

# Clinical Profile of Snake Bite Envenomation in Patients Admitted at Tertiary Care Hospital

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## Abstract

**Background:** Snakebite envenoming is a potentially life-threatening disease that typically results from the injection of venom following the bite of a venomous snake. Sometimes envenoming can also be caused by venom being sprayed into a person's eyes by certain species of snakes that have the ability to spit venom as a defense measure. Not all snakebites are venomous. Some snakes are non-venomous and venomous snakes do not always inject venom during a bite. **Subjects and Methods:** Patients were examined for complications of snake bite. Haemotoxicity was assessed based on features like bleeding from the bite site, gums, epistaxis, haemoptysis, haematemesis, rectal bleeding or malaena, haematuria, vaginal bleeding, bleeding into the mucosae, skin (petechiae, purpura, discoid haemorrhages, ecchymoses. Neurotoxicity by drowsiness, paraesthesiae, abnormalities of taste and smell, ptosis, external ophthalmoplegia, paralysis of facial muscles and other muscles innervated by the cranial nerves, respiratory and generalized flaccid paralysis. **Results:** Majority of the patients were farmers with 44% followed by housewives (26%). Lower limbs were the most common site of bite in our study group comprising of 74% of the patients. **Conclusion:** Most common manifestation of envenomation is local envenomation comprising of 66%.

**Keywords:** Snake Bite Envenomation, Haemotoxicity, Neurotoxicity.

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## Introduction

Snakebite is a predominantly rural problem mainly amongst farmers rampant in a tropical country like India. Most bites are inflicted on the feet and ankles of bare-footed agricultural workers who tread on snakes inadvertently while walking in the dark or working in fields and plantations. Snakebite is an occupational, environmental and domestic health hazard with a significant economic fallout on the individual and the family.<sup>[1]</sup>

The bites inflicted are frequently accidental as when snakes are trodden upon or could result due to sleeping on floor and open style habitation. The most affected region in the world is South East Asia because of dense population and extensive agricultural practices. Many of us worship snakes as gods and celebrate festivals like nagarapanchami in devotion.<sup>[2]</sup>

The WHO has included snake bite in its list of WHO neglected tropical diseases portfolio as a Category A neglected tropical disease in 2017<sup>[3]</sup>. It is time that WHO strictly implements its own policies for guideline development on snakebite envenoming in a transparent manner as is being done for other diseases.<sup>[4]</sup>

Snakebite envenoming is a potentially life-threatening disease that typically results from the injection of venom following the bite of a venomous snake. Sometimes envenoming can also be caused by venom being sprayed into

a person's eyes by certain species of snakes that have the ability to spit venom as a defence measure. Not all snakebites are venomous. Some snakes are non-venomous and venomous snakes do not always inject venom during a bite.<sup>[5]</sup> An accurate estimate for global morbidity and mortality of snake bite has been an uphill task due to various reasons. This is probably because of the prevalence of the disease among individuals in the poor agricultural and herding communities in low-and middle-income countries. They have limited options for health care and also have poor health education regarding the same. Due to poor socioeconomic background they resort to traditional methods of treatment which goes unnoticed by the official statistics.<sup>[5]</sup>

Most recent reveal a shocking data of a broad global estimate of 81,000 to 1, 38,000 deaths resulting from 1.8 million to 2.7 million cases of snakebite envenoming, and 4.5 to 5.4 million bites from venomous and non-venomous snakes.<sup>[6]</sup> The recently released Global Burden of Disease 2016 study estimated that there was a total of 79,000 deaths caused by venomous animals in 2016.<sup>[7]</sup>

According to a National survey, the annual snakebite deaths nationally have been reported as 45,900. The highest rates have been reported in rural areas of India. It was seen that the state of Andhra Pradesh had the highest state rate for snake bite deaths (6.2/100,000).<sup>[8]</sup>

The incidence and annual death rate in Karnataka is also high<sup>[8]</sup> which is alarming as a good number of population is

engaged in agricultural activities.

## Subjects and Methods

Using purposive sampling technique, a minimum of 50 patients with history of snakebite was studied.

On admission, vital signs [pulse rate, respiratory rate, blood pressure, saturation of peripheral oxygen (SpO<sub>2</sub>)], and site of bite was recorded.

Patients were examined for complications of snake bite. Haemotoxicity was assessed based on features like bleeding from the bite site, gums, epistaxis, haemoptysis, haematemesis, rectal bleeding or malaena, haematuria, vaginal bleeding, bleeding into the mucosae, skin (petechiae, purpura, discoid haemorrhages, ecchymoses. Neurotoxicity by drowsiness, paraesthesiae, abnormalities of taste and smell, ptosis, external ophthalmoplegia, paralysis of facial muscles and other muscles innervated by the cranial nerves, respiratory and generalised flaccid paralysis.

On patients presenting with history suggestive of snakebite, the following lab tests were included. Haemoglobin, TC (total count), DC (differential count), ESR (erythrocyte sedimentation rate), platelet count, PCV (packed cell volume), Peripheral smear, Urine routine and micro analysis, Serum CRP, LDH, APTT (activated partial thromboplastin time), PT-INR (prothrombin time with international normalized ratio). Serum CRP, LDH and Hb will be repeated later during the course of study when necessary.

### Inclusion Criteria

- Patients with alleged history of snakebite.
- Patients with a history of unknown bite but with symptoms and signs compatible with snake bite envenomation.

### Exclusion Criteria

- Known case of any bite not caused by a snake.
- Patients with history of bleeding disorders
- Patients who received ASV before arriving to the hospital.
- Patient with a history of vasculitis
- Patient with a history of acute or chronic liver disease
- Patient with history of malignancy
- Patient with a history of acute myocardial infarction

## Results

**Table 1: Age Distribution of the Patients**

Age in years	No. of patients	Percentage
18 – 30	22	44%
31 – 40	14	28%
41 – 50	10	20%
51 – 60	4	8%

Maximum incidence of snake bite occurred in the age group of 18 to 30 years (44%).

The mean age of the patients was 35.22 years.

**Table 2: Sex Distribution of Patients**

Male	Female
29	21
58%	42%

Majority were male with 58% and females with 42%. The male to female ratio was 1.38 :1.

**Table 3: Occupational Profile of the Patients**

Occupation	Number of patients	Percentage
Carpenter	2	4%
Labourer	3	6%
Driver	2	4%
Farmer	22	44%
Housewife	13	26%
Student	7	14%
Unemployed	1	2%

Majority of the patients were farmers with 44% followed by housewives (26%).

**Table 4: Site of Snake Bite**

Site of the bite	Number	Percentage
Right lower limb	18	36%
Left lower limb	19	38%
Right upper limb	5	10%
Left upper limb	3	6%
Miscellaneous	5	10%
<b>Total</b>	50	

Lower limbs were the most common site of bite in our study group comprising of 74% of the patients.

**Table 5: Manifestations of Envenomation**

Manifestation of envenomation	No. of patients	Percentage
Haemotoxic	15	30%
Neurotoxic	10	20%
Local	33	66%

Most common manifestation of envenomation is local envenomation comprising of 66%.

## Discussion

Majority of snakebite patients in this part of the country present with haemotoxic envenomation and its complications. While very few studies have been done demonstrating the role of serum LDH as a marker of haemolysis and CRP of acute inflammatory response, there have been no significant studies done showing a correlation between Hb and haemotoxicity in snakebite victims. Hence in this study we aimed to analyze the relationship between serum CRP, LDH and Hb with haematological profile, and to

ascertain their utility as markers of haemotoxicity in snakebite victims.

This study showed that the occurrence of snakebite was higher in the working age group. Maximum incidence of snake bite occurred in the age group of 18 to 30 years. The mean age of the patients was 35.22 years. This correlated with other studies done by Suchithra N, et al., Monteiro FN, et al and Sharma SK, et al. where the mean age was 40, 40.7 and 32 years respectively. As most patients affected fall in the working age group it places a great economic burden on the family and caused an impact on socioeconomic status.

In the present study the incidence of snakebite was seen to be higher in males (58%) compared to females (42%) and the ratio being 1.38 :1. The higher incidence in males might be attributed to higher exposure of males to outdoor environment and farming and hence the risk of snakebite. This was in correlation with other studies like the one by Monteiro FN, et al.<sup>[9]</sup> where the ratio was 1.38:1 and by Kulkarni ML, et al.<sup>[10]</sup> where the ratio was 2.17:1.

Snake bites were commonly seen among agricultural workers in the present study with 22 patients being farmers (44%). Next more commonly it was seen housewives (26%). Similar findings have been reported in a study done by Dayananda et al<sup>[11]</sup>, where 73% of the population was found to be engaged in agricultural activities and was also seen in a epidemiological study done by Bawaskar et al. In another study done by D P Punde<sup>[12]</sup>, similar findings were found where farmers were affected the most (36%).

In our study lower limb were the commonest sites of snakebite. The ratio of lower limb to upper limb bites was 2.84:1. A study done by Saravu K, et al.<sup>[13]</sup> showed a ratio of 3.48:1. Another study done by David S, et al.<sup>[14]</sup> showed that lower limb bites were 3.44 times more common than those of upper limb bites. As most of these bites happen outdoors especially either at night on accidental stepping or while working in the fields, lower limbs tend to have higher incidence of bite site than upper limb. Upper limb bites or bites on other parts of the body usually occur in patients during sleep.

In the present study, haemotoxic envenomation with coagulopathy was higher in occurrence compared to neurotoxic envenomation. A Study done by DP Punde<sup>[12]</sup>, showed a similar result of 64.2% of the victims developing coagulopathy after snakebite due to Echiscarinatus. This was also in correlation with a study done by Kulkarni ML, et al.<sup>[10]</sup> at Davangere which showed a similar result with 58.6% patients developing coagulopathy after snakebite. A study done by Suchithra N, et al.<sup>[15]</sup> in Kerala showed 71% of patients demonstrating coagulopathy after snakebite. These results could be seen as a consequence of increased number of viper bites rather than elapid bites in the respective regions.

## Conclusion

- Maximum incidence of snake bite occurred in the age group of 18 to 30 years. The mean age of the patients was 35.22 years.
- Majority were male with 58% and females with 42% with male to female ratio is 1.38:1.
- Majority of the patients were farmers with 44% followed by housewives (26%).
- Lower limbs were the most common site of bite in our study group comprising of 74%.
- Most common manifestation of envenomation is local envenomation comprising of 66%.

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