



## A study on Clinico-Epidemiological profile of snakebite patients in a tertiary care centre in Bangalore

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### ABSTRACT

**BACKGROUND** Snake-bites are the common cause of morbidity and mortality in tropical countries. In India, there are 216 species of snakes, of which only four are venomous snakes (cobra, krait, Russell's viper and saw scaled viper). This study was undertaken to find out the clinical and epidemiological profile of snake-bite patients in a tertiary care centre in Bangalore.

**AIMS** The study was done to know the epidemiology, clinical features, complications and outcomes of snake bite victims.

**METHODOLOGY** The present descriptive, cross-sectional, observational study was carried out in the department of Emergency Medicine, Kempegowda institute of medical sciences, a tertiary care centre in Bangalore on 50 snake bite victims. After obtaining their consent, data were collected on pre-designed, pre-tested, and structured questionnaire by interviewing the study subjects who were hospitalized during the study period.

**RESULTS** There were 36 males (72%) and 14 females (28%) out of 50 patients studied. Out of 50 patients studied 35 patients had Viper bite, 6 patients had Cobra bite, 2 patients had Krait bite and in 7 patients snake was not identified. Majority of the snake bites were in the lower limbs (72.0%). The highest number of cases occurred during July- October (42%). Most of the victims were farmers (54.0%) and labourers (18.0%), which suggested that snake bite was an occupational hazard. Mortality in our study was 4%.

**CONCLUSION** Snake bite is an occupational hazard and awareness among farmers and labourers regarding wearing of foot wears, early management and transfer to hospital is very important in reducing the morbidity and mortality associated with snake bite.

**Keywords:** Snake bites, Bangalore, Viper, Cobra, cross-sectional, epidemiology, occupational hazard

### INTRODUCTION

Bites by snakes still represent an important health problem in the tropical world. The true incidence of snakebites is difficult to assess and often is underreported. There are approximately 5.4 million victims per year, with 4 million in Asia, 1 million in Africa, 300,000 in central and South America, and 100,000 in the other continents<sup>1</sup> Among the estimated 125,345 deaths in 1998, 100,000 were in

Asia, 20,000 were in Africa, 5,000 were in central and South America, and 345 were in the other areas. In Asia, deaths by snakebites per year have been estimated to be around 20 in Thailand, 200 in Nepal, 250 in the Philippines, 1,000 in Sri Lanka, and 20,000 each in India and Pakistan<sup>2</sup>

Among 2,700 species of snakes, 500 are venomous. Venomous snakes belong to 4 families, including

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Atractaspidae, Colubridae, Elapidae, and Viperidae. Snakes in the Atractaspidae family are not present in Asia. Common poisonous snakes in Asia include the cobra (*Naja*), king cobra (*Ophiophagus Hannah*), krait (*Bungarus*), and sea-snake (Hydrophinae) in the Elapidaefamily, Asian red-necked keelback (*Rhabdophis subminiatus*) in the Colubridae family, Russell's viper (*Daboia russellii*), green pit viper (Cryptelytrops, Trimeresurus, and Protobothrops), Malaysian pit viper (*Calloselasma rhodostoma*), saw-scaled viper (*Echis carinatus*), and hump-nosed pit viper (*Hypnale hypnale*) in the Viperidae family<sup>3-6</sup>

The available data on the epidemiology of snakebite from the Indian subcontinent are sparse, because most of the snake bites occur in illiterate, rural people who use witchcraft and traditional healers. Only the cases of snakebite with severe envenomation reach the healthcare centres.

This study was carried out to describe the epidemiology and clinical features of snakebite patients which were admitted in a tertiary care hospital of Bangalore.

#### OBJECTIVES

The primary objective of this study was to study the epidemiology, clinical features, complications and outcomes of snake bite victims.

#### MATERIAL AND METHODS

**Study population:** Fifty patients consecutively admitted with history of snakebite were included in the study after obtaining ethical committee clearance as well as informed consent from all patients. All patients were evaluated with a detailed history and clinical examination. The present

descriptive, cross-sectional, observational study was carried out between May 2012 to November 2013 in the department of Emergency Medicine, Kempegowda institute of medical sciences, a tertiary care centre in Bangalore.

#### Inclusion Criteria

Patients with history of snake bite with signs of envenomation were included in the study.

#### Exclusion Criteria

Children were not included in the study as there is separate entry point for pediatrics department in this hospital.

#### Data collection

Data were collected on pre-designed, pre-tested, and structured questionnaire by interviewing the study subjects who were hospitalized during the study period.

Detailed information was collected regarding demographic and epidemiologic parameters such as age, sex, residence, occupation, site of bite, place of bite, type of snake, time interval between snake bite and receiving medical treatment (particularly ante-snake venom). Thorough clinical examination was carried out to identify the type of snake bite (vasculotoxic, neuroparalytic, and nonpoisonous).

#### Statistical analysis

Statistical tests were applied to calculate the frequencies and means of different variables studied. Epiz2000 software was used for this analysis.

#### RESULTS

**Table 1** Age distribution of patients studied

Age group (years)	Number of patients	%
<18	2	4
18-40	19	38
>40	29	58
Total	50	100



Table 2 Gender distribution of patients studied

Gender	Number of patients	%
Male	36	72
Female	14	28
Total	50	100

Table 3 Snake bite site of patients studied

Snake bite site	Number of patients	%
Right upper limb	7	14
Left upper limb	7	14
Right lower limb	17	34
Left lower limb	19	38
Others	50	100

Table 4 Distribution of Tourniquet application of patients studied

Tourniquet application	Number of patients	%
Yes	5	10
No	45	90
Total	50	100

Table 5 Identification of snake of patients studied

Identification of snake	Number of patients	%
Viper	35	70
Cobra	6	12
Krait	2	4
Unidentified	7	14
Total	50	100

Table 6 Occupation of snake bite patients

Occupation	Number of patients	Percent
Farmer	27	54
Business	3	6
Housewife	8	16
Labourer	9	18
Gardener	2	4
Others	1	2
Total	50	100



Table 7 Season of snake bite

Season	Number of patients	Percent
March – June	14	28
July – October	21	42
November – February	15	30

Table 8 Distribution of Lapse of time in hrs of patients studied

Lapse of time in hours	Number of patients	%
0 – 2	6	12
2 – 4	20	40
4 – 12	13	26
12 – 24	2	4
>24	9	18
Total	50	100

Table 9 Symptoms of snake bite patients

Symptoms	Number of patients	%
Fang marks	33	66
Reduced urine output	25	50
Bleeding from bite site	20	40
Bleeding from the gums	7	14
Hematuria	20	40
Breathlessness	17	34
Ptosis	5	10
Swelling/inflammation of the bite area	45	90
Muscle pain/Tenderness	30	60
Vomiting	13	26

Table 10 Number of ASV vials given

Number of ASV vials given	Number of patients	%
<10	11	22
10-20	13	26
>20	26	52

Table 11 WBCT in minutes of patients studied

WBCT in minutes	Number of patients	%
<20 min	14	28
>20 min	36	72
Total	50	100



**Table 12 End results of snake bite patients studied**

End results	No of patients	%
Discharged	47	94
Death	2	4
Chronic kidney disease	1	2
DIC	24	48
Acute renal failure	20	40

## DISCUSSION

Snake-bites are the common cause of morbidity and mortality in tropical countries. In India, there are 216 species of snakes, of which only four are venomous snakes (cobra, krait, Russell's viper and saw scaled viper).

In the present study, maximum incidence of snake bite was found above the age of 40 years (58%), followed by 38% in the age group between 18 to 40 years, attributed mainly for their outdoor activities in this age group. Similar findings were observed by Jones AL et al<sup>7</sup> and Warrell DA et al<sup>8</sup>.

Male predominance was noted in our study again attributed mainly for their outdoor and farming activities. 72% of the snake bite occurred in males compared to females.<sup>9</sup> In India males are the main earning members of the family, working outside and sleeping in fields is very common leading to increased incidence among males. Majority of the snake bite were in lower limbs constituting to 72%. So, this shows that use of protective footwear can reduce the snake bites.

Tourniquet was applied in just 10% of the snake bite victims.

Most of the snake bites were haematotoxic (Viper bite), constituting to 70%. Cobra in 12%, Krait in 4% and snake was not able to identify in 14% of the bites. The predominant manifestations of viper snake bite includes bleeding from the bite site (40%), bleeding from the gums (14%), hematuria (40%), reduced urine output (50%). Neuroparalytic symptoms were noted in few cases mainly in cobra bites. They include ptosis (10%), breathlessness (34%).

Other clinical manifestations include fang marks in 66% of the victims, swelling of the bite area in 90% of the victims, 60% had muscle pain and vomiting in 26% of the snake bite victims.

Snake bite can be said as an occupational disease since it is more common in farmers, labourers and gardeners. Farmers constituted for 54% and labourers accounted for 18%, housewives in 16% of the snake bite cases. They are more prone for accidental snake bites while working. One more reason for higher incidence among farmers and labourers is bare foot walking while working.

Maximum number of snake bite occurred in the season between July to October (42%) reason being the monsoon season the where there is flooding of the habitats of the snakes and their prey.<sup>10</sup>

We noticed in our study that 12% of the cases were received within 2 hours of the snake bite, 40% between 2 to 4 hours and 26% between 4 to 12 hours. The delay in reaching our hospital can be attributed to distance from the villages, traffic problems, poor transportation facilities, lack of knowledge about the complications of snake bite, time may be wasted for application of tourniquet and herbal medicines. Similar results were observed by Kulkarni ML, Anees S et al and Lahori UC, Sharma DB et al.<sup>10, 11</sup>

Anti snake venom (ASV) can be species specific (monovalent) or polyspecific (polyvalent) and is the main modality of treatment in snake bite. Currently administration of monovalent ASV is recommended but because of the difficulty in the availability and identification of snakes, polyvalent ASV is more administered. Since same amount of venom is injected into children and adults, children should also receive the same amount of dose of antivenom as the adults<sup>12</sup>. In our study more than 20 ASV vials were given in 52% of the snake bite victims, 10 to 20 vials in 26% and less than 10 in 22% of the patients. Life threatening allergic reactions to ASV was not noted in any of the snake bite victims but minor allergic reactions like pruritis, pain and vomiting on injection were noticed in less than 10% of the victims.



In our study, 47 patients were discharged without any long term complications. Most common complication in our study was DIC (disseminated intravascular coagulation), 48% of patients developed DIC and acute renal failure was second most common complication in 40% of patients. These two complications were higher in our study due to higher number of viper bites. One patient (2%) developed chronic kidney disease. The mortality rate of this study was 4%.The mortality

was mainly attributed to DIC and acute renal failure.

### CONCLUSION

Snake bite is an occupational hazard and awareness among farmers and labourers regarding wearing of foot wears, early management and transfer to hospital is very important in reducing the morbidity and mortality associated with snake bite

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