



Evaluation of Fatal Snakebite Cases in Coastal Odisha: An Autopsy based Cross-sectional Study

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¹Jyotish Chandra Choudhury, ²Geeta Sahu, ³Dipali Prusty



¹ Associate Professor, Department of Forensic Medicine and Toxicology, SCB medical college, Cuttack, Odisha.

² Professor and Head, Department of Forensic Medicine and Toxicology, SCB Medical College, Cuttack, Odisha.

³ Final year Post Graduate Student, Department of Forensic Medicine and Toxicology, SCB Medical College, Cuttack, Odisha.

ARTICLE INFO

Corresponding author: Dr Geeta Sahu, Professor and Head, Department of Forensic Medicine and Toxicology, SCB Medical college, Cuttack, 753007. E mail: geetasahu2004@gmail.com Telephone: 09861535036.

How to Cite this article: Choudhury JC, Sahu G, Prusty D. Evaluation of Fatal Snakebite Cases in Coastal Odisha: An Autopsy based Cross-sectional Study. Journal of Indian Society of Toxicology 2018;14(1):1-5. DOI: 10.31736/jist/v14.i1.2018.12-16.

Keywords:

snakebite
seasonal Variations
site of Bite
survival Period.

Conflicts of Interest and Fundings: Declared none

Received on 21st March 2018
Accepted on 23rd June 2018
Published on 30th July 2018

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Published at JIPMER, Pondicherry, 605006, INDIA Subscription & payment related queries at: toxicology@aims.amrita.edu and rest all types of queries related to the journal to be done at drambika_editor@jist.org.in

ABSTRACT

BACKGROUND: Snake bite is a neglected health problem in the world and one of the major causes of mortality and morbidity in many areas, particularly in rural tropics and coastal areas. It also poses substantial economic burdens on the snake bite victims due to treatment related expenditure and loss of productivity. However an accurate estimate of risk of snake bite is largely unknown in developing countries.

OBJECTIVES: The main aim of this study is to compare the trends and patterns of snake bite in a particular area along with the position and timing of snake envenomation. The survival period, features of envenomation at autopsy with the initiation of treatment are also considered in this study.

MATERIAL & METHODS: The present study was conducted in the tertiary hospital, SCB MCH, Cuttack from the period of April 2016 to March 2017. A total of 218 cases were taken into consideration. Data were collected and tabulated in a specially designed proforma.

CONCLUSION: An increased incidence of snakebite was observed during monsoon period when their buried holes become full of water and they have to come out in search of prey. Secondly nocturnal bites are common in winter when snakes find shelter at home because of cold weather outside.

INTRODUCTION

The most innocent animal of the world - has the largest enemy. Snakes are known to be active during monsoon and in darkness. This season coincides with the period that the snakes lay their eggs which possess a risk to the farmers when they venture to the fields. Snake bite being a neglected public health problem, is the important cause of morbidity and mortality in tropics¹. WHO has identified snake bite as an important neglected tropical disease. It is also emerging as an occupational disease of agricultural workers. In view of their strong beliefs and many associated myths, people refer to magico-religious

treatment for snake bite thus causing delay in seeking proper treatment. Snakes are most likely to bite when they feel threatened, are startled, are provoked or have no means of escape when cornered. Snakes are poikilothermic carnivorous reptiles that have evolved the venomous apparatus for the purpose of procurement of food². The four important species of venomous snakes being common in coastal odisha are cobra, common krait, banded krait and viper. The data to be provided below can prove valuable in educating the public of increased threat during the seasonal period. It can help in reducing the incidences of snake bites by adopting preventive strategies. Agriculture being the

Table 1: Showing relation of snakebite cases with months and seasonal trends

Seasonal variations	Number of Cases
Summer (March – June)	7
Rainy (July – September)	124
Winter (October – February)	87

Table 2 : Sites of Snakebites on the body of study population.

Seasonal variations	Number of Cases
Toes	14
Dorsum of foot	61
Malleolus	49
Lower leg	9
Thigh	4
Head	1
Shoulder	30
Arm	2
Forearm	6
Dorsum of hand	24
Fingers	18

major occupation of people of Odisha and the problem of snake bite in costal parts Of Odisha being magnanimous we were provoked to take up the study.

MATERIALS AND METHODS

The present cross sectional study was conducted in the tertiary hospital in SCB MCH Cuttack Odisha from April 2016 to March 2017. Consent of the patient or relatives was taken and a total of 218 cases were taken into consideration. An accurate history regarding the date , time of bite and the circumstances leading to the bite were obtained. The examination included **local** examination of the fang mark and signs of **systemic** envenomation like bleeding , ecchymosis or cellulites. Relation with age , sex , survival period and initiation of treatment were collected and recorded in specially designed proforma for further evaluation.

EXCLUSION CRITERIA

1. Child < 10 years.
2. Unknown person.
3. Unknown bite.
4. Decomposed bodies.

RESULTS

The most common age group affected by envenomation was 31-40 years having 112 cases out of 218 , followed by 21-30 years(Fig:1) the least being above 60years. Number of male victims marginally exceeded female victims ratio being 1.13:1 . Envenomation is at its peak around August(rainy season) being 59 cases followed by November (winter season)having 41 cases[Table-1]. The present study revealed that the incidence of envenomation was nil during the month of March. The common timing of bite being 6am-11.59am (46.79%) or 102 cases followed by 12am-5.59am (40.83%) or 89 cases. The least common timing involved was around 12pm-5.59pm having 6 cases(2.75%). Mostly involved timing of bite is morning hours when snakes come out in search of prey mainly near paddy field followed by during sleeping hours in cold climate. Most common site associated with envenomation is dorsum of foot [Table-2]. Maximum cases of snake bite are registered in our hospital after 6 to 9 hours because of problems in diagnosing these cases , lack of proper knowledge in initiation of treatment and increase duration of travel time from rural to urban areas[Table-3]. In cases of neurotoxic bites maximum patients were received

Table 3 : The Interval between incidence and initiation of treatment

Seasonal variations	Number of Cases
< 3 hours	17
3 – 6 hours	84
6 – 9 hours	96
>9 hours	21

Table 4 : Manifestations of envenomation during autopsy

Seasonal variations	Number of Cases
Presence of puncture marks	136
No puncture mark	7
Erythema or swelling	40
Puncture and erythema	93
Gangrene or inflammation of LN	6
Only history available	29
Mark of initiation of ASV	149

dead and in haemotoxic bites, death was maximum within 24 hours. Considering percentage wise in both cases death was within 24 hours. Out of total 529 cases of admissions of envenomations neurotoxic bite (Fig:2) were 356(67.29%) and haemotoxic bite (Fig:3) were 173(32.70%). Deaths from neurotoxic bites were 130 (59.63%) and haemotoxic bites were 88 (40.36%). Out of total 130 neurotoxic bites, envenomation by cobra involved 49 cases, banded krait was found to be 25 and common krait was about 56 in number. Haemotoxic envenomation involves mainly viper which was found to be 88 cases. In the present study on comparing all the features of envenomation during autopsy, it was found that mark of initiation of anti snake venom was found in maximum of 149 cases(68.34%) followed by presence of puncture marks in 136 cases(62.38%). The least detected finding was inflammation of lymph nodes which involved around 6 cases(2.75%). There was absence of puncture mark in 7 cases(3.21%)[Table-4].

DISCUSSION

The reason attributed our age group variation could be that the people of third decade are mostly engaged in field work thus exposed to snake bites and elderly people being restricted to the house are less exposed to snake bite. The age group findings are contrary to reports by George et al³ who have found most common age group to

be 21-30 years. Sumana Sarkhel et al⁴ identified the most common age group to be 20 – 45 years which was almost identical to our study. The male female ratio is similar to findings by George p et al³ and Khirsagar V Y et al⁵. To explain the seasonal trends of our study, in rainy season the snake holes are water logged and also their eggs hatch during this time so they tend to venture out interacting with humans. In Nov-Dec the snakes find shelter inside the house due to cold climate outside. Somewhat similar seasonal variation was also reported by Alm Q, Bhat Ks et al⁶ and Emillie Alirole et al⁷. The time of bite showed incoherence in the previous studies by Daniel JC et al⁸ having the most common timing at around 6pm-11.59pm. Regarding the site of bite, as foot is mostly in contact with the ground where these reptiles moves so it could be the usual site. Moreover the farmers go bare foot for harvestation or accidentally stepping onto a snake in view of poor visibility. According to Singh J et al⁹ foot and lower leg had equal preponderance. In their study they mentioned that the site of bite involved least is the arm but we found out head(parietal eminence) to be the least involved. The time gap between the bite and initiation of treatment may sometimes be reasoned to the religious belief of people and interference by quacks which delay the treatment¹⁰. Similar observation echoes with the findings of Warell DA et al.¹¹ and Anuradhani Kasturiratne et al.¹² The death

toll of neurotoxic and haemotoxic snake bites in our study matched the findings of Chugh KS¹³ The number of cases involved in neurotoxic and haemotoxic snake bites in our work was similar to that of Ballesteros et al¹⁴ Findings of author Halesha BR et al contradicted our results revealing 108 haemotoxic and 72 neurotoxic bites out of total 180 cases.¹⁵ Our findings were coherent with the findings of Hama PK, *et al.*¹⁶ and Gutierrez J M.¹⁷ As regards the autopsy findings, the data of Jarwani B, *et al.*¹⁸ and Brian J Daley, *et al.*¹⁹ revealed equal incidence of presence of puncture mark with common association of both erythema and puncture mark in about 72.38% cases. The least involvement was absence of puncture mark in 6.23% cases.

CONCLUSION

People should be educated regarding the preventive strategies of snake bite along with identification of snakes which can result in better outcomes in the form of reduced incidences of bites or mortality.²⁰ The religious beliefs of village people and the interference

of quacks should also be handled in order to curtail the gap between the incident and treatment. Partnership between health authorities and citizens can hence play an important role in reducing the burden of this potentially preventable condition. The limitation of our study was that the paediatric cases, who tend to be common victims of snake bite, could not be included as they are treated in another hospital of the city.

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Figure 1 : Case comparison with different age and sex

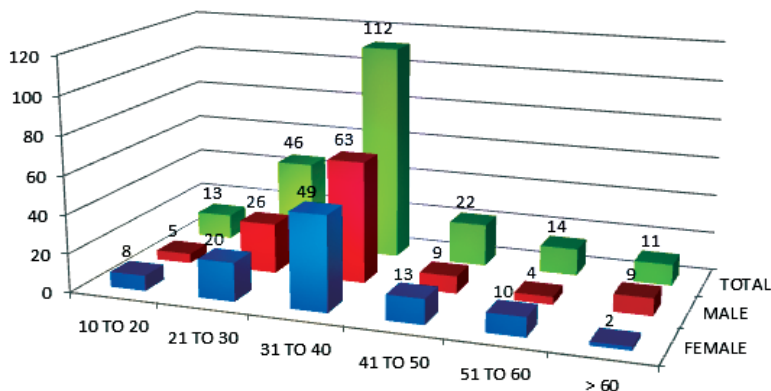


Figure 2 : Survival periods in case of neurotoxic bites

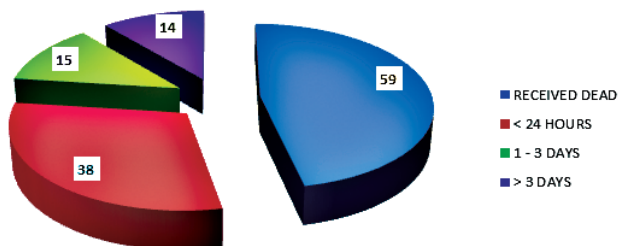
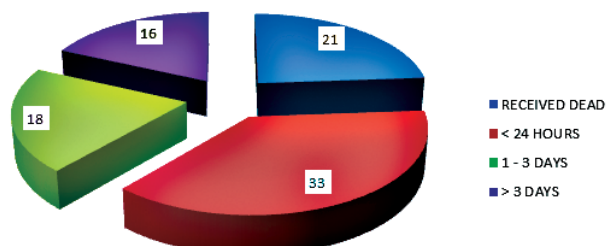


Figure 3 : Survival periods in case of haemotoxic bites



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