

Original Article

Pattern and seasonal variations of snake bite in southern part of Bangladesh

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Abstract

Background: Snake bite is one of the leading causes of mortality and morbidity in many regions, notably the rural tropics, and is a globally overlooked occurrence. Present study is aimed to find the pattern and seasonal variations of snakebite in the southern part of Bangladesh. **Methods:** A one-year retrospective survey was done on 554 venomous or non-venomous snake bite patients admitting in a tertiary care hospital Chittagong Medical College Hospital, Bangladesh. Through the administration of a questionnaire, data on snake bites and kinds, date and time of bite and envenomation characteristics were obtained from respondents over a twelve-month period. After data collection, SPSS-20 was utilized for analysis. **Results:** In the present study male (64.1%) were found more affected than female and the vast majority of snake bite victims are younger. Regarding pattern of envenomation, 400(72.2%) patients had no features of envenomation, 37(6.7%) local envenomation with spontaneous bleeding, 35(6.3%) had systemic envenomation, 74(13.4%) had local envenomation and 8(1.4%) had local swelling with neurotoxicity. Most of the patients were male (64.1%), female was mostly housewives (24.9%) and 68.1% were from poor socioeconomic status. Regarding monthly distribution of study patients where most patients were found during May to September and venomous bite were also more common during the month of May to August. Analysis of species of snakes revealed 89(16.1%) were pit viper, 87(15.7%) were dora snake, 23(4.2%) were cobra and 355(64.1%) snake bite were remained unidentified. **Conclusions:** During the monsoon season (May to September) in Bangladesh, the incidence of both nonvenomous and venomous snake bites is much high and poisonous snake bites are prevalent during this time. Poor access to health services and superstition regarding dealing with Ozahs are also a common finding in our study.

Key words: Snake bite, Ozah, Venomous, Venomation, Monsoon, Bangladesh.

Introduction: Snake bite is one of the important causes of envenoming worldwide including south east Asia.^{1, 19, 20, 21} In rural Bangladesh, an estimated 589,919 people are bitten by snakes and 6041 die from snake bites year.² According to a study done by Faiz et al, 1666 snake bite victims attended to the Chittagong Medical College Hospital for snake bite during a study period of five years which is a tertiary care hospital situated in the southern part of Bangladesh. 28.5% of these patients were bitten by venomous snakes, although only eight (0.5%) succumbed.³

Majority of this sub continental snakes are active during the monsoon or rainy season and in the night or darker areas.^{4, 8, 9, 10} The season also coincides with the time that the snakes usually lay their eggs.^{4, 11, 12, 13} This poses a particular risk of bite to farmers as they venture to the fields during the monsoon.^{5, 14, 15} It was observed that there was an increased incidence of snake bite during the monsoon at other centers. So, this present study was carried out retrospectively from the snake bite patient's registry of a tertiary care hospital of Chittagong, Bangladesh to evaluate the species variation of snakebites with their seasonal

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influence. The data can prove to be valuable as educating the public of the increased threat during this period may help in reducing the incidence of snake bite by adopting preventive strategies.

Materials & Methods

Study design and setting

This study was a retrospective observational study conducted in Chittagong Medical College Hospital (CMCH), Chittagong, Bangladesh in duration of one year from 1st March 2013 to 28th February 2014. A Total of 554 patients were admitted during that study period with history of snake bite or an unknown bite presenting with signs of local and systemic envenomation. A written informed consent from hospital director was taken to handle and use the data from their records. An accurate history regarding the date, time of bite and the circumstances leading to the bite was obtained. The clinical examination findings done with emphasis on local examination findings with note of fang marks and other signs of systemic envenomation were noted if present. A systemic examination finding regarding cardiovascular, respiratory, gastrointestinal and nervous system were also noted. The information was collected in a preformatted data sheet. Data was analyzed using frequency, percentages or mean with the help of SPSS-20.

Results

Regarding pattern of envenomation where 400(72.2%) patients had no features of envenomation, 37(6.7%) local envenomation plus spontaneous bleeding, 35(6.3%) had systemic envenomation, 74(13.4%) had local envenomation and 8(1.4%) had local swelling with neurotoxicity. Most of the patients were male (64.1%), female were mostly house wives (24.9%) and 68.1% were from poor socioeconomic status. Monthly distribution of study patients showed most patients were found during May to September time zone and venomous bites were also more common during the month of May to August. According to our observation, the number of snake bites is higher during the monsoon season. In November, an increase in snake bites was also reported. The majority of bites occur at home or in the workplace. Regarding species name where 89(16.1%) were pit viper, 87(15.7%) were dora snake, 23(4.2%) were cobra and 355(64.1%) snake bite were remained unidentified.

Table-01: Distribution of study population according to envenomation (n = 554)

Envenomation pattern	Frequency	Percent
No envenomation	400	72.2
Local envenomation only	74	13.4
Local envenomation + spontaneous bleeding/ coagulopathy	37	6.7
Systemic envenomation (neurotoxicity)*	35	6.3
Local swelling + neurotoxicity*	8	1.4
Total	554	100.0

*needed anti-venom as regarded as venomous snake bite

Table 1 showing subgroup of envenomation where 400(72.2%) patients had no features of envenomation, 37(6.7%) local envenomation plus spontaneous bleeding, 35(6.3%) had systemic envenomation, 74(13.4%) had local envenomation and 8(1.4%) had local swelling with neurotoxicity.

Table-02: Distribution of socio-demographic variables among the study population (n = 554)

Socio-Demographic Variables	Frequency	Percentage (%)	
Gender	Male	355	64.1
	Female	199	35.9
Occupation	House wife	138	24.9
	Student	181	32.7
	Farmer	79	14.3
	Business	32	5.8
	Day labor	55	9.9
	Service holder	47	8.5
	Fisherman	18	3.2
	Others	4	0.7
Socio-economic Status	Rich	3	0.5
	Upper Middle Class	29	5.2
	Lower Middle Poor	145	26.2
		377	68.1

Table 2 showing demographic variables where most of the patients were male (64.1%), female were mostly house wives (24.9%) and 68.1% were from poor socioeconomic status.

Table – 03: Distribution of patients according to moths of the year (n = 554)

Months	Non-Venomous		Venomous*		Total	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
January '14	28	96.6	1	3.4	29	5.2
February '14	27	93.1	2	6.9	29	5.2
March '13	16	94.1	1	5.9	17	3.1
April	29	93.5	2	6.5	31	5.6
May	42	82.4	9	17.6	51	9.2
June	51	91.1	5	8.9	56	10.1
July	89	92.7	7	7.3	96	17.3
August	52	89.7	6	10.3	58	10.5
September	67	93.1	5	6.9	72	13.0
October	36	94.7	2	5.3	38	6.9
November	50	96.2	2	3.8	52	9.4
December '1	24	96.0	1	4.0	25	4.5
Total	411		43		554	100.0

*those patients needed anti-venom for recovery

Table 3 showing monthly distribution of study patients where most patients were found during May to September time zone and venomous bite were also more common during the month of May to August.

Table-4: Information of snake bites and pre-hospital activities

Variables	Frequency	Percentage (%)	
Activity during bite	Awake	536	96.8
	Sleep	18	3.2
Interaction with bitten snake	Caught	18	3.2
	Disturbed	419	75.6
	Trodden	63	11.4
	Incidental	54	9.7
Previous snake bite	Yes	12	2.2
	No	542	97.8
Pre-hospital treatment	Given	42	7.6
	Not given	512	92.4
Application of ligature	Yes	531	95.8
	No	23	4.2
Immobilization of bitten limbs	Yes	182	32.9
	No	372	67.1
Incision of bite site	Yes	51	9.2
	No	503	90.8
Herbal medicine	Yes	99	17.8
	No	455	82.2
Offender identified	Yes	198	36.6
	No	356	63.4
Time with Ozas (n=90)	0-30 minutes	53	58.8
	31-1 hours	18	20.0
	1-2 hours	26	28.8
	>2 hours	3	3.3

Table – 5: Species name

Species name	Frequency	Percent
Cobra	23	4.2
Pit viper	89	16.1
Dora snake (Local name)	87	15.7
Total	199	35.9
Not identified	355	64.1
Total	554	100.0

Table 5 showing species name where 89(16.1%) were pit viper, 87(15.7%) were Dora snake, 23(4.2%) were cobra and 355(64.1%) snake bite were remained unidentified.

Discussion

We have evaluated the pattern and seasonal aspect of snake bite in admitted patients in a tertiary care hospital of Bangladesh. In the study total of 554 patients were included where more patients were admitted in May to September of the year during which there is heavy rainfall in Bangladesh. In a study done Rahaman et al³ found As high as 789.2 per 100,000 person-years, the yearly incidence of snake bites is 623.4 per 100,000 person-years. According to the findings of the study, there are an estimated 710,159 cases of snakebites annually in rural Bangladesh. According to Faiz et al² In rural Bangladesh, snake bites pose a particularly severe medical emergency. An estimated 4, 3 bites per 100,000 inhabitants resulted in 2,000 fatalities each year.

The majority of snake bite victims in this study are younger, indicating that an active population is at a greater risk for snake bites. Similar findings were observed from Nepal, Malaysia, and a prior Bangladeshi investigation.^{2,3} According to Faiz MA⁷ The unfavorable contact between a snake and a human victim that results in a bite. Typically, the victim is a young, energetic, impoverished person who is bitten during a day-to-day occupational activity such as farming, fishing, planting, collecting wood, seeing the 'crop' or 'garden' laying on the floor, or even on a rural foot stroll. Occasionally it occurs in the household environment, such as during chicken or pet bird care.

In the present study male were found more affected than female. In the study of Rahaman et al² and Faiz at al³ observed a comparable ratio of male to female victims of snake bites. A few studies revealed a male majority, primarily attributable to bites in paddy fields, but the ratio of males to females in these researches varied. Our findings on the male-to-female ratio are comparable to those of previous research. In impoverished nations, males may have greater hospitalization rates than females. In addition, women receive more bites at home and at night. This may be the result of the existence of krait in house area. Typically, Krait is nocturnal. It dwells near human habitation and conceals itself in burrows, forests, and household gardens. At night, particularly at the height of the monsoon season, kraits invade rural homes in search of their natural prey, which consists of tiny snakes, amphibians, rodents, and geckos. In many regions of Bangladesh, women participate alongside men in agricultural operations in the field.

According to our research, the biggest number of snake bites occurs during the monsoon or rainy season. This is likely due to the fact that in Bangladesh, agricultural operations take place during this season, since we rely on rainwater for crops. In addition, this season is the mating season for snakes, resulting in an upsurge in snake activity during this period of hot, humid weather and monsoon rain. These altered circumstances are expected to push snakes to leave their shelters and seek protection in higher, drier locations. This may contribute to the elevated risk of snake bite during the monsoon season. Similar results have been observed in other investigations.^{2,3,6}

The majority of bites occur when people are at home or at work, participating in activities like farming, fishing, planting, wood collecting, or caring to crops or gardens. However, victims are frequently bitten when walking or sleeping. Numerous victims in this research were bitten by snakes while working in agricultural fields or bodies of water. 35 percent were bitten by snakes while staying at home. Most houses in Bangladesh are not made of brick, and snakes often inhabit the gaps in the muddy flooring. In addition, the majority of residences in rural sections of the nation are surrounded by homestead vegetation, which provides natural habitats for snakes. Consequently, snake bites are a typical

occurrence in residential areas. People frequently leave their homes and become victims to use the restroom and for other household needs. Villagers keep grains, particularly paddy, in their bedrooms, which creates a haven for snakes and so increases the danger of snake bite. Similar findings were obtained in a prior research conducted in Bangladesh.^{2,3}

Among various species, 89 (16.1%) were pit vipers, 87 (15.7%) were Dora snakes, 23 (4.2%) were cobras, and 355 (64.1%) snake bites remained unidentified. In Bangladesh, cobras are a prevalent source of daylight bites. Nepal, Bangladesh, Malaysia, and Hong Kong each reported identical results.^{2,3,6} According to previous research, the green pit viper may also be capable of biting in the head and neck region^{2,3, 16, 17, 18}

Anti venoms administered intravenously is the most effective therapy for snake bites. In the current study, 90 (16.2%) patients received first therapy support from the Ozahs. Our study found that snake charmers employ several unsanitary procedures to treat snake bites, including repeated incisions, a tight tourniquet around the bite mark, and the suction of blood from the bite wound. Therefore, it is imperative that these snake charmers receive training so that they can discontinue their dangerous activities, maybe learn how to effectively apply tourniquets, and quickly refer victims to the nearest medical facilities. Free anti venom for snake bites should be made available at public hospitals, especially in distant rural regions.

Limitations

It was a hospital data based retrospective study done in a part of Bangladesh so actual national scenario may not represent.

Conclusions:

During the monsoon season (May to September) in Bangladesh, the incidence of both nonvenomous and venomous snake bites is much high and poisonous snake bites are prevalent during this time. Poor access to health services and superstition regarding dealing with Ozahs are also a common finding in our study.

Declarations

Author Contributions

Mohammad Nazim Uddin designed the study, supervised the project and participated in patients'

enrollment. Aniruddha Ghose supervised the project's accuracy; Mahabubul Islam Majumder prepared the draft of the manuscript; Raushan Akter, Mohammad Moharam Ali and Mostaque Ahmed participated in patients' enrollment and gave a substantial contribution. All authors have read and agreed to the published version of the manuscript.

Conflict of Interest Statement

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Data availability statement

Data will be made available on request.

Ethical Approval

The ethical permission received from the ethics review committee of Chittagong Medical College Hospital (CMCH), Chittagong, Bangladesh. Prior to data collection, patients were told about the project and consented and anonymity was maintained throughout the study.

Consent for Publication: Not applicable

Code Availability: Not applicable

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