

Original Research Article

A hospital-based cross-sectional study on animal bite wound cases in the rural block of Khurda district

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ABSTRACT

Background: Rabies remains a major public health concern in India, accounting for 36% of global rabies deaths. This study evaluates animal bite wound management practices at Community Health Center (CHC) Mendhasal, Khurda district. Objective of the study was to describe the socio-clinical profile of animal bite wound cases, assess anti-rabies prophylaxis modalities, and recommend improvements.

Methods: A descriptive cross-sectional study was conducted among 120 randomly selected animal bite cases registered at CHC Mendhasal from December 2023 to March 2024. Data were collected via telephonic interviews using a validated questionnaire.

Results: Most victims were male (78%) and adults (>18 years: 64.2%). Dog bites (91%) and unprovoked attacks (68%) were predominant. All category III cases received RIG. However, 17% used plant products on wounds, and 33% of bleeding wounds were misclassified as category II.

Conclusions: While vaccination coverage was high, gaps in wound classification and harmful first aid practices persist. Training and community awareness are essential to achieve zero rabies deaths by 2030.

Keywords: Animal bite, Rabies prevention, Post-exposure prophylaxis, Hospital-based cross-sectional study, Rural Odisha

INTRODUCTION

Rabies is an acute, progressive encephalitis that remains almost universally fatal once clinical symptoms appear, yet it is entirely preventable through timely wound care and appropriate post-exposure prophylaxis (PEP).^{1,2} India accounts for a disproportionately high share of global rabies mortality, contributing an estimated one-third of the world's dog-mediated human rabies deaths.³ The burden is particularly pronounced in rural and peri-urban regions, where exposure to stray dogs is common, delays in seeking care are frequent, and traditional first-aid practices persist.⁴⁻⁶ Community health centres (CHCs) serve as critical points of first contact for bite victims, providing wound assessment, WHO-based wound categorization, and administration of anti-rabies vaccine (ARV) and rabies immunoglobulin (RIG).⁷ Despite clear national guidelines

under the National Rabies Control Programme (NRCP), variability in wound classification, first-aid practices, and PEP delivery has been documented across primary-care settings.⁸⁻¹⁰ Gaps in community awareness further compound the challenge, as inappropriate wound applications and delayed presentation remain common in many rural settings.^{11,12}

The objectives of this study were: to describe the socio-clinical profile of animal bite cases, to assess the modalities of anti-rabies prophylaxis at the community health centre, and to suggest evidence based recommendations for improving quality of prevention.

The findings provide a foundation for evidence-based recommendations aimed at strengthening clinical practice, reducing preventable exposures, and driving India's

commitment to eliminating dog-mediated human rabies deaths by 2030.¹³⁻¹⁵

METHODS

Study design and setting

A descriptive cross-sectional study was conducted at CHC Mendhasal, a rural health facility in Khurda district, Odisha, between December 2023 and March 2024. The CHC serves a semi-urban and rural catchment population with a high burden of animal bite cases.¹⁶

Sampling

The sampling frame included all 156 animal bite cases recorded in the CHC register during the study period. Using Slovin's formula with 5% precision, the minimum required sample size was calculated as 112.¹⁷ After adjusting for 5% non-response, the target sample size was 118. Ultimately, 120 eligible participants were included, improving the precision of estimates. Simple random sampling was performed using a computer-generated sequence.

Eligibility criteria

Inclusion criteria were: documented animal bite registered at CHC Mendhasal, valid contact number, and provision of verbal informed consent. Exclusion criteria included human bites, repeat exposures during the study period, and critically ill individuals unable to participate in telephonic interviews.

Data collection

Data were collected using a pretested, expert-validated questionnaire administered via telephonic interviews. Variables included socio-demographic characteristics, bite history, wound classification, first-aid practices, and PEP details. Data were stored in a password-protected repository accessible only to the research team.

Data analysis

Data were cleaned and analysed using descriptive statistics. Frequencies and percentages were used to summarize categorical variables. Cross-tabulations were performed to explore patterns in wound characteristics and management practices. Given the descriptive design, no inferential tests were applied.

RESULTS

The study included 120 animal bite cases. Table 1 summarizes the socio-demographic profile: most participants were male (94/120; 78%) and adults aged >18 years (77/120; 64.2%). Table 2 presents bite history: dog bites accounted for the majority of exposures (109/120; 91%), unprovoked attacks were more common

than provoked ones (82/120; 68%), and more than half of incidents involved stray animals (69/120; 57.5%). Table 3 details wound characteristics and management: oozing of blood was reported in 61 cases (51%), yet 76 wounds (63%) were recorded as WHO category II, suggesting potential misclassification of bleeding wounds. Wound washing for at least 15 minutes was reported by 110 participants (92%), although 20 (17%) applied plant-based products and 5 (4%) used antibacterial ointments, indicating persistence of inappropriate first-aid practices. All eligible participants received anti-rabies vaccination (120/120; 100%), and all WHO category III cases received rabies immunoglobulin (44/44; 100%), demonstrating strong adherence to recommended post-exposure prophylaxis at the health facility.

Table 1: Socio-demographic profile of study participants.

Variables	Category	Frequency (%)
Gender	Male	94 (78)
	Female	26 (22)
Age group (years)	<10	21 (17.5)
	10–18	22 (18.3)
	>18	77 (64.2)
Ration card	Yes	83 (69)
	No	37 (31)
Health insurance	Yes	81 (67.5)
	No	39 (32.5)

Table 2: Animal bite history of study participants.

Variables	Category	Frequency (%)
Type of animal	Dog	109 (91)
	Cat	11 (9)
Provocation	Unprovoked	82 (68)
	Provoked	38 (32)
Domestication	Pet	51 (42.5)
	Stray	69 (57.5)

Table 3: Wound management practices.

Variables	Category	Frequency (%)
Oozing of blood	Yes	61 (51)
	No	59 (49)
WHO category	Category III	44 (37)
	Category II	76 (63)
Wound washing ≥15 min	Done	110 (92)
	Not done	10 (8)
Local applications	Plant products	20 (17)
	Antibacterial ointment	5 (4)
Vaccination	Given (cat II and III)	120 (100)
RIG (cat III)	Given	44 (100)

DISCUSSION

This study provides important insights into animal bite wound management practices at a rural CHC in Odisha. The high proportion of dog bites and predominance of unprovoked attacks align with national and global epidemiological patterns, where domestic and stray dogs account for the majority of human rabies exposures.^{18,19} The demographic profile, with a higher proportion of adult male victims, is consistent with previous studies attributing increased exposure to occupational and outdoor activities.²⁰ The facility demonstrated strong adherence to PEP protocols, with 100% vaccination coverage and universal RIG administration for category III wounds. These findings reflect effective supply chain management and provider compliance with NRCP guidelines.²¹ However, notable gaps were observed in wound classification, with one-third of bleeding wounds misclassified as category II. Misclassification may result in underuse of RIG and inadequate protection, a concern highlighted in multiple clinical audits across India.^{22,23} Pre-hospital practices remain an area of concern. Although most participants reported washing wounds for ≥ 15 minutes, 17% applied plant-based products and 4% used non-recommended topical agents. Such practices have been widely documented and are associated with delayed care-seeking and increased risk of infection.²⁴ Targeted community education, particularly through pharmacies and informal providers, is essential to address these gaps. The findings underscore the need for standardized training for frontline clinicians on WHO wound classification and RIG indications. Integrating human and animal health interventions through a One Health framework including mass dog vaccination, community engagement, and improved surveillance remains central to achieving India's goal of zero human rabies deaths by 2030.²⁵

CONCLUSION

This study provides valuable local evidence on animal bite wound management in rural Odisha. While vaccination and RIG administration were strong, gaps in wound classification and first aid practices persist. Strengthening provider training and community awareness is essential to support India's goal of zero rabies deaths by 2030. This study's strengths include a complete CHC register sampling frame, random selection, and attainment of a sample size that exceeded the calculated requirement, which together strengthen the internal validity of descriptive estimates. Limitations include reliance on telephonic self-report for some variables (risking recall and social-desirability bias), and a single-centre design that limits external generalizability.

Recommendations

Recommendations include: sensitization of medical officers on classifying animal bite wounds, behaviour change communication on dos (application of virucidal agents viz.; povidone-iodine), and do not (avoid skin

irritants (like plant products). The IEC campaign needs to target medicine stores and pharmacists on potential virucidal agents.

Future research should include mixed-methods community-based studies to explore cultural beliefs and decision-making related to first-aid practices. Multi-site clinical audits and prospective observational cohorts are needed to quantify misclassification rates and evaluate the impact of targeted interventions on PEP timeliness and appropriateness.

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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