Study of Incidence and Pattern of Snake Bite Cases Brought in Tertiary Care Hospital, Rims, Ranchi, Jharkhand

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Abstract

The hospital-based cross-sectional was done to check the toxic nature of snake bite. The study was carried in 375 patients, patients were divided in the group of 46 male belong to the age group of 20 - 49 (67.39%), female (48.27%) and farmers (60%), in RIMS Ranchi from 1st Jan to 31st Dec 2019. Among farmers 63.04% was male and 55.17% was females. The most of the females shoed to be housewife among famers. The result showed maximum victims among farmers, and it was shown to be illiterate. The Maximum victims such as 81.3% were belongs to lower middle and upper lower class while 93.3% were belongs to rural region. There is a statistically significant data of occurrence in rural and urban area, the statistical analysis was done based on 5 % confidence level (p=0.05) (student t –test analysis). The result showed 60% were bitten in fields followed by 36.1% at home. Among all the groups, 37.3% bite was 12.01 pm to 6PM and 32% during 12.01 AM to 6AM. Of the 225 cases who had bites in fields, 125 bitten between 12.01 pm to 6 pm, and the number showed, 135 cases at home, 110 cases bitten during 12.01 am to 6 am. The study showed 60.1% victims had been bitten by snake in the month of June to September (monsoon season). The conclusion showed adult males were more prone to snake bites since they were more commonly involved in agricultural/outdoor activities. The specific reason not known, but it can be concluded based on sociodemographic profile of the literacy population

Keywords: *Snake bite, literacy, male, female, farmers, snake toxicity*

Introduction

Snake bite is a major public health problem throughout the world especially in tropical and subtropical countries like India, particularly in the rural areas. In Greek mythology, Snake represent Goddess Hygeia was worshipped along with Asclepius, the God of Health. The tradition is carried over to modern time and the snake has found a place in the universal symbol of medical profession. [1]

In general, about 70% of bites are due to snakes which are non-poisonous, of the rest, 15% are dry bites and only 15% cause envenomation. Venom is the saliva, proteolytic enzymes, some organ or system specific poisons i.e. neurotoxic, Vasculotoxic, or Myotoxic, ejected during the bite, from the modified parotid glands. Most of the time, mixed manifestations will be seen. Neurotoxicity is a key feature of some envenoming, and there are many unanswered questions regarding its manifestations. Venomous snakes found all over the world sparing few countries, and therefore, cases of snake bite were reported from all over the world[1]. Total number of snake bites in world is around 500,000 per year with approximately forty thousand to one lac deaths as reported by various authors. [1-3]

The incidence being relatively higher in tropical countries as compared to developed countries. [4] Approximately 330 species of snakes exist in India, of which about 70 species are poisonous. The commonest poisonous snakes are common krait, spectacled cobra,

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saw scaled viper and Russell's viper. [2] Pit viper (Hyphenate - hyphenate) is equally deadly, though not recognized by many and that could be one of the causes of increased mortality by pit viper envenomation. [5] In India, there are estimated 10,000 to 50,000 deaths per year due to poisonous snakebite. [3]

In this study, population is predominantly native tribal (rural as well as urban) in Jharkhand state, peculiar Clinical, Demographic and Social profile significantly varies from other regions of our country, that may lead to variation in many statistical data. Special attention was given to specific and significant facts in reference to our study population. Snake bite is a neglected tropical disease of global importance. [6] Data from the million deaths study in India estimates that snake bite deaths are more than 30-fold higher than recorded in official hospital returns. [7] As per various sources, there was no such study conducted in this area to know the profile of snake bites. Therefore, this study was designed to find the incidence and pattern of snake bites admitted to various departments of RIMS, believing that the findings of this study will help in control of snake bites.

Material and methods

Study place: Different indoor/outdoor/emergency departments of RIMS, Ranchi, Jharkhand

Study duration: one year from 1st January 2018 to 31st December 2019

Study design: Hospital-based cross-sectional and observational study conducted for duration of one year from 1st Jan 2018 to 31st Dec 2019. The study comprised all of 375 cases of snake bite. The data collected from following records and format.

1) In-patient case records of snake bite victims from central/paediatric emergency.

2) Performa which was designed to collect information regarding the incidence.

3) Police inquest and post mortem reports in cases where death occurred.

Inclusion criteria:

1) Snake bite of all age and sex groups.

2) History of unknown bite responding to ASV.

3) No history of snake bite but presenting with symptoms of snake bite and responding to ASV treatment.

4) Cases admitted to emergency departments and brought dead cases of snake bite directly/indirectly from different departments to Forensic Medicine and Toxicology, RIMS Ranchi.

Exclusion criteria: Unknown bites not responding to ASV were excluded from the study.

Method of collection of data: A Performa was designed to collect relevant information regarding the incident, the snake (if seen), first aid taken and socio demographic profile from the patient and/or relatives.

Statistical analysis: All the data thus collected was tabulated and statistical analysis was done using Microsoft Excel and Graph Pad Instat software.

Results

Table 1: Distribution of victims based on Age, Sex, Occupation and Education

Age and Sex distribution						
Age in years	Male		Female		Total	
	n	%	n	%	n	%
0-9	5	2.17	5	3.45	10	2.7
10-19	35	15.22	35	24.14	70	18.7
20-29	65	28.26	25	17.24	90	24

Cont.... **Table 1: Distribution of victims based on Age, Sex, Occupation and Education**

30-39	55	23.92	25	17.24	80	21.3
40-49	35	15.22	20	13.79	55	14.7
50-59	15	6.52	10	6.90	25	6.7
60-69	15	6.52	25	17.24	40	10.7
> 70	5	2.17	0	0.00	5	1.3
Total	230	100	145	100	375	100
	X2=7.62, df=2, p=0.02 (significant)					
Distribution of victims on the basis of Occupation and Sex						
Farmer/Farm wage workers	145	63.04	80	55.17	225	60
House wife	0	0.00	45	31.03	45	12
Snake charmer	5	2.17	0	0.00	5	1.3
Student	40	17.39	20	13.79	60	16
Others*	40	17.39	0	0.00	40	10.7
Total	230	100	145	100	375	100
*others-2 drivers, 1 child, 1 postman, 1 clerk, 1 Sheppard, 1 mess staff and 1 shop employee						
Distribution of victims on the basis of Education and Sex						
Illiterate	100	43.48	75	51.72	175	46.7
Primary	65	28.26	30	20.69	95	25.3
Secondary	45	19.57	30	20.69	75	20
PUC	15	6.52	10	6.90	25	6.7
Not applicable*	5	2.17	0	0.00	5	1.3
Total	230	100	145	100	375	100
* Not applicable- 1 male child of 3yrs was not eligible for schooling. Among the study group						

Table 2: Distribution of cases as per Socio-economic status

Socio-economic status	n	%
Class I -Upper class	10	2.7
Class II- Upper middle class	20	5.3
Class III- Lower middle class	110	29.3
Class IV- Upper lower class	115	52.0
Class V- Lower class	40	10.7
Total	375	100

Table 3: Region wise distribution of cases

Region	Male		Female		Total	
	n	%	n	%	n	%
Rural	225	97.83	100	86.21	350	93.3
Urban	5	2.17	20	13.79	255	6.7
Total	230	100	145	100	375	100

P= 3.86 at df= 1 p=0.04 (significant)

Table 4: Distribution based on time and place of occurrence of the incident

Place of occurrence	Time				Male		Female		Total	
	6.01am-12 noon	12.01pm-6 pm	6.01pm- 12 mid night	12.01am-6am	n	%	n	%	n	%
Home	0	5	20	110	75	32.61	60	41.38	135	36.1
Field	50	125	40	10	150	65.21	75	51.72	225	60.0
Animal shelter	5	0	0	0	0	0	5	3.45	5	1.3
Garbage pit	0	5	0	0	0	0	5	3.45	5	1.3
Road	0	5	0	0	5	2.17	0	0	5	1.3
Total	55	140	60	120	230	100	145	100	375	100

Table 5: Distribution of cases based on month of incident

Month	Male		Female		Total	
	n	%	n	%	n	%
Jan	10	4.35	0	0	10	2.7
Feb	0	0.00	5	3.45	5	1.3
March	0	0.00	5	3.45	5	1.3
April	20	8.70	5	3.45	25	6.7
May	15	6.52	10	6.90	25	6.7
June	30	13.04	10	6.90	40	10.7
July	30	13.04	40	27.59	70	18.7
August	25	10.87	30	20.69	55	14.7
September	40	17.39	20	13.79	60	16
October	35	15.22	5	3.45	40	10.7
November	5	2.17	10	6.90	15	4
December	20	8.70	10	3.45	25	6.7
Total	230	100	145	100	375	100

Discussion

Age and Sex

Maximum victims (60%) belonged to 20-49 years age group. Among 230 males and 145 females, 67.39% and 48.27% belonged to 20-49 yrs age group respectively. In both the sex groups, a statistically significant difference (p value 0.02) was found among 20-49 years age group. Of both the sex groups, males were predominant 61.3% as compared to females 38.7% (sex ratio1.6:1).

Similar observations were made in studies conducted by Kulkarni ML & Anees S (1994) [8] in Karnataka, Ganneru B & Sasidhar RB (2007) [9] in Andra Pradesh and Suchitra N et al. (2008) [10] in Kerala. This observation is not consistent with the findings recorded in the study conducted by Monterio NP et al. (2010) [11] in Manipal, where female predominance was recorded with male to female ratio of1:1.5.

The probable reason for predominance in males and 20-49 yrs age group is increased agricultural activity among these individuals. If considered demographically, Jharkhand region, result we expected would be like Monterio NP et al. (2010) [11], but results were not like that. We thought that here in Jharkhand the more working population was of female, but this effect was counterbalanced by much more outdoor as well as sports activities of male population here, which makes them vulnerable population for snake bite. Probably that's the reason of our study results with this respect.

Occupation

Maximum (60%) victims were farmers. Among the male's majority 63.04% were farmers. Similarly, among female victims 55.17% (maximum) were farmers followed by housewives 31.03%. The above observations made in the study are consistent with the studies conducted by Lal P et al. (2001) [12] in JIPMER Hospital Pondicherry, Chauhan S et al. (2005) [13] in

PGIMER Hospital Chandigarh and Shetty AK & Jirli SP (2010) [14] in Belgaum. The predominance of farmers can be attributed to increased frequency of human confrontation with snakes in agricultural fields owing to the snake habits, habitat and prey preferences.

Education and Socio-economic status

46.7% were illiterates and the rest 53.3% were literates having different levels of education. Majority 25.3% had primary education followed by 20% had secondary education and 6.7% had PUC level education. None of the victims were graduates. The above observation depicts that illiterate victims and victims with non-technical (unskilled) education are more involved in agricultural works, hence more exposed to snake bites. The low literacy level also leads to lack of knowledge regarding precautions to be taken to avoid snakebites.

Socio-economic status classification based on Modified B G Prasad classification for rural population and Kuppuswamy classification for urban population in the study group. Maximum victims 81.3% belonged to lower middle and upper lower class.

Region

Maximum victims 93.3% belonged to rural region. A statistically significant (p value 0.004) association was noted between snake bite occurrence and rural region. This finding is consistent with the observations in the studies made by Kulkarni ML & Anees S (1994) [8] in Karnataka, Ganneru B & Sasidhar RB (2007) [9] in Andra Pradesh, Shetty AK & Jirli SP (2010) [14] in Belgaum and Mohapatra et al. (2011) [4] in India.

Place of occurrence

Maximum 60% had snake bites in the fields followed by 36.1% snake bites at home. Similar finding was noted in the study conducted by Suchithra N et al. (2008) [10] in Kerela, Monterio NP et al. (2010) [11] in Manipal and Shetty AK & Jirli SP (2010) [14] in Belgaum.

Time of occurrence

Maximum 37.3% of snake bites occurred between 12.01PM to 6 PM followed by 32% between 12.01 AM to 6 AM. Similar finding was observed in the study conducted by Bawaskar HS et al. (2008) [15] in rural Maharashtra and Monterio NP et al (2010) [11] in Manipal.

Relationship between Place of occurrence and Time of occurrence of the incident

Of the 225 bites that occurred in the field, maximum 55.5% occurred during 12.01PM to 6PM. Of the 135 bites that occurred at home, maximum 81.5% bites occurred during 12.01 AM to 6 AM.

Relationship between Time of occurrence and Probable type of snake

Of the 375 victims, only 110 victims saw the snake that bit them. Of these 110 cases, 50% (55) of the snakes were identified as Saw Scalded Viper (SHERCHANDWA), of which 54.6% (30) occurred during 12.01AM to 6AM. Of the 25 cases of Russell's viper, all bites occurred during 12.01PM to 6PM.

Here, identification of the probable type of snake that bite the victims was made by us based on the description of the snake given by the victims / relatives. In our study no killed snake was brought along with the victim for identification.

Seasonal variations in the incidence of snake bite

60.1% (maximum) occurred during June to September (monsoon season) followed by 24.1% during October to January (winter season). Similar observations were made in the study conducted by Lal P et al. (2001) [12] in JIPMER Hospital Pondicherry, Bawaskar HS (2002) [16] in Mahad region of Maharashtra, Bawaskar HS et al. (2008) [15] in rural Maharashtra, Shetty AK & Jirli SP (2010) [14] in Belgaum and Mohapatra B et al (2011) [4] in India. Whitekar R (2005) [6] in his study conducted in Kerala, observed that the month of May had highest incidence of snake bite. However, in our study, the highest incidence of snake bite was in the month of July 18.7%.

Limitation of the study

Best efforts were put in to record all the cases of snake bite which were admitted to the Rajendra Institute of Medical Sciences Ranchi. However, few cases who consulted doctors practicing other medicinal systems (Homeopathy, Ayurveda) were not recorded. Our study was done with all the necessary efforts as well as

precautions.

Conclusions

Snake bite is a common medical emergency encountered all over the country. This study includes snake bite cases admitted/brought dead to RIMS, Ranchi. Rural adult males were more prone to snake bites as they are commonly involved in agricultural/ outdoor activities. Incidence and mortality due to snake bite can be prevented by educating the rural people about the snake species prevalent in the respective regions, their habits and public health education regarding the recommended first aid.

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Ethical Clearance: Taken

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