

Animal bite wound categories, their determinants and health seeking behaviors among patients presenting to the anti-rabies clinic at a tertiary care hospital of Kathmandu: a mixed methods study

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ABSTRACT

Introduction: Rabies, an invariably fatal viral disease, is transmitted to humans through animal bites, most commonly dogs. There is little information about categories of wounds due to animal bites, their determinants and health seeking behaviors in Nepal. This study aims to find out different categories of the animal bite wounds, their determinants and health seeking behaviors among the patients presenting to the anti-rabies clinic at Sukraraj Tropical and Infectious Disease Hospital, Kathmandu.

Method: This study is based on concurrent, triangulation (quantitative dominant) mixed method design. Those animal bite cases who attended Sukraraj Tropical and Infectious Disease Hospital were the participants of the study. Data was collected purposively for 1 week and total number of respondents were 50. Then convergent, divergent, expansive findings were triangulated from the quantitative and qualitative data analysis.

Result: Most common type of animal was dog (74%) and most common category of the wound was category 2 (70%) followed by category 3 (30%). Most common site of exposure was leg (58%). Most common place of first visit after animal bite was health facility (94%). Around 46% of patients were referred from other places. Convergent findings revealed the most common type of animal that bit was dog. Divergent findings revealed the existence of cultural practices and consultations with local practitioner as the place of first visit after animal bite. Expansive findings revealed suggestions of preventing animal bites and decreasing referral of patients with animal bite.

Conclusion: Most common type of bite was dog-bite. Most common site of exposure was lower extremity of the body. Category 2 bite was the most common. They gave important suggestions to prevent future animal bites and to decrease referral of the animal bite injury patients from the periphery to this hospital.

Keywords: Animal, bite, dogs, determinants, health seeking behaviors, Nepal, rabies, wound

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INTRODUCTION

According to WHO, each year, 23,000 – 25,000 people die in the Southeast Asia Region due to rabies. These account for approximately 45% human deaths due to rabies worldwide.¹ There is little information about the categories of animal bite injuries, their determinants and health seeking behaviors among animal bite injury victims because of the lack of systematic reporting in Nepal.²

Although rabies is potentially preventable disease due to availability of effective preventive and control measures, lack of epidemiological data poses threat to its effective implementation.²

Rabies, an invariably fatal viral disease, is transmitted to humans through animal bites, most commonly dogs. The success of any rabies elimination program depends on accurate assessment of the burden of disease, morbidity and mortality and an understanding of the epidemiological trends. These require a strong epidemiological surveillance mechanism.³

This study was done about animal bite cases, which is very common in Kathmandu valley. Those animal bite cases who attended Sukraraj tropical and infectious disease hospital were the participants of the study. Determinants of animal bite injuries and health seeking behavior were assessed using questionnaire (quantitative data) and interviews (qualitative approach) were also used to explore the problem. This study aimed to find out different categories of animal bite injuries, their determinants and health seeking behaviors among animal bite patients presenting to the anti-rabies clinic at Sukraraj Tropical and Infectious Disease Hospital, Kathmandu. The convergent, divergent and expansive findings of mixed study will be useful for the community and policy makers.

METHOD

This study is based on concurrent triangulation, quantitative dominant, mixed method study design. Quantitative survey was done, and qualitative interviews were taken from the purposive sample of participants. Those animal bite cases who attended anti rabies clinic of Sukraraj Tropical and Infectious Disease Hospital were the participants of the study. This is a pilot study, so ethical approval was not obtained but an information sheet and informed consent was taken. Duration of data collection period was 1 week. Quantitative data was collected by

structured questionnaire (closed ended questionnaire) and outpatient department ticket (prescribed) of animal bite victims. Quantitative survey was planned to determine the determinants and health-seeking behavior associated with animal bites: - category of exposure; time gap to visit health facility; compliance of anti-rabies vaccination; type of treatment undertaken after animal bite. Qualitative data was collected by semi structured / unstructured interview (open ended questionnaire) with the animal bite patients attending the hospital. Qualitative interviews were used in the same patient to further explain deeply about determinants of animal bite injuries, their cultural practices and health seeking behavior. Five in-depth interviews were taken for the study and they were recorded in mobile phone.

Content validity of tools were done by the doctor attending the anti-rabies clinic and face validity was done by asking the questions to participants to know if there was any problem in understanding the question. Background, mediating and outcome variables were formed, and a conceptual framework was developed. Total sample size was 50 as it was enough to use chi-square test or Fisher's exact test to find associations.

Data entry of survey questionnaire was done initially by making a codebook and then entering data in excel sheet. Quantitative analysis was done by descriptive analysis by calculating frequency and percentage of different variables in the study. Association was seen by chi-square test. Qualitative analysis was done using the Braun and Clarke's six steps of thematic analysis by coding, theme development, thematic mapping after transcribing interviews.

RESULT

Part 1: Quantitative analysis

Out of 50 respondents, 56% were males and 44% were females. Almost similar percentage of respondents were from different parts of the country, however from metropolitan/sub metropolitan city, it was more common (36%). Unskilled manual was more common, 30% followed by agricultural work of 24%. 30% were educated less than primary followed by 26% from secondary (table 1).

Most common type of animal was dog (74%). Most common site of exposure was leg (58%). Most common category of animal bite wound was category 2 (70%). Category 1 was not found. Fate of

animal after bite was commonly alive (48%). 90 %respondents did not blame anybody for the incident (Table 2).

Most common place of first visit after animal bite was health facility (94%). All the respondents attended health facility before 48 hours of animal bite. So, no delay was found. All respondents washed their wounds after animal bite. All respondents took tetanus toxoid injection after animal bite. All respondents took anti-rabies vaccine after animal bite. Majority of respondents did not receive rabies immunoglobulin (80%). Majority of respondents received antibiotics after animal bite (60%). seeking of cultural practice for management of animal bite in community was not found commonly (92%) Percentage of animal that died on their own after bite was 34% (Table 3).

Most commonly, respondents were on treatment (60%), rest had completed the full dose of ARV. Majority of respondents did not give prior history of animal bite (80%). Out of those who had prior history of animal bite, all had taken full dose of anti-rabies vaccination. Duration of full dose of last ARV was more than 3 months in all respondents who had taken prior full dose of ARV. 46% patients were referred from other places which is a significant number (Table 4).

Here fisher exact p-value was 0.015 (<0.05) for categories of animal bite. It means categories of animal bite and referral status are significantly associated with each other. Fisher exact p-value was 0.011 (<0.05) for place of residence, which means place of residence and referral status are significantly associated with each other. (table 5).

Part 2: Qualitative analysis

Total four themes were identified; those themes were about animal bite exposure, health seeking behaviors, prevention of animal bite, and referral of animal bite patients. These themes addressed different codes.

Under the theme of animal bite exposure, study participants discussed regarding important basic concepts (codes) like type of animal that bit the person, site of animal bite wound, different kinds of human behavior responsible for animal bite and if they blame anybody regarding the animal bite incident.

Under the theme of health seeking behavior, study participants discussed about important basic

concepts (codes) like different types of treatment received after animal bite, immediate measures taken by animal bite victims, place of first visit after animal bite, and time gap to seek treatment after animal bite.

Under the theme of prevention of animal bite, study participants discussed about important basic concepts (codes) like animal population control, mass vaccination of dogs, issue of unmanaged dog population and raised issue regarding attention of authority.

Under the theme of referral of animal bite patients, study participants discussed about important basic concepts (codes) like unavailability of animal bite management, different kinds of problems during referral of animal bite patients, complication of wound due to delay and, cost of vaccine especially rabies immunoglobulin.

Part 3: Triangulation of Qualitative and Quantitative Findings (Mixed-Method Findings) Convergent Findings:

Quantitative data analysis showed that most common type of animal was dog (74%).

Qualitative data analysis also showed similar findings. Qualitative data showed that there were five codes of "type of animal" from five interviews files showing dog bites:

"I: will you please describe about the animal bite?"
"Dog bit me today when I was giving biscuits to it".
36 years, female, social worker

"Yesterday dog bit me at my place".
24 years, male, student

Divergent Findings:

Quantitative data shows that few patients seeking of cultural practice (8%) while qualitative data does not show this type of finding.

"I washed my wound with soap water, I didn't do anything more."
24 years, male, student

Quantitative data shows few patients did not go to health facility after animal bite (6%) while in qualitative data, all had consulted at health facility after animal bite.

"Came to emergency department of this hospital and taken treatment".
36 years, female, social worker

"I went to Kirtipur Hospital."

51 years, male, agriculture worker

Expansive Findings:

There were many suggestions regarding preventing animal bite cases and decreasing referral of patients. They recommended for vaccination of all dogs, animal population control by controlling breeding, attention of the local authority regarding unmanaged animals. They also raised important issue regarding unavailability of animal bite management at every place especially rabies immunoglobulin, which leads to referral of many patients, cost of vaccine outside in local pharmacies, strong information system just like in covid, problems due to referral of animal bite patients.

"Veterinarians should be mobilized for vaccinating all dogs".

36 years, female, social worker

"All stray dogs should be vaccinated."

24 years, male, student

"In our municipality dogs are operated for family planning by veterinary person".

43 years, female, housewife

"Animal population control is one measure which government can take, but this is animal right also.

36 years, female, social worker

"Rural municipality should take action and help us."

24 years, male, student

"Policy makers, implementation level should be active. Along with controlling of stray dogs. Just like during Covid, information system should be good."

28 years, female, student

"Anti-rabies vaccine is available at most places in our country; however immunoglobulin is not available. If it is available everywhere, there will be less referral."

36 years, female, social worker

"If this injection would have been available there, I would have saved money.

43 years, female, housewife

Table 1. Socio demographic characteristics of animal bite victims attending at anti rabies clinic of Sukraraj Tropical and Infectious Disease Hospital, Kathmandu, N = 50

Variables	f (%)	Variables	f (%)
Age (Mean ± SD)	37.56 ± 11.99	Occupation	
Gender		Agriculture	12(24%)
Male	28(56%)	Unskilled manual	15(30%)
Female	22(44%)	Skilled manual	9(18%)
Residence		Sales and services	8(16%)
Metropolitan/sub metropolitan	18(36%)	Clerical	3(6%)
Municipality	16(32%)	Professional/ technical/ manager	3(6%)
Rural municipality	16(32%)	Education	
		None/less than primary	15(30%)
		Primary	10(20%)
		Secondary	13(26%)
		More than secondary	12(24%)

Table 2. Exposure of animal bite victims attending at anti-rabies clinic of Sukraraj tropical and infectious disease hospital, Kathmandu, N = 50

Variables	f (%)	Variables	f (%)
Type of animal		Categories of bite	
Dog	37(74%)	Type-1	0(0%)
Cat	4(8%)	Type-2	35(70%)
Monkey	9(18%)	Type-3	15(30%)
Others	0(0%)	Fate of animal after bite	
Site of exposure		Alive	24(48%)
Leg	29(58%)	Killed	9(18%)
Arm	15(30%)	Died	17(34%)
Chest	2(4%)	Not able to observe	0(0%)
Face	4(8%)	Blame anybody for the bite	
Others	0(0%)	Yes	5(10%)
		No	45(90%)

Table 3. Health seeking behavior of animal bite victims attending at anti rabies clinic of Sukraraj tropical and infectious disease hospital, Kathmandu, N=50

Variables	f (%)	Variables	f (%)
Place of first visit after animal bite		Tetanus Toxoid	
Health facility	47(94%)	Yes	50(100%)
Local practitioner	3(6%)	No	0(0%)
Traditional healers	0(0%)	Anti-rabies Vaccine	
Others	0(0%)	Yes	50(100%)
Time gap between animal bite and visit to health facility		No	0(0%)
Less than 48 hours	50(100%)	Rabies immunoglobulin	
More than 48 hours	0(0%)	Yes	10(20%)
Types of treatment received after animal bite		No	40(80%)
Wound wash		Antibiotics	
Yes	50(100%)	Yes	30(60%)
No	0(0%)	No	20(40%)
		Seeking any cultural practices for the management of animal bite in the community	
		Yes	4(8%)
		No	46(92%)

Table 4. Anti-rabies vaccination compliance of animal bite victims attending at anti-rabies clinic of Sukraraj tropical and infectious disease hospital, Kathmandu, N=50

Variables	f (%)	Variables	f (%)
Completion of full dose of Anti rabies Vaccination		If yes, did you take full dose of anti-rabies vaccination previously	
Yes	20(40%)	Yes	10(100%)
On treatment	30(60%)	No	0(0%)
Patient bitten by dog/other animal before this bite		Duration of full dose of last anti rabies vaccination	
Yes	10(20%)	< 3 months	0(0%)
No	40(80%)	> 3months	10(100%)
		Referred from other health facility	
		Yes	27(54%)
		No	23(46%)

Table 5: Categories of animal bite wound and place of residence with referral status from other health facility of animal bite victims attending at anti rabies clinic of Sukraraj Tropical and Infectious Disease Hospital, Kathmandu

Variables	Referral from other health facility		Total	Fisher's exact test P value
	Yes	No		
Categories of animal bite				
Type 2	12 (16.1)	23 (18.9)	35	0.015
Type 3	11 (6.9)	4 (8.1)	15	
Place of residence				
Metropolitan/sub metropolitan	7(8.3)	11(9.7)	18	0.011
Municipality	4(7.4)	12(8.6)	16	
Rural municipality	12(7.4)	4(8.6)	16	

Themes with associated codes

Themes	Codes
Animal bite exposure	Type of animal, site of exposure, human behavior, blaming anybody for the bite.
Health seeking behavior	Type of treatment received, immediate measure taken after bite, place of first visit after animal bite, knowledge about rabies, time gap to seek treatment.
Prevention of animal bite	Animal population control, unmanaged dog population, vaccination of dog, attention of authority.
Referral of animal bite patients	Unavailability of animal bite management, complication of wound, cost of vaccine outside in pharmacy, problems due to referral of patient.

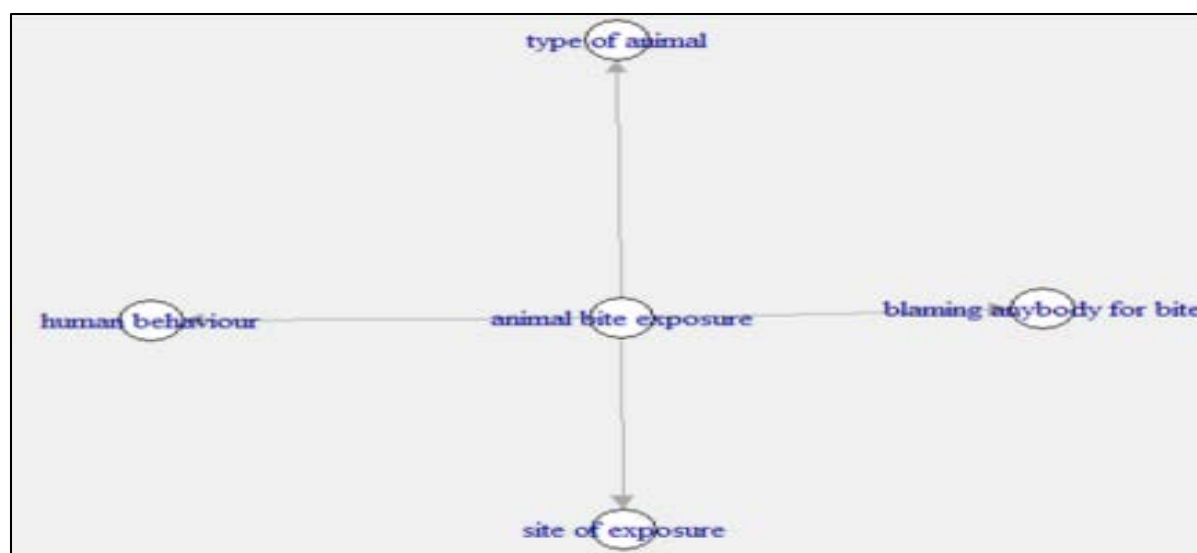


Figure 1. Animal bite exposure and associated codes

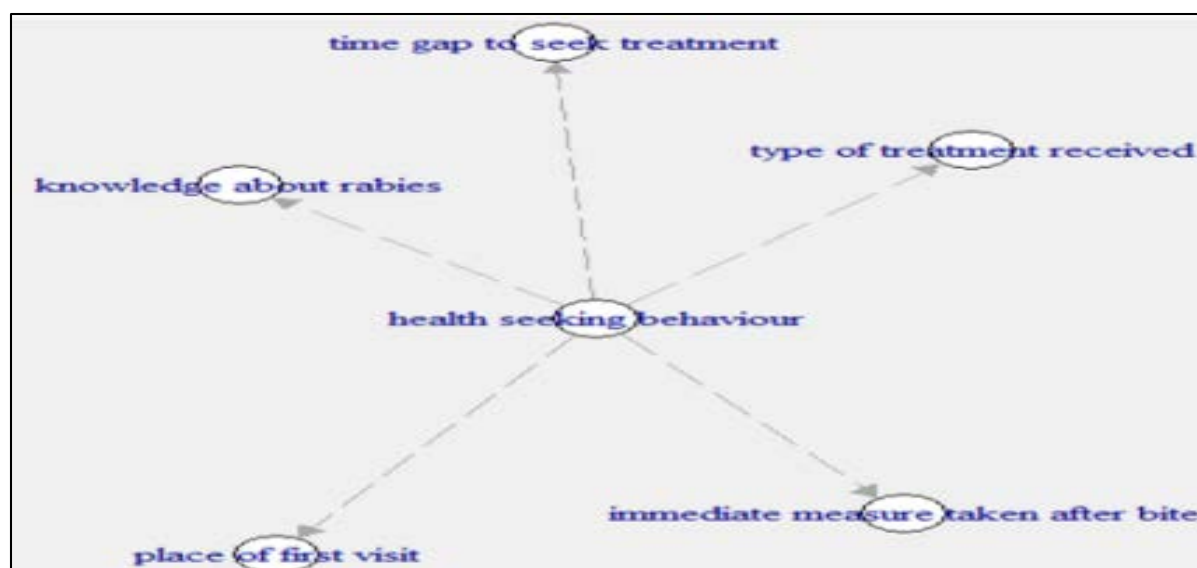


Figure 2. Health seeking behavior and associated codes



Figure 3. Prevention of animal bite and associated codes



Figure 4. Referral of animal bite patients and associated codes

DISCUSSION

In this study, majority of animal bite was due to dog. However, category 2 bite was more common in this study. According to Venu Shah (2012),⁴ out of total 1112 cases of animal bite, 96% were bitten by stray dog. Category III bites were seen in 754 (67.8%) among all the new cases of animal bite attending anti rabies clinic of V S General Hospital, Ahmedabad for the period of three months.

According to Matildeet Jimenez-coello (2012),⁵ a hospital-based questionnaire survey was conducted during 2007 among dog bites victims who visited a referral hospital in the city of Tuxtla Gutierrez, Chiapas, Mexico. Out of 194 persons, 175 (89.7%) receive hospital care due to injuries caused by dog bites. This study showed no difference in the gender of the victims attacked by dogs (50.9 and 49.1% for male and female gender respectively). Places where people were attacked by dogs were in the households and the streets, in most cases by stray dogs. In relation to the number of injuries caused by dog attacks, 80.9% of cases were reported as multiple lesions (type II) and only 19% had a single lesion associated with the attack (type I). The anatomic regions where victims were mostly affected were in the legs, hands, feet and arms. From the dogs biting people, 80.57% had owner and 19.4% were ownerless stray dogs. This study discussed about the issue of transmission of a large number of zoonotic diseases (including rabies) to their victims and advised about increased educational awareness of people about the risk of

dog bites together with enforcement of regulations for licensing of dogs, efficient stray dog population management and animal birth control programs to reduce bite incidents, especially in developing countries such as Mexico. Majority of animal bite was due to dog in this study too. In this study, status of ownership of animal was not discussed, issue regarding licensing of dogs was not raised in qualitative analysis.

According to Jose M. Ramos (2015),⁶ Consecutive patients with potential rabies exposures attending the outpatients' clinic in Gambo Rural Hospital (GRH) Ethiopia, from 11 September 2006 – 10 March 2010 (43 months), the most common site of exposure was the leg (66.8%). The primary sources were dogs (93.4%) followed by cats (2.6%). Similar findings were in this study too.

According to Neera Marathe (2016),⁷ across sectional institutional study conducted in 406 animal bite victims presenting to the tertiary care hospital and district hospital Rewa, Madhya Pradesh, India from February 2014 to February 2015, 95.8% victims bitten by dog of them 89% were stray, 89.4% had Category III bite, and lower extremity was affected in 60.8%. In this study, majority of animal bite was due to dog, leg was most common site of exposure but category 2 injury was most commonly found in this study.

According to Sibaprasad Pattanayak (2017),⁸ conducted in the casualty, Department of

Community Medicine, Department of Surgery at M. K. C. G. Medical College, Odisha, India between 1st April 2016 - March 31st, 2017. Out of 6242 animal bite cases, 4785 (76.66%) were bitten by dogs. 5617 (90%) are category III bite, 548 (8.78%) are category II bites, 77 (1.23%) are category I bite. Most common parts of body bitten by animals was limbs 5828 (93.37%). In this study, majority of animal bite was due to dog, leg was most commonly affected but category 2 bite was most commonly found. According to Kinley Penjo (2019)⁹, using information from the rabies post exposure prophylaxis (PEP) register, animal-exposed victims who had visited five hospitals in south Bhutan between January and March 2017, common reasons for not seeking health care included assumptions that risks of infection were minor if bitten by an owned or vaccinated dog. Overall, 82% of the victims sought PEP from the hospitals within 24 h after exposure. Eighty-three percent completed the PEP course prescribed by the physician. The respondents living in urban areas (OR: 2.67; 95% CI: 1.34–5.30) were more likely to complete the prescribed PEP course than rural dwellers and advised for a risk-based advocacy program is necessary to prevent dog-mediated human rabies deaths. In this study too, all animal bite victims visited health facility within 48 hours for seeking post exposure prophylaxis. Advocacy programme was discussed in this study too.

According to Ravish Shankaraiah Haradhanha (2019)¹⁰, conducted from May 2017 to January 2018 at six selected states, ensuring geospatial distribution across different regions of India, among a total of 529 animal bite victims, 83.6% sought post exposure prophylaxis coming directly to health facility, the compliance rate for the full course of intramuscular rabies vaccination was 65.9% and for intra-dermal rabies vaccination, it was 85.1%. Among Category III exposures, only 46.2% received rabies immunoglobulin. So, health-seeking behavior and compliance to complete course of anti-rabies vaccination is unsatisfactory, which has to be improved to prevent rabies. In this study, most patients of animal bite injury consulted health facility first for seeking animal bite management.

According to TJ Beyene (2017),¹¹ conducted on suspected rabid dog bite cases in three areas of Ethiopia between September 2013 and August 2014, about 77% of these suspected rabid dog bite victims visited a health centre, while 57% received sufficient doses of PEP. The overall likelihood of seeking medical services following rabies exposure

was higher for people bitten by dogs of unknown ownership, with regard to accessibility of post-exposure prophylaxis delivering health centres in shorter distance which could improve health seeking behavior and the promotion of medical treatment through awareness creation campaigns could be beneficial. In this study too, availability regarding animal bite management centres was discussed in qualitative analysis.

According to Rahul R. Chopade (2019),¹² animal bite patients between urban and rural areas of Aurangabad city, India from January 2016 to May 2016, showed that most of the people in rural area were bitten by stray dog (42%) as compared with 38% of stray dog bite cases in urban areas. The commonest site of animal bites was found to be lower limb. Maximum cases belonged to category III (84%) in rural areas. Also, most of the rural patients (46%) preferred home remedies of treatment and relied more upon home remedies thereby reporting late to government hospitals. In this study, quantitative analysis showed that few animal bite victims (8%) sought some kind of cultural practices after animal bite injury.

According to Chandana Krishna (2019),¹³ conducted in urban poor locality of Tumkur District, Karnataka, showed that among the exposed, 96.1% sought help from the medical doctor, among whom 61.7% from government health care facility and advised that the post exposure prophylaxis seeking behavior has to be further improved; since early and correct post exposure prophylaxis is necessary to prevent rabies. Similar themes with codes were generated from qualitative analysis in this study.

Limitation of this study

Sample size was very small as it was a pilot study for a large study. Duration of study was short. Health seeking behaviors can be best evaluated in community settings of study.

CONCLUSION

Quantitative data analysis showed that most common type of animal that bit was dog. Most common site of exposure was lower extremity of body. Category 2 bite was commonly found in this study. Place of first visit was health facility in most patients. Percentage of animal that died on their own after bite was 34%. So, they might be rabid and could alarm the authority on prevalence of rabid animal in the community. Quantitative survey found association between categories of animal bites and place of residence with referral status.

Qualitative data analysis showed dog bite while feeding as the main reason for the visit. Convergent findings from quantitative and qualitative data showed that most common type of animal that bit was dog. Divergent findings revealed existence of cultural practice and consultation with local practitioner as place of first visit after animal bite. Expansive findings revealed important suggestions to prevent future animal bites and to decrease referral of the patients from the periphery to this hospital. Most of the respondents also suggested to control the stray dog population in the Kathmandu valley by the concerned authorities in order to minimize the risk of dog bites and rabies among the residents.

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None

CONFLICT OF INTEREST

None

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