

## Original Article

## Snake bite prevalence &amp; outcome of poisonous snake bite in Patuakhali Medical College Hospital, Patuakhali

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**ABSTRACT**

**Background:** Snakebite envenoming is increasingly recognized as a major, deadly tropical disease of public health importance. Early antivenom treatment of snakebites might reduce the severity of thrombosis and systemic bleeding, the incidence of acute renal failure, and the length of the recovery time. **Objective:** To find out the prevalence and outcome of poisonous snake bite. **Methodology:** The present descriptive observational study was carried out in medicine wards of Department of medicine, Patuakhali Medical College Hospital during January' 2016 to December' 2020. A total of 580 cases of snake bite were admitted in medicine wards during the study period. Among them 116 cases were poisonous Snake bites. In this study we included 116 poisonous Snake bite cases. **Results:** Prevalence of poisonous Snake bite cases was 116(20%). Majority

patients came from rural area 95(81.9%) and 21(18.1%) came from urban area. Majority 80(69.0%) patients had neurotoxicity, 51(44.0%) had local pain, 49(42.2%) had cellulitis, 20(17.2%) had gangrene, 10(8.6%) had hematotoxicity, 10(8.6%) had acute renal failure, 9(7.8%) had coagulopathy, 9(7.8%) had oedema and 8(6.9%) had severe headache. Out of 116 patients, anti-venom given 110(94.8%), death 20(17.2%), broad death 4(3.4%), snake identification 10(8.6%), out of which Kobra was 8(6.9%) & Russel's Viper 2(1.7%). Adverse effect (Anaphylactic reaction) due to venom 10(8.6%), adrenalin given 18(15.5%), endotracheal intubation & ICU transfer 2(1.7%) and referred was 3(2.6%) patients. **Conclusion:** Prevalence of poisonous Snake bite cases was 20%, common complications due to snake bite were local pain, cellulitis, coagulopathy, hematotoxicity, oedema, acute renal failure, neurotoxicity and ulcer of limb.

**Key word:** Snake bite, complications, outcome, management.

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## INTRODUCTION

On a global scale, snake bite envenoming causes more than 100,000 human deaths annually, as well as pain, terror, or serious disabilities in about 5 million victims, as reported by the World Health Organization.<sup>1</sup> Snakebite envenoming is increasingly recognized as a major, deadly tropical disease of public health importance. Snakebite was re-included in the World Health Organization's (WHO) list of Neglected Tropical Diseases (NTDs) in June 2017.<sup>2,3</sup> Many scientists have made efforts to develop more effective antivenoms or to expand the limits of existing antivenoms. Such endeavors are challenging but worth the effort in the long run. However, to use precious antivenom more effectively, a snake species discrimination tool might be helpful for treatment by ensuring accurate antivenom usage and dosage.<sup>4</sup> Early antivenom treatment of snakebites might reduce the severity of thromboses and systemic bleeding, the incidence of acute renal failure, and the length of the recovery time.<sup>5</sup> Human-snake contacts occur mainly during field activities, in high grass or forest walks, but also around or in houses in regions of high density of snake population, typically farming regions where grain attracts rodents that, in turn, attract snakes. Snake venom components are known to vary greatly leading to varied clinical manifestations following snakebite. The success of antivenom therapy, which is the mainstay of therapy, usually depends on the snake species involved, and uncertainties concerning the species involved remain a major hurdle in effective management of snakebite. Therefore, proper identification of snake species is of prime importance, consequently leading to the development of the Snake Venom Diagnostic Kit (SVDK).<sup>6</sup> The effectiveness of therapy against snakebite is reliant on the unambiguous identification of bitten species of snake followed by immediate administration of venom specific

monovalent antivenom. However, this is a challenging task and therefore, over the several years scientists are constantly trying to address this issue by developing species-specific snake venom diagnostic kits as an alternative to classical methods of snake identification in clinics. Recently quite a few modern tools and techniques have been deployed for the development of simple, inexpensive, rapid, specific, and sensitive snake venom detection kits. However, despite these efforts a lone snakebite diagnostic kit is available until now which is a severe concern for efficacious snakebite therapy.<sup>7</sup>

## METHODS AND MATERIAL

The present descriptive observational study was carried out in medicine wards of Department of General Medicine, Potuakhali Medical College Hospital during January' 2016 to December' 2020. A total of 580 cases of snake bite were admitted in medicine wards during the study period. Among them 116 cases were poisonous Snake bites. In this study we included 116 poisonous Snake bite cases. 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. 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. Thorough clinical examination was carried out in each case. For identification of type of snake bite (Vasculotoxic, VT, 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 analyses were carried out by using the Statistical Package for Social

Sciences version 23.0 for Windows (SPSS Inc., Chicago, Illinois, USA). The mean values were calculated for continuous variables. The quantitative observations were indicated by frequencies and

## RESULT

Total 580 Snake bite patients attend in Potuakhali Medical College Hospital during study period from January 2016 to

percentages. Chi-Square test with Yates correction was used to analyze the categorical variables, shown with cross tabulation. P values <0.05 was considered as statistically significant.

December'2020 among them 116 cases had poisonous snake bite which was 20%. So, prevalence of Poisonous Snake bite cases was 116(20%) (Table-I).

**Table I: Prevalence of poisonous Snake bite in Potuakhali Medical College Hospital**

Snake bite population	Number	Percentage
Total Snake bite patients attend in Hospital January'2016 to December' 2020	580	100%
Poisonous Snake bite	116	20%
Non poisonous Snake bite	464	80%

Majority 31(26.7%) patients belonged to age group 31-40 years with mean age was  $37.8 \pm 12.6$  years. Male patients were predominant 70(60.3%) whereas female 46(39.7%). Male-female ratio was 1.5:1. Majority patients came from rural area

95(81.9%) and 21(18.1%) came from urban area. Most of the patients were farmers 51(44.0%) followed by labourer 29(25.0%), housewife 21(18.1%) and others 15(12.9%) (Table-II).

**Table II: Demographic characteristics of the study patients (n=116)**

Variables	Frequency	Percentage
<b>Age (years)</b>		
≤10	6	5.2
11-20	12	10.3
21-30	19	16.4
31-40	31	26.7
41-50	25	21.6
>50	23	19.8
<b>Mean±SD</b>	37.8±12.6	
<b>Sex</b>		
Male	70	60.3
Female	46	39.7
<b>Residence</b>		
Rural	95	81.9
Urban	21	18.1
<b>Occupational status</b>		
Farmers	51	44.0
Labourer	29	25.0
Housewife	21	18.1

Others	15	12.9
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Most snake bite was seen during rainy season 2(50.0%) in poisonous cases and 41(36.6%) in non poisonous cases. During summer season 2(50.0%) and 54(48.2%) in poisonous cases and non poisonous cases respectively. Victims in this study

were bitten outdoors mostly in the field during the night time between 6pm to 6am in both poisonous cases and non poisonous cases respectively (100% vs 68.8%) (Table-III).

**Table III: Season of bite and time of bite (n=116)**

Parameters	No. of poisonous cases (n=4)		No. of non poisonous cases (n=112)	
	n	%	n	%
<b>Season of bite</b>				
Rainy	2	50.0	41	36.6
Winter	0	0.0	17	15.2
Summer	2	50.0	54	48.2
<b>Time of bite</b>				0.0
6 pm -6 am	4	100.0	77	68.8
6 am -6 pm	0	0.0	35	31.3

The most common bitten site was in the left lower limb in both poisonous cases and non poisonous cases (50.0% vs 36.6%). Right lower limb was 2(50.0% in poisonous cases and 29(25.9%) in non

poisonous cases. Left upper limb was found in 21(18.8%) and right upper limb was 12(10.7%) in non poisonous cases (Table-IV).

**Table IV: Distribution of cases as per site of bite (n=116)**

Parameters	No. of poisonous cases (n=4)		No. of non poisonous cases (n=112)	
	n	%	n	%
Right upper limb	0	0.0	12	10.7
Left upper limb	0	0.0	21	18.8
Right lower limb	2	50.0	29	25.9
Left lower limb	2	50.0	41	36.6
Others	0	0.0	9	8.0

Majority 80(69.0%) patients had neurotoxicity, 51(44.0%) had local pain, 49(42.2%) had cellulites, 20(17.2%) had gangrene, 10(8.6%) had hemattoxicit,

10(8.6%) had acute renal failure, 9(7.8%) had coagulopathy, 9(7.8%) had edema, 8(6.9%) had severe headache. Other results are depicted in the table (Table-V).

**Table V: Complications of due to snake bite (n=116)**

Complications	Frequency	Percentage
Local pain	51	44.0
Cellulites	49	42.2

Coagulopathy	9	7.8
Hematotoxicity	10	8.6
Edema	9	7.8
Acute renal failure	10	8.6
Neurotoxicity	80	69.0
Gangrene	20	17.2
Severe headache	8	6.9
Ulcers of limb	4	3.4
Respiratory failure	3	2.6
Iron Deficiency Anemia	3	2.6
Chronic Renal Failure	3	2.6
Septicemia	2	1.7
Pulmonary Edema	1	0.9

Out of 116 patients, anti-venom given 110(94.8%), death 20(17.2%), broad death 4(3.4%), snake identification 10(8.6%), out of which Kobra was 8(6.9%) & Russel's Viper 2(1.7%). Adverse effect

(Anaphylactic reaction) due to venom 10(8.6%), adrenalin given 18(15.5%), endotracheal intubation & ICU transfer 2(1.7%) and referred was 3(2.6%) patients (Table-VI).

**Table VI: Distribution of the study patients by outcome (n=116)**

Outcome	Frequency	Percentage
Anti-venom given	110	94.8
Death	20	17.2
Broad death	4	3.4
Snake Identification	10	8.6
Kobra	8	6.9
Russel's Viper	2	1.7
Adverse effect (Anaphylactic reaction) due to venom	10	8.6
Adrenalin given	18	15.5
Endotracheal intubation & ICU transfer	2	1.7
Referred	3	2.6

## DISCUSSION

In this study observed that majority 31(26.7%) patients belonged to age group 31-40 years with mean age was  $37.8 \pm 12.6$  years. Nagaraju et al.<sup>8</sup> observed snake bite was most commonly reported in the age group 30-39 years with 83 patients [30.74%], followed by the 40-49 years age group of 59 patients [21.85%], followed by more than 50 years aged patients of 46 victims [17.03%] which correlated with other studies.<sup>9-10</sup> Kumar et al.<sup>11</sup> reported the majority of the victims (722) fell in the age group between 21 and 40 years. Bhalla et al.<sup>12</sup> also observed the majority

43(56.57%) patients belonged to age group 14-30 years followed by 28(36.84%) were 31-50 years and 5(6.57%) were >50 years.

In current study showed male patients were predominant 70(60.3%) whereas female 46(39.7%). Male-female ratio was 1.5:1. Nagaraju et al.<sup>8</sup> also consistence our observation they showed that males patients 201[74.44%] were more prevalent than females patients, 69 [25.55%] Kumar et al.<sup>11</sup> also revealed most of the patients were males (65%).

In present study observed majority patients came from rural area 95(81.9%) and 21(18.1%) came from urban area. Most of the patients were farmers 51(44.0%) followed by labourer 29(25.0%), housewife 21(18.1%) and others 15(12.9%). Nagaraju et al.<sup>8</sup> reported the majority of snake bites were reported from rural area with 214 patients [79.25%], compared to urban area with 56 patients [20.75%]. They also summarized with our data that, farmers of 153 patients [56.66%] are the major group of occupational population who were envenomed, followed by laborers with 89 patients [32.96%] and other group of population like, snake catchers, charmers, accidental attacks, etc with 28 patients [10.38%]. From our reports, they observed that majority of the population who were bitten by snake were from the rural areas, which are justified by the previous studies conducted on the prevalence of snake bite in different parts of the world,<sup>13</sup> because most of the developing countries, agriculture and working in the field are main source of income and occupation. Hence farmers and laborer class of population are most victimized by snake bite, due to easy contact with the snakes.<sup>14,15</sup> Bhalla et al.<sup>12</sup> reported maximum incidence of snake bites was found in rural areas (85%) than urban areas (15%). Poisonous snake bites were more prevalent in rural than urban areas.

In this study showed that most snake bite was seen during rainy season 2(50.0%) in poisonous cases and 41(36.6%) in non poisonous cases. During summer season 2(50.0%) and 54(48.2%) in poisonous cases and non poisonous cases respectively. Victims in this study were bitten outdoors mostly in the field during the night time between 6pm to 6am in both poisonous cases and non poisonous cases respectively (100% vs 68.8%). Kumar et al.<sup>11</sup> reported most of the bites (42%) occurred between the months of August and October. The timing of the snakebites

varied, with the majority of the bites occurring in the evening hours (5–9 pm) and the least during the early morning hours (4–8 am). Increase in number of snake bite cases is seen during the monsoon season when there is rainfall and increase in harvesting activities in the field.<sup>14,16</sup> The time of bite corresponds to the outdoor activities, like going to the field for water harvesting, sleeping outside the house on the floor due to more number of person staying in a small house or to combat the heat during summer, passing urine and stool in an open field, commuting to the nearest place with barefoot without light, which makes more prone for snake bites.<sup>13, 17</sup> Nagaraju et al.<sup>8</sup> also observed most snake bite was seen during rainy season with 186 patients [68.8%] followed by 66 patients [24.4%] during winter and 18 patients [6.8%] in summer. Victims in our study were bitten outdoors mostly in the field during the night time between 6pm to 6am with 174 patients [64.44%] followed by 6am to 6pm of 96 patients [35.55%]. Bhalla et al.<sup>12</sup> reported higher incidence of snake bites was found in summer (51.33%) i.e. March to May.

Regarding site of bite the most common bitten site was in the left lower limb in both poisonous cases and non-poisonous cases (50.0% vs 36.6%). Right lower limb was 2(50.0% in poisonous cases and 29(25.9%) in non-poisonous cases. Left upper limb was found in 21(18.8%) and right upper limb was 12(10.7%) in non-poisonous cases. Study concludes that majority of the snake bite involved the lower extremities as it is been more exposed sites of the body due to people work in the plantations, wood collections, gardening with bare-footed, particularly in rural areas covering major percentage of population which confirms with other previous studies.<sup>13, 18</sup> Kumar et al.<sup>11</sup> reported bites in the extremities predominated. About 1156 (77%) patients reported lower limb bites. Other sites of snakebite, in decreasing order, were upper

limb, trunk, and head and neck. Nagaraju et al.<sup>8</sup> observed that the most common bitten site was in the lower extremities [65.17%] of which left lower limb was reported to be bitten more in 98 patients [36.29%] than right lower limb with 78 patients [28.88%]. There were also reports of bitten sites in upper extremities [30%] with left upper limbs reported to be more in 45 patients [16.66%] followed by right upper limb with 36 patients [13.33%]. About 13 patients [4.81%] reported to be bitten on the chest, backside of the neck, shoulder.

In present study observed that majority 80(69.0%) patients had neurotoxicity, 51(44.0%) had local pain, 49(42.2%) had cellulites, 20(17.2%) had gangrene, 10(8.6%) had hematoxicity, 10(8.6%) had acute renal failure, 9(7.8%) had coagulopathy, 9(7.8%) had edema, 8(6.9%) had severe headache. Kumar et al.<sup>11</sup> reported the systemic bleeding manifestations, hematuria was the most common (seen in 246 patients) followed by bleeding gums in 218 patients. Hemoptysis was seen in 172 patients. Retinal hemorrhages were seen in 106 patients. Features of disseminated intravascular coagulation (DIC) were seen in 89 patients (in 72 patients with Russell's viper bite and the rest were seen in those with a HNPV bite). Three patients had thrombotic thrombocytopenic purpura. Seven patients had intracranial hemorrhage. Nagaraju et al.<sup>8</sup> reported The envenomed patients developed major incidence of complications such as local pain [256 patients], cellulites [253 patients], coagulopathy [74 patients], Hematoxicity [68 patients], edema [48 patients], Acute renal failure [48 patients] and neurotoxicity [35 patients]. Fewer incidences of complications such as ulcer of limb [17 patients], respiratory failure [14 patients], Iron deficiency anemia [14 patients] and chronic renal failure [13 patients]. We found that most of patients had incidence of multiple complications. Bhalla et al.<sup>12</sup> reported VT snake bites

(55.26%) were more common than neuroparalytic bites (27.63%). Commonest VT manifestation was local bleed (83.33%) and next on the list was cellulitis (57.14%). Hematuria (42.85%) was the commonest manifestation in those patients who developed ARF. Ptosis (100%) was the commonest and earliest manifestation of neuroparalytic snake bite.

In present study observed that out of 116 patients, anti-venom given 110(94.8%), death 20(17.2%), broad death 4(3.4%), snake identification 10(8.6%), out of which Kobra was 8(6.9%) & Russel's Viper 2(1.7%). Adverse effect (Anaphylactic reaction) due to venom 10(8.6%), adrenalin given 18(15.5%), endotracheal intubation & ICU transfer 2(1.7%) and referred was 392.6%) patients. Nagaraju et al.<sup>8</sup> reported about 228 patients [84.44%] got discharged with medication to be continued at home with an advice to review after 15 days to outpatient department of medicine. 27 patients [10%] had mortality, due to multi organ failure, respiratory collapse, and cardiotoxicity with sever renal failure during the course of treatment. 15 patients [5.55%]. Reports of morbidity and mortality depend on the lack of awareness in the community due to snake bite, lack of availability of antisnake venom, lack of transportation and inability to afford transportation. The death rate in our study was 10%, which compares well with the other studies with 3%-10% mortality across India.<sup>19,20</sup>

## CONCLUSION

Most of the cases were found younger age and male are predominate. Majority patients came from rural area with farmers and labourers are common. Poisonous cases were found rainy and summer season. Victims in this study were bitten outdoors mostly in the field during the night time between 6pm to 6am in both poisonous cases. Common complications due to snake bite were local pain, cellulites, coagulopathy, hematoxicity,

edema, acute renal failure, neurotoxicity and ulcer of limb.

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