

Burden, epidemiological profile, and wound management practices of dog bite injuries at Government General Hospital, Machilipatnam: A retrospective observational study.

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Abstract

Background

Dog bite injuries remain an important public health problem because of wound-related morbidity, demand for emergency care, and the risk of rabies after exposure. Hospital-based data help quantify service burden and guide post-exposure prophylaxis planning.

Objective

To assess the burden, epidemiological profile, and documented wound management practices of dog bite injuries at Government General Hospital, Machilipatnam.

Methods

This retrospective, record-based cross-sectional observational study reviewed all eligible dog bite injury records reported from January to December 2025. A total-enumeration approach was used, with all documented eligible cases during the study period included. Data were compiled for demographic categories and documented management practices. Descriptive statistics were used, and results were expressed as frequencies and percentages.

Results

A total of 3776 dog bite injury cases were reported during the one-year study period. Adult males constituted the largest group with 1905 cases (50.5%), followed by adult females with 1114 cases (29.5%). Male children accounted for 515 cases (13.6%), and female children accounted for 242 cases (6.4%). Overall, males, including adult males and male children, represented 2420 cases (64.1%), while females represented 1356 cases (35.9%). Adults formed 3019 cases (80.0%), and children formed 757 cases (20.0%). Documented management practices included wound washing, rabies vaccination, and rabies antiserum administration where clinically indicated.

Conclusion

Dog bite injuries contributed a substantial clinical burden at Government General Hospital, Machilipatnam. Adult males were the most frequently affected group, while children formed one-fifth of the caseload. Strengthening wound care documentation, vaccine completion tracking, rabies antiserum availability, and public awareness can improve post-exposure care quality.

Recommendations

Strengthen wound care documentation, ensure vaccine completion, maintain rabies antiserum availability, improve surveillance, and expand awareness on dog bite prevention.

Keywords: Dog bite; epidemiology; rabies vaccine; rabies antiserum; wound management; retrospective study; post-exposure prophylaxis.

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Introduction

Dog bite injuries are a persistent public health concern across both urban and rural settings, with clinical implications extending from minor abrasions to deep wounds, secondary infection, disfigurement, disability, and rabies exposure. Globally, dog-mediated rabies continues to impose preventable mortality and economic loss, particularly in countries where canine rabies remains endemic and where rapid access to post-exposure prophylaxis is uneven [1]. In India, animal bite surveillance has repeatedly shown that dogs are the predominant biting animals, and public hospitals commonly serve as the first point of care for exposed individuals because anti-rabies vaccine and rabies immunoglobulin services are concentrated in government facilities [2-4].

The burden of dog bite injuries is shaped by community dog density, human-dog interactions, occupational mobility, school-going activities, health-seeking behaviour, and local awareness of first aid. Indian multicentric data have documented a predominance of male victims and a high proportion of paediatric exposures, reflecting greater outdoor activity, contact with stray animals, and delayed recognition of risk among children [2,3]. Similar hospital-based studies have shown that animal bite clinics face substantial daily caseloads and that many patients present with wounds requiring structured triage, exposure categorisation, vaccine administration, and counselling for follow-up doses [5,6]. Such evidence is especially relevant for district-level hospitals that manage large volumes of preventable exposure events.

Appropriate wound management is central to rabies prevention. Immediate and thorough washing of the wound reduces viral inoculum and bacterial contamination, while anti-rabies vaccination stimulates active immunity after exposure [7,8]. Rabies immunoglobulin or antiserum provides passive neutralisation at the wound site in severe exposures and is particularly important in category III wounds [9-12]. Despite the availability of effective post-exposure prophylaxis, gaps persist in timely wound washing, use of rabies immunoglobulin, adherence to the vaccination schedule, and accurate documentation of care [6,8-10]. These gaps are critical because rabies remains almost uniformly fatal after the onset of clinical disease.

Local hospital data are valuable for planning vaccine stocks, maintaining rabies antiserum availability, improving patient flow, and designing community awareness programmes. Retrospective record-based studies, although limited by existing documentation, provide practical evidence on caseload

magnitude and affected demographic groups. Government General Hospital, Machilipatnam caters to a large population and receives a continuous flow of dog bite injury cases. The present study was conducted with the objective of assessing the burden, epidemiological profile, and documented wound management practices of dog bite injuries reported at Government General Hospital, Machilipatnam over a one-year period from January to December 2025.

Methodology

Study design and setting

This was a retrospective, record-based cross-sectional observational study conducted at Government General Hospital, Machilipatnam, Andhra Pradesh, India. Hospital records of dog bite injuries reported during the one-year period from January 1 to December 31, 2025, were reviewed. Government General Hospital, Machilipatnam, is a public-sector teaching and referral hospital associated with Government Medical College, Machilipatnam. It provides outpatient, inpatient, and emergency services to residents of Machilipatnam and surrounding urban and rural areas, including assessment and post-exposure management of animal-bite injuries. The retrospective cross-sectional design was used to quantify the one-year hospital burden and describe the epidemiological profile and documented wound-management practices without altering patient care.

Study population and participant selection

The source population comprised all patients registered at Government General Hospital, Machilipatnam, with a documented history of dog bite injury during the defined study period. A total-enumeration (census) approach was used; every eligible record available from January through December 2025 was reviewed, and no random or convenience sampling was performed. Records were included irrespective of age or sex when dog bite was clearly identified as the cause of injury. Records with insufficient identification of the exposure type and duplicate registrations were excluded during data compilation. After applying these criteria, 3776 unique dog bite injury records were included in the final analysis.

Study size

Because the study used total enumeration of all eligible dog bite injury records over the predefined one-year period, a separate sample-size calculation was not required. The final study size was 3776 eligible records.

Data collection procedure

Data were extracted from available hospital registers and clinical records using a structured data abstraction format. The extracted variables included total number of dog bite cases, demographic category, and documented management practices. The demographic grouping used in the available records included adult male, adult female, male child, and female child. For grouped analysis, adult male and male child categories were combined as males, while adult female and female child categories were combined as females. Adult male and adult female categories were combined as adults, while male child and female child categories were combined as children.

Bias

Potential selection bias was reduced by including all eligible dog bite records during the study period rather than selecting a subset of cases. Duplicate registrations and records in which dog bite exposure could not be clearly identified were excluded according to the stated eligibility criteria. To limit information and misclassification bias, data extraction was restricted to variables explicitly documented in the hospital registers and clinical records and was performed using a structured abstraction format. The compiled dataset was checked for duplicate entries and internal consistency before analysis, and clinical details that were not documented in the source records were not inferred.

Operational definitions and management variables

Dog bite injury was defined as any hospital-recorded bite injury attributed to a dog during the study period. Wound management practices were assessed from documented entries and included wound washing, administration of rabies vaccine,

and administration of rabies antiserum where clinically indicated. These management components were interpreted as core elements of post-exposure prophylaxis, consistent with standard principles of rabies prevention that emphasise local wound care, active immunisation, and passive immunisation for high-risk exposures [8,11,12].

Statistical analysis

Data were entered into a spreadsheet and checked for duplicate entries and internal consistency before analysis. Descriptive statistics were used because the study objective was to describe hospital burden and distribution rather than test causal associations. Frequencies and percentages were calculated for demographic categories, sex-wise distribution, and age-group distribution. Documented wound-management practices were summarised descriptively because the source records did not provide complete patient-level counts for each management component. Percentages were rounded to one decimal place.

Ethical considerations

Ethical approval for this retrospective, record-based cross-sectional observational study was obtained from the Institutional Ethics Committee, Government Medical College, Machilipatnam, with approval number GMCM/IEC/005/2026, dated 15/04/2026. The study was conducted at Government General Hospital, Machilipatnam, using existing hospital records without direct patient contact. Patient names and personal identifiers were removed from the data collection sheet to maintain confidentiality and privacy.

Results

A total of 3776 dog bite injury cases were reported at Government General Hospital, Machilipatnam during the one-year retrospective study period from January to December 2025. This indicates a substantial clinical burden of dog bite injuries presenting to the hospital during the study period. Among the total cases, adult males constituted the largest group, accounting for 1905 cases (50.5%), followed by adult females with 1114 cases (29.5%). Male children contributed 515 cases (13.6%), while female children accounted for 242 cases (6.4%). The distribution of dog bite injury cases according to demographic category is shown in Table 1.

Table 1: *Distribution of Dog Bite Injury Cases According to Demographic Category*

Demographic category	N	%
Adult male	1905	50.5
Adult female	1114	29.5
Male child	515	13.6
Female child	242	6.4
Total	3776	100.0

Note. N = 3,776. Values are presented as frequency and percentage.

When grouped by sex, dog bite injuries were more common among males than females. Overall, males, including adult males and male children, represented 2420 cases (64.1%),

whereas females, including adult females and female children, represented 1356 cases (35.9%). Adults formed the majority of the study population with 3019 cases (80.0%), while children accounted for 757 cases (20.0%). The sex-wise and age-group-wise distribution is shown in Table 2.

Table 2: *Sex- and Age-Group Distribution of Dog Bite Injury Cases*

Variable	Category	N	%
Sex	Male	2420	64.1
	Female	1356	35.9
Age group	Adults	3019	80.0
	Children	757	20.0

Note. N = 3,776. Percentages are based on the total number of dog bite injury records.

Regarding wound management practices, the documented management approach included wound washing, administration of rabies vaccine, and use of rabies antiserum

where indicated. Wound washing formed the immediate local care measure, while rabies vaccination and rabies antiserum represented key components of post-exposure prophylaxis for prevention of rabies following dog bite injuries. The documented wound management practices are summarised in Table 3.

Table 3: *Documented Wound Management Practices Among Dog Bite Injury Cases*

Management practice	Description
Wound washing	Immediate local wound care after dog bite injury
Rabies vaccine	Post-exposure rabies vaccination
Rabies antiserum	Passive immunisation used where clinically indicated

Note. Management practices reflect items documented in the available records. Patient-level proportions for receipt of each component were not available in the source dataset.

Overall, the study demonstrates that dog bite injuries contributed a considerable outpatient and emergency care burden at Government General Hospital, Machilipatnam. Adult males were the most commonly affected group, followed by adult females and male children. The management pattern was

centred on wound cleaning and rabies post-exposure prophylaxis through rabies vaccine and rabies antiserum.

Discussion

The present retrospective observational study demonstrates a considerable burden of dog bite injuries at Government General Hospital, Machilipatnam, with 3776 cases recorded over one year. This volume reflects the continuing public health relevance of dog bite injuries in coastal Andhra Pradesh

and highlights the operational pressure placed on public hospitals that provide first-line wound care, anti-rabies vaccination, and rabies antiserum services. The high caseload also indicates the need for uninterrupted vaccine supply, trained staff, and standardised documentation at anti-rabies care points.

Adult males formed the largest affected group, accounting for half of all cases, and the overall male proportion was 64.1%. This finding is consistent with Indian multicentric evidence, where male predominance has been repeatedly observed among animal bite victims. Greater outdoor exposure, travel for work, occupational activities, and increased contact with street dogs could explain this pattern. The male-to-female ratio of approximately 1.8:1 in the present study is also comparable to hospital-based animal bite studies that report higher bite occurrence among males [6,9]. From a prevention perspective, adult men engaged in outdoor work and commuting represent an important target group for health education on immediate wound washing and timely reporting to healthcare facilities.

Children accounted for 20.0% of dog bite cases, with male children affected more often than female children. Although the paediatric proportion was lower than that reported in some multicentric studies, it remains clinically important because children are at higher risk of severe injuries due to short stature, inability to avoid aggressive animals, and delayed communication of exposure [13]. Paediatric dog bite prevention requires school-based education, parental awareness, supervision around dogs, and clear messages that even apparently small bites and scratches require prompt medical attention.

The documented management practices included wound washing, rabies vaccination, and rabies antiserum administration where indicated. This aligns with the core principles of post-exposure prophylaxis described in the literature [11,12,14]. However, the available data did not quantify the proportion of patients receiving each component, the wound category, the timing of presentation, or completion of vaccine schedule. Other Indian studies have shown that wound management practices, rabies immunoglobulin use, and vaccine compliance remain inconsistent despite the availability of prophylaxis [8-10]. Therefore, routine registers should capture exposure category, anatomical site, time since bite, wound washing status before arrival, vaccine dose schedule, and antiserum use. Such improvements would convert service records into stronger surveillance evidence and support rabies elimination activities.

Generalizability

The findings of this study may be applicable to similar government hospitals and anti-rabies clinics serving semi-urban, rural, and coastal populations in Andhra Pradesh and comparable Indian settings. The large one-year caseload provides useful insight into the service burden and demographic pattern of dog bite injuries. However, as this was a single-centre retrospective study based on available hospital records, the results may not fully represent community-level dog bite incidence, private healthcare utilisation, or patients who did not seek medical care.

Conclusion

Dog bite injuries formed a substantial clinical and public health burden at Government General Hospital, Machilipatnam, with 3776 cases recorded during January to December 2025. Adult males were the most frequently affected group, and children contributed one-fifth of the total caseload. The documented management pattern included wound washing, rabies vaccination, and rabies antiserum administration where indicated. These findings support the need for sustained anti-rabies services, assured vaccine and antiserum supply, improved wound care documentation, and focused community education within a public hospital framework. A strengthened hospital registry capturing exposure category, wound site, presentation delay, and vaccine completion would improve surveillance quality and guide local rabies prevention strategies.

Limitations

The study was limited by its retrospective record-based design and dependence on existing hospital documentation. Details such as bite category, anatomical site, stray or pet dog status, time interval before reporting, vaccine dose completion, and exact number receiving rabies antiserum were unavailable. The findings represent a single hospital and cannot be generalised to all community dog bite events in Machilipatnam.

Recommendations

Hospitals should maintain dedicated anti-rabies clinics with uninterrupted vaccine and rabies immunoglobulin supply. Standardised registers should record exposure category, wound site, time of presentation, wound washing, vaccination schedule, and completion status. Emergency staff require periodic training on wound assessment, infiltration of rabies immunoglobulin, counselling, and follow-up reminders.

Community education should emphasise immediate washing with soap and water, early hospital reporting, and avoidance of unsafe contact with stray dogs. School-based awareness, responsible pet ownership, dog sterilisation, and coordinated municipal surveillance can reduce bite incidence. Regular audit of records will improve post-exposure prophylaxis quality and support local rabies-control planning more effectively sustainably.

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Conflict of interest

The authors declare no conflict of interest.

Author contributions

BM: Concept and design of the study, data compilation, results interpretation, review of literature, preparation of the first draft, and revision of the manuscript. **VAL:** Study design, data verification, results interpretation, literature review, manuscript drafting, and critical revision. **AM:** Data collection support, data organisation, review of literature, manuscript preparation, and revision of the manuscript. **ADR:** Overall supervision, interpretation of findings, review of literature, critical review, and final approval of the manuscript.

Data availability

Data are available from the corresponding author on reasonable request.

Author Biography

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