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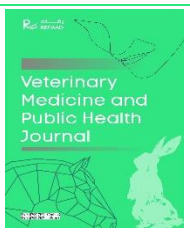

A Cross-sectional Study of Knowledge, Attitude, and Practice Regarding Rabies Among Residents of Kabul City, Afghanistan

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Abstract

Objectives: The main aim of the present study was to assess the knowledge, attitude, and practice of Kabul City residents towards Rabies.

Methods: A cross-sectional questionnaire survey was carried out from September to December 2022. Eight of the 22 districts of Kabul city were selected, and after oral consent was obtained, 400 questionnaires were filled out. The data were analyzed using MS Excel and SPSS software.

Results: The results of the present study showed that 85% of the sample population have heard the name Rabies while, only 46% of them had information about the disease. Three-fourths of the participants knew that Rabies is transmitted by a suspected dog bite. Furthermore, only half of the interviewees knew that Rabies is a vaccine-preventable disease. Likewise, pet animal vaccination practice against Rabies was poor among dog and cat owners.

Conclusion: It is concluded that community awareness and animal vaccination practice about the disease was poor especially, in the illiterate population of the city. A comprehensive awareness campaign across the country is needed to enhance community awareness regarding Rabies.

Keywords: *Afghanistan; Rabies; Community awareness; Vaccination; Dog bite.*

1 Introduction

Rabies is a vaccine-preventable zoonotic disease caused by a *Lyssavirus* genus of *the Rhabdoviridae* family (Velander et al., 2022). The disease is usually fatal once clinical symptoms are appeared (Alam et al., 2020). Transmission of disease from an animal to a human usually occurs following bite of a rabid animal (Ali et al., 2013). Non-bite exposures such as scratches and licks can also lead to rabies infection, although less frequently reported than bites (Dahourou et al., 2021). Up to 99% of all human cases of rabies around the world are transmitted by dogs, while this percentage reaches 96% in Southeast Asia (Gongal & Wright, 2011), making them the main cause of rabies-related deaths in humans (Pantha et al., 2020; WHO, 2023). Except for Antarctica, all continents have rabies and over 95% of human deaths from the disease occur in Asia and Africa (WHO, 2023). Rabies causes the deaths of about 60000 people every year globally, and Asia accounts for more than 58% (35000) of them. According to estimates, South Asian countries (Afghanistan, India, Pakistan, Nepal, Bangladesh, Bhutan, Maldives, and Sri Lanka) are responsible for 45% of the world's cases of human rabies (Acharya et al., 2021). To be specific, except for the Maldives which is free of Rabies due to their remote location in the Indian Ocean, all South Asian countries including Afghanistan are Rabies endemic. In 2015 the World Health Organization (WHO), the World Organization for Animal Health (WOAH), the Food and Agriculture Organization (FAO), and the Global Alliance for Rabies Control (GARC) issued a joint call for action to eradicate rabies by 2030 (Acharya et al., 2021).

Afghanistan has an estimated population of over 42 million in 2023 (WorldpopulationReview, 2023), more than 70% of whom are living in rural areas of the country (Worldometers, 2023). Based on United Nations Educational, Scientific and Cultural Organization (UNESCO) reports, about 43% of the Afghan population above the age of 15 are literate. In terms of gender, 55% of men and 30% of women are literate. Focusing on age group, 65% of Afghans between the ages of 15 and 24 can read and write (UNESCO, 2020). Regarding the disease burden in South Asia, Afghanistan is ranked in third class, while India, Pakistan, and Bangladesh are in first, and Bhutan, Sri Lanka, and Nepal are in second class (Chowdhury et al., 2015). However, there is no regular data available in relation to human and animal deaths caused by rabies in Afghanistan (Tenzin & Ward, 2012) but according to reports, a total of 36959 animal cases and 29 human fatalities were reported from 2017 to 2019 from all over the country (Acharya et al., 2021). In Kabul province (the capital of the country) there were three human deaths of Rabies and 1789 recorded dog bites in 2017 (Mohammadzai & Rowan, 2019). According to the reports of the Ministry of Public Health (MoPH) of Afghanistan in 2020, about 8503 Rabies suspected dog bites were verified in the country whereas, these numbers decreased in 2021 to 3550 cases. Recently, MoPH announced that from the April of 2022 till the April of 2023 (during the 1401 solar year), they recorded about 33089 Rabies suspected dog bites in the country, nearly half of whom were in male and the rest were in children and females. During this time 18 individuals were died of Rabies (Suhrabi, 2023).

Different control strategies have been developed for rabies prevention. Among these strategies, canine mass vaccination, dogs' movement restriction, and control of roaming dogs are well practiced in developed countries and resulted in effective control and elimination of rabies in humans as well as animals (Dahourou et al., 2021). Like other developing countries, these measures have not been applied effectively in Afghanistan and thus the rabies disease remained endemic in the country. In Kabul, dogs were strychnine-poisoned until 2016, but the nation has recently started to implement widespread dog vaccination and neutering programs (Acharya et al., 2021). As for the proper and effective elimination strategy for Rabies disease, the Knowledge, Attitude, and Practice (KAP) of residents are important to be determined. As seen in the cases of various disease conditions, the disease burden can be reduced as a result of changing attitudes and practices. In other words, a more positive outlook and effective behaviors that stop the spread of infection resulting from having better disease-related knowledge. (Ahmed et al., 2020; Nomanulhaq et al., 2013). To the best of our knowledge, such a study has not been conducted in Afghanistan. Thus, the present study was designed to evaluate the KAP factors of the Kabul City residents towards Rabies.

2 Methods

2.1 Study area

A cross-sectional descriptive study of KAP was conducted from September to December 2022 in Kabul city, the capital of Kabul province (**Fig.1**). Kabul is one of the 34 provinces of Afghanistan, located in the east of the country. According to the National Statistics and Information Authority (NSIA) of Afghanistan, the current population of Kabul City is estimated to be more than 4.6 million,

which constituted almost 13.7% of Afghanistan's total population in 2020 (Samadi et al., 2023). Forty five percent population of the city are Tajiks, 30% Pashtuns, 20% Hazaras and the rest are Uzbeks, Baloches, Turkmen, Hindus, and other ethnic groups. Eighty five percent of the city population lives in urban areas and 15% lives in rural areas (Wikipedia, 2023). According to WorldpopulationReview (2023), the density of the population per Km^2 of land of Afghanistan was about 65 in 2023. This area is about 1790 meters higher than the sea surface. According to the estimation of 2015, about 27000 stray dogs live in Kabul City which ratio to people is 7.7-8.0 per 1000 people. Besides these stray dogs, it is estimated that there are about 2 owned dogs per 1000 people in the city. In general, there are 10 dogs per 1000 people in Kabul City (Mohammadzai & Rowan, 2019).

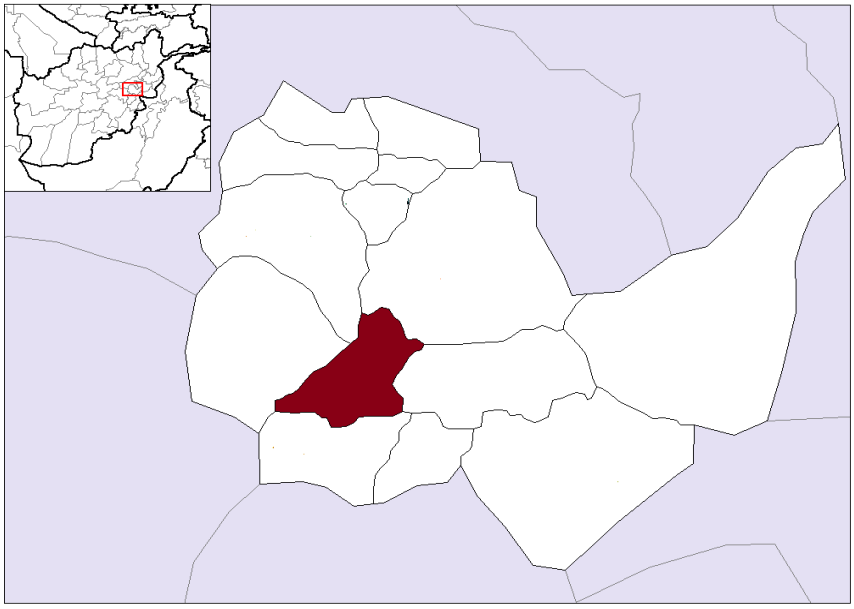

Fig. 1. Location of Kabul City in Kabul Province, Afghanistan

2.2 Sample size Sampling and technique

A sample size of 384 was determined with a 95% confidence interval, 5% margin of error, and 50% response distribution. In order to be more accurate, the sample size was augmented to 400. Out of 22 districts of Kabul city 8 of them (1st, 2nd, 3rd, 4th, 5th, 7th, 11th, and 17th) were selected for the present study which included 110 areas of these 8 districts. A convenience sampling method was applied for data collection and a trained enumerator reached out to the respondents at different sites in these districts. All of the individuals included in this survey were above the age of 18 years old. Literate participants filled the questionnaire by themselves and for illiterate participants a face-to-face interview was given after the verbal consent and the questionnaire was filled by the enumerator.

2.3 Questionnaire survey

The questionnaire with three different sections and 29 questions was prepared from previously conducted research about the KAP of Rabies disease (Ahmed et al., 2020) with a few changes adapted to the culture of the society. For a better understanding, the questionnaire was translated into the local language (Dari). In general, the questionnaire consisted of four sections. Section one was about demographic information with 8 open and closed-ended questions. Section two consisted of 8 questions about the Knowledge of the respondents regarding Rabies disease. Section three with 6 and section four with 7 questions were respectively about the attitude and practice of participants regarding Rabies disease.

In first section, we collected information regarding age, education, sex, marital status, job, monthly income, family size, and current inhabitance. In second section, questions regarding the knowledge, source of knowledge, rabies vaccine, route of transmission, the fate of rabies disease, and the role of stray dogs in disease transmission were asked. In third and fourth section, we collected information about the experience of participants regarding rabies, cases of dog bites and rabies disease in their family, stray dog offenses, rabies vaccination and awareness campaigns in their area, vaccination status and the reason for no vaccination, pre-and post-exposure prophylaxis, clinical signs of rabies in human and animals and their views concerning rabies vaccine acceptance.

2.4 Data analysis

The data were collected by a trained veterinarian enumerator to reduce missing values in the data. After collection, the data was entered into an MS Excel 2019 spread sheet and then imported to SPSS (version 25) for descriptive statistics (percentage and frequency). Each response of multiple-response questions was analyzed separately.

3 Results

3.1 Demographic characteristics of respondents

A total of 400 questionnaires were filled and all the respondents (100%) were men (**Table1**). The majority of our respondents (69.5%) were literate; they include high school graduates (25.2%),14th class graduates (6.5%), and bachelors (19.8%). Approximately one-third of the respondents were illiterate. One-fourth of the respondents were single and the rest (74.5%) were married. About 60% of the participants had a private business, 23% were school and university students, and 6.8% and 10.5% of them were civil servants and unemployed, respectively. The average family size of the respondents was 7 with a minimum and maximum number of 4 and 15 people, respectively. The vast majority of the respondents (79.8%) were between the ages of 18-49, 16% were between 50-64, and the rest were above the age of 65.

Table 1: Descriptive statistics of respondents' characterization.

Variables	Category	Frequency	Percentage
Gender	Male	400	100%
	Female	0	0%
Age	18-49	319	79.8%
	50-64	64	16%
	>65	17	4.2%
Education	Illiterate	122	30.5%
	Primary school	43	10.8%
	Secondary school	28	7%
	High school	101	25.2%
	14th graduate	26	6.5%
	Bachelor degree	79	19.8%
	Master degree	0	0%
	Ph.D.	1	0.2%
Marital status	Single	102	25.5%
	Married	298	74.5%
Job	Private business	239	59.8%
	School & university students	92	23%
	Civil servants	27	6.8%
	Unemployment	42	10.5%

3.2 Respondent's knowledge of Rabies

Of all 400 respondents, 85.2% said that they had heard the name of Rabies disease while 14.8% of them had not even heard the name of the disease. Of the group of participants who had heard the disease's name, 46.2% said they had some information about the disease. This study found that schools and universities (24.4%), books (21.3%), social meetings (14.6%), internet (13.4%), radio and TV (16.5%), and physicians, veterinarians, and institutions active in this sector (9.8%) were the prominent sources of knowledge for the people. Nearly 60% of the respondents were knowing that dog bite is a way of disease transmission to human whereas only 5.2% said that cat too play role in disease transmission. Close to ninety percent of the respondents were knowing that Rabies is a fatal disease whereas, around half of them (54%) were aware that it is a vaccine-preventable disease. About 2% of the participants stated that they or their family members have experienced a dog bite while, only one case of family member death was reported among the participants (**Table2**).

The vast majority of the illiterate respondents (91.8%) had no information about Rabies. From the total 92 respondents who were school and university students about 74% (n=68) of them had information about the disease while, 26% (n=24) had no information regarding Rabies. Only 37% (n=87) of the participants who were busy whit their private businesses had information about Rabies while, majority of them (n= 152, 63%) had no information about the disease. One-fourth of the illiterate respondents were knowing that Rabies is a vaccine-preventable disease whereas, the remaining 80% did not have any information about the role of vaccine in prevention of the disease. Eighty seven percent of dog-bite cases were occurred in the city's densely populated regions with stray dogs. Three-fourths of those participants who were keeping dogs or cats had

basic information regarding Rabies. Almost all of the respondents who had no information about Rabies disease (n=215, 100%) also stated that no awareness campaign regarding Rabies has been held in their area.

Table 2: Descriptive statistics of respondents' knowledge concerning Rabies Disease

Variables	Response	Frequency	Percentage
Have you heard about Rabies disease?	Yes	341	85.2%
	No	59	14.8%
Do you have information about Rabies?	Yes	185	46.2%
	No	215	53.8%
Does dog play any role in disease transmission?	Yes	238	59.5%
	NO	61	15.2%
	I don't know	101	25.2%
Does cat play any role in disease transmission?	Yes	21	5.2%
	NO	286	71.5%
	I don't know	93	23.2%
Does Rabies cause human death?	Yes	355	88.8%
	NO	20	5.0%
	I don't know	25	6.2%
Can rabies be prevented by vaccination?	Yes	216	54.0%
	No	90	22.5%
	I don't know	94	23.5%
Have you or your family members experienced a dog bite yet?	Yes	8	2.0%
	No	392	98.0%
Have your family members or relatives died of Rabies?	Yes	1	0.2%
	No	399	99.8%

3.3 Respondents' attitude toward Rabies

The results of the present study showed that 93.2% of the respondents were willing to vaccinate themselves if they are attacked by a dog or cat. In response to the question of where do you go for prophylaxis treatment after a dog bite, 93.5% responded that they go to doctor/clinic and nearly 6% said they go to the pilgrimage **(Fig.2)**. Regarding the prevention strategy, killing of stray dogs (38%), restriction of dog movements (36.2%), regular vaccination (7%), and castration and spay (18.8%) were the most selected options. One-fifth of respondents were aware that rabies vaccine is available in local hospitals, while the rest were unaware. Forty-three percent of our interviewees knew a dog showing clinical signs of Rabies is not curable. More than half of the respondents said that there are many stray dogs in their surroundings, and 43% reported that there are a medium number of stray dogs in their neighborhood. **(Table 3)**.

Table 3: Descriptive statistics of respondent's attitude concerning Rabies Disease

Variables	Response	Frequency	Percentage
Do you vaccinate yourself if you are attacked by a dog or cat?	Yes	373	93.2%
	No	27	6.8%
In your opinion, which one of the following methods is more effective for controlling Rabies disease?	The killing of stray dogs	152	38.0%
	Restriction of dog movements	145	36.2%
	Regular vaccination	28	7.0%
	Castration	75	18.8%
Are the local clinics equipped with the rabies vaccine?	Yes	78	19.5%
	No	164	41.0%
	I don't know	158	39.5%
What is the prognosis for dogs exhibiting rabies symptoms?	Successfully curable	17	4.2%
	Not curable	172	43%
	I don't know	211	52.8%
How many stray dogs are there in your neighborhood?	Very much	27	6.8%
	Much	196	49.0%
	Medium	172	43.0%
	Low	5	1.2%

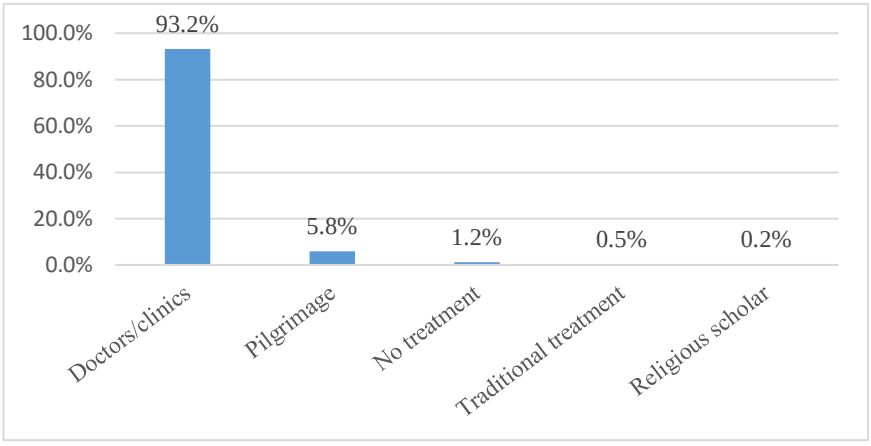

Fig. 2. Addresses where people go to treat Rabies.

3.4 Respondents practice toward Rabies

Among the 400 respondents, only 57 individuals said they keep a dog or cat. Except for one person who was keeping cat, all of them (98.2%) were keeping dog. Of those who were keeping dog and cat, around half of them were vaccinated their animals against Rabies. Almost half of the respondents replied they can't identify a rabid dog based on its clinical signs. Excessive salivation and aggressiveness of dog are among the clinical signs of rabies, on the basis of which 28.7% and 21.9% of the respondents respectively knew a rabid dog **(Fig. 3)**. Except for one person, all the respondents stated that no rabies awareness campaign was held in their area. Meanwhile, about 75% of the respondents said that a vaccination campaign for pet animals was held in their area.

Table 4: Descriptive statistics of respondents' practice of Rabies disease.

Variables	Response	Frequency	Percentage
Do you keep dog and cat in your home?	Yes	57	14.2%
	No	343	85.8%
If yes, which one do you keep?	Dog	56	98.2%
	Cat	1	1.8%
Do you vaccinate your dog and cat against Rabies disease?	Yes	31	54.5%
	No	26	45.6%
Can you identify a dog suffering from Rabies based the clinical symptoms of disease?	Yes	204	51.1%
	NO	194	48.9%
Has any awareness campaign regarding Rabies disease been held in your area?	Yes	1	0.5%
	No	399	99.5%
Has any vaccination campaign for this disease been held for dogs and cats in your area?	Yes	299	74.8%
	No	101	25.2%

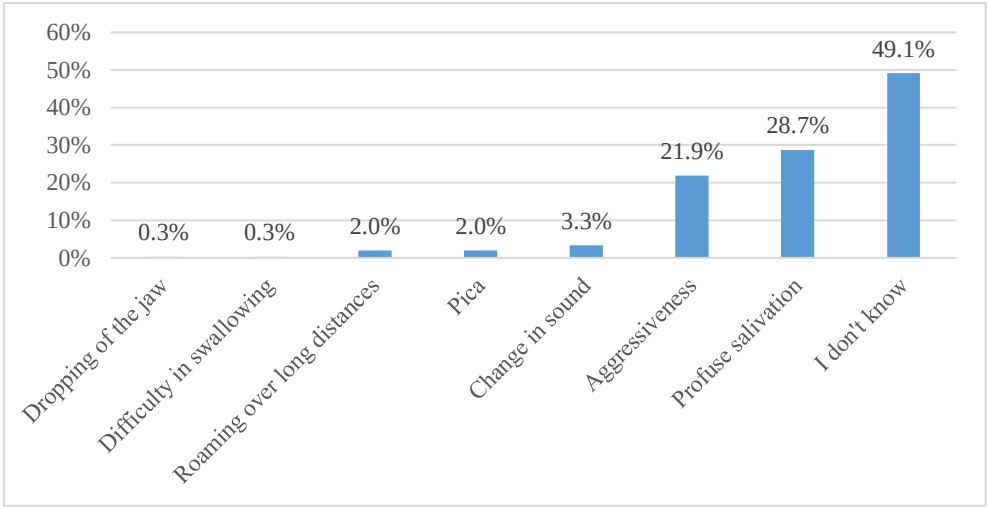

Fig. 3. Clinical signs based on which people recognize a rabid dog.

4 Discussion

Because of cultural restrictions, unavailability and unwillingness of women for participation in the survey, all of our participants were men. Eighty five percent of our participants had heard the name of Rabies. The results of Khan et al., 2019 who reported that 89% of their respondents have heard about the disease, are consistent with our findings. Contrary to Tiwari et al., 2019, Sambo et al., 2014 and Pal et al., 2021 reported higher percentage of people in their studies who heard about the Rabies (97%, 96% and 93%) ,respectively. About sixteen percent of our sample population, those who had information regarding disease stated that Radio and TV were the only source of information for them. This is a little bit higher than the results reported by Matibag et al., 2007. The findings of present study showed that for 30% of participants the main source of information was social media while 14% said they got information regarding Rabies from social meetings. The same results were reported by Ntampaka et al., 2019.

Sixty percent of our respondents knew that a suspected dog bite cause disease transmission which is not consistent with the findings of Sambo et al., 2014. About 93% of our respondents stated they vaccinate themselves if they are attacked by a suspected dog which is higher compared to the findings reported by Glasgow et al., 2019. In our study we found a positive correlation between Rabies awareness and education level which was also reported by Sambo et al., 2014 and Matibag et al., 2007. It means that a person with a higher degree of education knows more about the disease. About 90% of the interviewees were knowing that Rabies is a fatal disease. Similar results were reported by Laishram et al., 2016 While, respondents' knowledge rate regarding fatality of Rabies was lower in the studies reported by Ahmed et al., 2020 and Rahaman et al., 2020. Likewise, 6 of 10 respondents in our study knew that dog play an important role in disease transmission while, only 5% of them were knowing about the role of cat in disease transmission. The same study was conducted by Laishram et al., 2016 in Manipur of India; reported that 90% of their participants stated a bites from apparently infected dogs or cats could spread the disease, which is not consistent with our results. Tiwari et al., 2019 reported that all their respondents were aware that dog transmit Rabies while, 22% were knowing that cat also transmit the virus. The knowledge of the people about the role of the cat in disease transmission was 17% in the study of Prakash et al., 2013. Knowledge of people about the role of cat, bat and other animals is very low. Higher rate of knowledge about fatality of disease in Afghanistan might be due the long endemic status of disease, recurrent dog bite reports and mass vaccination of dogs by some institutions.

Little more than half of our respondents knew that Rabies can be prevented by vaccine. These results were consistent with the findings of Laishram et al., 2016 and Prakash et al., 2013 where 49% and 55% participants said Rabies is a vaccine-preventable disease. The results of Ahmed et al., 2020, Tiwari et al., 2019 and Rahaman et al., 2020 reported a higher rate of people's knowledge about the prevention of disease by vaccine. When attitude of sample population was investigated about the treatment of suspected dog bite, 90% of them stated they will visit doctor/clinic which is consistent with the results of Laishram et al., 2016 and Matibag et al., 2007 where 92% and 96% of their respondents respectively stated they will go to hospital for suspected dog bite treatment. It is important to note that in Afghanistan, some people believe that going to some pilgrimage of famous dead persons cures Rabies. The believe of curing by visiting pilgrimage is not only present about this disease, people go to pilgrimage in many other diseases as well.

Aggressiveness and profuse salivation were the most common sings based on which our respondents could recognize Rabid dog. Meanwhile, 2% of our participants experienced dog bit. Thes e are consistent with the results of Laishram et al., 2016 who stated that aggressiveness and hypersalivation were the most common signs of Rabid dog and only 1% participants have been bitten by dogs. Fourteen percent of our participants were keeping dog and cat in their households. While percentage of pet owners were higher (25% and 54%) in the study of Prakash et al., 2013 and Ahmed et al., 2020 respectively. More than half of the participants of the present study stated they vaccinate their pets against rabies. The same results (52%) were reported by Prakash et al., 2013 while, the Ahmed et al., 2020 reported a lower percentage of participants (26%) who were willing to vaccinate their pets against Rabies. More than one-fourth of interviewees believed that the killing of stray dogs is the best method of controlling the dog bite related Rabies while almost one-fifth of them stated castration/spay is the best method. Compared to our findings, Matibag et al., 2007 reported a higher percentage of participants (two-thirds) who believed animal birth control is the most effective way of Rabies control while, the percentage (one-fifth) of participants who believed killing of stray dog is the most efficient control strategy was lower.

5 Conclusion

It can be concluded that more than half of the participants in this study had no information about Rabies, majority of whom were illiterates. In addition, only one-fourth of the illiterate respondents were aware that Rabies is a vaccine preventable disease. Furthermore, all of the respondents who had no information about Rabies also stated that no awareness campaign has held in their area. Though, vaccine acceptance in case of suspected dog bite in human was higher but prophylactic vaccination of pet animals was not acceptable. It is needed to improve peoples' knowledge about Rabies through radio, television and social meetings. It is recommended to evaluate the knowledge, attitude and practice of rural area residents regarding disease. In order to reach the goal of zero Rabies cases by 2030, the government should allocate a specific amount of budget for awareness campaign, availability of post-exposure prophylaxis for human, Rabies vaccination of animals and stray dog population control.

Conflict of interest

The authors declare no conflicts of interest regarding the publication of this paper.

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