Original Research Paper

An Autopsy Based Study of Deaths Due to Snake Bite in Kurnool Region of Andhra Pradesh

V. Rajasekhar,[1] Sugnan Bandaru[2], Katta Sri Ram[3], Mahesh Mandala[3], N.Sridhar Reddy[4]

[1]Professor of Forensic Medicine, Government Medical College, Nandyal, Andhra Pradesh. [2]Assistant Professor of Forensic Medicine, Guntur Medical College, Guntur, Andhra Pradesh. [3]Assistant Professor of Forensic Medicine, Siddhartha Medical College, Vijayawada, Andhra Pradesh. [4]Medical Officer of Govardhanagiri Primary healthcare centre, Kurnool district, Andhra Pradesh.

How to cite this article: V. Rajasekhar, Sugnan Bandaru, Katta Sri Ram et al. An Autopsy Based Study of Deaths Due to Snake Bite in Kurnool Region of Andhra Pradesh. Indian Journal of Forensic Medicine and Toxicology/ Volume 18 No. 2, April-June 2024.

Abstract

Snakebite envenoming is a neglected tropical disease (NTD) that is responsible for enormous suffering, disability and premature death. This study is an autopsy based epidemiological study of deaths due to snake bite conducted in Kurnool medical college attached Government General Hospital, Kurnool, Andhra Pradesh. The results of the study indicated that snake bites are more common among middle-aged, uneducated, male agricultural laborers working in fields during monsoon season. In Majority of the them bitten by snake over lower extremities. The majority of patients could not reach the hospital in time because their habitats are rural areas and not well connected to the nearby health centers.

KEY WORDS: Snake Bite, Neglected Tropical Disease, Kurnool Region of Andhra Pradesh, Autopsy Based Study on Snake Bites.

Introduction

Snakebite envenoming is a potentially fatal illness caused by toxins released during venomous snake's bite. As per Central Bureau of Health Intelligence the average snakebite cases is approximately 300,000 and average deaths due to snakebite is 2000 each year.[1] There is a huge gap between the number of snakebite deaths reported from direct surveys and official data.[1] Only a small proportion of snakebite victims across country report to the clinics and hospitals and actual burden of snakebite is grossly underreported.[1]

Accurate recording of data of incidence of snake bite is not available in India as many victims seek treatment from traditional healers and quacks initially and only when the condition worsens gets medical care from modern hospitals[2]. This epidemiological study of snake bite deaths was done in the Department of Forensic medicine, Kurnool medical college, Kurnool district, Andhra pradesh.

Materials and Methods

Data of this retrospective, epidemiological study of snake bite deaths was collected from all

Corresponding Author: Mahesh Mandala, Assistant Professor of Forensic Medicine, Siddhartha Medical College, Vijayawada.

Email: mahesh.mandala94@gmail.com

Mobile: 9440090094

Submission date: Jan 4, 2024 **Revision date:** Jan 15, 2024 **Published date: April 27, 2024**

the medico-legal autopsies of snake bite deaths conducted during the period from February 2021 to July 2022 in the Mortuary of Kurnool Medical College & Hospital, Kurnool, Andhra Pradesh. we included all the autopsy cases of snake bite death being conducted in the study period and we have excluded all cases of decomposed bodies, bites from other animals and cases with obscure histories. As per the criteria, a total of 50 autopsy cases of snake bite death were included in the study and remaining 10 cases of decomposed bodies, 14 cases of bites from other animals and 6 cases with obscure histories were excluded. The data for the study was collected from inquests, autopsy reports, hospital records and information from relatives of the deceased. The data collected was tabulated in Microsoft Excel and analysed. The approval from the Institutional ethical committee of Kurnool medical college was obtained for conducting the study. This autopsy based retrospective, epidemiological study of snake bite deaths was conducted for 18 months from February 2021 to July 2022 in Kurnool medical college attached Government General Hospital, Kurnool, Andhra pradesh.

Observations and Results

In this retrospective, epidemiological study of snake bite deaths, a total of 50 cases were included in study as per selection criteria. Among those 50 cases, 31 cases (62%) were males and 19 cases (38%) were females. Number of cases as per age category were tabulated in the Table no -1. Categorization as per habitation of victims were mentioned in the table no-2. Regarding occupation of victims, 46% were agricultural laborers, 14% were other laborers, 16% were students, 10% were house-wives and 14% belong to other occupations. Regarding education status of victims, 16% of them were uneducated, 48% of them completed their primary education, 32% of them completed their higher secondary education, 4% of them were graduates. 62% of the victims were bitten by the snake during the daytime i.e., 6am to 6pm and 38% were bitten during the night time. More than 50% (i.e., 52%) of victims were bitten by a snake at fields, 22% were bitten at houses, 18% were at the house premises and 2% were at vacant lands. As most of the victims were from agricultural backgrounds 46% of them were bitten by the snake during their agricultural work at the fields, 22% were bitten while they were sleeping, 18% were walking and 8% were cleaning while bitten by the snake. 58% of the victims were bitten by the snake during the Monsoon season, 24% victims were bitten during the winter season and 18% were during the summer season. 32% of the victims did not see the type of snake that bitten them, 30% were able to identity that they were bitten by Krait snakes, 24% were Vipers and 14% were bitten by Cobra-snakes. Most of the victims I.e., 72% were bitten in the lower limbs, 26% were bitten in their upper limbs and 2% in other parts of their body. 80% of the victims were treated in Kurnool medical college attached hospital and 20% were brought dead to the hospital. Categorization of victims based on the time interval between the snake bitten and reaching to Kurnool medical college attached hospital were tabulated in the table no-3. Categorization of victims based on survival time from snake bitten to death were tabulated in the table no-4. The manner of death in the current study is accidental in all cases (100%).

Table 1: Age distribution of victims

AGE	Frequency	Percent %	Cum. Percent
Less than 10 years	2	4%	4.00%
11-20 years	9	18%	22.00%
21-30 years	10	20.0%	42.00%
31-40 years	10	20.0%	62.00%
41-50 years	10	20.0%	82.00%
51-60 years	6	12.0%	94.00%
61-70 years	2	4.00%	98.00%
71-80 years	1	2.00%	100.00%
Total	50	100%	100.00%

Table 2 : Habitation of victims

HABITATION	Frequency	Percent	Cum. Percent
Urban	4	8.00%	8.00%
Rural	45	90.00%	98.00%
Semi-Urban	1	2.00%	100.00%S
Total	50	100.00%	100.00%

Table 03 : Time interval between the snake bite and reaching to hospital

TIME2	Frequency	Percent	Cum. Percent
0 to 1 hr	3	6.00%	6.00%
– >1 to 6 hrs	35	70.00%	76.00%
– >6 to 24 hrs	4	8.00%	84.00%
– >24 hrs	8	16.00%	100.00%
Total	50	100.00%	100.00%

Table 04: Survival time after the bite

Time after bite	Frequency	Percent	Cum. Percent
Within 30 min	2	4.00%	4.00%
1 to 6 hours	8	16.00%	20.00%
6hrs-24 hrs	11	22.00%	42.00%
1-2 days	6	12.00%	54.00%
2-3 days	6	12.00%	66.00%
3-4 days	3	6.00%	72.00%
4-5 days	4	8.00%	80.00%
5-6 days	2	4.00%	84.00%
6-7 days	2	4.00%	88.00%
1 to 2 weeks	6	12.00%	100.00%
Total	50	100.00%	100.00%

Discussion

In this study, 20% of victims were aged 21-30 years, 20% were aged 31-40, 20% were aged 41-50 and 18% were aged 11-20 years. 4% were aged less than 10 years. This indicates that snake bites are common among middle-aged persons probably due to more involvement in outdoor work. Among total cases, 62% of victims were males and 38% were females. This is because in India predominantly males carry out outdoor work and risk of accidental exposure to snake bites is more common when compared to the females. Thapar R[3] et al were conducted a record-based retrospective study of clinico-epidemiological profile of snakebite poisoning cases admitted in Kasturbha Medical College, Mangalore. All the snakebite cases admitted from 2007 to 2011 were included. Results showed that 198 patients as victims of snake bite. 68.2% were males. Male: Female ratio was 2.1:1. Male preponderance was similar to the current study. The average age of patients was 34.8 years. Most of cases of snakebite were seen in age-group of 21–30 years followed by 41–50 years. 4.5% of cases were aged below 10 years, 17% were aged 11 to 20 years, 25% were aged 21-30 years, 13% were aged 31 to 40 years, 21% were aged 41 to 50 years, 12% of patients were aged 51 to 60 years, and 5% were aged above 60 years. In the study of Yogiraj et al[4], authors conducted the study for 2 years from 2010 to 2011. During this period among 1637 autopsies done, 43 were done for victims who died due to snakebite poisoning. Men: Women ratio was 1.5:1. Males constituted 60.4% of victims, Male preponderance was similar to the current study. The age of victims ranged between 01-61 years. 16.27% of victims were aged the 1-12 years of, 69.76% were aged 13-40 years and 13.95% victims were aged 41 to 61 years.

90% of the Victims were from rural localities, 8% were from urban locality and 2% were semi-urban in the current study. This implies that lack of facilities for early treatment in rural areas. Yogiraj et al[4] study and Subhash et al[5] studies were reported that most of the patients were from rural area, which is similar to the present study. In the study of Sandip B et al[6] most of the patients were from urban area, in contrast to the current study.

The victims of Among 50 Victims, 46% were Agricultural laborers, 14% were other laborers, 16%

were Students, 10% were house-wives and 14% belongs to other occupations in the current study. This implies that the victims of working in the fields (60% - 74%) are prone to snake bite because those fields are the habitats of the snakes. 16% of Victims were uneducated but 48% completed their primary education, 32% completed their higher secondary education, 4% were graduates in the current study. This implies that the victims with low education (64%) were didn't take proper precautions and wear proper footwear because of illiteracy. Navin Kumar et al[7] reported that most of the patients were doing farming, similar to the current study. 68% of patients were uneducated, 22% had primary education, 4% had SSC education, contrasting little with the present study.

In the current study most of the snake bite incidence was seen in outdoors (78%) and a similarity was observed in the study done by Ashok Kumar Shetty et al [8].

Maximum incidence was seen while doing agricultural activity (46%) followed by sleeping (22%) and walking (18%). This is because of the reason that agriculture is the main occupation in the region of the current study. People living in kuccha houses and sleeping on the floors, which are so proximity to the agricultural fields are the reasons for more incidence of cases in the present study.

Maximum number of deaths due to snake bite are (58%) during the Monsoon season, followed by winter season (24%) and comparatively less in summer season(18%) in the current study. This indicates that snake bites are more common during monsoon season because of more agricultural activity during this season when compared to winter and summer seasons. Studies of M Rajesh kumar et al [9] Gopal Shankar et al [10] , J Singh et al [11] were also in consistent with current study. Almost all the above studies were showing the same seasonal similarity as like present study and the reason may the same that the human activity in the agricultural fields is more during the monsoon season.

In the current study 6% of the victims received the treatment within an hour of snake bite, 70% of the victims received the treatment between 1-6 hours, 8% between 6 - 24 hours and 16% received the treatment after 24 hours of the snake bite. Majority of the cases (94%) are brought to the hospital after the golden hour i.e. after 1 hour of snake bite due to various reasons like lack of proper transport facilities, approachability and connectivity from the remote places to the health care facilities. The other reason in cases of bites from rural areas is approaching locally available traditional healers/ local quacks.

In the study population, 4 % of victims survived not more than one hour, 16% of victims survived for 1-6 hrs, 22% of victims had survived 6 hrs-24 hrs after the bite, 12% were 1-2 days and 10% were 2-3 days respectively in the current study. This implies that 20% cases died due to immediate effects of snake bite poisoning i.e., within 6 hours of bite and rest of 80% cases died due to complications of snake bite poisoning, i.e., more than 6 hours after bite. Navin Kumar et al [7] reported that the survival time was less than 6 hours in 45.5% of cases, 6 to 24 hours in 22.75% of cases, 1 to 3 days in 18.2% of cases and 3 to 7 days in 13.5% of cases which is in contrast to the current study in which 62% died within 6 hours of snake bite.

The manner of death in the current study is accidental in all cases (100%). Hence the percentage basing on manner of death in the current study is 100% accidental and 0% suicidal and 0% homicidal. In the study of Navin Kumar et al [7] also, all the cases (100%) of snake bites were accidental in manner.

The region or location of the body subjected for snake bite in 72% cases of current study is over the lower extremities, in 26% of cases, is over upper extremities and in 2% of cases, is over other parts of body in the current study. In the studies of Yogiraj et al[4], and Muhammad Aftab et al [12], et al majority of the patients had bites in the lower limbs, in similar to our study. In Muhammad Aftab et al [12] study most of the bites had happened in the nocturnal time in contrast to present study.

In the current study among 50 victims Sathish et al[13] et al reported that in 65.8% of victims, the type of snake was not identified by victim or surrounding members. Among identified cases, the commonest offender was viper which accounted for 31.6% of cases followed by cobra which caused 2.6% of the deaths among 38 victims. The most common snake identified was saw scaled viper followed by cobra

in Punde et al[14] study conducted research on 633 admitted patients in Mukhed, Maharashtra.

Conclusion

This study indicates that snake bites are more common among middle-aged, uneducated, male agricultural laborers working in fields during monsoon season.

The following preventive measures are advised based on the study findings:

- The surroundings of houses should be kept tidy and clean, free from prey of snakes.
- We recommend subjects to work during proper illumination, to wear protective clothing and foot wears while working in the fields and to have the facility to reach health care centre at earliest possible time.
- All the health care centers should have the stocks of anti-snake venoms and other lifesaving facilities.
- Meta-analysis of existing research and other multi-center studies of various hospitals are recommended.

Conflicts of Interest: None to declare.

Source of Funding: Nil

Ethics Committee Approval: Approved from the Institutional Ethics Committee, Kurnool Medical College, Kurnool, Andhra Pradesh, Vide IEC No-71/2021, dt 27-02-2021.

References

1. Invitation of public comments 14 th dec -2023 by National centre for disease control of ministry of health and family welfare, government of india on national action plan for prevention and control of snakebite envemoning (nap-se) in india by 2030(draft), Pg no:4-6.
2. B. Umadethan, Forensic Medicine, CBS Pub;1st Edition, 30 March 2017, Pg no:411
3. Thapar R, Darshan BB, Unnikrishnan B, Mithra P, Kumar N, Kulkarni V, Holla R, Kumar A, Kanchan T. Clinico-Epidemiological Profile of Snakebite Cases Admitted in a Tertiary Care Centre in South India: A 5 Years Study. Toxicol Int. 2015 Jan-Apr;22(1):66-70.
4. Yogiraj, V. & Chaithanya, R. & Jatti, V.B. & Patil, A.N. & Bharat, C. A study of post-mortem histo-pathological findings in snake bite poisoning. Medico-Legal Update. 2013; 13. 203-208.
5. Joshi Subhash, Prakash Chandra, Joshi Arun, Joshi Godawari, Nigam Pranesh, Profile of Snakebite cases admitted at a Tertiary care centre, Journal of Indian Academy of Forensic Medicine, 2012,34,[3], 217-219.
6. Sandip Bhelkar et al , Study of snake bite cases admitted in tertiary care hospital in Nagpur, International Journal of Community Medicine and Public Health, April 2017, 4, .5(6).
7. Navin kumar M. Varma & P.R.Kulkarni: Post Mortem Study of Snake bite Cases. International Journal of current Medical and Applied sciences; 2017, 16(2), 110-116.
8. Ashok Kumar Shetty, Prasanna SJiri.: Incidence of Snake Bites in Belgaum. Journal of Indian Academy of ForensicMedicine, April 2010,32(2), pp139-141.
9. M Rajesh Kumar, M Veeraprasad et al. A retrospective review of snake bite victims admitted in a tertiary level teaching institute. Annals of African Medicine, 2014, 13[2], 76-80
10. Gopal Shankar sahni, Clinic-epidemiological profile of snake bite in children – A descriptive study, Indian Journal of child health, December 2017,4 [4]
11. Jasjit Singh, Sanjeev Bhoi, Vineet Gupta, Ashish Goel: Clinical Profile of Venomous Snake bite in north Indian Military Hospital: Journal of Emergencies, Trauma, and Shock , 2008, 1(2):78-80
12. Muhammad Ahtab Akbar, M. I.-e.-M. A Clinico Epidemiological study of snake bite. Gomal journal of medical sciences.2003 volume 1 (48).
13. Sathish, K., Shaha, K.K., Patra, A.P. et al. Histopathological profile of fatal snake bite autopsy cases in a tertiary care center in South India. Egypt J Forensic sci, 2021, 11, 3.
14. Punde DP. Management of snake-bite in rural Maharashtra: a 10-year experience. Natl Med J India. 2005 Mar-Apr;18(2):71-5. PMID: 15981441.