

Original Research Article

A study on animal bites and envenomings in rural Varanasi: a community based cross-sectional study

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ABSTRACT

Background: Animal bites are major public health issues in children and adults worldwide. The most important bites are by dogs, cats and monkeys that may cause rabies. Globally, approximately 60,000 annual deaths occur from rabies. Another important bite is by snakes. In India, approximately 94,000–1,25,000 deaths occur by snake bites annually. Therefore, we undertook this study to estimate the incidence of animal bites and to determine the treatment seeking behaviour of victims of animal bites.

Methods: It is a cross-sectional study conducted in Bariyasanpur village of Chiraigaon block of Varanasi district. A total of 2039 individuals above one year of age were covered by surveying 342 households out of 437 households. Pre-tested structured schedule was used to find out the incidence of animal bites/ envenomings and treatment seeking behaviour among study subjects during the last one year.

Results: The incidence of animal bites/envenomings for the study population in the past one year was 35.31/1000 population. Proportion of the bites by dogs was 51.4% (37/72) followed by scorpions 23.6% (17/72), rats 11.1% (8/72), snakes 11.1% (8/72), monkeys 1.4% (1/72) and jackals 1.4% (1/72). Immediately after the bites, 28 subjects (38.9%) went to faith healers. Only 70.8% took treatment for animal bites at appropriate health facility.

Conclusions: From this study, we found a high incidence of dog bite cases and poor treatment seeking behaviour. Probably poor awareness about the animal bites/envenomings could be the main reason for improper management practices. It is a matter of concern for policy planners.

Keywords: Animal, Bites, Envenomings, Rabies, Incidence

INTRODUCTION

A research on various animal bites conducted among rural population in Tamil Nadu showed that 71% of animal bites were caused by bite of dogs followed by cats. Proportion of animal bites like monkey bites and rat bites are 4% and other animal bites were caused by bites of snakes, scorpions, millipedes and centipedes.¹

Rabies, which is caused by *Lyssavirus* type-1 of the family *Rhabdoviridae* is an acute, highly fatal viral

disease of the central nervous system. Those who are susceptible to rabies are warm blooded animals including human beings.²

WHO conducted a national multi-centric rabies survey in 2003, the annual incidence of animal bites was 1.7 percent and it was more in rural areas (1.8%) and children (2.6%). It also observed that the high proportion (39.5%) of bite victims did not wash their wounds with soap and water.³

Those who are susceptible to rabies are warm blooded animals including human beings.

Around 18,000 to 20,000 cases of rabies occur annually in India and country accounts for 36% of the world's deaths from the disease.⁴

Mainly people of lower socio-economic status and children between the ages of 5 and 15 years are affected with this fatal disease. Indian children often play near stray dogs, roam freely and sharing their food with them, which results in frequent dog bites.

In one study, most children who were victims of dog bite were unaware of the status of being bitten and their parents ignored the attacks or simply treated the wounds by applying indigenous products like turmeric etc. Only few parents sought medical advice but with delay.⁵

Thus community awareness on the management of animal bites is lacking. So, it is important to know the epidemiology, pattern and treatment seeking behaviour among victims of animal bites so that effective strategy can be made to control rabies and to reduce the mortality among the cases of animal bites.

Objective

- To estimate the incidence of animal bites and to determine the treatment seeking behaviour of victims of animal bites.

METHODS

A cross-sectional study was conducted in Bariyasanpur Village of Chiragaon Community Development Block of Varanasi District. It is the field practice area of Department of Community Medicine, Institute of Medical Sciences, Banaras Hindu University. Data was collected for 3 months in 2016. There are 437 households in the village, 342 households were surveyed covering a population of 2039 individuals above one year of age.

Tools and technique

Pre-tested structured schedule was used to find out the incidence of animal bites and envenomings among study subjects during the last one year. In each household, it was asked if there is any person above one year of age who had animal bite in last one year. If victim was not present at the time of visit then the appropriate time for their availability was asked to contact him/her. History was taken from parents in case the child was unable to answer.

Victims of animal bites were asked about the type of animal, site of bite, frequency of bite, vaccination status of animal, whether animal was pet or stray/street/wild, treatment taken or not. Socio-demographic profile of study population and treatment seeking behaviour among

those who were bitten by animals were also recorded. This study was approved by ethical committee of institute.

Inclusion criteria

Inclusion criteria were study subjects above one year of age and subjects who were willing to participate.

Exclusion criteria

Exclusion criteria were households where door was locked; households where only child or person who was not able to tell about the animal bite among household members in last one year was present at the time of visit and we were not able to contact within next 3 visits to any adult member or a person who was able to tell about the animal bites among household members.

Data analysis

The data of study subjects was collected and entered in MS Excel 2013. SPSS (Statistical Package for Social Sciences) software trial version 21 was used for statistical analysis. Percentage, proportion and annual incidence were used. To study the association of socio-demographic characteristics with animal bites, chi square statistics was used. A $p < 0.05$ was considered statistically significant.

RESULTS

Approximately one-third (36.9%) of the study population belonged to the age group between 6-25 years and majority (72.2%) of the subjects with animal bites/envenomings in the last one year were significantly related to the age group of 6-25 years. 5.6% of the subjects with animal bites were in the age group of 1-5 years.

There were 53.4% males and 46.6% females in the study population and 59.7% of the subjects with animal bites/envenomings were males. About one-third of the study subjects were illiterate followed by up to primary education or children (<7 years) not attending school.

Cases of animal bites/envenomings were significantly higher in the category who were educated up to primary or children of age less than 7 years, who were not attending school (43.1%).

40.5% of the study subjects were employed followed by homemaker/unemployed (36.7%) and students (22.8%). Cases with animal bites/envenomings were significantly higher among students (48.6%).

Majority (78.7%) of the study subjects belonged to lower upper or lower class according to modified B G Prasad scale. Cases of animal bites/envenomings were significantly high in lower upper/lower class (Table 1).

Table 1: Socio-demographic characteristics of the study population.

Socio-demographic characteristics	Study population N (%), n=2039	Subjects with animal bites in the last one year N (%), n=72	P value
Age group (years)			
1-5	141 (6.9)	4 (5.6)	<0.001***
6-25	752 (36.9)	52 (72.2)	
26-45	738 (36.2)	14 (19.4)	
≥46	408 (20.0)	2 (2.8)	
2. Sex			
Male	1088 (53.4)	43 (59.7)	0.282
Female	951 (46.6)	29 (40.3)	
Education			
Illiterate	660 (32.4)	11 (15.3)	0.002***
Up to primary/children (<7 years) not attending school	600 (29.4)	31 (43.1)	
Up to secondary	340 (16.7)	18 (25.0)	
Intermediate and above	439 (21.5)	12 (16.6)	
Occupation			
Homemaker/unemployed	748 (36.7)	13 (18.1)	<0.001***
Employed	826 (40.5)	24 (33.3)	
Others (students)	465 (22.8)	35 (48.6)	
Socio-economic status (according to modified B. G. Prasad scale, May 2016)			
Upper/upper middle	194 (9.5)	13 (18.1)	0.011***
Lower middle	240 (11.8)	12 (16.6)	
Lower upper/lower	1605 (78.7)	47 (65.3)	

Table 2: Distribution and site of animal bites and envenomings in the last one year.

	Number (%)	Annual incidence (per 1000)
Distribution of animal bites/envenomings		
Dog	37 (51.4)	18.15
Monkey	1 (1.4)	0.49
Snake	8 (11.1)	3.92
Scorpion	17 (23.6)	8.34
Jackal	1 (1.4)	0.49
Rat/mouse	8 (11.1)	3.92
Site of animal bites/envenomings		
Lower limb	36	50.0
Upper limb	29	40.3
Back	4	5.5
Face/neck	2	2.8
Genital area	1	1.4

The overall annual incidence rate of animal bites/envenomings was 35.31 per 1000 population. Proportion of the bites/envenomings by dogs was 37/72 (51.4%) followed by scorpion 17/72 (23.6%), rats/mouse 8/72 (11.1%), snakes 8/72 (11.1%), monkeys 1/72 (1.4%) and jackals 1/72 (1.4%). Among the subjects with snake bite, one died. Most (86%) of the animal bites were of wild/street/stray variety. It was found that the most common site of animal bite/envenoming was lower limb (50%) followed by upper limb (40.3%), back (5.5%), face/neck (2.8%) and genital area (1.4%) (Table 2).

After animal bites/envenomings, more than one-third (38.8%), immediately went to faith healers, only 13.9% of the subjects with bites/envenomings, immediately washed their wounds with soap and water. There were 4 cases who used home remedies (application of turmeric powder and irritants like ash, calotropis milk, lime, red chillies, lime, ink etc.). There were 3 cases who killed the biting animal. Among 10 cases who washed wound with soap, 6 cases washed their wounds for 5 minutes and rest washed for 10 minutes.

Table 3: Treatment seeking behaviour after animal bites/ envenomings.

	Number	Percentage (%)
1. Immediate action taken after animal bites/ envenomings		
Went to faith healers	28	38.8
Went to doctor	15	20.8
Washed wound with soap and water	10	13.9
Washed wound only with water	7	9.7
Home remedies	4	5.6
Applied dettol and savlon	4	5.6
Killed biting animal	3	4.2
Did nothing	1	1.4
2. Duration of wound washing with soap and water		
5 minutes	6	60.0
10 minutes	4	40.0
3. Subjects have taken treatment for animal bites/envenomings		
Yes	51	70.8
No	21	29.2
4. Time taken for treatment after animal bites/envenomings		
Within 30 minutes	10	19.6
30 minutes- 1 hour	2	3.9
1-6 hour	11	21.6
6-12 hour	6	11.8
>12 hour	22	43.1
5. Preferred place of treatment		
Government hospital	36	70.6
Private hospital	15	29.4
6. Preferred pathy of treatment		
Allopathy	47	92.2
Ayurveda	4	7.8

Table 4: Status of tetanus and anti-rabies vaccination and anti-venom injection.

Status of tetanus vaccination (n=51)	Number	Percentage (%)
No/ they had not been vaccinated in previous 5 years of animal bites	5	9.8
Yes	46	90.2
They had been vaccinated in previous 5 years of animal bites	0	0
Status of anti-rabies vaccination (n=39)	Yes (n₁=33; 84.6%)	No (n₂=6; 15.4%)
Dog	31	6
Monkey	1	0
Jackal	1	0
Status of anti-venom injection (n=8)	Yes	No
	4 (50.0%)	4 (50.0%)

Approximately more than two-third (51/72) of the subjects with animal bites/envenomings had taken treatment for the same. Only 19.6% (10/51) of cases went for the treatment within 30 minutes. Majority (70.6%) of the cases, who took treatment, went to government hospital and most (92.2%) of the cases preferred allopathy for the treatment (Table 3).

Most (90.2%) of the study subjects who had taken treatment received tetanus vaccination. More than three-fourth (84.6%) of the subjects who had rabid animal bite

received anti-rabies vaccination and half of the subjects with snake bite received anti-venom injection (Table 4).

DISCUSSION

In this study, 77.8% of the animal bite victims were below 25 years and 59.7% of the victims were male. Kinge and Supe found that 58.6% of animal bite cases were below 30 years of age and 70.6% of them were males.⁶ A study by Sangeetha et al in Salem, India observed that 47.83% of animal bites/envenomings cases

were below 25 years and 40.58% of them were males.¹ Santra et al found in their study that 57.8% of animal bite victims were males, this is consistent with our finding.⁷ Sudarshan et al and Ghosh and Pal also reported that animal bites were more frequent in males than females.^{3,8} This may be found due to the fact that adult males are more likely to go for outdoor work.^{3,7}

This study found that animal bites/envenomings cases were higher (58.4%) in those who were less educated (illiterate, children less than 7 years who were not attending school and cases educated up to primary level). A study by Venkatesan et al in rural district of Tamil Nadu, India also found the similar observation that in comparison with graduates, dog bites were significantly higher among illiterates and those who went to school only.⁹

Our study showed that 33.8% of the subjects with animal bites/envenomings were employed and 48.6% of them were students. Occupation was significantly associated with animal bites/envenomings. About two-third (65.3%) of the victims belonged to lower upper and lower class and socio-economic status was significantly associated. Venkatesan et al found that occupation such as farming and daily wage labourer were significant risk factor.⁹ Sudarshan et al observed that majority (75%) of bite victims belonged to poor and low income group.³ In Sangeetha et al animal bite/envenoming cases were found maximum in students (34.78%), unskilled worker (31.89%) and those belonging to lower upper and lower socio-economic status (50.73%).¹ Santra et al reported that majority (80.4%) of the individuals belong to lower upper and lower socio-economic status according to modified B G Prasad scale 2013.⁷

The present study showed that overall annual incidence of animal bite/ envenoming was 35.31/1000 population. Most common animal bite was dog bite followed by scorpion sting. Venkatesan et al also reported the similar finding that most common biting animal was dog followed by scorpion. The overall period prevalence of bites in their study was 81.8/1000 population.⁹ Sangeetha et al, Kine and Supe and Sudarshan et al also found that most common biting animal was dog.^{1,3,6}

Most common site of animal bite/ envenoming was lower limb followed by upper limb, this finding is consistent with Varsharani et al, Ghosh and Pal also reported that main site of bite was lower limb. This may be attributable to the fact that upper and lower extremities are most approachable of human body for an animal.^{8,10}

Present study found that 38.8% of the victims went to faith healers and 5.6% of them used home remedies. Only 13.9% of the subjects with animal bite/envenoming washed their wounds with soap and water. Santra et al reported that 3.9% of the subjects went to faith healers.⁷ Wash of the site of bite with soap and water was practiced only by 1/3rd of the victims in Ghosh and Pal.⁸

A study by Sharma et al in Rural district of Pune observed that practice of washing wound with soap and water was done in 23.5% of the subjects. 31.3% of the subjects applied turmeric, lime, chili etc.¹¹ In Sangeetha et al, 26% of the victims used chili powder, coffee powder, lime stone etc. and 40% of the victims washed their wounds with soap and water.¹

Our study found that 70.8% of the animal bite/envenoming victims had taken treatment. Majority (70.6%) of the cases who had taken treatment went to government hospital. 84.6% of the cases with rabid animal bites, took anti-rabies vaccination and 50% of the cases with snake envenomation took anti-snake venom injection. In Venkatesan et al, 59.4% of rabid animal bite cases had anti-rabies vaccination and only 9.4% of the cases with snake envenomation took anti-snake venom injection.⁹

CONCLUSION

From this study, we found a high incidence of dog bite cases and poor treatment seeking behaviour. Incidence of scorpion sting was also very common in the study area. A significant proportion of the animal bite victims went immediately to faith healers. Probably poor awareness about the animal bites could be the main reason for improper management practices. It is a matter of concern for policy planners.

Therefore, people living in rural areas should be educated about different types of animal bites and envenomings, its probable consequences and the health facility available in the area for the management of specific animal bites.

Knowledge about the importance of immediate washing of the wound with soap and water after rabid animal bites, anti-rabies vaccination, anti-snake venom injection and preventive measures for rabid animal bite, scorpion sting, snake envenomation and rat bite should be given to the people.

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