



## STUDY OF CLINICAL PROFILE OF SNAKE BITE IN CHILDREN AT TERTIARY CARE CENTER

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**ABSTRACT** Snakebite is a neglected public health problem which is affecting mainly rural population where medical resources are often sparse. People in countries like India prefer traditional healers rather than qualified physicians. Snake bite is completely treatable if treated early. Early steps must be taken to transport the victim to the hospital rural population, educate people to avoid local traditional treatments for avoiding the precious time where early intervention at hospital can save life. The goal of this study was to study the clinical profile and outcome of snakebite subjects in western Maharashtra. Our study emphasizes the importance of timely ASV administration and correlation between the demographic pattern, type of bite, time between bite and arrival to hospital with outcome and complication. A hospital record based retrospective observational study done in Pediatric intensive care unit in Western Maharashtra.

**Materials And Methods:** Eighty six children admitted with snake bite were analyzed, the data was analyzed using Statistical Package for Social Services (SPSS) software Version 21.0

**Results:** Incidence was 1.19%, most common age group was 11-14 years, with male predominance, majority belonging to rural area. Majority of bites were between 6pm to 12am, most common site being lower limb. Majority of study subjects presented to hospital within 6 hours of bite. Total 41 cases were non poisonous and 45 were poisonous, of which 28 were vasculotoxic and 17 were neuroparalytic snake bites. Mortality of snake bite admitted in our hospital was 4.65%, all were due to neuroparalytic bite.

**KEYWORDS :** Snake bite, antisnake venom(ASV), vasculotoxic, neuroparalytic, outcome.

### INTRODUCTION

India is among the countries most heavily impacted by snakebite and accounts for nearly half of the world's estimated annual deaths. In a nationally representative mortality survey, the projected trends in snakebite mortality in India from 2000 to 2019 reported 2,833 snakebite deaths, from 611,483 verbal autopsies from an earlier study. There is an enormous difference between the number of deaths from snakebite recorded from direct the survey and official records. Of the 3346 species identified in the world only 667 have fangs ventrally, can inject the venom while biting human or animals. In India there are about 242 species of which 57 are poisonous and belong to the family of Elapidae, Colubridae and Viperidae. Bites of Viperidae, Crotalidae and Colubridae usually have hemostatic abnormalities and Elapidae is producing neurological signs and Hydrophidae causes Rhabdomyolysis. The carpet or saw scaled viper (Echis Carinatus) is one of the most dangerous snakes<sup>2</sup>

Aim is to study incidence, demographic pattern, clinical profile and outcome of patients with snake bite in less than 14 years of age. Most common symptom following snakebite whether poisonous or nonpoisonous is fright. Neuroparalytic snakebite present with classical symptoms within 30 min– 6hours in case of Cobra bite and 6–24 hours for Krait bite; however, ptosis in Krait bite have been recorded as late as 36 hours after hospitalization. Viperine bite presents with local manifestations and coagulation defects, complications could be acute renal failure, gangrene, compartment syndrome, respiratory failure<sup>3</sup>.

ASV is indicated if signs and symptoms of envenomation are present with or without evidence of laboratory tests. There is no absolute contraindications to ASV, any patient claiming to have snake bite should not be routinely started with ASV, as it leads to the risks of ASV reactions and also wastage of ASV. However, do not delay or withhold ASV on the grounds of anaphylactic reaction to a symptomatic patient.

### MATERIALS AND METHODS

This is a hospital record based retrospective study in Government medical college hospital, Solapur, a tertiary referral center.

Children less than 14 years admitted with alleged history of snake bite

and clinical features suggestive of snakebite from December 2018 - March 2021 were selected for the study. Data of eighty six such children was collected. In our study syndromic approach is used in treating snake bite victims. We treated patients with bleeding tendencies, neuroparalysis and progressive cellulitis with polyvalent Anti Snake Venom as per WHO guidelines. Data on demographic factors, clinical features, complications, delay in seeking treatment outcome and correlation of the above factors with outcome and complications was studied.

For continuous data such as age, the descriptive statistics Mean was presented. For categorical data, the number of participants and percentage was presented. The chi square test was used to assess the association between factors and outcome. All tests were two-sided at p<0.05 level of significance. All analyses were done using Statistical Package for Social Services (SPSS) software Version 21.0

### RESULTS

Incidence of snake bite cases was 1.19% in our hospital, most common age group was 11-14 years i.e. 45 (52.32%) mean age was 9.9yrs, proportion of male children was 50 (60.46%) significantly higher than female and from rural area 67 (77.98%) was higher than urban area. Low socioeconomic group was 62 (72.09%) and peak incidence was between June to September. Majority of bites were between 6pm to 12am, most common site being lower limb 50(58.1%). Majority of study subjects presented to hospital within 6 hours of bite 66(76.74%). Children with snake bite were 73 (84.88%) and with unknown bite with features suggestive of snake bite were 13 (15.11%). Total 41(47.67%) cases were non poisonous and 45 (52.33%) were poisonous, of which 28(62.22%) were vasculotoxic and 17 (37.78%) were neuroparalytic snake bites. Depending upon the signs of envenomation, ASV was given, 45 (52.32%) required ASV and 41 (47.7%) did not require ASV and were asymptomatic throughout indicating nonpoisonous bite. 28 out of 86 had complications, of which cellulitis was more common 12(42.86%), respiratory failure in 6(21.43%) and renal failure in 5 (17.86%), gangrene was seen in 3 (10.71%) and encephalopathy in 2 (7.14%). Mortality from snakebite in our hospital was 4.65% i.e. 4 out of 86 study subjects, all were due to neuroparalytic bite.

An attempt was made in present study to find correlation of various

demographic and other analyzed data with complications and outcome. It was found that, there was significant correlation between development of complications with interval between bite and arrival to hospital, out of 66 children who presented within 6 hours, 15 children developed complication whereas 4 out of 7 children who presented after 24 hours of bite had complications, which was statistically significant. Most of the complications occurred in patients residing in rural area, accounting to 87%. Complication rate was high in patients with poisonous snake bite, among them 56.5% occurred in hemotoxic type. There was no significant correlation between the age, sex of the patient, site of bite and complications, the data was not statistically significant. In present study, neuroparalysis as cause of mortality is significant statistically. Significant correlation was also found between interval from bite and arrival at hospital and outcome, death was common among patients who received ASV after 24 hours of bite. Statistically significant correlation was also found between complications and outcome i.e. death. However, in present study, no significant correlation was found between age, sex, site of bite, area of residence, pre hospital intervention and outcome.

**Table 1: Demographic pattern and clinical profile.**

Variables	N=86	%
<b>Age in years</b>		
<7years	15	17.45%
7 -10 years	26	30.23%
11- 14 years	45	52.32%
<b>Sex</b>		
Male	52	60.46%
Female	34	39.54%
<b>Residence</b>		
Rural	67	77.98%
Urban	19	22.02%
<b>Socioeconomic status</b>		
Upper class	2	2.32%
Middle class	22	25.58%
Lower class	62	72.09%
<b>Time of bite</b>		
6am -12pm	17	19.77%
12pm-6pm	20	23.25%
6pm -12am	39	45.35%
12am-6am	10	11.62%
<b>Site of bite</b>		
Upper limb	26	30.24%
Lower limb	50	58.14%
face, trunk, neck	10	11.62%
<b>Time interval between bite and Arrival at tertiary Center</b>		
0-6 hours	66	76.74%
6-24 hours	13	15.12%
> 24 hours	7	8.14%
<b>Duration of stay</b>		
1-5days	42	48.85%
6-10 days	30	34.88%
>10 days	14	16.27%
<b>Complications</b>		
Cellulitis	12	42.86%
Renal failure	05	17.86%
Respiratory failure	06	21.43%
Gangrene	03	10.71%
Encephalopathy	02	07.14%
<b>Outcome</b>		
Survival	82	95.35%
Death	04	04.65%

**DISCUSSION**

Out of the total 7200 admissions, 86 cases(1.19%) were of snake bite and unknown bite with features suggestive of snake bite. Kumar A et al<sup>4</sup>(2017) reported 1.38% incidence. In our study, 45(52.32%) were in age group of 11–14 years, most common age group, which is comparable to, Karunanayake et al<sup>5</sup>(2014) showed commonest age group 6-12 yrs (48%), BansalA et al<sup>6</sup>(2020) most common age group was 6-12 years contributed to 76%, Schulte et al<sup>7</sup>(2016) study reported mean age 10.7yrs. This is because they are engaged in outdoor games and activities. 52(60.46%) were male comparable to SivagamiA et

al<sup>8</sup>(2017) which showed male predominance 61.4%, Kshirsagar et al<sup>9</sup>(2013) showed male predominance(60.5%). This could be due to involvement in outdoor activities and risky behavior. There were 67(77.98%) children from rural areas, which is similar to, Bhusanpatnaik et al<sup>10</sup> and Kumar A et al<sup>11</sup>(2017) studies reported 65% and 67.7% from rural areas respectively, which may be because of poor light and toilet facilities. Maximum cases were from lower socio-economic status 62(72.09%), other studies and Siddappa FD et al<sup>16</sup>(2019) and Bhusanpatnaik B et al<sup>10</sup>. Maximum cases were in August 17(19.77%) followed by July 13(15.11 %), similar was seen in Kshirsagar et al<sup>9</sup>(2013) maximum cases from July to September 51.9%, as in monsoon, snakes have no shelter as the holes and burrows are filled with water, their activity is also more. Involvement of lower limb was maximum 50(58.1%) suggesting the accidental contact with snake during activity, this was similar to SivagamiA et al<sup>8</sup>(2017) reported 81.4% lower extremities involvement. 66 cases were brought to hospital within 6 hours of bite contributing to 76.74% similar was seen in BansalA et al<sup>6</sup> and Lingayat AM et al<sup>11</sup>(2015). This early referral could be due to increasing awareness of snake bite and also due to improved transport facility in rural areas. Total 41 cases were nonpoisonous and 45 were poisonous, of which 28 were vasculotoxic and 17 were neuroparalytic snake bites. Kshirsagar et al<sup>9</sup>(2013) and SivagamiA et al<sup>8</sup>(2017) reported most common bites as poisonous 66% and 42.4% respectively. In present study children with unknown bite with features suggestive of snakebite either neuroparalytic or vasculotoxic were also included. 45(52.32%) cases required ASV which is similar to Mahajan and Mhaskar et al<sup>12</sup>. 28 subjects had complications, of which cellulitis was more common 12(42.86%), respiratory failure 6(21.43%) and renal failure 5(17.86%). Bhusanpatnaik B et al<sup>10</sup> study reported respiratory failure in 19%, renal failure in 6.5%, cellulitis in 39%, neuroparalysis in 27.5% cases, LingayatAM et al<sup>11</sup>(2015), reported renal failure in 3%, respiratory failure in 7.81%, neuroparalysis in 27.5%, cellulitis in 32.8%. In our study mortality was 4.65 %. BansalA et al<sup>6</sup>(2020) and LingayatAM et al<sup>11</sup>(2015) reported death 4.8% and 3.1% respectively. Outcome depends upon the time interval between bite and initiation of treatment, type of envenomation and complications. Out of 66 children who presented within 6 hours, 15 developed complication whereas 4 out of 7 children who presented after 24 hrs of bite had complications. Other studies, SuchitraN et al<sup>13</sup>(2008) reported higher rate of complications in those who receive ASV late, AshT et al<sup>14</sup> and ThomasL et al (1998)<sup>15</sup> showed positive correlation between the severity of renal failure and increased time interval between bite and treatment initiation. In present study, most of the complications occurred in patients from rural area 87%, it was found to be statistically significant. This is also due to lack of medical facility and delay in the initiation of treatment. Complication rate was high in patients with poisonous snake bite, 56.5% in hemotoxic type and was statistically significant. Similar was found in Karunanayake et al<sup>5</sup>(2014), where complications were more in poisonous bites. There was no significant correlation between the age, sex of the patient, site of bite and complications, data was not statistically significant.

**Table 2: Correlation Of Variables With Complications And Outcome.**

VARIABLES	COMPLICATION		P
	PRESENT n(%)	ABSENT n(%)	
<b>GENDER</b>			
Males (52)	18(64.29)	34(58.62)	<b>0.61</b>
Females (34)	10(35.71)	24(41.38)	
<b>DURATION BETWEEN BITE AND ARRIVAL TO HOSPITAL</b>			
0-6 hours (66)	15(53.57)	51(87.93)	<b>0.017</b>
6-24 hours (13)	9(32.14)	4(6.89)	
> 24 hours (07)	4(14.29)	3(5.18)	
<b>AREA</b>			
Rural(67)	26(92.9)	41(70.7)	<b>0.020</b>
Urban (19)	2(7.14)	17(29.3)	
<b>TYPE OF BITE</b>			
Hemotoxic(28)	20(71.4)	8(13.8)	<b>0.00</b>
Neurotoxic(17)	8(28.6)	9(15.5)	
Nonpoisonous (41)	0	41(70.69)	
<b>OUTCOME</b>			
	<b>SURVIVED</b>	<b>DIED</b>	
<b>AGE</b>			
<7years	13(15.85)	2(50)	<b>0.203</b>

7 - 10 years	25(30.49)	1(25)	
11 - 14 years	44(53.66)	1(25)	
<b>DURATION BETWEEN BITE - ARRIVAL TIME</b>			
0-6 hours	65(79.26)	1(25)	<b>0.004</b>
6-24 hours	12(14.63)	1(25)	
> 24 hours	5(6.01)	2(50)	
<b>AREA</b>			
Rural	63(78.05)	4(100)	<b>0.275</b>
Urban	19(21.95)	0	
<b>TYPE OF BITE</b>			
Non poisonous	41(50)	0	<b>0.00</b>
Vasculotoxic	28(34.15)	0	
Neuroparalytic	13(15.85)	4(100)	
<b>COMPLICATIONS</b>			
Cellulitis	12(14.63)	0	<b>0.020</b>
Renal failure	5(6.10)	0	
Respiratory failure	2(2.44)	2(50)	
Gangrene	3(3.66)	0	
Respiratory failure Encephalopathy	2(2.44)	2(50)	
Significant at 5% - level of significance (p<0.05)			

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In present study, neuromyolysis as cause of mortality is significant statistically. Karunanayake et al<sup>8</sup> (2014) and Sivagami A et al<sup>9</sup> (2017) studies also showed neuromyolysis as a statistically significant cause of death in children. There was significant correlation in interval from bite and arrival at hospital with outcome, death was common among patients who received ASV after 24 hours of bite. Kshirsagar et al<sup>9</sup> (2013) reported 162 children less than 15 years from rural Maharashtra, 32.7% patients presented beyond 6 hours after bite, due to such delay in seeking treatment all mortalities occurred in the group beyond 6 hours of bite. No significant correlation was found between age, sex, site of bite with outcome, which was consistent with Sivagami A et al<sup>9</sup> (2017) in which p value for gender and outcome correlation was 0.67. In some, site of bite was found to have correlation with death, bite at upper limb or face, neck was related more with death, due to their proximity to central nervous system which is in contrast to our study may be due to low death rate in present study. There was significant correlation between complications and mortality.

## CONCLUSIONS

Snakebite is easily treatable with timely management. Delay in appropriate treatment leads to significant morbidity and mortality. First aid, early referral, administration of adequate, timely dose of ASV and timely management of allergic reactions can significantly reduce mortality rate. ASV in primary health care centers before referral to tertiary care centre should be encouraged. The syndromic approach to be followed, ASV should be instituted at the earliest possible is found through this study.

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