs?	Killing	220	52.9
	Aware of the owner	196	49.1
Would you inform the authorities if you bite by a dog?	Yes	355	85.3
	No	61	14.7
Did you vaccinate your dog?	Yes	153	36.8
	No	263	63.2
Can you show the dog's vaccination certificate?	Yes	153	36.8
	No	263	63.2
Where do you care for your dog?	Free to move	75	18.4
	Kept indoors	211	50.3
	Other specified	130	31.3
Does dog registration and licensing help control rabies?	Yes	364	87.5
	No	52	12.5

Table 4. Logistic regression analysis output of demographic characteristics with transmission ways

Variables	Category	Respondents who do not know transmission ways		Univariable		Multivariable	
		Yes (%)	No (%)	OR	*p* value	OR	*p* value
Sex	Male	38.07	61.93	1.62	0.73	-	-
	Female	35.62	64.38	Ref.			-
Age (yr)	18–30	63.27	36.73	1.15	0.744	-	-
	31–50	39.55	60.45	2.52	0.23	-	-
	51–65	33.82	66.18	0.69	0.54	-	-
	> 65	27.78	72.22	Ref.		-	-
Occupation	Unemployed	47.51	58.49	0.90	0.84	-	-
	Self-employed	31.03	68.97	1.14	0.61	-	-
	Civil servant	65.71	34.29	0.84	0.77	-	-
	Student	36.41	63.59	0.58	0.54	-	-
	Farmer	43.14	56.86	Ref.		-	-
Educational level	No formal educ.	75.68	24.32	2.89	0.03*	2.89	0.03*
	Primary educ.	58.42	41.58	1.51	0.02*	1.51	0.02*
	Secondary educ.	61.54	38.46	1.97	0.04*	1.97	0.04*
	Higher educ.	64.37	35.63	Ref.		Ref.	

OR, odds ratio.
*$p < 0.05$.

Table 5. Logistic regression analysis output of demographic characteristics with the risk of not vaccinating dogs

Variables	Category	Respondent did not know the risk of not vaccinating dogs		Univariable		Multivariable	
		Yes (%)	No (%)	OR	*p* value	OR	*p* value
Sex	Female	93.91	6.09	Ref.		-	-
	Male	84.02	15.98	2.93	0.01*	-	-
Age (yr)	18–30	87.76	12.24	Ref.		Ref.	
	31–50	100.00	0.00	-	-	-	-
	51–65	66.18	33.82	0.89	0.03*	0.86	0.04*
	> 65	100.00	0.00	-	-	-	-
Occupation	Civil servant	100.00	0.00	Ref.		-	-
	Self-employed	97.83	2.17	1.12	0.03*	-	-
	Student	91.43	8.57	-	-	-	-
	Unemployed	64.71	35.29	2.21	0.78	-	-
	Farmer	67.24	32.76	3.14	0.01*	-	-
Educational level	higher education	75.96	24.04	Ref.		Ref.	
	Secondary education	99.43	0.57	0.61	0.02*	0.72	0.01*
	Primary education	97.03	2.97	0.89	0.03*	0.88	0.03*
	No formal education	28.65	71.35	4.12	0.01*	4.41	0.01*

OR, odds ratio.
*$p < 0.05$.

The respondents' knowledge of the risk of not vaccinating dogs was compared with different demographic characteristics. Females (15.98%), those age groups between 51 and 65 years (33.82%), unemployed (35.29%), and respondents with no formal education (71.35%) did not know the risk of not vaccinating dogs. Among the demographic risk factors, sex ($p = 0.01$), age ($p = 0.03$), occupation ($p = 0.03$), and educational level ($p = 0.01$) were statistically significant in univariable logistic regression (**Table 5**). The risk factors with *p*-values ≤ 0.25 in univariable logistic regression were subjected to a multivariable logistic regression model, and the final model was developed using the backward elimination technique. The final multivariable logistic regression model was developed. Age and educational level were the risk factors associated with the risk of not vaccinating dogs (**Table 5**).

DISCUSSION

Rabies is a severe public health concern because of the rapid mortality rate, particularly in tropical nations such as Ethiopia. Few awareness-raising and public education initiatives are conducted globally because rabies is regarded as a NTD. According to preliminary research, Ethiopia has the highest dog population, with a high risk of dog bites and rabies. The present study showed that all 416 respondents (100%) interviewed had heard about rabies from different sources. The result of this study was consistent with a report that most respondents had heard of rabies [20].

Contrary to the present study, in Mersa town, most respondents (83.33%) had not heard of rabies [14]. Regarding the source of information, 62.0% of the respondents heard about rabies from nonmass media (from their family and neighbors), 1% from formal media (media and animal health workers), and 37% from both sources. This discrepancy is likely explained by the absence of rabies-related media coverage and community education in the research area.

In the current study, 31.7% of the respondents knew that a virus was the cause of rabies. This was higher than reported by Abraham et al. [21] and Gebeyaw et al. [14], who showed that 18% and 25.83% of respondents, respectively, knew that the virus was the causal agent of rabies. Regarding the causative agent of rabies, the majority of respondents were found to have

misperceptions, such as starvation and thirst. This result is consistent with a study in Munesa District, Arsi Zone, southeastern Ethiopia [22] that reported misperceptions of starvation and thirst being the causes of rabies. Several scholars from different areas of Ethiopia reported similar misperceptions [23-25]. On the other hand, this variation might be associated with a difference in community awareness between different study areas. The possible reason for this could be the lack of information gained by the media about the causes of rabies. This finding showed that all respondents knew that all warm-blooded animals, including humans, can be infected with rabies, with dogs being the main source of rabies.

The result of the present study was consistent with the report from Mozambique that the majority (96.5%) of participants were aware that dogs were the main source of rabies and that dog could be affected by the disease (98.2%) [26]. Overall, 51.9%, 0.7%, and 47.4% of participants knew the bites of rabid animals, saliva contact, and saliva contact and bites of rabid animals were the transmission modes. Most respondents attempted to identify the signs and symptoms of rabies in animals and humans.

In the current study, 13.7% of respondents did not know about postexposure treatment, including washing the bite site wound with soap and water. Contrary to the present study, approximately 44% of respondents did not know that postexposure treatment starts with nonspecific treatment, such as washing the bite site with water and disinfectant [27]. The percentage of respondents who were unaware was consistent with other reports, such as 18% in Cameroon reported by Barbosa and 30.7% in rural household heads of Gondar Zuria District, Ethiopia, reported by Digafe et al. [28,29]. On the other hand, the percentage of respondents who were unaware was higher than in Bangladesh (2%) [30].

In the current study, 88.7% knew the risk of getting rabies if the dog was not vaccinated. In contrast, 57.5% of the study participants did not know that it was dangerous to keep dogs not vaccinated against rabies [27]. This may be due to the difference in frequency and method of information dissemination from community to community. Among the study participants, only 36.8% had vaccinated their dogs. In contrast, a high percentage of study participants in other areas who vaccinated their dogs has been reported: 79% in Mekelle City, Ethiopia [31], and 71.1% in Adigrat Town, Tigray Regional State [32]. Approximately 85.3% of dog owners vaccinated their dogs in Chiro town, West Hararghe, Oromia region, Ethiopia [33]. The present result was greater than that of the study conducted in Jima [29]. The variation may be due to the availability of animal vaccines or conditions in the information sharing in the study area.

In the present study, 18.6% of respondents managed their dogs by letting them free. In contrast, 50.3% of respondents kept their dogs indoors and 31.3% unspecified. This difference may be due to information about the importance of dog control in reducing the risk of rabies [14]. The current study showed that rabies is a significant disease in humans and animals in the study area. The level of knowledge about the clinical signs and lethality of rabies in animals and humans is good. Nevertheless, several knowledge gaps were found regarding the cause and mode of rabies transmission. The participants had a positive attitude toward stray dog danger, as rabies is a problem for the community, and holy water cannot treat rabies disease. Regarding the idea of killing stray dogs for rabies prevention, the respondents agreed that this was an effective method.

The majority of interviewees agreed that educating society has a significant impact on preventing rabies. On the other hand, they lack the practice of washing their hands after

touching the dog(s) or cat(s). Some respondents allow their dogs to roam free, putting their family and other domestic animals at risk of rabies. The incidence of rabies increased due to factors, such as a lack of community awareness, vaccination coverage, and regulation for stray dog control in addition to coordination between the health, veterinary sectors, and community in the study area. Moreover, most respondents were aware of the first lines of action after an animal bite, including immediate visits to health facilities.

The study showed that low levels of education, most respondents obtaining information from informal sources (family and friends) and a lack of formal education programs in the communities were significant factors contributing to poor awareness among communities. Veterinarians and health professionals must develop strategies for periodic education to raise community awareness about rabies. Every individual bitten by a dog should immediately wash their dog-bite wounds with soap and water and go to the hospital. Every community pet owner should control their pets indoors and vaccinate them.

A preprint of this manuscript has previously been published [34] at medrxiv. Despite this, it is an original article and has not been considered elsewhere.

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