

Epidemiological study of animal bite victims in Rural Northern India: A hospital based cross sectional study

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Abstract

Introduction: Animal bites remain a significant public health issue, with the number of these injuries increasing annually. Dog bites represent the most common mammalian bites treated in emergency departments, followed by cat bites and human bites. **Aims & Objectives:** We aimed to study the epidemiological trends and characteristics of people bitten by animals in a rural Medical College & Associated hospital of District Rajouri, Jammu & Kashmir (India) in order to plan for prevention and enhance management strategies. **Material & Methods:** A hospital based cross-sectional study was undertaken among animal bite victims attending Anti-Rabies section, Department of Community Medicine, Govt. Medical Rajouri & Associated Hospital from January 2021 to December 2022. Data collection was done for 627 subjects. The sample size was estimated by taking the average of previous 02 years of animal bite victims attending Anti-Rabies section, Department of Community Medicine. A 10% of the victims fulfill the study purpose hence sample size was determined to be 627 study subjects. **Results:** A total 627 victims of animal bite were included in the study. Males constituted 490 (78.1%), whereas, females were 137 (21.9%) of the total victims. Majority 231 (36.9%) were observed in the age group of 11-30 years. Majority 466 (74.4%) of the victims presenting to hospital were residing in rural area. Lower extremity (55%) was most commonly site affected followed by head /neck (23%) and upper extremity (14%). Most of the victims 292(46.5%) were bitten during evening hours followed by 193 (30.7%) during morning hours. Most of the victims 230 (36.6%) were of category II, there were 192 (30.6%) victims of category III followed by 140 (22.3%) in category I respectively. **Conclusion:** Public health educational programmes are needed to create awareness in the public regarding the dangers of animal bite and to avoid contact with the stray dogs. Active surveillance activities must be carried out to know the actual burden of animal bite problem.

Keywords: Animal bite, Surveillance, Anti-rabies section

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INTRODUCTION

Animal bites remain a significant public health issue, with the number of these injuries increasing annually. Dog bites represent the most common mammalian bites treated in emergency departments, followed by cat bites and human bites ¹.

Rabies, an invariably fatal viral disease, is transmitted to humans through animal bites, most commonly dogs. Dog bites are the primary source of human infection in all rabies endemic countries and account for 96 % of rabies cases in South East Asia region. It is caused by bites of warm-blooded animals, is almost always fatal after the onset of clinical signs. The disease can efficiently be averted by avoiding contact with wild animals and post-exposure prophylaxis (PEP).

According to WHO, Each year, 23 000 – 25 000 people die in the SEA Region due to rabies. These accounts for approximately 45% human deaths due to rabies worldwide². Out of the estimated 25,000 deaths due to rabies in SEAR, a majority are in India (around 19,000) and Bangladesh (2000). More than 2.5 million people undergo post-exposure prophylaxis after being bitten by rabid or suspected rabid animals causing considerable morbidity and economic loss ³. In spite of economic loss and sufferings, there is little information about the incidence of animal bites and rabies because of a lack of systematic reporting In India. As rabies is not a notifiable disease in India it is widely believed that this figure may be an underestimate⁴. Sporadic studies have been conducted indifferent parts of India but profile of bites not only varies from country to country but region to region within country ^{5,6}.

There is a paucity of data on global estimates of dog bite incidence; however studies suggest that they account for tens of millions of injuries annually ⁷. Dog bite fatality rates are higher in low and middle-income countries than in high-income countries. This is believed to be attributed to the prevalence of rabies in many of these countries and a lack of post-exposure treatment and suitable access to health care ⁸.

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. The success of any elimination programme 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. Unfortunately dog and human rabies are not notifiable diseases in most endemic countries ⁹. Therefore we aimed to study the epidemiological trends and characteristics of people bitten by animals in a rural Medical College & Associated hospital of District Rajouri, Jammu & Kashmir (India) in order to plan for prevention and enhance management strategies.

MATERIAL & METHODS

The present hospital based cross-sectional study was undertaken among animal bite victims attending Anti-Rabies section, Department of Community Medicine, Govt. Medical Rajouri & Associated Hospital from January 2021 to December 2022. Data collection was done for 627 subjects. The sample size was estimated by taking the average of previous 02 years of animal bite victims attending Anti-Rabies section, Department of Community Medicine. A 10% of the victims fulfill the study purpose hence sample size was determined to be 627 study subjects.

Inclusion criteria: Animal bite victims presenting to the health care facility for seeking treatment and gave consent for participation.

Exclusion criteria: Those who did not give consent, critically injured and not able to respond were excluded.

Ethical clearance: The study was commenced after approval from institutional ethical committee. Invasive procedure and active interventions was not done in the study so only informed verbal consent was taken. They were assured that their responses would be kept anonymous and confidentiality maintained.

Data collection method: All the cases of animal bite victims visiting Anti-Rabies section, Department of Community Medicine were explained about the study purpose. In case of victim <15 years attendees preferably mother or father were explained about study and information collected thereafter. A pretested and structured oral questionnaire was used to elicit the required information pertaining to the epidemiology of animal bite. Face to face interview of victims and local examination was done after taking informed verbal consent.

Study variables: Age, sex, residence, occupation of the victim. Information about animal included stray/ pet/ wild animal biting, provoked/unprovoked bite, site of bite, fate of the animal, category of exposure, time of bite, and locality of bite. Categorization of exposures was done as per guidelines given by World Health Organization (WHO).

Provoked/unprovoked bite: Bite resulted from subject initiating interaction with the pet animal such as playing with the dog or annoying the dog during his meal was considered as provoked. Data management and statistical analysis: Data was analysed using appropriate statistical tests. Results were presented in percentages and proportions.

RESULTS

A total 627 victims of animal bite were included in the study. Males constituted 490 (78.1%), whereas, females were 137 (21.9%) of the total victims. Majority 231 (36.9%) were observed in the age group of 11-30 years. Majority 466 (74.4%) of the victims presenting to hospital were residing in rural area. Regarding occupation 46.8% and 34.4% of the victims were school students and agriculture workers respectively (Table 1).

Lower extremity (55%) was most commonly site affected followed by head /neck (23%) and upper extremity (14%) respectively (Fig-1). Dog bite 546 (87%) was the most common animal bite reported by the victims attending Anti-rabies section and were mostly stray dogs (81.5%). Other animal responsible for bite were Bear (5.1%) and Cat (4.3%) respectively (Table 2).

Most of the victims 292(46.5%) were bitten during evening hours followed by 193 (30.7%) during morning hours. Unprovoked bites were seen in majority of the victims 508 (81%) whereas provoked bites were seen in only 119 (18.9%) victims. Most of the victims 519 (82.7%) were not able to observe the biting animal. 16.1% victims told that biting animal was alive till the time of seeking treatment while 07 animals were dead or killed by people and 409 victims (65.2%) were bitten in market/street area followed by field/farms/construction areas (17.8%). A total of 1.7% of victims had previous history of animal bite in last 5 years (Table 3).

Most of the victims 230 (36.6%) were of category II, there were 192 (30.6%) victims of category III followed by 140 (22.3%) in category I respectively (Fig-2).

DISCUSSION

The present study revealed that animal bite was more common among males and male to female ratio was found to be 3.2:1. This finding was quite similar to the other studies¹⁰. This may be due to the fact that men were more likely to go out of their homes for work as compared to females in this area. Our study shows more proportion of animal bite victims from rural areas this is similar from the other studies which show preponderance from rural areas¹¹. This may be due to the peripheral location of Medical college & Associated hospital in other studies which cater population predominantly population from rural areas. Most of the victims belong to age group 10-30 yrs. This is the age group usually go outside for school/colleges/jobs. Other studies show the similar findings¹². Our study found that most of the victims were school students and agriculture workers by occupation. Housewife and unemployed were at least risk for animal bite. This correlates well with the time spend in outdoor activities and risk for animal bite. Study done by Umrigar et al shows correlation of occupation requiring travel with risk for animal bite. Wankhede et al also reported that persons having field job to earn livelihood were vulnerable for animal bite. The most common site of bite was lower extremity and majority of victims were having category II bite as per WHO classification¹³. Our study showed that majority were victims of dog bites and most of the victims were bitten by stray dogs. The finding is similar to the other studies¹⁴. Most of the bites have taken place in evening hours and morning hours with proportion slightly higher in evening hours. Wankhede et al and Khokhar et al reported majority of bites occurring in morning hours. Umrigar et al, in his study reported that the morning hours was the most common time of bite. Almost three- fourth victims had unprovoked bite in our study. Study done by Khokhar found at Alipur the unprovoked bites were 74.76%¹⁵. The study conducted at Juniad M et al has found unprovoked bites in 80.6% of cases. In our study majority of the study subjects were affected by animal in the market followed by farms and construction site. In study done by Wankhede V majority of dog-bites, (71.9%) have taken place while walking on road¹⁶.

CONCLUSION

Animal bites, especially dog bites still poses public health problem in urban area of our country. These bites not only cause increase morbidity and mortality but also loss of workers days and cost for treatment. People at risk were mainly men and 11-30 yrs age group. The majority of the bite victims had occupation involving outdoor activity. Majority of the bites are attributed to stray dogs and are unprovoked, occurred during evening and morning hours that is dark hours Maximum no. of cases belonged to Category II bites. This indicates the importance of need of large amount of quality anti-rabies serum or HRIG thereby increasing the cost of management of animal bite cases. There is a need to control stray dog population and immunize pet dogs. On the other hand there is a need to implement Public health educational program to create awareness in the public regarding the dangers of animal bite and to avoid contact with the stray dogs. Active surveillance activities must be carried out to know the actual burden of animal bite problem.

Limitations

Since the subjects included in the study were patients attending tertiary care hospital, the study findings cannot be generalized to the whole population at large. To get more insight for assessing burden and epidemiology of the animal bite, community based studies are needed.

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TABLES & GRAPHS

Table 1: Socio-demographic characteristics of the animal bite victims (n=627).

Socio-demographic characteristics	Frequency/ Number	%
Gender		
Male	490	78.1
Female	137	21.9
Residence		
Urban	161	25.6
Rural	466	74.4
Age(in years)		
<10	140	22.3
11-30	231	36.9
31-50	190	30.3
>50	45	7.1
Occupation		
Student	294	46.8
Unemployed and housewife	42	6.6
Service and business	75	11.9
Agriculture work	216	34.4
Laborer	108	17.2

Figure 1: Distribution of study subjects according to the site of animal bite (n=627).

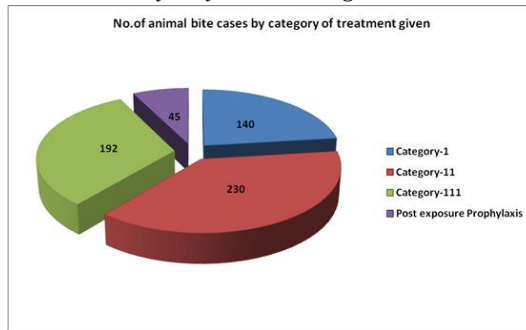


Table 2: Distribution of study subjects by type of animal bitten (n=627)

Type of animal	Number	percentage
Dog	546	87
Pet	101	18.49
Stray	445	81.5
Bear	32	5.1
Cat	27	4.3
Monkey	07	1.1
Jackal	11	1.7
leopard	04	0.6

Table 3: Profile of animal bite (n=627)

Characteristics of Bite	Frequency	Percentage
Time of bite		
Morning	193	30.7
Noon	95	15.1
Evening	292	46.5
Night	46	7.3
Type of bite		
Provoked	119	18.9
Unprovoked	508	81.0

Fate of animal bite		
Alive	101	16.1
Killed/died	07	1.1
Not able to observe/Escaped/Fate not known	519	82.7
Place of animal bite		
Own residence	70	11.1
Neighbor's house	36	5.7
Market/ street	409	65.2
Field/farms/construction areas	112	17.8
Previous history of animal bite		
Yes	11	1.7
No	616	98.2

Figure 2: Distribution of study subjects by category of animal bite (n=627)

