

**Research Article**

## **CLINICAL PROFILE OF SNAKE BITE CASES IN MARATHWADA, INDIA**

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### **ABSTRACT**

Snake bite is a common medical emergency faced mainly by rural populations in tropical and subtropical countries with heavy rainfall and humid climate. The present descriptive observational study was carried out to study the epidemiological and clinical features of snake bite cases.

In the present study, we studied 387 cases of snake bite admitted in the teaching hospital over a period of 12 months. Detail information regarding demographic, epidemiological and clinical parameters was taken from the study subjects.

Analysis of the data showed that majority (71.83%) of the snake bite victims were in the age groups of 10 to 39 years and snake bites were 1.7 times more in males than females. About two third cases were bitten on lower extremities during day time and by poisonous snakes. Most common presenting symptoms at the site of bite were pain (90.69%), swelling (73.90%), and burning sensation (56.07%). Few cases were having blister formation (11.36%), tissue necrosis (10.33%) and bleeding (4.32%) from the site of bite. 33.08% cases reached the health care unit within 1 hour of bite and 48.84% within 1 to 6 hours after bite. First aid given was in the form of application of tourniquet (40.82%), local application of lime, chilies, herbal medicine etc. (30.49%), incision over bite (2.32%) and sucking over site of bite (1.29%). 6.20% cases were sensitive to anti snake venom. Overall mortality rate was 5.68%.

**Key Words:** Snake Bite, Poisoning, First Aid Treatment, Anti-Snake Venom

### **INTRODUCTION**

Snake bite is a common life-threatening condition in many tropical countries; farmers, hunters and rice pickers are at particular risk and prompt medical treatment is vital (Jones and Karalliedde, 2006). In India, the most important species are Cobras (*Naja naja*, *N. oxiana*, *N. kaouthia*), Common Krait (*Bungarus Caeruleus*), Russell's Viper (*Daboia russelii*) and *E. Carintus* (Warrell, 2003). India is the largest single contributor to the global tally of snake bite deaths, numbers ranging between 15,000 to 50,000 a year. Accurate statistics are not available and there is no standardized reporting of bites and identification of snakes. Many victims are treated by a variety of traditional healer. Small surveys have suggested an annual death rate of 1/10,000 in the early 20<sup>th</sup> century and 3.1/100,000 in the 1950's (Bambery, 2008).

In Burdwan District, West Bengal, 8000 people are bitten and 800 die each year (Warrell, 2003). Each year, there occur more than 2000 deaths in Maharashtra due to snake bite (Bawaskar and Bawaskar 2002). Morbidity and mortality from snake bite is still a major problem faced by medical profession. With the development of positive health approach and rapid urbanization with expansion of human colonization, better understanding of this problem is essential for prevention and therapeutic measures, to reduce morbidity and mortality from snake bites in the country (Banerjee, 1978).

The Nanded district is having large area under irrigation and majority of rural population is involved in agricultural work. Near about 400 cases of snake bite per year are hospitalized at Dr. S.C. Govt. Medical College, Nanded. Hence, we decided to study the clinical profile of snake bites in hospitalized cases, so that preventive and therapeutic measures can be applied in the light of this study.

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### MATERIALS AND METHODS

The present descriptive observational study was carried out in medicine wards of Dr. Shankarrao Chavan Govt. Medical College, Nanded in Marathwada region, India during July 2004 to June 2005. The study was approved by the ethical committee of Dr. S. C. Govt. Medical College, Nanded.

A total of 387 cases of snake bite were admitted in medicine wards during the study period. After obtaining consent data was collected on pre-designed, pretested and structured questionnaire by interviewing the study subjects who were hospitalized during the study period. In case of children such information was obtained from their parents. A detailed information regarding demographic and epidemiological parameters such as age, sex, residence, occupation, site of bite and place of bite, type of snake if identified etc. was obtained. Time interval to reach the health facility after snake bite and first aid received if any was asked to them. Through clinical examination was carried out in each case. For identification of type of snake bite (Vasculotoxic, Neuroparalytic and Non Poisonous) opinion from treating physician was taken. Subsequent information was collected on the day of discharge or death of the patient from the case paper of the patient. Statistical tests applied were chi square test and percentage.

### RESULTS

A total of 387 cases of snake bite were admitted in the hospital during the study period. Among them 246 (63.57%) were males and 141 (36.43%) were females. The highest incidence of snake bite was observed in the age group of 30 to 39 years (25.32%), followed by 23.51% in the age group of 20 to 29 years and least i.e. 5.17% in the age group of less than 10 years (Table 1).

**Table 1: Age and Sex wise distribution of snake bite cases.**

Age Group (Years)	Male No. (%)	Female No. (%)	Total No. (%)
<10	14(70.00)	06(30.00)	20(100)
10-19	57(64.04)	32(35.96)	89(100)
20-29	60(65.93)	31(34.07)	91(100)
30-39	61(62.24)	37(37.76)	98(100)
40-49	27(62.79)	16(37.21)	43(100)
≥ 50	27(58.70)	19(41.30)	46(100)
Total	246(63.57)	141(36.43)	387(100)

A majority of cases (89.41%) were from rural area and only 10.59% were from urban area. Among rural patients 70.23% cases were bitten in the farms followed by 24.86% in the houses and only 4.91% cases in the public places. On the other hand 65.85% cases from urban area were bitten in the houses and 17.07% cases in the farms and public places each. The relationship between rural area and farm as a place of snake bite was statistically highly significant ( $\chi^2 = 45.88$ , df = 2, P value < 0.001) (Table 2).

**Table 2: Place of bite and residence of snake bite cases.**

Place of bite	Residence		Total No. (%)
	Rural No. (%)	Urban No. (%)	
Farm	243(70.23)	07(17.07)	250(64.60)
House	86(24.86)	27(65.85)	113(29.20)
Public Place	17(04.91)	07(17.07)	24(06.20)
Total	346(100)	41(100)	387(100)

$\chi^2 = 45.88$ , df = 2, P value < 0.001

Regarding occupation of the study subjects, 53.40% cases were farm laborers, 17.80% were farmers and 28.80% were having other occupations like government servants, housewives, students etc.

62.27% cases were having site of bite on lower extremity, followed by 34.36% on upper extremity, 2.06% on head, neck and face and only 0.78% on the trunk. About two third of snake bites occurred during day time and one third during night time (Table 3).

**Table 3: Site and time of snake bite cases.**

Site of bite	Time of bite		Total No. (%)
	Day No. (%)	Night No. (%)	
Lower extremity	155(64.32)	86(35.68)	241(100)
Upper extremity	98(73.68)	35(26.32)	133(100)
Head, Neck and Face	03(37.50)	05(62.50)	08(100)
Trunk	00(00.00)	03(100)	03(100)
Not Known	00(00.00)	02(100)	02(100)
Total	256(66.15)	131(33.85)	387(100)

Among 387 snake bite cases, maximum (90.69%) were having pain at the site of bite followed by swelling (73.90%), burning sensation (56.07%) and only 4.32% were having bleeding from the site of bite. On local examination bite marks, blister formation and tissue necrosis was observed in 76.74%, 11.36% and 10.33% cases respectively. Majority of the cases (48.84%) reached the health care unit within 1 to 6 hours followed by 33.07% within 1 hour of bite. Among late visitors 6.20% visited the health care unit within 6 to 12 hours, 4.13% within 12 to 24 hours and 7.49% visited more than 24 hours after bite. First aid treatment given was in the form of application of tourniquet (40.82%) proximal to the site of bite, and local application of lime, chilies, herbal medicine etc. in 30.49% cases. Incision and sucking over

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site of bite were attempted only by 02.32% and 01.29% cases respectively. No any form of first aid was given in 37.72% cases (Table 4).

**Table 4: Symptoms, signs and factors affecting outcome of snake bite cases.**

Symptoms, signs and factors affecting outcome		No. of cases	Percentage
<b>Symptoms*</b>	Pain at site of bite	351	90.69
	Burning sensation	217	56.07
	Swelling at the site of bite	286	73.90
	Giddiness	106	27.39
	Difficulty to open the eyes	46	11.88
	Difficulty in breathing	46	11.88
	Vomiting	78	20.15
	Pain in abdomen	68	17.57
	Bleeding from the site of bite	17	4.32
<b>Local signs*</b>	Bite mark	297	76.74
	Blister formation	44	11.36
	Tissue necrosis	40	10.33
<b>Time interval</b>	Within 1 hour	128	33.07
	1-6 hours	189	48.84
	6-12 hours	24	6.20
	12-24 hours	16	4.13
	>24 hours	29	7.49
<b>First aid*</b>	Not received	146	37.72
	Application of tourniquet	158	40.82
	Local application of lime/chili	118	30.49
	Incision over site of bite	09	2.32
	Sucking over bite	05	1.29
<b>Sensitivity to ASV</b>	Yes	24	6.20
	No	363	93.80

*\*Multiple responses*

Regarding sensitivity to anti snake venom (ASV) only 6.20% cases were sensitive to ASV and remaining 93.80 % were not sensitive to it.

After admission to this hospital 336 (86.82%) cases were completely cured, 22(5.68%) cases died, 9 (02.32%) discharged against medical advice, 8 (02.06%) absconded and 12 (3.11%) referred to higher centre for further management.

11 cases died each due to vasculotoxic as well as neuromuscular snake bites. The mortality rate for vasculotoxic snake bites was 5.14% and for that neuromuscular snake bite was 22.0% (Table 5). The

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mortality difference between neuromuscular and vasculotoxic snake bite was statistically highly significant (Yates corrected  $\chi^2 = 12.96$ , P value < 0.001).

**Table 5: Relation between type of poisonous snake bite and death.**

Type of snake (poisonous)	Death		Total No. (%)
	Yes No. (%)	No No. (%)	
Vasculotoxic	11(5.14)	203(94.86)	214(100)
Neuromuscular	11(22.00)	39(78.00)	50(100)
Total	22(8.33)	242(91.67)	264(100)

Yates corrected  $\chi^2 = 12.96$ , P Value < 0.001

### DISCUSSION

In the present study incidence of snake bite was found to be 71.83% in the age group of 10 to 39 years which is active age group involved in various outdoor activities and are more prone for snake bites. Similar findings were observed by Bhardwaj and Sokhey (1998), Hansdak et al (1998), and Bakshi (1999).

Male victims were more bitten by snakes than female victims. The reason for this is males are more involved in outdoor activities compared to females. Similarly male predominance in cases of snake bites were also observed by Nigam et al (1974), Lahori et al (1981), Saini et al (1984), Kulkarni and Anees (1994) and Hansdak et al (1998).

In this study incidence of snake bite was found more in people residing in rural area compared to urban area and this difference may be because of their exposure to agricultural work. Similar residential difference in snake bite cases were also observed by Hansdak et al (1998), Lahori et al (1981), Saini et al (1984) and Kulkarni and Anees (1994).

We observed that 33.08% cases reached the hospital within 1 hour of bite, 48.84% cases within 1 to 6 hours and remaining after 6 hours of bite. Lahori et al (1981) observed that 85.0% patients were admitted to the hospital within 24 hours after the snake bite of these 7.4% within 1 hour. Kulkarni and Anees (1994) stated that 78.0% cases were admitted within 24 hours after the bite and only 6.6% cases admitted within the first hour. In this study we observed that some delay in seeking medical aid was largely attributed to prevalent faith in healing by 'Pandhalya' (a local word meaning traditional healer of snake bite cases) using 'Mantra' magic, manipulation of herbs especially among the lower socio-economic sections of the community.

In the present study presenting symptoms were pain (90.69%), swelling (73.90%), burning sensation (56.07%) and bleeding (4.32%) from the site of bite. On local examination we observed bite marks 0.5 to 1 cm apart in 76.74% cases, blister formation in 11.36% and tissue necrosis in 10.33% cases. Similar observations at the site of bite were observed by Lahori et al (1981), Saini et al (1984), Gauri et al (1993), Bhardwaj and Sokhey (1998) and Hansdak et al (1998).

37.72% cases reached the hospital without any first aid treatment. Among those who received first aid treatment, maximum were having application of tourniquet proximal to the site of bite and local

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application of lime, chilies, herbal medicine etc. Very few cases had taken incision and attempted sucking over site of bite. Same form of first aid treatment was observed by Lahori et al (1981), Saini et al (1984) and Kulkarni and Anees (1994).

In this study non-poisonous snake bite cases were 31.78%. Highest non-poisonous snake bite cases were observed by Bhardwaj and Sokhey (1998) - 90.5% followed by Bakshi (1999) - 61.59%, Bawaskar and Bawaskar (2002) - 49.5% and Saini et al (1984) - 41.5%. Kulkarni and Anees (1994) and Hansdak et al (1998) reported 24.3% and 19.0% non-poisonous snake bite cases respectively. This variation in non-poisonous snake bite cases may be due to variation in the geographical distribution of poisonous and non poisonous snakes in various parts of the world.

In the present study only 6.20% cases were sensitive to ASV. Those who were sensitive to ASV, they were treated under cover of steroids, anti-histamine and supportive measures. Range of hypersensitivity to ASV was as low as 1.3% to as high as 52.0% observed by Kulkarni and Anees (1994) and Theakston et al (1990) respectively. No allergic reaction to repeated ASV injections was reported by Nigam et al (1974). The probable reason for this may be administration of corticosteroids to 14 patients of Cobra and Viper bite out of 22 poisonous snake bite cases by the author.

The overall mortality rate in the present study was 5.68%. Similar overall mortality rates were also observed by Saini et al (1984), Kulkarni and Anees (1994) and Hansdak et al (1998). Mortality rate after snake bite depends upon various factors like amount of venom injected, site of bite (serious if bitten on the trunk or head, neck and face), species and size of the snakes, the extent of its anger or fear, the presence of bacteria in the mouth of the snake or on the skin of the victim. It also depends on exertion i.e. running immediately after the bite, age, size and health of the patient (envenomation in a child is serious and fatal) and rapidity of the treatment (Nigam et al, 1974).

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