



## EPIDEMIOLOGICAL AND CLINICAL PROFILE OF SNAKE BITE: A RETROSPECTIVE OBSERVATIONAL STUDY IN A TERTIARY CARE HOSPITAL, MANDYA

### General Medicine

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### ABSTRACT

**Background:** Snakebite remains a major public health issue in rural India, contributing significantly to morbidity and mortality. This study aimed to evaluate the epidemiological and clinical profile of snakebite cases in a tertiary care hospital. **Methods:** A retrospective observational study was conducted at Mandya Institute of Medical Sciences from January to December 2024. A total of 562 patients with suspected or confirmed snakebite were analyzed for demographic data, clinical features, complications, and outcomes. **Results:** Most patients were males (68.3%), primarily in the 31–50 age group. Farmers were the most affected (57.4%). Bites occurred predominantly on lower limbs (86.1%), mostly during monsoon evenings. Hemotoxic envenomation (31.7%) was more common than neurotoxic (15.8%). ASV was administered in 68.3% of cases, with adverse reactions in 40.6%. Mortality was low (0.5%). **Conclusion:** Timely ASV administration and supportive care resulted in favorable outcomes. Public awareness and improved rural healthcare access are key to reducing snakebite burden.

### KEYWORDS

Snake Bites, Envenomation, Hemotoxins, Neurotoxins.

### 1. INTRODUCTION

Snakebite is one of the neglected tropical diseases that World Health Organization (WHO) aimed to eradicate.<sup>[1]</sup> However, it has been excluded from WHO report of 2010 and 2013 on neglected tropical diseases. Currently, snakebite has been included along with other neglected non-tropical diseases such as strongyloidosis, scabies, mycetoma, etc.<sup>[2,3]</sup> The problem of snakebites has been persistently neglected by public health personnel, clinicians and policy makers even though its social and economic impact are wide-spread.<sup>[4]</sup> Around 4.2 lakh cases of snakebite envenomation and 20,000 deaths have been reported globally, but the actual figures may be much higher. Estimations did conservatively have revealed the death rate to be 0.297/lakh population ranging from 0.001 in North American region to 2.434 in Oceania region.<sup>[5]</sup> The regions mainly affected by snakebites are South Asia, South East Asia and Sub-Saharan Africa.<sup>[1]</sup> Envenomation in India is estimated to be at 81,000/year, which is highest in the world, followed by Sri Lanka, Vietnam and Brazil.<sup>[5]</sup> In India, Uttar Pradesh, Andhra Pradesh and Bihar are the worst affected states, with the majority of the deaths being reported in Andhra Pradesh.<sup>[6]</sup>

### 2. MATERIALS AND METHODS

#### Study Design

Retrospective Observational study

#### Study Setting

Mandya institute of medical sciences

#### Study Population

Patients presenting to causality or medicine OPD of mandya institute of medical sciences.

#### Study Duration

January 1, 2024 to December 1, 2024.

#### Sample Size- 562

#### Sampling Technique

Convenient Sampling

#### Inclusion and Exclusion Criteria

##### Inclusion Criteria

1. All patients aged  $\geq 18$  years.
2. Confirmed or clinically suspected cases of snakebite.

##### Exclusion Criteria

1. Incomplete medical records.
2. Bites by unidentified animals.

### METHODOLOGY

This was a retrospective observational study conducted at a tertiary care hospital in India. Medical records of all patients admitted with confirmed or suspected snakebite from January to December 2023 were reviewed. A total of 562 cases were included based on eligibility criteria. Data were collected on demographics, time and site of bite,

clinical presentation, type of envenomation, treatment received—including anti snake venom (ASV)—complications, and outcomes. Data were entered into Excel and analyzed using descriptive statistics

#### Statistical Analysis

Data were analyzed using Statistical Package for Social Science (SPSS) version 20. The Chi-square test was used to find the statistical significance for the association of categorical variables. Student's t-test was used to compare continuous variables between the different groups in univariate analysis.  $P < 0.05$  was considered statistically significant.

### 3. RESULTS

A total of 562 patients with suspected or confirmed snakebite were included in the study. The majority of patients were male (68.3%), reflecting the higher exposure of men to outdoor and agricultural activities. Most of the snakebite victims (35.6%) belonged to the 31–50 year age group, followed by the 14–30 year group. In terms of occupation, farmers were the most affected (57.4%), followed by homemakers and students. The seasonal distribution showed a peak during the monsoon months (71.3%), with evening hours (4 PM to 7 PM) being the most common time of bite (46.5%). The majority of bites (86.1%) occurred on the lower limbs, mainly due to barefoot walking in fields and unlit paths. Most patients (86.1%) managed to reach a health facility within 12–24 hours after the bite, aiding early management.

Clinically, nearly half of the patients (48.5%) were asymptomatic, while 31.7% exhibited hemotoxic symptoms and 15.8% had neurotoxic symptoms. Local complications were observed in 7.9% of cases, which included cellulitis, necrotizing fasciitis, and compartment syndrome. Among neurotoxic patients, ptosis was universally present (100%), followed by ophthalmoplegia (88%) and respiratory distress (62.5%). Mechanical ventilation was required in 62.5% of these cases. Hemotoxic envenomation commonly presented with local bleeding (94%), gum bleeding (47%), hematuria (38%), and hematemesis (28%). Renal dysfunction was seen in 53% of hemotoxic cases, of which 19% required dialysis and 6.3% underwent plasmapheresis. ASV was administered to 384 patients (68.3%), with adverse reactions occurring in 40.6% of those treated. Overall mortality was low at 0.5% (3 patients), and surgical intervention was required in 14 cases (2.5%).

Table 1 Showing Clinical Profile of Snake Bite

| Clinical Feature | Number of Cases (n) | Percentage (%) |
|------------------|---------------------|----------------|
| Asymptomatic     | 273                 | 48.5           |
| Hemotoxic        | 178                 | 31.7           |

|                       |                        |     |      |
|-----------------------|------------------------|-----|------|
| Neurotoxic            |                        | 89  | 15.8 |
| Local Complications   |                        | 44  | 7.9  |
| Neurotoxic            | Ptosis                 | 89  | 100  |
|                       | Ophthalmoplegia        | 78  | 88   |
|                       | Respiratory distress   | 56  | 62.5 |
|                       | Mechanical ventilation | 56  | 62.5 |
| Hematotoxic           | Local Bleeding         | 167 | 94   |
|                       | Gum Bleeding           | 84  | 47   |
|                       | Hematuria              | 68  | 38   |
|                       | Hematemesis            | 50  | 28   |
|                       | Renal Dysfunction      | 94  | 53   |
| Surgical intervention |                        | 14  | 2.5  |

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#### 4. DISCUSSION

India contributes nearly half of global snakebite deaths, a critical public health issue in rural areas. In our study of 562 patients, males (68.3%) were predominantly affected, aligning with findings by Bhalla et al. (66%) and Bhat et al. (70%)<sup>[7,8]</sup> likely due to higher outdoor exposure. The most affected age group was 31–50 years, differing from studies citing the 14–30 age group<sup>[7,8]</sup> possibly due to regional differences in occupation and behavior. Farmers comprised the largest affected group (57.4%), consistent with other Indian studies.

Most bites (86.1%) occurred on lower limbs, reflecting barefoot farming practices, particularly during evening hours (46.5%). Monsoon season saw the highest bite incidence (71.3%)—a period linked with increased snake activity and agricultural work.

Clinically, 48.5% of patients were asymptomatic, while hemotoxic features appeared in 31.7% and neurotoxic signs in 15.8%. Hemotoxic bites, likely from vipers, led to local and systemic bleeding and renal dysfunction (53%). Neurotoxic envenomation showed ptosis (100%), ophthalmoplegia (88%), and respiratory distress (62.5%), often requiring mechanical ventilation.

ASV was administered to 68.3% of patients, with 40.6% experiencing adverse reactions, including fever, nausea, and, in severe cases, respiratory distress or anaphylaxis. Early recognition and supportive measures like hydrocortisone and antihistamines minimized these effects. Local complications such as cellulitis and necrotizing fasciitis occurred in 7.9% of cases, and 2.5% required surgical intervention.

Our findings highlight the importance of early medical care, ASV use, and public health efforts to improve snakebite outcomes in rural populations.

#### 5. CONCLUSION

Snakebite envenomation continues to pose a serious health burden in India, especially in rural and agrarian communities. In our study of 562 cases, hemotoxic bites predominated, with significant morbidity in terms of renal dysfunction and coagulopathy. Neurotoxic bites posed a risk for respiratory failure and required intensive ventilatory support. While most patients survived with prompt ASV and supportive therapy, the high rate of ASV-related adverse events and pre-hospital mismanagement remain critical challenges.

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