International Journal of Life Sciences, Biotechnology and Pharma Research Vol. 14, No. 2, February 2025 Online ISSN: 2250-3137
Print ISSN: 2977-0122

DOI: 10.69605/ijlbpr_14.2.2025.105

Original Research

A Retrospective Study On Animal Bite Occurrence At A Tertiary Care Hospital

Priyanka Tiwari[1], Deepa Pandey[1], Bimal Kumar Singh[2], Meenakshi Agarwal[1]

[1] Department of Microbiology, Northern Railway Central Hospital, New Delhi, India.
[2]Department of Medicine, Northern Railway Central Hospital, New Delhi, India.

Corresponding author
Dr. Priyanka Tiwari
Department of Microbiology, Northern Railway Central Hospital, Basant Lane, New Delhi, India
Email:ptmbbs@gmail.com

Received: 21 December, 2024 Accepted: 08 January, 2025

Abstract

Introduction: "Rabies: 100 per cent fatal, 100 per cent preventable"- as rightly mentioned, but still it remains an under-reported and neglected zoonotic disease, endemic in many of the world's poorest and underserved communities. We analysed the demographic characteristics, category of exposure (as per WHO Rabies exposure Categories), post exposure prophylaxis received and outcome in terms of mortality in animal bite cases.

Methods: This was a retrospective data analysis of animal bite cases that presented in the Emergency department (ED), of a tertiary care hospital at New Delhi from 01 January 2024 till 30 June 2024.

Results: In the present study, a total of 273 animal (dog, monkey, cat, rodent) bite cases were reported, out of which 58.61% were males and 41.39% were females. 72.16% of animal bite cases were in the age group of 15-59 years, followed by 11.35% in the 5-14 years age group, 8.79% in 60-74 years, 4.76% in the age group below 5 years and 2.93% were 75 years and above. Out of 273 animal bite cases, stray dog bites were 193 (70.69%), pet dog bites were 33 (12.09%), monkey bite cases were 14 (5.13%), cat bite cases were 24 (8.79%), rodent bites were 09 (3.30%). Depending on the Category of exposure, we found 16.48% belonged to Category I, Category II were 63.74% and Category III had 19.78%. Categorising anatomically, 194 (71.06%) animal bites were in the lower limb, followed by upper limb 54 (19.78%). Animal bites on trunk were 16 (5.86%) and bites on head and neck region were 9 (3.29%). Post exposure prophylaxis (PEP) was administered in 100% cases with anti-rabies vaccine (PCEC vaccine) & the route of administration among all was intramuscular. Out of 228 patients, all category 3 bites i.e. 54 patients received 20 IU/kg body weight Human Rabies Immunoglobulin (HRIG) or 3.33 IU/kg body weight Rabies Monoclonal Antibody (RMAb) at the time of initial presentation depending on the availability of the type of ARS. No case fatality due to rabies was reported.

Conclusion: In a rabies endemic country like India, PEP needs to be accessible (both ARV and ARS) at all levels of health care as rabies is a nearly 100% fatal disease and is a vaccine-preventable viral disease.

Keywords: Rabies, exposure prophylaxis, ARV, ARS.

Introduction

"Rabies: 100 per cent fatal, 100 per cent preventable"- as rightly mentioned, but still it remains an under-reported and neglected zoonotic disease, endemic in many of the world's poorest and underserved communities.[1, 2]

Globally, dog mediated rabies causes an estimated 59,000 human deaths annually.[3] According to WHO, India accounts for 36% of the global deaths due to rabies. In India, the sudden spike in the number of cases of rabies is a major public health concern. Ministry of Health and Family Welfare (MOHFW) launched the "National Action Plan for Dog Mediated Rabies Elimination" from India by 2030.[4] Since it is a vaccine preventable disease, the significance of anti-rabies vaccine (ARV) in Post Exposure Prophylaxis (PEP) is quite evident.[5]

Materials and Methods

This was a retrospective data analysis of animal bite cases that presented in the Emergency department (ED), of a tertiary care hospital at New Delhi from 01 January 2024 till 30 June 2024. The demographic characteristics, category of exposure (as per WHO Rabies exposure Categories), type of post exposure prophylaxis received- the ARV (PCEC i.e. Purified Chick Embryo Cell vaccine) & ARS (Anti-Rabies serum) and outcome in terms of mortality were analysed. Category of exposure followed were Category I which included touching or feeding animals, animal licks on intact skin (no exposure); Category II included nibbling of uncovered skin, minor scratches or abrasions without bleeding (exposure); whereas Category III exposure referred to single or multiple transdermal bites or scratches,

DOI: 10.69605/ijlbpr_14.2.2025.105

contamination of mucous membrane or broken skin with saliva from animal licks, exposures due to direct contact with bats (severe exposure).[6]

Results

In the present study, a total of 273 animal (dog, monkey, cat, rodent) bite cases were reported, out of which 160 (58.61%) were males and 113 (41.39%) were females with a male preponderance **[Figure 1]**. 72.16% of animal bite cases were in the age group of 15-59 years, followed by 11.35% in the 5-14 years age group, 8.79% in 60-74 years, 4.76% in the age group below 5 years and 2.93% were 75 years and above **[Figure 2]**.

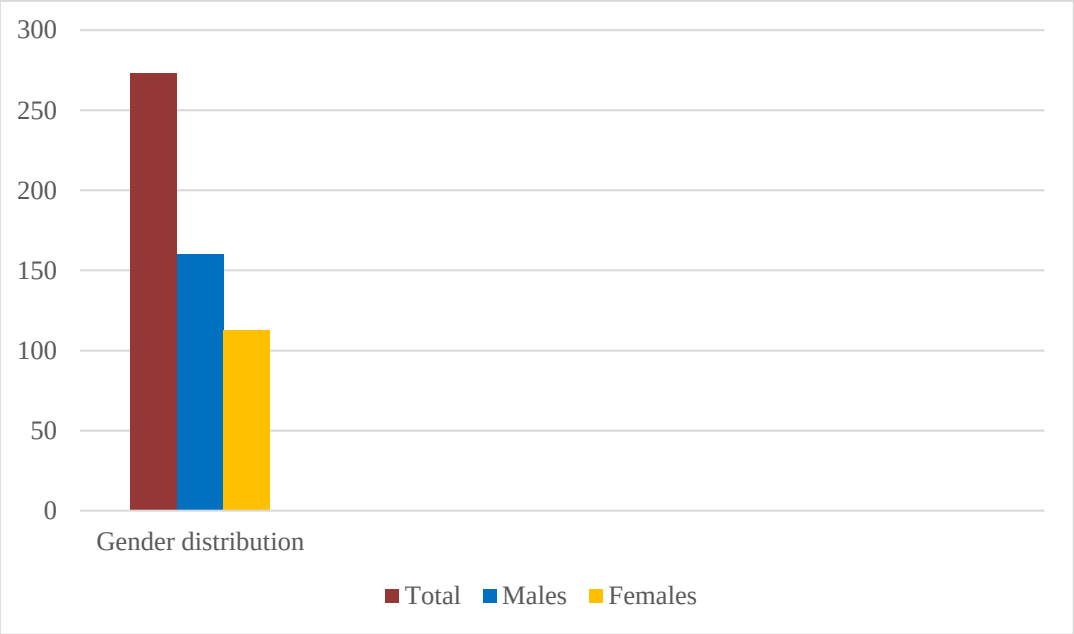

Figure 1. Gender distribution among animal bite

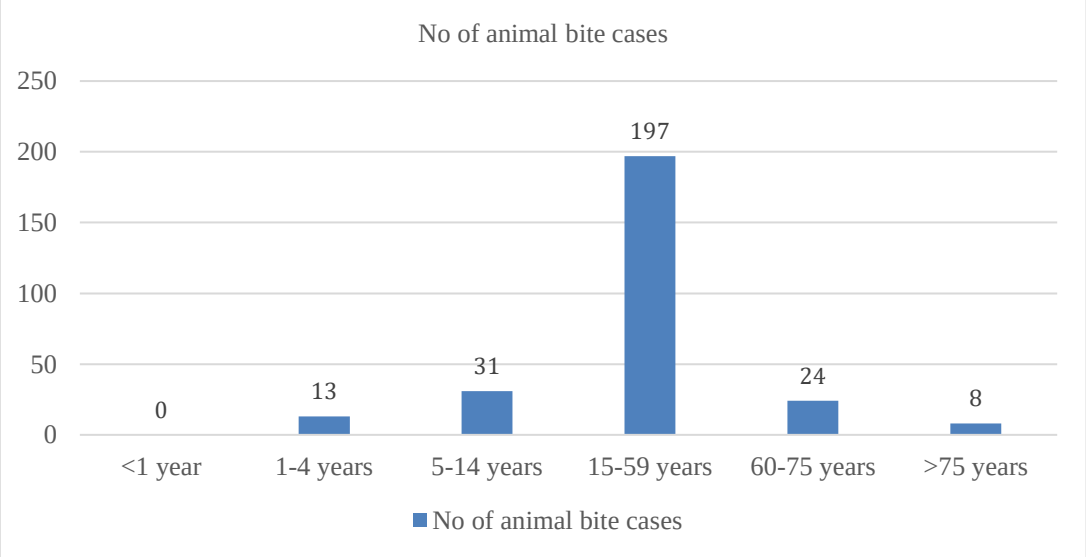

Figure 2. Age distribution of animal bite cases

Out of 273 animal bite cases, stray dog bites were 193 (70.69%), pet dog bites were 33 (12.09%), monkey bite cases were 14 (5.13%), cat bite cases were 24 (8.79%), rodent bites were 09 (3.30%) **[Figure 3]**.

DOI: 10.69605/ijlbpr_14.2.2025.105

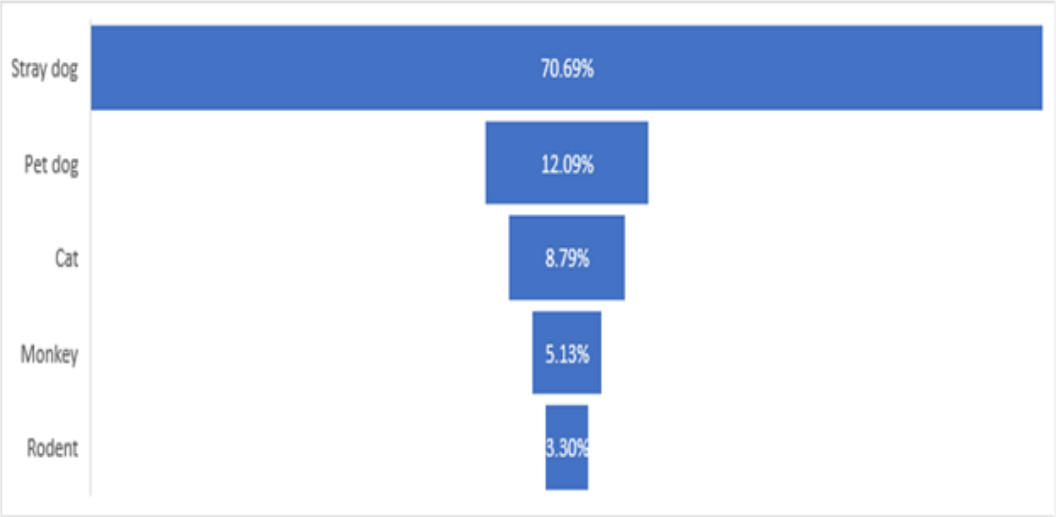

Figure 3. Distribution of animal bite cases

Depending on the Category of exposure, we found 16.48%(n=45/273) belonged to Category I, Category II were 63.74% (n=174/273) and Category III had 19.78% (n=54/273) **[Figure 4]**. Maximum bites were category II (63.74%) followed by category III bites (19.78%) and least were category I bites (16.48%).
Categorising anatomically, 194 (71.06%) animal bites were in the lower limb, followed by upper limb 54 (19.78%). Animal bites on trunk were 16 (5.86%) and bites on head and neck region were 9 (3.29%) **[Table 1]**.
Post exposure prophylaxis was administered in 100% cases with anti-rabies vaccine (PCEC vaccine) & the route of administration among all was intramuscular. Out of 228 patients, all category 3 bites i.e. 54 patients received 20 IU/kg body weight Human Rabies Immunoglobulin (HRIG) or 3.33 IU/kg body weight Rabies Monoclonal Antibody (RMAb) at the time of initial presentation depending on the availability of the type of ARS. No case fatality due to rabies was reported.

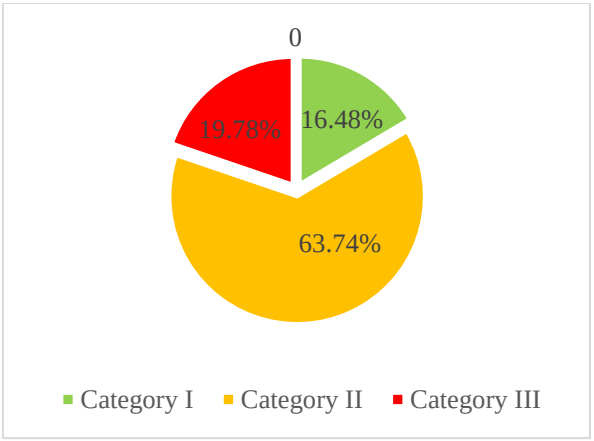

Figure 4. Category of animal bite exposure as per WHO guidelines

Bite over various body parts	No. of cases
Lower limb	194 (71.06%)
Upper limb	54 (19.78%)
Trunk	16 (5.86%)
Head and neck	9 (3.29%)

Table 1. Distribution of the Animal bite over various parts of the body

Discussion:
Rabies is a serious public health problem in over 150 countries and territories, mainly in Asia and Africa. It is a viral, zoonotic, neglected tropical disease that causes tens of thousands of deaths annually, with 40% being children under 15.[7] Once the virus infects the central nervous system and clinical symptoms appear, rabies is fatal in 100% of cases. However, rabies deaths are preventable with prompt post exposure prophylaxis (PEP) by stopping the virus from reaching the central nervous system. PEP consists of thorough wound washing, administration of a course of human rabies vaccine and, when indicated, rabies immunoglobulins (RIG). [7]

DOI: 10.69605/ijlbpr_14.2.2025.105

In the present study it was found that, males were major victims of animal bite. This could be because of higher outdoor activities of males. Similar findings were reported in a study conducted by Satapathy et al.[8] In the present study, around 82.78% of animal bites were dog bites followed by cat bite (8.79%), monkey bite (5.13%) and rodent bite (3.30%) which differed with a study conducted by Kumar S et al.[9] Our study found that the main biting animal was dog, which is similar to various other studies.[10,11,12] In present study, stray dog was the common biting animal similar to other studies.[10,11,12]

Washing with soap and water for 15-20 minutes is the first recommended in dog bites especially.[13] In the present study majority (65%) of victims washed their wound with soap and water. This finding was comparable to a study conducted by Harish et al.[14], where 69.8% of study population washed their wound with soap and water. However, the study findings differed with a study conducted by Jahnavi et al.,[15] where only 33% of them had washed their wound with soap and water and 12% had applied irritants to the wound.

In our study almost 70% of patients received post exposure prophylaxis within 24 hours of animal bite. This could be because of the reason that our health facility is easily accessible as it is located near the residential premises and the anti-rabies vaccination and anti-rabies serum is available round the clock in our emergency department and most of the patients exposed to animal bites even during evening and night report to the emergency department the same day. This finding was similar to a study conducted by Kumar S et al.[9], which reported that approximately two-thirds of their study population received the post exposure prophylaxis within 24 hours of animal bite.

In the present analysis, the route of vaccine administration among all category II and III bites was intramuscular. Improper or non-administration of ARS or poor wound management provides more time for the virus to spread. Hence, the vaccine alone is not sufficient to prevent rabies in category III exposure, and ARS must be given for passive immunity as soon as possible. WHO recommends infiltration of RIG / RMAb as anatomically possible, into or close to all Category III animal bite wound(s) for post exposure prophylaxis.[5] The WHO recommend rabies antibody titre of at least 0.5 IU/ml as an adequate level of protection against rabies.[16]

The maximum dose of Human RIG (HRIG) is 20 IU/kg body weight, for Equine RIG (ERIG) is 40 IU/kg body weight and for Rabies Monoclonal Antibody (RMAb) the dosage is 3.33 IU/kg body weight.[5] Interestingly, Scholand SJ et al.[17] highlighted the need for revision of current three exposure categories to include a special fourth Category (Cat IV) to acknowledge the severity and increased risk and subsequently optimize wound care, infiltration with the full dose of intact RIG (i.e. human RIG or RMAbs) if the patient was previously unvaccinated. They pointed out that current recommendations do not address multiple factors like route, wound severity, depth, contamination, viral dose, proximity to highly innervated areas and the CNS, and the number of lesions, are not yet considered.

It would be prudent to mention that 99 per cent of human rabies cases are due to dog-to-human transmission & can be eliminated at source by mass canine rabies vaccination campaigns. Eliminating rabies from dog populations will significantly reduce human exposure to the disease.[1] Integrated Disease Surveillance Programme (IDSP) monitors rabies data in India by providing weekly data on disease trends and seasonality.[4]

Fortunately, no mortality related to rabies was reported in our study since the population is educated and health facilities are easily accessible, along with availability of ARV.

The current rabies crisis in many countries including India is not controlled because stray dogs and other rabid animals roam freely and attack people. Local municipalities need to be strengthened in terms of resources and funding in the development of effective control measures. More research & surveillance need to be conducted to estimate the levels of neutralizing anti-rabies antibodies in serum from vaccinated humans, unvaccinated humans domesticating pets and animals and even in unvaccinated general population without any documented history of animal bite/ occupational exposure.

Conclusion:

In a rabies endemic country like India, PEP should be made accessible and available (both ARV and ARS) at all levels of health care as rabies is a nearly 100% fatal disease and is a vaccine-preventable viral disease.

References:

1. World Health Organisation (WHO). 2015. Rabies: 100 per cent fatal, 100 per cent preventable. https://www.who.int/publications/i/item/vr-148.
2. Abela-Ridder, B. Rabies: 100 per cent fatal, 100 per cent preventable. Veterinary Record 2015, 177. 10.1136/vr.h4196. PMID: 26251539.
3. Hampson K, Coudeville L, Lembo T, et al. Estimating the global burden of endemic canine rabies. PLoSNegl Trop Dis. 2015;9(4):e0003709.
4. Ministry of Health and Family Welfare, Government of India. National Rabies Control Programme. National Guidelines for Rabies Prophylaxis, 2019.
5. WHO Guide for Rabies Pre and Post Exposure Prophylaxis in Humans updated 2014.
6. World Health Organization Weekly Epidemiological Record. Rabies Vaccines: WHO Position Paper April 2018. 20 April 2018 No 16. [(accessed on 22 January 2022)];2018 Volume 93:201–220. Available online: http://www.who.int/wer. [Google Scholar]
7. Rabies - World Health Organisation (WHO). June 2024. Available online: https://www.who.int./news-room/fact-sheets/detail/rabies.
8. Satapathy, Durga Madhab, Karmee, et al. A trend analysis of animal bite cases attending a Tertiary Care

DOI: 10.69605/ijlbpr_14.2.2025.105

Hospital, Odisha during COVID lockdown. Indian Journal of Public Health. 2021;65(4):384-86.
9. Kumar S et al. Epidemiological profile of animal bite patients attending emergency department at a tertiary care health facility in a northern hilly Indian city. Int J Community Med Public Health. 2019;6(7):3014-17.
10. Sahu KK, Manar MK, Singh SK, Singh H. Epidemiological characteristics of patients attending for rabies post exposure prophylaxis at the infectious diseases hospital of Lucknow, India. J Global Infect Dis. 2015;7:30-2
11. Thangaraj, Jeromie Wesley Vivian Patil, Deepak B et al. Estimates of the burden of human rabies deaths and animal bites in India, 2022–23: a community-based cross-sectional survey and probability decision-tree modelling study. The Lancet Infectious Diseases, Volume 0, Issue 0.
12. Sudarshan M, Mahendra BJ et al. An Epidemiological Study of Animal Bites in India: Results of A Who Sponsored National Multi-Centric Rabies Survey. J. Commun. Dis. 38 (1) 2006:32-39
13. K. Park Textbook of Preventive and Social Medicine 27th edition.
14. Harish BR, Mahendra BJ, Subhash BP, Vinay M. Profile of women reporting to Anti Rabies clinic at Mandya Institute of Medical Sciences, Mandya, Karnataka. APCRI J. 2010;12(1):26-9.
15. Jahnavi R, Vinay M, Manuja LM, Harish BR. Profile of patients attending anti rabies clinic in a government tertiary care hospital in south Karnataka and their compliance to 4 dose intra dermal rabies vaccine. APCRI J. 2015;17(1):12-5.
16. WHO Immunological Basis for Immunization Series Module 17: Rabies Update 2017.
17. Scholand SJ, Quiambao BP, Rupprecht CE. Time to Revise the WHO Categories for Severe Rabies Virus Exposures-Category IV? Viruses. 2022 May 22;14(5):1111. doi: 10.3390/v14051111. PMID: 35632852; PMCID: PMC9146666.