

A Pilot Study on Snake Bite Deaths in the District of Malda, West Bengal, India

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Abstract

The alarming number of deaths due to snake bite are often under-reported and missed due to several interrelated socioeconomic factors. Epidemiology of fatal snake bite have been reported sparsely from West Bengal in recent past. The present investigation was devised to explore the profile of the fatal cases of envenomation in snake bite from a district of northern part of West Bengal. Deaths due to snake bite constituted 02.067% of all unnatural deaths from mortuary data. The mean age of the cases of fatal snake bite was 34.18 with SD 2.67. It was seen that the mean interval between bite and treatment was 3.35 hours with SD 0.48. The present work was a short regional research to supplement epidemiology and add to the database of deaths from snake bite in a district of West Bengal, India.

Key words *Epidemiology, Snake Bite Deaths, District, West Bengal, India*

Introduction

Mortality due to envenomation in snake bite has remained as an underrated and less studied public health issue. Primarily in developing agrarian countries like India, the alarming number of deaths is often under-reported and missed due to several interrelated socioeconomic factors. It mainly affects the rural population who has poor access to health care facilities. The World Health Organization (WHO) have designated snakebite as a neglected tropical disease and urged its member states to formulate measures to reduce mortality and morbidity from poisonous snake bite.

The victims of snake bite envenomation also suffer economic loss and the burden has to be shared by poor families. Most often the economically productive

member is lost due to snake bite. WHO reported that major brunt of the problem of snake bite has to be borne by the South Asian countries including India and Sri Lanka. Snakebite remains an underestimated cause of death in rural India. Some authors indicate that because a large proportion of global totals of snakebites arise from India, global snakebite totals might also be underestimated ¹

Epidemiology of fatal snake bite has been reported sparsely from West Bengal in recent past. Earlier study from south 24-Pargana District in West Bengal showed that only 07.23% snake bite deaths were officially reported. Only 22.19% of the snake bite victims attended the hospitals. Nearly 65.7% of the snake bite deaths were due to Common Krait bite, most of them occurring in the months of June to September. Studies from a tertiary level Medical College in West Bengal ² reveal significant number of snake bite admissions and deaths. Total number of snakebite deaths in Midnapore Medical College and Hospital (MMCH) was 222 from the period 2012–2016. The case fatality rate was 03.5%. The number of snakebite cases that attended the hospital

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during this period was 6343³.

An earlier Study from South India ⁴ was conducted on 198 snakebite victims and analyzed their socio-demographic and epidemiological details. Their study period was five years with average 40 cases per year. Their case fatality rate was observed as 03.0%. The results revealed that male to female ratio of the study participants was 2.1:1. Similar findings have been reported from the studies conducted in different parts of India^{5,6,7}.

Clinical and autopsy studies are well documented in fatal snake bite from published works Previous reports from Burdwan district of West Bengal have reported the incidence of severe nephrotoxicity in Cobra ⁸ Krait⁹ and Viperbites¹⁰. Proven autopsy methods for diagnosis of snake bite and its classification has been devised from semi quantitative methods ¹¹. Regional variations in the species of poisonous snakes and the composition of venom are to be reckoned with. Earlier autopsy based research ⁸ reveals renal involvement in 64.28 % of fatal bites by Indian cobra (Naja naja) primarily considered neurotoxic. The major renal changes were tubular necrosis 01(7.14%), cortical necrosis 03 (21.42%) and interstitial nephritis 03(21.42%).

The present investigation was devised to explore the profile of the fatal cases of envenomation in snake bite from a district of northern part of West Bengal. Special emphasis was accorded to the determinants of fatality, the socio-demographic profile, economic burden, and medico legal aspect. Besides the public health aspect

of the problem was analyzed in the light of treatment seeking behavior of the nearest of kin of the deceased.

Materials and Method

The descriptive epidemiological study was conducted at the Department of Forensic Medicine & Toxicology, Malda Medical College, Malda, West Bengal after obtaining clearance from the Ethics committee of the institution. The sample consisted of all the cases of fatal snake bite that were brought to the mortuary for medico legal autopsy. As per statutory rules all deaths due to snake bite envenomation are subjected to autopsy to ascertain the cause and manner of death. For the purpose of the study all unknown bites were excluded as they did not conform to the inclusion criterion. The study period was May 2018 to June 2019. The source of information was police inquest, hospital records (for hospital deaths), information from nearest of kin, post- mortem reports and departmental records. Major socio-demographic details, autopsy findings, history and treatment protocol was in a pretested and predesigned proforma. Descriptive statistics and study of association was performed using SPSS version 19 for windows (IBM). P value of less than .05 was considered significant.

Obseervation/Results

There was 1839 unnatural deaths during the study period of which 38 were due to snake bite envenomation (2.067%). Descriptive statistics for age, time interval between bite and admission and time interval between admission and death are seen from Table 1.

Table 1

Descriptive Statistics							
	N	Range	Minimum	Maximum	Mean		Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic
AGE [years]	38	60.00	10.00	70.00	34.1842	2.67884	16.51348
Bite admit gap [hours]	27	13.00	1.00	14.00	3.3556	0.48871	2.53943
Admit death gap[hours]	28	71.50	.50	72.00	8.3946	2.73588	14.47692

The mean age of the cases of fatal snake bite was 34.18 with SD 2.67. The number of males was 18 and female were 20. The mean age of male and female victims were 41.16 and 27.90 years respectively. There was significant difference in the mean age of the two sexes ; males being higher than females. (t test 2.67,df 36, p=0.011).

Majority of deaths occurred in the months of May to July, June recording highest of 12 deaths. The time of bite is seen from Figure1. Majority of the bites occurred during night between midnight and 2am.

29 (76.3%) cases in the present investigation were hospital indoor deaths while 09 were declared brought dead. The socioeconomic status , monthwise distribution are described in figures 2 and 3.

20 (52.6%) cases were bitten in their lower extremity followed by 15(39.5%) in upper extremity. For the upper extremity group, 11 (28.9%) were in the hand while only 04(10.5%) were in the forearm.

Regarding the toxicity type and presence of fang mark the present series showed no statistically significant association as from Chi square test (chi square 6.86 df 6, p value 0.333).

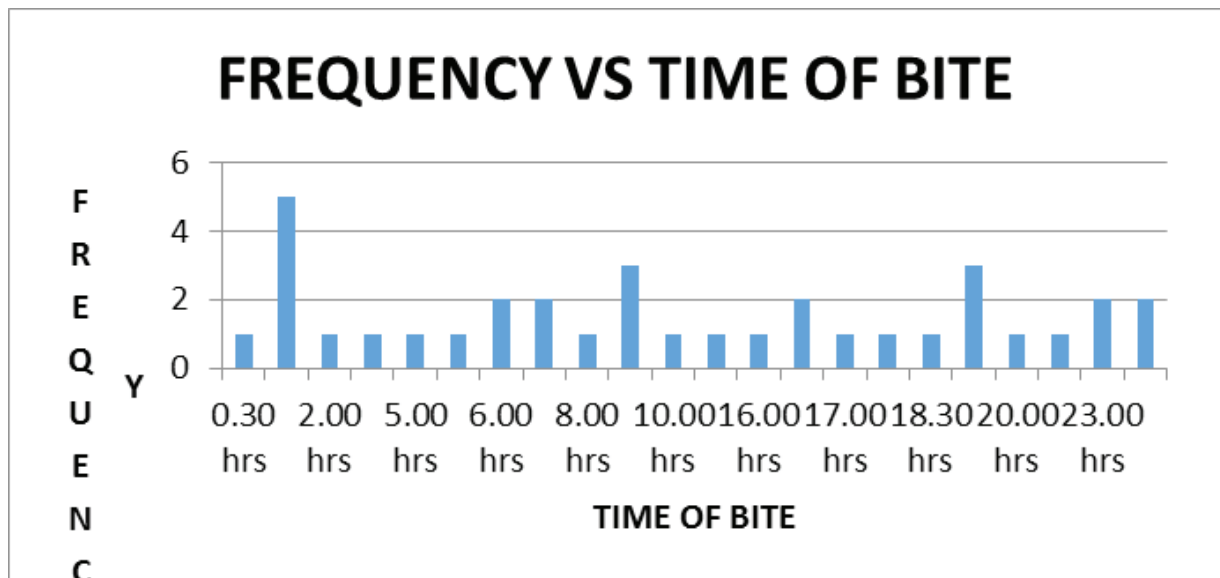


FIGURE 1

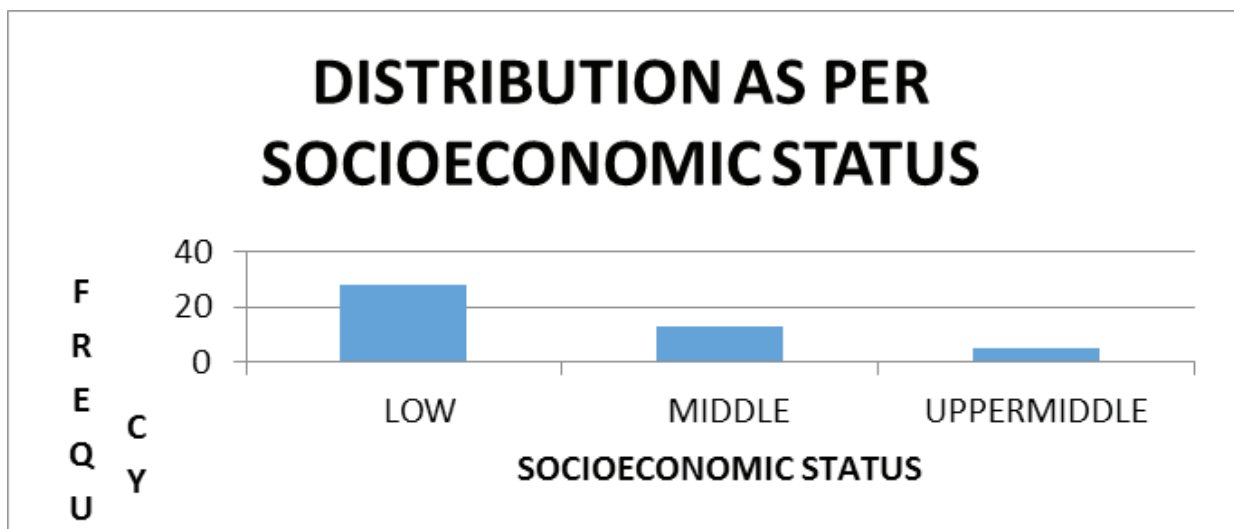


FIGURE 2

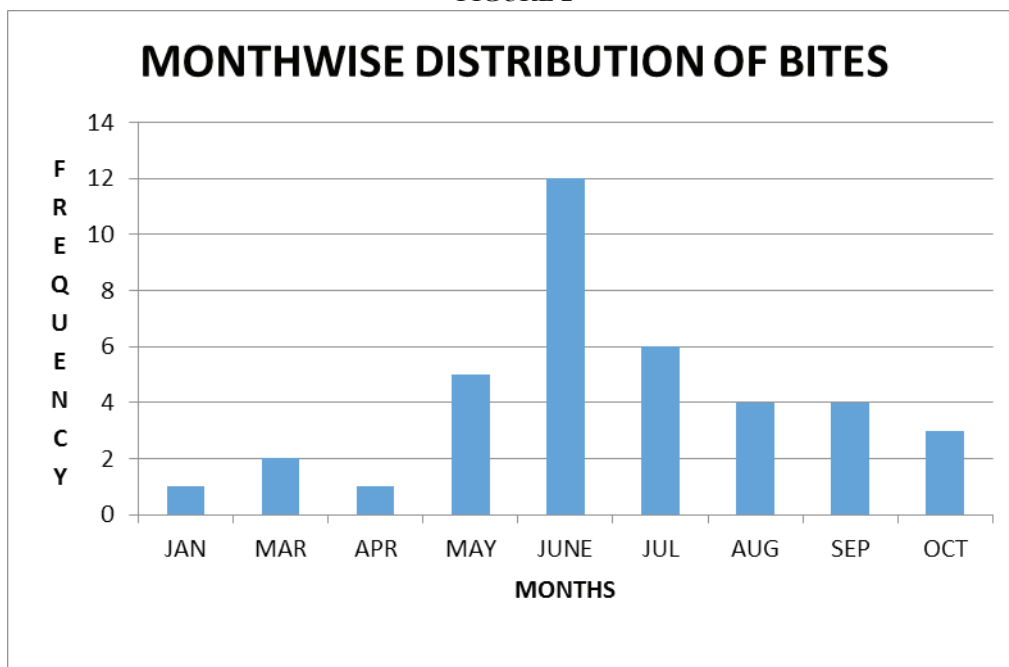


FIGURE 3

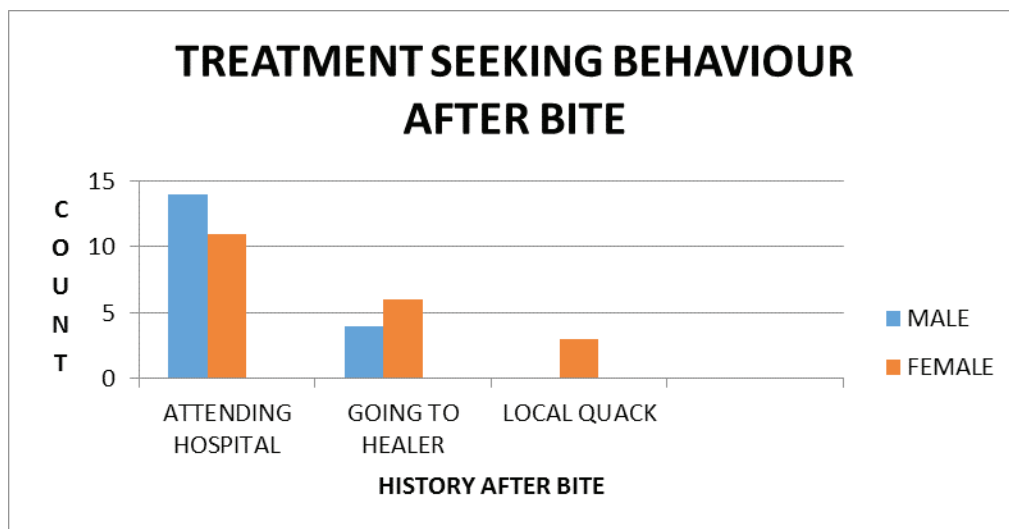


Figure 4

The detail of treatment seeking behavior was seen from figure 4. 11 females (28.95 % of total sample) were directly taken to the hospital for treatment. 04 males (10.53%) and 06 females (15.79%) were taken to some magic /traditional healer after the incident of bite. There after they were shifted to hospital or were brought dead at emergency.

It was seen that the time interval between bite and hospital admission was almost same for both type of snake bites. It was 3.31 hours for neurotoxic bites and

3.39 hours for hemotoxicbites. The interval between admission and death differed in the two types of bites being 9.31 hours for hemotoxic bites and 7.12 hours for neurotoxic bites.

Discussion

Snake bite is an important public health issue that needs more attention and in-depth analysis. The policy perspectives need to be aimed at reduction of mortality and morbidity from this natural accidental hazard. The crux of the problem still remains much underrated,

especially in our country as a whole. Review of recent research clearly indicate that the epidemiology remains unstandardized, erratic. The great variance in the data regarding snake bite related deaths (from 20000 to 50000 per annum) are alarming as many cases are not brought within the purview of official records. There is no uniform system of registering the deaths across so diverse a country. Similar has been the global concern, especially in South Asian and African Countries^{1,2}. The present investigation was conducted to capture basic data on a regional basis to supplement the epidemiology of snake bite related mortality. Malda Medical college is the only regional tertiary center for treatment and medico legal cases of the district. This work can be regarded as a district level investigation of snake bite mortality from West Bengal.

In the present series of 38 cases of fatal snake bites, 18 were male and 20 were female. This is strikingly different from earlier reported studies from Indian several states ^{4,5,6} wherein the percentage ranged from 30 to 35 in females. The mean age in our study was 34.18 year, SD 2.67. The minimum age was 10 years. The major age group that was affected was 25 to 40 years. This is comparable with previous reports^{2,3}. This clearly indicated that the most active and productive age group is the worst victims in rural areas of our country. The findings of age wise distribution was similar to works from South India⁴ where the highest proportion of snakebite was observed in the age-group of 21–30 years ($n = 50, 25.2\%$), followed by 41–50 years.

This is in agreement with studies from neighboring state of Bihar⁶ and reporting from South India^{12,13}. Rural population far outnumber the urban counterparts in incidence and mortality of snake bites. It still remains a rural health problem that leads to loss of productivity. This compounds the socioeconomic burden of weaker section of our society.

Education wise distribution in our series reveals that majority were illiterate and primary level learners with their occupation being manual agricultural laborer or poor marginal farmer. This is an agreement with all previous researches from developing countries. Access to healthcare, logistics and awareness is poor in the rural population in major parts of our country. Besides, faith in traditional healers and other superstitions associated

with snake bite lead to the gamut of the problem. Poor living conditions, improper clean homes, Kuchcha huts with numerous holes and crevices are ideal for snakes to attack human habitats readily. Sleeping habits on floor, careless about surroundings and growth of vegetation around human dwellings are the contributing factors for the high incidence of snake bite.

In the present work it was seen that the frequent biting time was around 9am during day, 4pm to 7 pm in the evening and mainly at night. Majority were bitten between 6pm and 6 am with 12 cases bitten at around 1-2 pm. This indicated the night habit of biting poisonous snakes and the unsafe sleeping conditions making people vulnerable to bites. This is different from other works where majority were day bites. Since substantial number of the victims were engaged in outdoor works during bite it can easily be inferred that snake bite still remains as an occupational hazard for agricultural and farmland workers. Similar results are reported from several regional studies from South India^{12,13}, North India¹⁴ and western India¹⁵.

Regarding the site of bite and activity after the incidence of bite the present series reveals some interesting facts. It was observed that 20 victims were bitten in the lower extremity, followed by 15 in upper extremity and 03 in other parts like trunk and neck. Interestingly 17 (94.44%) of the lower extreme bites ranges from 2 inches above ankle to the toes. This remains the most vulnerable body parts where bites are common place. Several advocacies emphasize wearing of boots as a preventive aspect during field work. Bites on upper parts and trunk are mainly associated with nocturnal bites where the victims were either sleeping on lying in bed.

The present investigation was designed to explore the time lapse between bite and institution of treatment as a pilot study. It was seen that the mean interval between bite and treatment was 3.35 hours (SD0.48). It was noted that 25 reported directly to hospital 03 received primary care by some local medic and remaining 10 were first seen by some magic healer / traditional healer. Undue delay in reporting and initiating treatment with ASV leads to the increased mortality in snake bites. These findings are comparable with earlier works from different parts of our country. Early initiation of supportive care and ASV

is the mainstay in the therapy and reduces mortality. Herein lays the primary focus of all preventive programs in developing countries.

From the autopsy finding in the present series it was seen that bite mark was present in only 24(63.2%) cases. Prominent local changes including edema and blistering swelling and sloughing of tissue was seen in 17(44.7%). Kidneys showed pinpoint hemorrhages and cortical hemorrhages in 14(36.8%) cases each. Renal changes are evident hemotoxic (Viper) bites as well as neurotoxic bites (Cobra and Krait). This has been emphasized and elucidated in earlier autopsy centered researches^{8,9,10,11}.

Awareness program and training of medical officers in rural services need to be regularized. Snakebite related fatality has truly remained as a neglected tropical disease. Advocacy by groups along with improved healthcare need to be focused on mitigating the scourge.

Conclusions

The present work was a short regional research to supplement epidemiology and add to the database of deaths from snake bite in a district of West Bengal. It is a pilot study to assess the problem. It reflects the profile of deaths due to snake bite of the entire district. Snake bite comprises 2.067% of all unnatural deaths.

Our present study emphasizes that fatal snake bite is a public health concern and need to be addressed with priority. Policy should be focused on the reduction of incidence and mortality from envenomation in snake bite. More serious large scale research on the problem of snake bite needs to be designed for assessing the socioeconomic burden and policy framework for developing management of snake bite.

Ethics Clearance : The work was approved by IEC of Malda Medical College

Conflict of Interest: No conflict of interest financial or otherwise

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