Research Article

Clinico-Demographic Profile and Trend of Animal Bite Cases Attending an Anti-Rabies Clinic in a Rural District in the Sub-Himalayan Region of North India: A Record-Based Descriptive Study

Atul Gupta[1], Des Raj[2], Sakshi Thakur[3]

[1]Senior Resident, [2]Assistant Professor, [3]Student, Department of Community Medicine Shri Lal Bahadur Shastri Government Medical College and Hospital Mandi at Nerchowk, Himachal Pradesh, India
DOI: https://doi.org/10.24321/0973.5038.202502

I N F O

Corresponding Author:
Raj D, Department of Community Medicine Shri Lal Bahadur Shastri Government Medical College and Hospital Mandi at Nerchowk, Himachal Pradesh, India
E-mail Id:
dr.des.raj@gmail.com
Orcid Id:
https://orcid.org/0009-0001-4652-5887

A B S T R A C T

Introduction: Animal bites are a significant cause of morbidity and mortality worldwide. Animal saliva contains a diverse array of harmful infectious bacteria or viruses that can infect people and cause multiple fatal illnesses, including rabies. Rabies is a common, neglected, and underreported zoonotic disease with nearly a 100% case fatality rate in humans if left untreated.

Aim: This study aimed to describe the clinico-demographic profile and trend of animal bite cases in a rural district in the sub-Himalayan region of northern India.

Methodology: Record-based, descriptive study conducted in RHTC in a rural area with data extracted for two years w.e.f. 1st June 2022 to 31st May 2024 over a two-week period from 14th to 27th July 2024 regarding animal bite cases. We collected data for demographic, injury, and treatment-related variables using the EpiCollect5 application.

Result: Out of 562 animal bite cases, the mean (± SD) age was 31.7 (± 19.8) years, 64% were males, and the 10-19-year-old age group sustained the maximum (23.6%) animal bites. Dogs were the biting animals in 83.4% of cases. 50.4% of injuries were sustained on the lower limb and 45% in the upper limb. The monthly animal bite cases fluctuated with an average of 21 cases in a month.

Conclusion: A high rate of dog bite injuries among males in children and adults is observed, more on lower and upper limbs. Getting medical help after being bitten by an unfamiliar or wild animal is essential to prevent rabies.

Keywords: Rabies, Animal Bite Profile, Anti-Rabies Vaccine, Trend

Introduction

Animal bites are significant causes of morbidity and mortality worldwide. Animal saliva contains a diverse array of harmful infectious bacteria or viruses that can infect people and cause multiple fatal illnesses, including rabies.[1] The health consequences of animal bites vary depending on the type and health of the animal species, the size and health of the bitten person, and the availability of adequate health care.[2] Animal bites expose humans to the risk of developing rabies, which affects over 3.3 billion people worldwide. These exposures occur in both urban and rural areas. Most cases occur in Africa and Asia, where there are many dogs and people are living in close proximity.[3] The annual incidence of animal bites in India is 1.7% (17 per 1000 persons). Rabies is a common, neglected and underreported zoonotic disease with nearly a 100% case fatality rate in humans, if left untreated.[4] It causes a significant social and economic burden. Over 99% of human rabies cases are caused by an infected dog bite.[2] Over 59,000 individuals worldwide lose their lives to rabies each year, making it a serious public health concern. The annual incidence of dog bites in India is 17.4 million.[5] While 100% of cases of rabies are fatal, they can also be 100% prevented by adhering to timely, adequate and complete post-exposure prophylaxis. PEP includes thorough wound washing with soap and water, anti-rabies vaccination (ARV) and administration of rabies immunoglobulin (RIG) for Category III bites.[6] The evidence is increasing regarding epidemiological determinants of animal bite cases in rural areas of North India, but most of this research work is carried out in tertiary care institutions mainly.[7] Therefore, this study aimed at describing the clinico-demographic profile and trend of animal bite cases in a rural district in the sub-Himalayan region of northern India.

Methodology

A record-based, retrospective, descriptive study was conducted using anti-rabies treatment registers maintained in the Rural Health Training Centre of Shri Lal Bahadur Shastri Government Medical College and Hospital Mandi at Ner Chowk in Himachal Pradesh, a tertiary care centre in the rural area of North India. The selected RHTC, i.e., CH Gohar, is located in the rural tehsil Gohar in district Mandi, Himachal Pradesh, in the sub-Himalayan region of Northern India.

The participants who had complete data, filled in the anti-rabies register, and received ARV and/ or immunoglobulin were included in the study. Records with incomplete data in the register were excluded from the study. The data was collected in two weeks w.e.f. 14th to 27th July 2024. The data was collected from all the cases recorded from 1st June 2022 to 31st May 2024 (24 months). Data was collected through Epicollect5 application using a pre-structured tool that included details on demographics (age, gender) and injury-related characteristics (date of injury, site of animal bite, injury and treatment given). The data was entered and analyzed using Microsoft Excel. Descriptive statistics were employed to analyze the data, which were presented as proportions and percentages. The results were presented in the form of tables and graphs.

Ethical Approval

In the study, animal bite cases were not physically examined, no questions were asked, and no drugs were administered; only recorded data were examined and retrieved. Therefore, the study was deemed exempt from Institutional Ethics Committee review.

Results

A total of 616 cases were recorded in the animal bite management register in the selected RHTC, CH Gohar District Mandi, Himachal Pradesh. A total of 562 animal bite cases with complete data were extracted from this record and included for final analyses, as data was incomplete for 54 cases, mainly due to incomplete ARV schedules. (Table 1)

Table 1. Clinico- Demographic characteristics of animal bite cases during the study period

Characteristics	N (562)
Age group (Years)	N (%)
1-9	68 (12.1)
10-19	133 (23.6)
20-29	89 (15.8)
30-39	72 (12.8)
40-49	79 (14.1)
50-59	54 (9.6)
60-69	40 (7.1)
70-79	25 (4.4)
80-89	2 (0.3)
Gender	
Male	361 (64.2)
Female	201 (35.8)
Type of Animal	
Dog	469 (83.4)
Cat	61 (10.8)
Wild Animals	13 (2.3)
Monkey	10 (1.7)
Site of Animal Bite	
Lower Limb	283 (50.4)
Upper Limb	253 (45)
Face	11 (1.9)

Head & Neck	8 (1.4)
Trunk	7 (1.2)
Category of Animal Bite	
Category I	28 (4.9)
Category II	445 (79.1)
Category III	89 (16)

The study participants had a mean (± SD) age of 31.7 (± 19.8) years. The age group of 10 to 19 years recorded a maximum of 133 (23.6%) animal bite cases, followed by the 20-29-year-old age group reporting 89 (15.8%) animal bites during the study period (figure 1). In this study 64.2% of the victims were males. Among all the recorded cases in this study, 469 (83.4%), 61 (10.8%), 13 (2.3%), and 10 (1.7%) were bitten by dogs, cats, wild animals, and monkeys, respectively. The highest number of animal bites were reported in lower limbs, comprising 283 (50.4%), followed by 253 (45%) in upper limbs, and the rest (4.6%) were either bitten on the trunk, face, or head and neck region, while the data regarding multiple site bites was not available in the record. As all the cases recorded in the anti-rabies registers in the RHTC were either of Category II (79.1%) or Category III (16%), and only 4.9% were in Category I, the post-exposure treatment was given to all 534 cases either in the form of anti-rabies vaccine for Category II or anti-rabies vaccine along with Rabies Immunoglobulin, both for Category III.

The number of animal bite cases fluctuates monthly from 11 cases to 37 cases, with an average of about 21 cases per month. More cases are observed during winter months. (Figure 2)
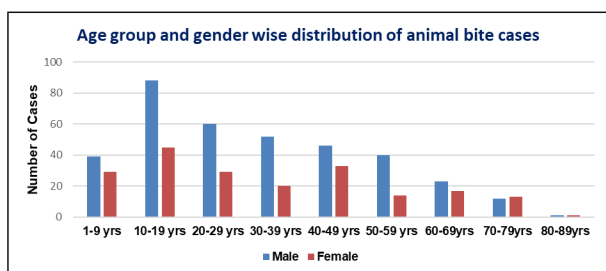

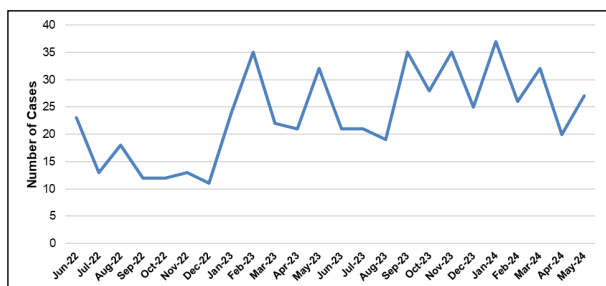**Figure 1.Age group and gender wise distribution of animal bite cases**

Figure 2.Month-wise distribution of animal bite cases during the study period

Discussion

The mean (± SD) age of animal bite victims in the present study is 31.7 (± 19.8) years, which is lower than a similar study conducted by Minhas A[7] in a tertiary care institute in Himachal Pradesh in 2015-16, where the mean age was 34.89 ± 3.9 years. The large variation in mean (and standard deviation) age of animal bite victims in our study is mainly due to the wide age range of the enrolled animal bite cases, as the youngest victim is one year old and the oldest is 81 years old.

In this study, the age group 10-19 years is most commonly affected, with 133 (23.6%) cases, followed by the 20-29 years age group with 89 (15.8%) cases. The results differ from the study by Minhas A[7], in which the 31-40 year-old age group was most commonly (20.5%) affected, and from another study by Nag K et al[8] between July and December 2012 in West Bengal, in which the age group below 10 years was most commonly (23.5%) affected, followed by the 21-30 year-old age group (19.4%), and the study by Patle RA et al[9] in Yavatmal, Maharashtra, during 2012-13. According to this study, the majority of animal bite victims were adults. This could be because a large section of this population comprises students pursuing higher education and working people, both of whom must go outside for their studies/ jobs, resulting in increased exposure to street animals.

About 35% of cases were of the paediatric age group and teenagers. Children are particularly vulnerable, most likely because they are animal lovers, have a greater tendency to provoke, and have a lower ability to defend themselves, as reported in the study from a tertiary care institute in Bengaluru during April to May 2016 by Sreenivas NS et al.[10] The study also showed that young men are disproportionately affected by animal bites.

In our study, 64.2% of males are affected, which is similar to the results of the study by Nag K et al[8] where 63% of males were affected and Tenzin D et al[11] from Bhutan in 2009-10; however, it is higher than the study by Indu D et al.[12] from Thiruvananthapuram in 2010-11 and lower than the results of the study by Minhas A[7], reporting 68.4% male victims. Since males are involved in many of the outdoor activities, it leads to increased exposure to stray dogs and other wild animals, consequently leading to a higher burden of dog bite injuries among males in our setting.

The study reported that 83.4% of individuals were bitten by dogs, followed by cats (10.8%) and other animals, which is comparable to 86.5% dog bite cases reported by Minhas A[7], 80% dog bites and 15.9% cat bites, and 75% stray animal bites reported from the study by Nag K et al.[8] and others.[13, 14] The lower limb is the most common (50.4%) site, followed by the upper limb (45%) in our study, while more (61.1%) bites were sustained in the lower limb in the

study by Minhas A[7]. Our study reported 79.1% and 16% of cases from category II and category III bites, respectively. In the study done by Minhas A[7] in a tertiary care institute in Himachal Pradesh in 2015-16, the majority (94.2%) of cases were of category III. The study by Nag K et al.[8] reported 65.8% Category III, 32.4% Category II, and only 1.8% Category I bite cases. Fewer Category III cases were reported in RHTC in this study because the majority of Category III cases were referred or directly took treatment in the nearby tertiary care centre.

However, the results of the study conducted by Sreenivas NS et al.[10] in a tertiary care institute in Bengaluru from April to May 2016 and Pavithra R et al.[15] in a tertiary care institute in Belagavi, North Karnataka, from 1st May to 30th July 2014 reported dog bite cases around 95%, which differ from our study, as ours, being a hilly state, has more species of wild animals.

As depicted in Figure 2, most dog bite cases were reported in winters, which can be attributed to the dogs being violent and having a protective nature for their puppies in this cycle of breeding season. These results were also supported by a study conducted by Borkar A et al.[16] in a tribal area in Maharashtra from 1st April 2013 to 31st March 2014, in which seasonal variation of dog bite cases in winters is reported more. A similar trend of increased animal bite cases during winters was also reported in a study from a tertiary care centre in Jabalpur during September-October 2022 by Sharma A et al[17] and other studies[18,19] while some studies[20,21] have shown more animal bite cases during the summer season.

All the bite cases were reported as appropriately managed. According to the World Health Organization (WHO), an important first aid step following an animal bite is to wash the wound with running water and soap. Unconventional home treatments, such as applying red chilies, salt, and ointments, should be avoided. This necessitates increasing public understanding of adequate first-aid treatment for animal bite injuries. Lessons, including first aid, might be made mandatory in the school curriculum. The use of television and digital channels, such as running informative shows with the assistance of health specialists, can help to disseminate information widely. The use of social media and telecommunications technologies in spreading information to the public must also be investigated. An observational study from China observed the use of a social media messaging application-based program to be a useful tool in spreading public health education regarding dog bite prevention and an effective management tool for dog bite victims.[22]

Conclusion

In the present study, a high rate of dog bite injuries, particularly among male adults and children, has been documented. Public knowledge and awareness about animal bites should be raised, particularly in low-socioeconomic areas. Since most of the victims are children and young adults, they should be made aware not to react to or provoke the animals. The public should be educated on avoidance techniques, appropriate first aid procedures and prompt bite wound health-seeking habits.

Wearing protective clothes and cleaning wounds with soap and water as the first line of therapy should be emphasized. To avoid death following a bite, prompt and efficient referral to health facilities and anti-rabies treatment, including immunization, is crucial. Additional research can be done on educational interventions.

Limitations

Since the secondary data was explored to extract the relevant data, many of the variables were not recorded. There was no mention of multiple bites on the victims or about the discontinuation of treatment. The reason for discontinuation of the treatment may be that some of the victims are visitors/ travellers who preferred treatment at their native place, and some might have taken treatment directly from a nearby tertiary care institute, about 20 kilometres away from this place.

References

1. Frey J, Mindekem R, Kessely H, Doumagoum Moto D, Naïssengar S, Zinsstag J, Schelling E. Survey of animal bite injuries and their management for an estimate of human rabies deaths in N'Djaména, Chad. Tropical Medicine & International Health. 2013 Dec;18(12):1555-62. [Google Scholar] [Pubmed]

2. World Health Organization. Rabies Fact Sheet. Geneva. World Health Organization; 2024 [Updated 2024 Jan 12]. Available at http://www.who.int/news-room/fact-sheets/detail/animal-bites. [Feb 20, 2025].

3. Jethani S, Singh SK, Kamble BD, Dobhal V, Singh S, Jha D, Ahlawat P. Epidemiological pattern and trend analysis of animal bite cases of anti-rabies clinic of tertiary care hospital of Delhi. Journal of family medicine and primary care. 2022 Feb 1;11(2):728-32.[Google Scholar] [Pubmed]

4. Praveen G, SubhaShini KJ, ShaShanK KJ, ASHIK M.

Trends of Animal Bite Cases and Comparison of Cases Reported during Pre-COVID-19 and COVID-19 Period in a Dedicated Anti-Rabies Clinic from a Tertiary Care Hospital, Hassan, Karnataka, India: A Retrospective Cohort Study. Journal of Clinical & Diagnostic Research. 2023 Sep 1;17(9). [Google Scholar]

5. Gogtay NJ, Nagpal A, Mallad A, Patel K, Stimpson SJ, Belur A, Thatte UM. Demographics of animal bite victims & management practices in a tertiary care institute in Mumbai, Maharashtra, India. Indian Journal of Medical Research. 2014 Mar 1;139(3):459-62. [Google Scholar] [Pubmed]

6. World Health Organization. Zero by 30: the global strategic plan to end human deaths from dog-mediated rabies by 2030. InZero by 30: the global strategic plan to end human deaths from dog-mediated rabies by 2030 2018. [Googale Scholar]

7. Minhas A, Singh M, Sood A, Raj D, Bhardwaj AK. Epidemiology of animal bite reported at animal bite clinic during 2015-16 at a tertiary care centre of Himachal Pradesh. Indian Journal of Community Health. 2018 Dec 31;30(4):354-60. [Google Scholar]

8. Nag K, Karmakar N, Saha I, Paul A, Mahapatra AS, Pradhan U. Awareness and practice of animal bite management among patients attending rabies clinic of a tertiary hospital, Burdwan, India. Medical Journal of Dr. DY Patil University. 2018 Nov 1;11(6):521-6. [Google Scholar]

9. Patle RA, Khakse GM. Clinico-demographic and treatment seeking profile of children below 15 years attending the anti-rabies clinic. International Journal of Medicine & Public Health. 2014 Apr 1;4(2).[Google Scholar]

10. Sreenivas NS, Sakranaik S, Sobagiah RT, Kumar A. An epidemiology of animal bite cases attending tertiary care centre of Bangalore Medical College and Research Institute, Bengaluru: a retrospective study. Int J Community Med Public Health. 2017 Jul;4(7):2538-42. [Google Scholar]

11. Tenzin, Dhand NK, Gyeltshen T, Firestone S, Zangmo C, Dema C, Gyeltshen R, Ward MP. Dog bites in humans and estimating human rabies mortality in rabies endemic areas of Bhutan. PLoS neglected tropical diseases. 2011 Nov 22;5(11):e1391. [Google Scholar] [Pubmed]

12. Indu D, Asha KP, Mini SS, Anuja U, Kirshna S. Profile study of patients attending preventive clinic for animal bites at Government medical College, Thiruvananthapuram. APCRI J. 2012;14:30-2. [Google Scholar]

13. Mohanty M, Giri PP, Sahu M, Mishra K, Mohapatra B. A study on the profile of animal bite cases attending the antirabies vaccination OPD in SCB Medical College and Hospital, Cuttack, Orissa. APCRI Journal. 2009;10(2):22-4.[Google Scholar]

14. Ganasva A, Bariya B, Shringarpure K. Perceptions and treatment seeking behaviour of dog bite patients attending regional tertiary care hospital of central Gujarat, India. J Res Med Den Sci. 2015 Jan 1;3(1):60-4. [Google Scholar]

15. Pavithra R, Viveki RG, Halappanavar AB. Socio demographic profile and management practices of animal bite cases attending anti rabies clinic in a tertiary care centre in North Karnataka. IJAR. 2015 Jan;5(1):371. [Google Scholar]

16. Kinge KV, Supe AC. Epidemiology of animal bite cases reported to anti-rabies vaccination OPD at a tertiary-care hospital, Nagpur. Int J Med Sci Public Health. 2016 Aug 1;5(8):1579-82. [Google Scholar]

17. Sharma A, Patel S, Maiti A, Mishra A. A Study on Seasonal Trends among Animal Bite Victims Reported to a Tertiary Care Hospital, Jabalpur. Journal of Public Health and Primary Care. 2024 Jan 1;5(1):39-43. [Google Scholar]

18. Hanspal JS, Bhanderi D, Nagar S. A review of attendance trend of animal bite cases in the anti-rabies clinic of GGS Hospital, Jamnagar (Gujarat). Assoc Prev Control Rabies India J. 2007;8:16-8.[Google Scholar]

19. Pratap AK, Behera TR, Satapathy DM, Sethi S, Tripathy RM. Seasonal trend of animal bite cases reporting at anti rabies clinic (ARC) of MKCG Medical College, Berhampur, Orissa. APCRI Journal. 2011;13(1):24-9. [Google Scholar]

20. Agarwal N, Reddajah VP. Epidemiology of dog bites: a community-based study in India. Tropical doctor. 2004 Apr;34(2):76-8. [Google Scholar] [Pubmed]

21. Vinay M, Mahendra BJ, Poornima S, Harish BR, Subhash P, Anil K, et al. Profile of animal bite victims and compliance to the 4 dose IDRV schedule among children attending Anti Rabies Clinic, MIMS, Mandya. J APCRI 2010;11:38-40. Available from: https://medical.advancedresearchpublications.com/index.php/APCRIJ/article/view/2263

22. Du Z, Huang W, Zhang Y, Zhang P, Liu Z, Chen Q, Wang C. Assessment of the content, usability, and benefits of the WeChat-based programme for dog bite victims in China: A prospective observation study. Medicine. 2020 Dec 11;99(50):e23657. [Google Scholar] [Pubmed]