

An Epidemiological study of Deaths in poisonous snake bite in Eastern India

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Abstract

Background: Snakes have always managed to grab human attention and have been an object of fear since historic civilization. Snake bite is an important occupational and rural hazard because India has always been a land of Exotic snakes. In West Bengal common poisonous snakes are Cobra, Viper and Krait. It is a fact that in spite of heavy morbidity and mortality, very little attention is paid by the clinicians to this occupational hazard. **Aim:** To study the prevalence of poisonous snake bites in part of West Bengal with reference to age, sex, occupation, part of body bitten, time of bite and seasonal variation, and the types of poisonous snakes common in this locality. **Methods:** This was a retrospective study conducted between 1st April 2013 to 31st March 2014 at a tertiary health care center in West Bengal. **Results:** Most of the cases (66%) were belonging to the age group 15-34 years. Male are having twice the incidence than the female (M: F ratio 2.12:1). Maximum cases were from rural areas i.e. 72%. In 66% cases snake bite occurred during night time and most of the cases i.e. 82% occurred during rainy season. **Conclusion:** Snake bite is a common life-threatening emergency in this area. Delay in hospitalization is associated with poor prognosis. Co-ordinated multidisciplinary approach is needed for proper management of snake-bite victims. Meticulous autopsy examination helps to find out the exact cause of death behind it.

Keywords: Epidemiology, Autopsy, snake bite, occupational hazard.

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Introduction

Snake bite is a common medical emergency and occupational hazards more so in India where agriculture is a major source of employment. Snake bite poisoning deaths are considered as unnatural deaths in India and hence post-mortem examination of deceased persons is mandatory according to law. WHO has estimated that nearly 125000 deaths occurred among 250000 poisonous snake bite worldwide every year. India to have most envenoming country in the world that is 81000 envenoming and 11000 deaths annually[1]. Envenoming and deaths resulting from snake bites however, are a particularly important public health problem in the rural areas. Populations in these regions experience high morbidity and mortality because of poor access to health services, which are suboptimal, and in some instances scarcity of anti-venom, which is the only specific treatment[2].

Materials and methods

We conducted a prospective, descriptive, and observational cross sectional autopsy based study in association with the clinical records available from investigating agencies. The Hospital and mortuary-based study was carried out taking 50 cases of snake bite in the department of Forensic and State Medicine, at Jagannath Gupta Institute of Medical Sciences and Hospital under Mominpur Police Morgue, Kolkata from 1st February 2021 to 31st January 2022.

All the dead bodies with the history of poisonous snake bite brought to Mominpur Police Morgue, Kolkata for medico legal autopsy were

included in the present study. Decomposed bodies and subjects having pre-existing pathology in kidneys were excluded. A tabulation, data and statistical analysis was done in the department of Forensic Medicine at Microsoft Excel (version 2016).

Results

In this study, there were 50 cases of death due to snake bite comprising 2.02% of all autopsies done at NRSMC&H mortuary from April 2013 to March 2014.

Maximum number of cases (66%) was belonging to the age group 15-34 years. Male are having twice the incidence of venomous snake bites compare to the female (M: F ratio 2.12:1). Maximum cases were from rural areas i.e. 72%. In 66% cases, snake bites occurred during night time. Most of the cases i.e. 82% occurred during rainy season. Maximum number of patients (68%) had the site of bite in lower limb while 30% were bitten over the upper limb. In only one case bite was present over left ear.

Table-1 shows that- Majority of the cases (66%) are young adults between 15 and 34 years. Half cases (50%) are involving young males of 15-34 years.

Table-2 shows that- Venomous snake bite is more common in rural areas (72% cases). Majority of snake bites occurred at night hours (66% cases). In more than half cases (52%), fang marks are not visible. Majority (84%) of the cases have reached the hospital within 12 hours of the snake bite.

Table-3 shows that- Venomous snake bites become major problem during rainy season between June and October (82% cases).

Table-4 shows that- Lower limbs are involved in majority of the cases of venomous snake bites followed by upper limbs.

Table-5 shows that- Agricultural worker are more commonly affected than non agricultural worker in snake bite and male (66%) are usually victim more than female cases (34%).

Table-6 shows that Neurotoxic envenomation (56%) is most

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common followed by Vasculotoxicity(44%).

Table and figure

Table-1: Distribution of the study population according to the age and sex (n=50)

Age Group (years)	Male	Female	Total Cases (%)
15-24	13	5	18(36)
25-34	11	4	15 (30)
35-44	3	1	04 (08)
45-54	6	3	09 (18)
55-64	1	1	02 (4)
>65	1	1	02 (4)
Total	35	15	50 (100)

Table-2: Selected variables of the cases
Variables Cases (n=50) (%)

Residential Area	
Rural	36 (72)
Urban	14 (28)
Time of bite	
Day time (6:00 am to 6:00 pm)	17 (34)
Night time (6:00 pm to 6:00 am)	33 (66)
Time Interval (Hours)	
0-6	31 (62)
7 – 12	11 (22)
12 – 24	06 (12)
>24	02 (4)
Fang Marks	
Present	24 (48)
Absent	26 (52)

Table-3: Distribution of cases according to seasonal variation

Month	2013	2014	
April	1	3	04 (8)
May	1	1	02 (4)
June	2	6	08 (16)
July	3	6	09 (18)
August	3	5	08 (16)
September	6	6	12 (24)
October	3	1	04 (8)
November	2	0	02 (4)
December	0	0	0 (0)
January	0	0	0 (0)
February	0	0	0 (0)
March	0	1	01 (2)

Table-4: Distribution of cases according to bite site

	Right	Left	Total (%)
Arm	2	1	3 (6)
Forearm	1	0	1 (2)
Hand	8	3	11 (22)
Thigh	1	2	3 (6)
Leg	6	6	12 (24)
Foot	6	13	19 (38)
Other (Left Ear)	0	1	1 (2)
Total	24	26	50 (100)

Table-5: Distribution of cases according to occupation

Occupation	Male	Female	Total Labourer (Agriculture/non agriculture)
Agriculture labourer	21	11	32
Non agriculture labourer	12	6	18

Total (n)	33	17	50
Percentage (%)	66	34	100

Table-6: Distribution of cases according to type of snake

Type	No. of cases		Total (n)	Percentage (%)
	Male	Female		
Cobra(Neurotoxic)	7	4	11	22
Krait(Neurotoxic)	9	8	17	34
Viper(Vasculo toxic)	9	13	22	44

Discussion

Snake bite may be appropriately categorized as a neglected tropical disease which makes it harder for public health officials to optimize the prevention and treatment of snake bites in their respective countries. A total 3254 cases of venomous snake bite cases admitted in Victoria Hospital of Bangalore (Jan 2002 to December 2011) were studied by Dayananda K.S. et al[2]. The majority of males and females were in the age group of 20-50 years. It was observed that there was more prevalence of snake bite cases in males compared to females of all age groups. More snake bites occurred during the months of May to October, during rainy season more cases were observed. Snake bites mostly occurred over the lower limbs (39 %) and it was observed 32 % in hands and 17 % in arms. The incidence of snake bite was observed in 78.1 % cases during day time. Maximum incidence was observed in rural areas (73.1 %). Dayananda's observations are consistent with the findings of our present study. A hospital based epidemiological study of snake bite was done in West Bengal by Sarkhel Suman et al[3] and data over 5 years were collected from BPHCs and PHCs. Their findings are also consistent with our observations and they are as follows. The male to female ratio was 1.03. The majority of snake bite cases were within the age of 21-45 years. Snake bite and death rate is always high in rainy season. Maximum number (34 %) of snake bites were reported in the months of June to September. A total of 87 snakebites caused by venomous and nonvenomous species were recorded from January 1 to December 31, 2015, in NECTR. The snakebites were more common during the summer; sixty-five (75%) cases were reported during the summer months from May to October. All snakebites patients' ages ranged (2-64 years) with a median age of 30.4 years. Males were more prevalent than females irrespective of venomous or nonvenomous status. The sex distribution was 24 females (27.58%) and 63 males (73.41%). The male to female ratio was 2.66: 1. Most snakebite occurs during summer, particularly in the evening was the common snakebite complications attributed to Viperidae species. Vij Krishan et al[4], Yogesh C et.al[5] and KulKarni et.al[6] found that most snake bites are inflicted on the lower limbs of farmers, plantation workers, herdsmen, and hunters. Usually, the snake is trodden on at night or in undergrowth. Snakes do not bite without provocation, but there may be an inadvertent tread or touch. Seasonal peaks in the incidence of snake bite are associated with agricultural activities, such as ploughing, or to fluctuations in the activity or population of venomous snakes which is consistent with our present study. Most of the species of snake bite in our study are Viper 44% followed by neurotoxic snake bite Krait 34% & Cobra 22%. This is consistent with Harshavardan et.al study[7] in which vasculotoxic bite was predominant Whithall et al[8] were also consistent with our current study. Time period during which snake bite was most recorded is 6pm- 6am (33%). This is in line with previous studies of Bhalla et.al[9]. Bite near the house premises are due to the rural environment with huts and houses, dry cowdung, dry firewood, firm tools being kept encourages rats, mice and lizards which are the prey for snakes. This percentage of outdoor predominance is in accordance with Vanamali et.al[10].

Conclusion

Following conclusions were drawn from the present study. Maximum number of cases (66 %) were belong to the age group 15-34 years as the members of this age group are young, active and having maximum outdoor activity. Male are having twice the incidence of

venomous snake bites compare to the female (M: F ratio 2.12:1). This can be explained by the fact that male are main earning member of the Indian families and they are having higher outdoor activity than female. Maximum number of patients of venomous snake bites was from rural areas i.e. 72 %. Rural areas are having favorable environmental conditions for the survival of snakes. In 66 % cases, snake bites occurred during night time i.e. between 6:00 pm to 6:00 am. Most of the venomous snakes are having nocturnal habit of food searching. In rural areas people are having habit of sleeping on the floor due to poor socioeconomic condition. These are the main reasons for higher incidence of venomous snake bites during night time. Most of the cases i.e. 82 % occurred during rainy season between June and October. The main reason is entry of water in to the snake burrow causing increase number of snakes on the ground. Interestingly, in 52 % cases, no any fang marks were seen at the site of bite even though there was a clear history of snake bite along with clinical manifestations of envenomation. This indicates that fang marks at bite site do not give adequate clue regarding clinical manifestations or complications following snake bite. Maximum number of patients (68 %) had the site of bite in lower limb while 30 % were bitten over the upper limb. In only one case (2 %) bite was present over left ear.

To reduce the current prevalence of snake bite in India co-ordinated multidisciplinary approach, the infrastructure of the hospital, education of people, training of health care personnel and recent technological advancement in the society can be considered. The authors hope that this work will help in the showing of light on the current situation in India in this matter.

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Conflict of Interest

Nil

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