

## Original Research Article

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# Pattern, profile and care seeking behaviour of animal bite cases and escorts in anti-rabies centre of a city in North India

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## ABSTRACT

**Background:** Animal bites are a neglected public health problem and remain a significant cause of morbidity and mortality worldwide. There are many myths and misconceptions regarding animal bites i.e. application of herbs, lime, chilli powder etc., on wound, consulting faith healers/quacks. There is dearth of evidence pertaining to it thus we aim to estimate the pattern, profile and determinants of care seeking behavior of animal bite cases reported at the ARCs, Chandigarh.

**Methods:** We undertook a cross sectional study at the ARCs of Chandigarh. Annual data on all reported animal bite cases during the period of January 2014 to December 2015 were collected from the hospital records to estimate case load and pattern of animal bite. 100 cases were purposively selected animal bite victims were interviewed during a four months period from January 2015 to April 2015. Pattern of animal bite cases and care seeking behaviour was ascertained by using pre tested questionnaire. Data was analysed using EpiInfo and MS excel.

**Results:** Majority of victims were males and above 15 years. Dog was the principal biting animal. Legs (61%) were most common biting site and 71% category III bites were recorded. Around 27% victims applied chili/salt/lime etc., 40% used water for wound washing and 4% applied Turmeric/Neem/Tulsi etc. Majority (65%) took local treatment within 10 minutes of bite.

**Conclusions:** Majority of victims presented with category III bites. Applying chili/salt/lime or some other form of irritant at the wound was a common practice amongst victims.

**Keywords:** Animal bite, Rabies, Care seeking behaviour, Anti rabies centre

## INTRODUCTION

Animal bites are a neglected public health problem and remain a significant cause of morbidity and mortality worldwide. The health impacts of animal bites are dependent on the type and health of the animal species, the size of bite, health of the bitten person, and accessibility to health care and services provided.<sup>1</sup>

Each year, an estimated 12 million people throughout Asia receive treatment after being exposed to animals that are suspected of rabies.<sup>2</sup> In India, estimated animal bites

per year are around 2.28 million and the annual incidence of animal bite is 1.7%. The frequency of animal bites in India lies at 1 per 2 seconds.<sup>3</sup> Globally, dog bites are the most prevalent among animal bites followed by snake bites, cat bites and monkey bites.<sup>1</sup>

Globally, rabies is the tenth leading cause of infection induced death in humans. Rabies in man is a dead-end infection and has no survival value for the virus. It is the only communicable disease of man that is always fatal. India reports around 18000-20000 human rabies deaths annually, maximum for any country. As rabies is not a notifiable disease in India, the deaths reported by national

authorities may not be a complete picture as these represent only deaths reported from hospitals. The principal animal reservoir in India is Dog (96.3%). The annual estimated number of dog bites in India is 17.4 million and the frequency of human rabies deaths is around 1 per 30 minutes. Around 1.8 million people annually receive post exposure prophylaxis against rabies following bite or exposure to rabid or suspected rabid animal<sup>3</sup>. Although all age groups are susceptible, rabies is most common in children under 15 years of age.<sup>4</sup>

Animal bite victims need care as soon as possible. Prompt and complete treatment following an animal bite incidence is the cornerstone of therapy. In a rabies endemic country like India every warm-blooded animal bite is suspected as a potentially rabid animal bite and requires post exposure prophylaxis (PEP). PEP has 3 main strategies depending on type of contact with the suspected rabid animal viz. local treatment of wound, immediate vaccination and administration of rabies immunoglobulin. There is also a lack of awareness of the magnitude of the problem in health authorities and politicians alike. This is due to the scarcity of adequate statistics on the real impact of these diseases. Lack of advocacy by and on behalf of the affected groups, mostly children and rural workers further complicates the issue.

Though considerable research has been done on rabies, the current statistics of, animal bites, rabies in humans, stray and pet animal population are scanty, unreliable and controversial due to poor surveillance and reporting system. Also, not much work has been done to explore the myths and misconceptions related to rabies and care seeking behavior of victims. The present study was carried out to document the profile and pattern of animal bite victims and their care seeking behavior.

## METHODS

The present cross-sectional study was conducted in ARC of Sector 19 and Sector 38 of Chandigarh. A mixed method approach was used for data collection. Annual data was collected for profiling of animal bite cases from January 2014 to December 2015 to encompass all seasonal variations. A total of 100 purposively selected animal bite victims were interviewed with use of pre tested questionnaire; 72 victims from ARC Sector 19 and 28 victims from ARC Sector 38. In case of child victims (<15 years); escorts were interviewed.

### Inclusion criteria

Quadruped animal bite cases including dog, cat, monkey and rat bite victims.

### Exclusion criteria

Unreported cases, cases reported at other centers/hospitals, snake bite and other animal bite cases.

To determine the pattern and profile of animal bite cases a pre-tested interview schedule was used. It consisted of parameters like the biting animal, site of bite, type of bite on basis of provocation, nature and number of wounds, type of exposure, fate of animal, number of other persons bitten by same animal, outcome in others etc. Care seeking behavior was ascertained by using a semi structured interview schedule. A detailed questionnaire was developed; victims were interviewed regarding self-care taken, wound management, agency where and when reported, treatment compliance, past record saving and related questions. Data was entered in EpiInfo and analyzed using EpiInfo and MS excel. Prior consent was obtained from the victims/escorts and all the data obtained was kept confidential.

## RESULTS

Annual reported number of animal bite cases from both ARCs of Chandigarh were 9973 with no significant seasonal variation. Of all animal bite cases, 88% (8705/9973) were of dog bite followed by others 8% (773/9973), cat bite 2% (238/9973) and monkey bite 2% (226/9973). In these dog bite cases, 32% (2743/8705) were of pet dogs while 68% (5962/8705) were stray dogs. Maximum of reported animal bite cases were from Chandigarh (80%; 7930/9973) followed by Punjab (18%; 1816/9973) & Haryana (2%; 227/9973). Of these animal bite cases, maximum was of WHO category III bite (84.5%; 8438/9973) followed by WHO category II bite (15%; 1489/9973) and WHO category I bite (.5%; 46/9973).

Data was obtained from detailed interview of 74 victims and 26 escorts (in case of child victims) those who came for treatment in ARCs during study period. Majority of victims belonged to age group of 16-30 years (38%) and 77% victims were males. 16% had not received any formal education and only 20% were graduate or post-graduation. Many (35%) victims were students followed by semi-skilled workers (19%). 18% victims were unemployed (Table 1).

Dog (96%) was the principal biting animal followed by rat bite in 3% of cases. 68% stray dog bites and 28% pet dog bites were seen. 1 case of monkey bite was recorded. In almost half of the cases there was a sudden, unprovoked attack by stray dog from behind the victim. Also, around 20% victims reported that they were attacked by community dogs which otherwise didn't attack (Table 2).

Legs (61%) were most common biting site followed by arms (24%), trunk (9%) and head and neck region (8%). Around 70% of the victims presented with single/multiple bites with bleeding which falls under WHO category III bite followed by minor scratches/abrasion without bleeding (27%) which are WHO category II wounds. In majority (78%) of the cases the bite was unprovoked. Only 22% provoked bite cases were reported. Of the

provoked bites majority occurred while playing (50%) with the dog followed by feeding (36%), beating/scolding and teasing (Table 3).

In 66% of cases the vaccination status of biting animal was unknown. Many (22%) victims claimed that the biting dog had received prior vaccination (all were pet dog bite victims). Out of the 22 victims only 5 victims had the vaccination card of the biting dog with them (Table 4).

**Table 1: Profile of respondents visiting the ARC Sector 19 and ARC Sector 38, Chandigarh (n=100).**

Profile of respondents	Number
<b>Sex</b>	
Male	77
Female	23
<b>Age group (years)</b>	
0-5	5
6-15	21
16-30	38
31-45	25
46-60	9
61-75	2
<b>Education</b>	
No formal education	16
Up to VIII	38
VIII-XII	26
Graduation	14
Post-graduation	6
<b>Occupation</b>	
Professional	7
Self employed	10
Semi-Skilled worker	19
Skilled worker	11
Student	35
Unemployed	18

**Table 2: Nature of attack by the biting animal (n=96).**

Nature of attack	Number
Accidental attack by pet/community dog	17
Provoked attack by stray/pet dog	10
Silent attack without barking	10
Unprovoked attack by friend's/relative's pet	8
Sudden attack from behind	51

In 60% of cases the fate of animal was unknown. Almost all of these cases were of stray dog bites. Many (39%) respondents stated that the biting animal was alive and in only 1 case the biting animal reportedly died. In 17% of cases the biting animal was reported to have bitten 1-3 other persons in last 1 week of bite while 57% respondents were unaware whether the biting animal had

bitten any other person or not. Outcome of bite in other persons was not known (Table 5).

**Table 3: Site and type of bite and exposure profile in respondents (n=100).**

Variable	Number
<b>Site of bite</b>	
Head and neck	8
Arms	22
Legs	61
Trunk	9
<b>Type of exposure</b>	
Licks on intact skin (category I)	2
Minor scratches or abrasion without bleeding (category II)	27
Single/multiple bites with bleeding (category III)	71
<b>Type of bite</b>	
a) Provoked	22
Playing	11 (50)
Feeding	8 (36)
Teasing	1 (4)
Beating/scolding	1 (5)
Any other*	1 (5)
b) Unprovoked	78

\*Any other represents bites while throwing stones, pushing/pulling and stepping on tail.

**Table 4: Vaccination status and availability of vaccination card of biting animal.**

Vaccination status of animal	Number (n=100)
Vaccinated	22
Not vaccinated	9
Unknown	66
Not applicable	3
Vaccination card	N (%) (n=22)
Available	5 (23)
Not available	17 (77)

**Table 5: Fate of biting animal and number of other persons bitten by the same animal in past 1 week of bite (n=100).**

Variable	Number
<b>Fate of biting animal</b>	
Alive	39
Died	1
Unknown	60
<b>Number of other persons bitten by the same animal in past 1 week of bite</b>	
None	19
1-3 persons	17
4-6 persons	5
7 or more	2
Don't know	57

Out of the 100 victims interviewed, 27% victims applied chili/salt/lime or some other form of irritant at the wound while 24% victims refrained from taking any remedy. 18% of the victims washed the wound with water and antiseptic followed by 11% victims who washed with soap and water and the same number washed with water alone. Water was used for wound washing by 40% of the victims. 4% of the victims applied Turmeric/Neem/Tulsi or other herbs (Table 6).

Out of 20 victims who were graduate educated or above, 16 washed wounds with water/soap/antiseptic. Of the 27 victims who applied chilli/lime/other irritants on the wound 21 were victims educated only up to VIII class. Out of the 54 victims who either had received no formal education or were educated below VIII standard, 21 applied chili/salt/lime or other irritants on the bite wound (Table 7).

Out of the 76 victims who took any remedy before consulting a doctor, majority (64%) of took local treatment within 10 minutes of bite. 11% victims took 10-30 minutes while 5% took more than 30 minutes to initiate local treatment. On applying Pearson chi square test (two tailed p value=0.105) it was seen that 20% victims who were graduate or above majority (75%) resorted to local treatment within 10 minutes of bite. All except one of the victims visited a doctor after the animal

bite; 72% of the victims reported to a government agency while 28% reported at a private agency. 44% of the victims reported at an ARC within 12-24 hours of bite followed by 24% who reported within 6 hours; 22% taking 2-3 days to report, 6% reported after 3 days and remaining 4% within 6-12 hours. 70% of the victims complied with treatment schedule and 82% victims maintained past and present treatment records. Amongst the animal bite victims interviewed 53% victims reported at day 0 of the vaccination schedule followed by 20% reporting at day 3, 14% at day 7, 7% at day 14 and remaining at day 28.

**Table 6: Remedy taken before visiting a doctor/ARC (n=100).**

Remedy taken before visiting a doctor or ARC	Number
Washed with water alone	11
Washed with water and antiseptic	18
Applied antiseptic alone	5
Washed with water and soap	11
Applied chilli/salt/lime or other irritants	27
Applied Neem/Turmeric/Tulsi or other herbs	4
No remedy taken	24

**Table 7: Education status and remedy taken before coming to ARC.**

Education status of victim	None	Washed with water/soap/antiseptic	Applied Turmeric/Tulsi/Neem/other herbs	Applied chilli/salt/lime/other irritants	Total
<b>Upto VIII</b>	18	13	2	21	54
<b>VIII-XII</b>	4	16	1	5	26
<b>Graduation or above</b>	2	16	1	1	20
<b>Total</b>	24	45	4	27	100

Two tailed p-value = 0.003, p<0.05 shows statistically significant.

## DISCUSSION

Rabies has been recognized in India since the Vedic period (1500–500 BC) and is described in the ancient Indian scripture of Atharvaveda. In Hinduism, it is believed that dogs guard the doors of heaven and hell. Due to the religious significance, animals in India are greatly loved, worshiped and protected. This may adversely affect their control.<sup>5</sup> Also, there are many myths and misconceptions related to wound management following an animal bite/attack. These include application of herbs, oil, lime, chili powder etc., on the wound inflicted by a potential rabid animal, more faith in indigenous medicines which are of unproven efficacy. Any animal bite victim in India firstly tends to ignore the bite/attack and seeks no professional care. In case the bite is severe and fails to heal, the victim due to lack of awareness consults a quack/faith healer or goes for sorcery/witch craft.

There are no global estimates of animal bite incidence; however, studies suggest that animal bites account for tens of millions of injuries annually. Attacks by wild animals are rare whereas attacks by domestic animals are common, and may result in serious systemic diseases.<sup>6</sup> Annually, global human deaths from rabies are estimated to be around 55000 with SEAR reporting 45% of total human rabies deaths.<sup>2</sup> India reports around 18000-20000 human rabies deaths annually, maximum for any country.<sup>3</sup> In order to address this challenge, by the year 2000 the government of India adopted animal birth control as its official programme.<sup>7</sup> India aimed to halve the currently estimated number of human rabies deaths by 2016 and achieve a rabies free status by 2020.<sup>2</sup> Though progress has been made in agriculture and veterinary sciences, with India ranked first milk producer globally. This has been possible by controlling many diseases in animals. Despite all these, rabies has not yet been controlled in India.<sup>3</sup> Still there are few evidence-based interventions which can help to resolve this issue i.e.

Availability of food determines the population size of stray animals. Poor hygiene of slaughter houses, butchers, and food outlets is an added public health risk. Therefore, proper collection and disposal of garbage helps in reducing animal bites in residential areas.<sup>8</sup> Apart from these strategies, community health education along with country level legislations for responsible dog ownership were also introduced to support the programme.<sup>9</sup>

In the present study, dog was the principal biting animal in more than 95% of cases with around 70% stray dog bites. This could be due to the uncontrolled stray dog population in the city and as well as attacking nature of dogs. Dogs are territorial animals and tend to attack on outsiders. Similar results were obtained by APCRI survey of 2003 where dog was biting animal in 91.5% of cases and few other studies.<sup>1,4,10,11,12</sup> where dog bite ranges from 76-94% followed by cat bites and monkey bites account for 2-50% and 2-21% of animal bite injuries respectively.

Our present study shows that out of total dog bites, maximum (68%) of the victims were bitten by stray dogs. Similar observation has also been made by other authors.<sup>4,12,13</sup> This can be explained by the fact that in the city beautiful no strict control over the population and movements of street dogs.

In our study, around three-fourth of the animal bite cases occurred in males due to more exposure of males to the outer environment as compared to women and it compares well with the findings of other studies.<sup>11,13,14,15,16,17,18,19</sup> In this present study working age group (16-45 yrs) with 63% was found to be the most frequent victim followed by children (<15 yrs) with 26% and rest with 11%. These results are unlikely with previous studies.<sup>4,13,14,15,16,17,18,20</sup> Where children (<15 yrs) were the most frequent victim of dog bite. This could be due to the reason that males of 16-45 years of age normally go out for work/study and need to go from one place another which increases their susceptibility to bite by stray dogs.

In our study, in terms of extent of bite it was found that WHO category III bite (84.5%) was maximum. This could be due to the reason that not all animal bite cases are reported at hospitals. Only severe bites get reported. Victims with licks or minor scratches tend to ignore the bite and may take no treatment. Results of our study are in accordance with most of other earlier studies.<sup>11,13,19</sup> In contrary to above results, Jain et al found WHO category II as maximum with 85%.<sup>13</sup>

In terms of education and occupational status, we observed that more than half of animal bite victims got educated of under VIII standard and around one-third victims were students and 7% of professional. It could be because lesser educated people mostly work in unorganized sector which involves outdoor work and thus are vulnerable to animal bites. In another study by

Neelam et al 16% were found illiterate and 23% which is thrice of professional by occupation of our study estimates.<sup>19</sup>

In almost three-fourth of the cases there was a sudden, unprovoked attack by stray dog from behind the victim. These findings are moreover similar to earlier estimates of studies.<sup>13,19</sup> Of the provoked bites majority occurred while playing (50%) with the dog followed by feeding (36%), beating/scolding and teasing. Our study shows that legs (61%) were most common biting site followed by arms (24%), trunk (9%) and head and neck region (8%). Legs are more approachable for dogs to attack. Although for pet dogs' relative proportion of arm as biting site was 50% more than legs as a biting site, from total arm and leg bites. Few other studies also observed similar findings to it.<sup>13,16,17,19</sup>

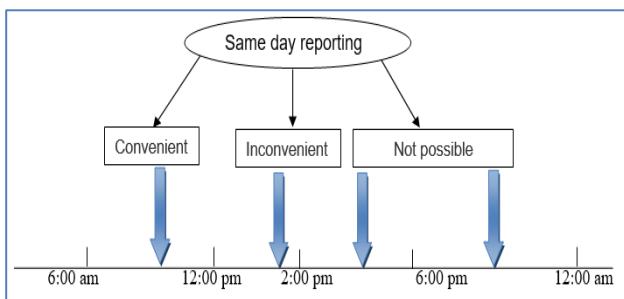
Immediate wound washing is a priority in rabies prevention. An efficient wound toilet alone decreases up to 80% chances of acquiring rabies. In this current study it was seen that around one-fourth victims applied chili/salt/lime or some other form of irritant at the wound while one-fourth victims refrained from taking any remedy. Majority of victims who applied chili/salt/other irritants were educated only up to VIII class. Also, most of the higher educated victims used correct materials for wound washing viz. water/soap/antiseptic. The findings show that with increasing education level people tend to follow correct wound washing practices. Myths and misconceptions regarding wound management practices were more prevalent amongst less educated victims. In another similar study Sekhon et al showed that 31.5% of patients did not apply anything on wound while 14.18% applied chillies on the wound.<sup>18</sup>

While in 40% of cases water was used either alone or with soap/antiseptic and few of the victims applied Turmeric/Neem/Tulsi or other herbs. Few studies also found similar results, but Shah et al studied the health seeking behavior of animal bite victims in which only 24% of cases had done the wound washing.<sup>11,13,19,21</sup> Another study by Jain et al studied that before coming to the dispensary as many as 80% had applied chili paste on the wound and only 2% had washed the wound with soap and water.<sup>13</sup>

This present study also entails that slightly less than three-fourth of the victims complied with treatment schedule and slightly more than three-fourth victims maintained past and present treatment records. Jain et al also found similar observations while as per survey, compliance to the full course of vaccination was about less than half of victims.<sup>13,12</sup> In our study we observed that around three-fourth of the victims reported to a government agency while one-fourth reported at a private agency. Results of this study is comparable to other studies.<sup>13,19</sup>

RIG/Serum which provides passive immunity is administered immediately after exposure preferably within 24 hours of bite. In the study around one fourth victims reported at the ARC within 6 hours which has best prognosis since the wound remains surgically clean up till 6 hours of exposure. Maximum number (44%) of victims reported at the ARC within 12-24 hours of bite while 28% took more than 2 days to report. Few other authors also studied and found similar observations.<sup>10,13</sup> Another study by Shah et al observed that nearly two third of cases had attended the ARV clinic within 24 hours of bite.<sup>21</sup>

Since the ARC is functional only from 9:00 am to 2:00 pm, therefore evening bite cases get to report only the next day of bite thereby losing critical time. Lack of awareness and ignorance may have led to the delay in reporting for victims taking 2 or more days in seeking care.



**Figure 1: Degree of convenience of bite victims regarding same day reporting at ARC.**

#### Time of bite

Same day reporting is only possible if bite occurs in morning upto 12:00 pm, as some time is also lost in reaching the ARC. In the absence of a 24x7 ARC facility, victims where bite occurs after 12:00 pm have the only option to report the next day. The rabies PEP requires a minimum of 5 visits spread over 1-month duration. Though treatment records were well maintained by majority of the victims, adherence to the treatment schedule was not satisfactory. Treatment compliance was improper in 30% cases where victims did not report on the desired time and date. This could be due to incomplete information provided by the staff regarding subsequent visits. Also, ignorance, lack of awareness and callous attitude of victims could be another reason. If no symptoms of disease appear victims tend to skip the last doses of vaccination. In the present study, no follow up was done to determine exact compliance rates. Survey showed that compliance to the full course of vaccination was about 40.5%.<sup>12</sup> In the present study, around half of the cases were interviewed on day 0 of their treatment. The number further reduced from day 3 to day 28 of treatment. The probable reason could be the higher drop out of patients as the treatment progressed.

#### Limitations

We would like to note a few of our study. As study area might not be generalizable to all other areas in country so in this context issue of external validation could not be addressed. In determining the care seeking behaviour not all the truth might have been told by the victims. Holding back of information by the victims is a possibility. Follow up of the animal bite cases was not done.

#### CONCLUSION

Animal bites are a neglected public health problem and remain a significant cause of morbidity and mortality worldwide. The present study revealed that dog was the biting animal in 96% of the cases. Legs (61%) were most common biting site and 71% Category III bites were recorded. Applying chilli/salt/lime or some other form of irritant at the wound was a common practice amongst victims. Majority of victims reported at the ARC/doctor within 24 hours of exposure. Government of India should frame policy and implement feasible and cost effective based on health promotion principles. Awareness amongst general public regarding seriousness of animal bites should be created. Public campaigns on prevention and management of animal bites must be organized from time to time. IEC activities should be given impetus to dispel myths and misconceptions. Rabies and its prevention strategies with special focus on wound washing practices must be incorporated in IEC activities. General public must be made aware of the benefits of efficient wound washing as well as other preventive measures of rabies. Further research and development are imperative to gain in-depth knowledge of management and control practices of this public health crisis. The solution to this disastrous situation should be multifaceted, involving simultaneous efforts from all the stakeholders.

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