



Original Article

Awareness towards Rabies in the residents of Kathmandu Metropolitan City, Nepal

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Summary

Rabies is a neglected tropical zoonotic disease, causing the majority of global human rabies deaths in developing countries of Asia and Africa. The objective of the study was to identify the social and demographic characteristics of the residents and pet (dogs and cats) owners of Kathmandu Metropolitan City. A cross-sectional study was carried during March - April 2017 to assess the community awareness and knowledge towards rabies by applying a semi-structured questionnaire. Awareness level was high on rabies about its cause (87.5%) and symptoms (91.94%). All respondents have knowledge that it is transmitted by the bite of rabid animals (100%), is a fatal disease (85.63%), is a vaccine preventable (96.25%), and is curable (60%) if treated before the onset of clinical symptoms. All the respondents would visit a hospital after being bitten by a stray dog/cat, while only (56.43%) of respondents would visit a hospital if being bitten by a pet dog/cat (56.43%). Furthermore, 87.36% of them reported that they would visit the hospital on the day of the bite. The respondents had positive attitudes and practices towards rabies as all the pet owners had vaccinated their pets against rabies, 98.28% mentioned that they would notify the concerned authorities in case of rabies outbreaks; approximately 47.41% will kill a rabid stray dog and either bury it or inform the municipality for its proper disposal. The results indicate the knowledge gaps about rabies in the community that could be improved by a rabies awareness campaigns, public health education, and vaccination campaigns.

Keywords: Awareness, Rabies, Knowledge, Nepal

Introduction

Rabies is a neglected tropical zoonotic disease caused by an RNA virus of the family Rhabdoviridae. The virus still has a worldwide distribution and causes a significant health and economic burden to mainly developing countries in Africa and Asia (Hampson et al., 2015). Dogs are the major source for the spread of rabies, which is true in 95% of the cases in regions like Asia and Africa (Wunner and Briggs, 2010). More than 99% of all human cases occur in Asia and Africa, where domestic dog is the most important source of transmission. Rabies is still prevalent as a global

threat, and half of the world's population live in an endemic area. Rabies is reported to kill around 500 animals and up to 32 human beings in Nepal in recent years. Thus, as a prophylactic measure, around 30,000 livestock and 300,000 humans get vaccinated each year in Nepal (Pantha et al., 2015). At least 110 countries out of 178 OIE member countries are considered endemically infected with rabies and only 161 member countries have considered rabies as a notifiable disease in dogs. On average, 200 domestic animals (mainly cattle) are reported to die of rabies in Nepal annually

through dog and fox bite rabies infection (Karki and Thakuri, 2010). It was found that 36 outbreaks of rabies were reported in Nepal in 2015, which killed 73 cattle, 36 buffaloes, 20 goats, and 20 dogs, whereas, in 2016, 112 outbreaks caused the death of 88 cattle, 42 buffaloes, 38 goats, three sheep, and 67 dogs (OIE, 2017). Similarly, 28, 11, and 10 human rabies cases were confirmed in the years 2011, 2012, and 2015, respectively, in Nepal by Sukraraj Tropical and Infectious Disease Hospital (STIDH), Kathmandu, Nepal (Pant et al., 2013).

Materials and methods

A questionnaire consisting of open and closed questions was designed to collect data on the knowledge, attitude, and practices in the people of Kathmandu Metropolitan City of Nepal for this study. The questionnaire covered topics related to the respondents and their socio-demographic information, questions related to the knowledge of rabies, questions related to attitudes and practices of rabies and its control activities, and questions on pet care practices (asked only to pet owners) were used for the analysis.

Study Area

The survey was carried out in 35 wards of Kathmandu Metropolitan City (Figure 1).



Fig. 1. Study area Kathmandu Metropolitan City

Study Design

A cross-sectional study design was used for this study. The unit of interest in this study was the wards (a cluster of households formed for unity, physical development of the community, facilitation for smooth implementation of local development by the local government). Three animal health workers were recruited to collect the data. Prior to the data collection, adequate orientation was given to the data collectors on rabies and data collection procedures.

Sample Size and Sampling Method

For the calculation of sample size, the stratified random sampling method was used on ProMESA software by assuming the expected prevalence of rabies to be 50%, acceptable relative error of 0.1, level of confidence to be 95% in the study area. The sample sizes were calculated to be 348 for Kathmandu Metropolitan City, Nepal. For the selection of households, random numbers were generated on Microsoft Office Excel 2016 program (Microsoft Corporation, Redmond, Washington, USA), based on the unique house-number provided to each house by the municipality.

Table 1- Characteristics of household respondents (n =348)

Variable	Number	%
<i>Gender</i>	Female	128 (37.06)
	Male	220 (62.94)
<i>Age (years)</i>	Up to 15	1 (0.22)
	16-30	210 (60.34)
	31-44	120 (34.48)
	45-60	17 (4.88)
<i>Dog ownership</i>	No	186 (53.44)
	Yes	162 (46.55)
<i>Education</i>	Illiterate/Literate	20 (5.74)
	Primary level to High School	150 (43.10)
	Bachelors and above	178 (51.14)
<i>Occupation</i>	Student	120 (34.48)
	Farmer/Laborer	25 (7.18)
	Job/Business	175 (50.28)
	Housewife	28 (8.04)
<i>Cat ownership</i>	No	331 (95.11)
	Yes	17 (4.8)

The household survey was conducted, and one person from each selected household or family of at least 15 years of age was allowed or interviewed to fill the questionnaire. The selected person was informed about the purpose of the study and that his/her participation was voluntary and the data collected would be confidential.

Statistical Analysis

Data collected were coded and entered into Microsoft Excel 2016 spreadsheet, double-checked with the questionnaire information to avoid input errors, and then cleaned for analysis. The analysis was carried out by using the software Epi Info™ (version 7.2.0.1). Descriptive tables were generated and descriptive statistics computed from the questionnaires for each interest variable (Table 1).

Results

Knowledge of participants about rabies

The results indicated that a total of 320 (91.95%) respondents had previously heard about rabies. A significant difference ($p = 0.001$) had been observed between pet-owning and not owning respondents on their knowledge about rabies (Table 2). Also, significant differences were observed between them in having the knowledge about the cause ($p = 0.03$) and symptoms ($p = 0.01$) of rabies (Table 2). A majority of pet owning respondents (90.48%) who knew that rabies is a fatal disease ($p = 0.02$) showed a non-significant difference from the non-pets owning respondents in believing that the dogs and cats are the major sources of rabies for human cases ($p = 0.24$; Table 2).

Table 2- Descriptive and bivariate Chi-squared analyses of responses to questions related to the knowledge of rabies, comparing pet-owners with non-pet owners, and male with female respondents.

Variables	Pet ownership status			P-value (Odds Ratio)
	N (%) Total	N (%) Have pets	N (%) Do not have pets	
Have heard about rabies				
Yes	320 (91.95)	192 (96)	128 (86.48)	0.001
No	28 (8.04)	8 (4)	20 (13.51)	
Know the cause of rabies				
Yes	280 (87.5)	180 (90.91)	100 (81.97)	0.03
No	40 (12.5)	18 (9.09)	22 (18.03)	
Know the symptoms of rabies				
Yes	294 (91.94)	163 (93.67)	131 (89.72)	0.01
No	26 (8.12)	11 (6.32)	15 (10.27)	
Know that dogs and cats are major sources of rabies				
Yes	177 (55.45)	95 (55.23)	82 (55.41)	
No	143 (44.55)	77 (44.76)	66 (44.59)	
Know that rabies is transmitted to human by the bite of rabid animal				
Yes	348 (100)	192 (100)	128 (100)	
No	0 (0)	0 (0)	0 (0)	
Know that rabies is a fatal disease				
Yes	274 (85.63)	180 (90)	94 (78.3)	0.02
No	46 (14.37)	20 (10)	26 (21.7)	
Know that rabies is a vaccine preventable				
Yes	308 (96.25)	200 (100)	108 (90.00)	0.46*
No	12 (3.75)	0 (0)	12 (10)	

a The response to the first question 'Have you heard about rabies? - (yes/no)' was based on the responses from 348 participants, while responses to the remaining questions were based on those who answered 'yes' to the first question (i.e. 320 respondents), * Fisher's exact test.

Community Knowledge on Rabies

The Pet owners have a better knowledge regarding rabies than non-pet owners, which is highly significant.

Attitude and practices of the respondents

A majority (98.28%) of the respondents mentioned that they would inform either animal public health officials about a rabies outbreak in the future. A

non-significant difference has been observed between pet-owning and not owning respondents in this regard ($p = 0.16$; Table 3). Also, 47.41% of the respondents had mentioned that they would kill rabid stray dogs and either bury or inform the municipality for its proper disposal, which can be accepted as a good attitude and practices towards prevention of rabies (Table 3).

Table 3- Descriptive and bivariate Chi-square analyses of responses to questions related to attitude and practices of rabies, comparing responses between pet owners and non-pet owners, and male with female respondents.

Variables	Pet ownership status			P-value (Odds Ratio)
	N (%) Total	N (%) Have pets	N (%) Do not have pets	
Will inform PHO/AHO in case of suspected rabies outbreak in the community				
Yes	342 (98.28)	148 (97.29)	144 (97.29)	0.16*
No	6 (1.72)	2 (1)	4 (2.71)	
Will kill a rabid stray dog				
Yes	165 (47.41)	100 (49.02)	65 (43.92)	0.32
No	183 (52.59)	100 (50.00)	83 (56.08)	
Feed stray dogs/cats				
Yes	186 (53.45)	108 (54.00)	78 (52.70)	0.05
No	162 (46.55)	92 (46.00)	70 (47.30)	
Pets can come in contact with the stray dogs/cats				
Yes	60 (30)	60 (30.13)	0 (0)	
No	140 (70)	140 (69.87)	0 (0)	
Is stray dog annoyance to your community?				
Yes	231 (66.38)	145 (72.5)	86 (58.12)	0.15
No	117 (33.62)	55 (27.5)	62 (41.88)	
Believe that it is necessary to control the number of stray dogs in their community				
Yes	291 (83.66)	192 (96.00)	73 (49.32)	0.89
No	57 (16.34)	8 (4.00)	75 (50.68)	
Which method do you think is appropriate to control stray dogs' number?				
Sterilization	179 (51.44)	100 (50.00)	79 (53.38)	0.02
Sterilization and impounding	126 (36.21)	78 (39.00)	48 (32.43)	
Impounding	15 (4.31)	7 (3.50)	8 (5.41)	
Killing	20 (5.75)	12 (6.00)	8 (5.41)	
Others (Translocation, dog shelter)	8 (2.29)	3 (1.50)	5(3.38)	

* Fisher's exact test

Health seeking behavior of the respondents

All the 348 respondents mentioned that they would seek medical treatment in case they are bitten by a stray dog or cat, which can be considered as a sign of good practice. On the other hand, 260 (74.71%) respondents would visit a hospital in case they are scratched by a stray dog or cat, and 196 (56.43%) respondents would do so in case they are bitten by an owned dog or cat (Table 3). In case of being bitten by a dog, more than 87.36% of the

respondents mentioned that they would visit a hospital on the same day (i.e., on the day of bite), 0.86% on the next day and 3.7% within 3-10 days, and 8.28% of the respondents would visit after 10 days of being bitten (Table 3). All the 30 respondents (themselves or someone in their family) who were bitten by a dog visited a health center, while only 10% of them washed the wound with soap and water as a first-aid treatment before visiting the hospital.

Table 3 (Continued)- Descriptive and bivariate Chi-square analyses of responses to questions related to attitude and practices of rabies, comparing responses between pet owners and non-pet owners, and male with female respondents

Variables	Pet ownership status			P-value (Odds Ratio)
	N (%) Total	N (%) Have pets	N (%) Do not have pets	
Will visit hospital if being bitten by a stray dog/cat				
Yes	348 (100)	200 (100)	148 (100)	0.16*
No	0 (0)	0 (0)	0 (0)	
Will visit hospital if being scratched by a stray dog/cat				
Yes	260 (74.71)	150 (75.00)	110 (74.32)	0.85
No	88 (25.29)	50 (25.00)	38 (25.68)	
Will visit hospital if being bitten by an owned dog/cat				
Yes	196 (56.43)	109 (54.50)	87 (58.78)	0.53
No	152 (43.57)	91 (45.50)	61 (41.22)	
In case of dog bite, will visit hospital				
On same day	304 (87.36)	177 (88.50)	127 (85.81)	0.14
On next day	3 (0.86)	0 (0)	3 (2.03)	
Within 3-10 days	17 (3.70)	4 (2.00)	8 (5.41)	
After 10 days	24 (6.89)	19 (9.50)	10 (6.75)	
In case of dog bite in the past				
Washed the wound with soap and water	3 (10)	3 (17.65)	0 (0)	
Immediately visited a health center	27 (90)	14 (82.35)	13 (100)	

* Fisher's exact test

Discussion

Results of this study show that rabies is an important public health concern in the study areas of Kathmandu valley, and the community knowledge and awareness on rabies were high among the respondents. The findings illustrate that 91.25% of the respondents in the study areas have heard about rabies. Pet owners were more likely to have high knowledge of rabies than non-pet owners. This high degree of awareness may be due to the endemic nature of the disease and frequent reports of dog bite cases, as well as rabies outreach programs and messages delivered via different means of communication as well as their linkage with the animal health officials. The findings were similar as reported by others (Muriuki, 2016; Matibag et al., 2009). The survey study shows that about 66% of the respondents considered stray dogs as a community problem due to the nuisance behavior of the dogs like barking and fouling,

attacking people and animals. Similar findings were mentioned by a previous study (Widyastuti et al., 2015).

It was reported that religious adoration of the dogs in Nepalese culture is among one of the causes of the problematic number of dogs in Kathmandu Valley (Bögel and Joshi, 1990). This ideology of religious belief might be the major cause that only about 47.41% of the respondents answered that they would kill a rabid dog.

Knowledge gaps were seen among the respondents: 8.04% of the respondents had not heard of rabies, indicating that rabies awareness programs are further necessary and public education, information, and communication materials should be prepared to aware the community. All the respondents were well aware of the zoonotic nature of rabies and knew that it is transmitted to humans by the bite of a rabid animal. They also mentioned that they would visit a hospital in case of being bitten by a stray dog or

cat, which can be correlated with their knowledge, as well as the provision of free Post-exposure and Prophylaxis (PEP) vaccination for up to three doses against rabies in all the governmental hospitals. However, 14.37% of the respondents did not know that rabies is a fatal disease and can lead to death. Lacking knowledge that rabies is a fatal disease may affect the health-seeking behavior of the community leading to rabies in some cases. This result was similar to the findings were observed by Agarwal and Reddaiah (2003) in India. About 60% of the respondents believe that rabies is curable if treated on time, i.e., before the onset of symptoms. Owing to this belief, many may visit a hospital only after a period of delay making themselves vulnerable to rabies. A good understanding of the health-seeking practices of the community is very important for rabies prevention in humans (Matibag et al., 2007). The similar research also reported that understanding the community knowledge, attitudes, and perception towards rabies is inevitable because of their influence on post-exposure treatment-seeking behavior (Matibag et al., 2008), and also, community support is essential for rabies prevention and control programs (Kayali et al., 2003). This study has shown a high degree of treatment-seeking behaviors of the respondents as all the respondents mentioned that they would visit a hospital in case of the stray dog bite. This finding is evidenced by the 30 dog-bitten cases of this study, that all of them visited a hospital. This study also revealed that the attitudes and practices of the respondents were positive. A majority of the respondents mentioned that they would inform the concerned authorities about a suspected rabies outbreak in the community. A majority of respondents considered stray dogs as a problem for the community, and their population should be controlled. Besides the cooperation from the community, their active involvement in the rabies awareness campaign, control programs, and public health are crucial to maintain an acceptable level of vaccination, which is necessary to break the chain of infection and to prevent the maintenance of rabies in the dog

(Totton et al., 2010). About 3.7% of the respondents reported that they would visit a hospital within 3-10 days of dog bite, while 8.28% would visit after 10 days of the bite.

Conclusions

The majority of the respondents from the study area were found to have a better knowledge of rabies; however, a relatively high proportion was not aware of the full Post-exposure prophylaxis (PEP). People having pets had more knowledge about rabies than the ones without pets. Respondents with pets showed more positive attitudes and practices towards rabies than non-pet owners.

All the respondents would seek medical treatment in case of a dog bite, although a majority of them were not aware of any first aid treatment at the home level.

Lacking knowledge regarding the washing of bite wounds immediately after dog bite might increase by 5-fold the risk of rabies infection. Thus, 'hand washing' as the first critical step following a dog bite should be emphasized with top priority during future rabies education campaigns in Nepal.

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Conflict of interest statement

All authors declare no conflict of interest.

Ethical Approval

Not applicable

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