

ORIGINAL RESEARCH

Clinico-Demographical Profile of Snake Bite in Children- A Retrospective Study from a Tertiary Hospital

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ABSTRACT

Background: Snakebite remains one of the major public health problems throughout the world, affecting several million people each year. The majority of snakebites occur in rural areas and result from 4 species namely Russell's viper, Cobra, common krait, and saw-scaled viper. High mortality in rural areas is due to delayed visits to the hospital and a preference for traditional healers. There are limited studies available on the demographic and clinical profiles of snake bites from rural parts of Telangana, South India.

Aim: To study the clinical and socio-demographic profile of snake bites in children.

Materials and Methods: A record-based retrospective study was carried out at S.V.S Medical College and hospital, Mahabubnagar, Telangana, India. All the children aged less than 15 years with snakebite cases admitted to the hospital from January 2016 to July 2022 were included in the study. Socio-demographic, clinical manifestations, complications, management, and outcome were recorded. The data were entered into a Microsoft Excel sheet and analyzed using Statistical Package for Social Services (SPSS) software Version 23.

Results: Out of 58 snake-bite cases, 63.8% were males and 36.2% were females. Most snakebites were observed in the 5-10 age group (41.3%), and 82.8% were from rural areas. Snakebites commonly occurred between the May-August months (60.3%). Most of the people were bitten inside the house (62%), and Most of the victims (67.3%) were lying on the floor at the time of the bite; 40% of the bites happened between 00:01 to 06:00 hours of the day. Fang marks were seen in the majority of the victims (72.4%). The lower limb (44.8%) was the commonest site. Most of the patients developed neurotoxic symptoms and krait (52%) was the common snake responsible for envenomation. Ptosis (86%) was the most common clinical feature followed by difficulty in breathing (82.8%), pain at the bite site

(68.9%), and epigastric pain (67.2%). ASV was administered in 94.8% of the children and 82.7% required mechanical ventilation. The majority of the children survived (91.4%) and three children died (5.2%).

Conclusion: Children between 5-15 years are vulnerable to snakebite due to outdoor activity, particularly in rural areas. Awareness must be created among the public on the early visit to health care after a snake bite. There is an urgent need to strengthen primary and secondary health care centers to manage snake bite cases. Training of healthcare providers is also essential to identify snake bite cases when the history of the bite is not obvious.

Keywords: Children, Snake-bite, Anti Snake Venom (ASV), neurotoxic envenomation, Mechanical ventilation.

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INTRODUCTION

Snakebite remains one of the major public health problems throughout the world. According to World Health Organization (WHO), nearly 81,000–1,38,000 people die each year from snakebites worldwide.^[1] In India, about 216 species of snakes are identified. Among them most of the snakes are non-poisonous. The majority of snakebites in India, result from 4 species namely Russell's viper, common Indian Cobra, common krait, and saw-scaled viper.^[2] It is estimated that there are over 10,00,000 snakebites in India alone causing 58,000 deaths annually and significant disability in almost four times the number³. Snakebite accounts for 3% of all deaths in children of ages 5–14 years.^[4,5]

Snakes bite humans when they feel threatened, startled, or provoked, and/or have no means of escape when cornered.^[6] But most snake bites are accidental and unprovoked with maximal bites in the lower extremities.^[7] Snakebite morbidity and mortality are generally considered to be under-reported, largely because all victims are not treated in hospitals.^[8] According to a new analysis, snake bite is a recent inclusion on the list of neglected tropical diseases by WHO.^[9,10]

In India, majority of the snake bites occur in rural areas. Mortality is high in rural areas, as most of them prefer traditional healers rather than trained doctors and unavailability of anti-snake venom in all healthcare settings.^[5]

The majority of patients die before they access medical treatment at health facilities and a considerable number die posttreatment because of delays in reaching the health facility. About 77% of snakebite victims from rural areas die outside the healthcare setup because of ignorance and monetary issues.^[11,12]

Serious complications like shock, systemic bleeding, respiratory muscle paralysis, acute renal failure, and bite site tissue necrosis are a few common causes of mortality and morbidity.

The key determining factor of outcome is the timely transport of patients to a tertiary care centre and initiation of anti-snake venom administration and proper supportive care in the dedicated Paediatric intensive care units.^[13]

This retrospective, descriptive study aims to ascertain ages, mode of presentation, complications and outcomes in patients of snake bites in the Paediatric age group from a rural area of South India.

MATERIALS & METHODS

This is a hospital record-based retrospective study conducted in the Pediatric department, S.V.S Medical College and Hospital, Mahabubnagar, Telangana, India. Prior approval was obtained from the Institutional Ethics Committee.

A total of 58 Pediatrics cases below 15 years with a history of snakebite from January 2016 to July 2022 were included in the study.

The case records were reviewed and detailed information regarding socio-demographic data about age, sex, time and site of the bite, Clinical signs and symptoms, time-lapse to reach a primary health centre or tertiary hospital, the time lapse between bite and the ASV treatment, requirement of a mechanical ventilator, complications, duration of stay in the hospital and outcome were recorded in a data capture sheet. Identification of the type of snake bite was carried out by history and physical examination of the bite site along with an examination of the dead snake brought by the attendees and using various photographs. All the data obtained were entered into a Microsoft excel sheet and Statistical analysis was conducted using the SPSS software, version 23. The results were expressed as percentages.

RESULTS

Gender: In this series, a total of 58 patients were registered for the study. Amongst them, 37 (63.8%) were male, and 21 (36.2%) were females. The highest incidence of Snakebite was observed in the age group of 5– 10 years (41.3%), followed by 10-15 years (34.4%), and the least was seen in the age group of less than 1 year (3.4%). [Figure 1]

Locality and Season: Out of 58 snakebite cases, 48 (82.8%) were from rural areas and 10 (17.2%) were from urban areas [Figure 2]. Among the total snakebite cases, 35 (60.3%) occurred between May to August, 19 (32.7%) between September to December, and 4 (7%) between January to April.

Place and Time of snakebite: Most of the snakebites happened inside the house (36, 62.1%); out of which 33 (91.7%) victims were sleeping on the floor, and the bites happened between 00:01 to 06:00 hours in 22 (61%) victims [Figure 3].

Site of bite: Among the studied population, 42 (72.4%) had fang marks. Among them, 26 (44.8%) had marks on lower limbs and 16 (27.6%) on upper limbs.

Time-lapse between bite and ASV administration: Most of the cases were admitted within 6 hours from the time of bite (51, 88%), whereas 7 cases (12%) were admitted after 6 hours. Out of 58 children, 57 required ASV, among them 42 (73.7%) received ASV on or before 6 hours from the time of the bite and 15 (26.3%) received it after 6 hours.

First Aid: First aid was not received in 34 (55.2%) cases and traditional and/or tantric therapies were given in 9 (15.5%) after a snake bite before reaching a higher centre.

Type of snake: The type of snake was identified in 44 (76%) cases and not identified in 14 (24%). Among the identified snakebite, the majority were by common krait (30, 68%), followed by cobra (10, 22%), and viper (4, 9%).

Clinical manifestations: Features of neuro-paralysis were observed in the majority of the cases, 50 (86%) had ptosis and 48 (82.8%) had difficulty in breathing. Other symptoms observed were pain at the site of the bite (40, 68.9%), epigastric pain (39, 67.2%), swelling at the site of the bite (36, 62%), bleeding from the site of the bite (11, 18.9%), and encephalopathy (2, 3.4%). [Figure 4] No sign of envenomation was seen in 1 child.

Anti-snake venom requirement (ASV): ASV was administered in 55 (94.8%) cases, whereas 3 (5.2%) didn't require the administration of ASV.

Need for mechanical ventilation: Mechanical ventilation was required in 48 (82.7%) cases. Ventilatory support was given for <3 days in 36 (75%), and > 3 days in 12 (25%).

Outcome: Most of the children 44 (75.9%) were discharged within 7 days of admission, 12 (20.7%) required treatment for more than 7 days, and 2 (3.4%) children went to a higher centre.

The majority of the snakebite patients (53, 91.4%) recovered fully and were discharged. Three children with snakebite died during treatment; of these, 2 had severe encephalopathy and 1 had severe coagulopathy with sepsis.

Demographic profile and clinical profile are shown in tables 1 & 2 respectively.

Table 1: Demographic profile of snake bite cases

Parameters	Frequency (n=58)	Percentage (%)
Age		
1mo-12 months	2	3.4
1-5 years	12	20.6
5-10 years	24	41.3
10-15 years	20	34.4
Gender		
Male	37	63.8
Female	21	36.2
Month		
January- April	4	7
May-August	35	60.3
September- December	19	32.7
Demography		
Rural	48	82.8
Urban	10	17.2
Timing of the bite		
00:01- 06:00	23	40
06:01- 12:00	4	6.9
12:01- 18:00	14	24.1
18:01- 00:00	17	29
Fang marks		
Present	42	72.4
Absent	16	27.6
Place of bite		
Indoor	36	62
Outdoor	22	38
Sleeping on the floor		
Yes	39	67.3
No	19	32.7
Type of the snake		
Identified snake	44	76
Common krait	30	68
Cobra	10	22
Viper	04	9
Unidentified snake	14	24
Site of bite		
Upper limb	16	27.6
Lower limb	26	44.8
Face and trunk	02	3.4
Unknown	14	24.1

Table 2: Clinical profile, Treatment and Outcome of the Snakebite cases

Variables	Frequency (n= 58)	Percentage (%)
Signs and symptoms		

Ptosis	50	86
Difficulty in breathing	48	82.8
Pain at the bite site	40	68.9
Epigastric pain	39	67.2
Swelling at the bite site	36	62
Vomiting	32	55
Bleeding from the bite site	11	18.9
Encephalopathy	02	3.4
No signs of envenomation	01	1.7
Admission from the time of the bite		
Within 6hrs	51	88
After 6hrs	7	12
ASV administration from the bite		
Within 6hrs	42	73.7
After 6hrs	15	26.3
Treatment received before reaching the hospital		
First aid	15	25.8
Native treatment	09	15.5
No treatment	34	58.6
Mechanical ventilation		
Required	48	82.7
Not required	10	17.3
Duration of hospital stay		
<7days	44	75.9
>7days	12	20.7
Outcome		
Recovered	53	91.4
Death	3	5.17
Referred to higher centre	2	3.4

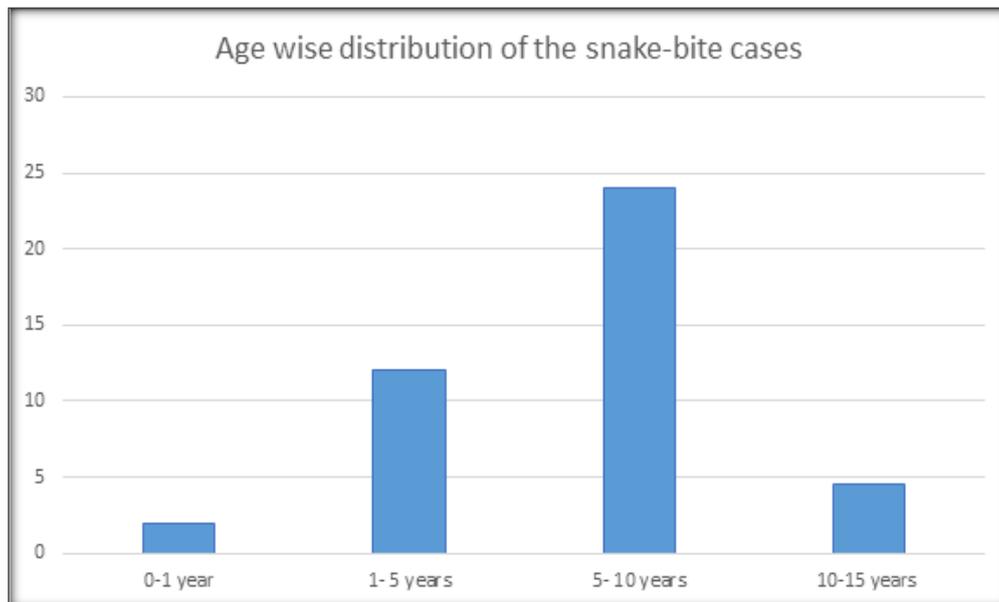


Figure 1: Age-wise distribution of the snake-bite cases

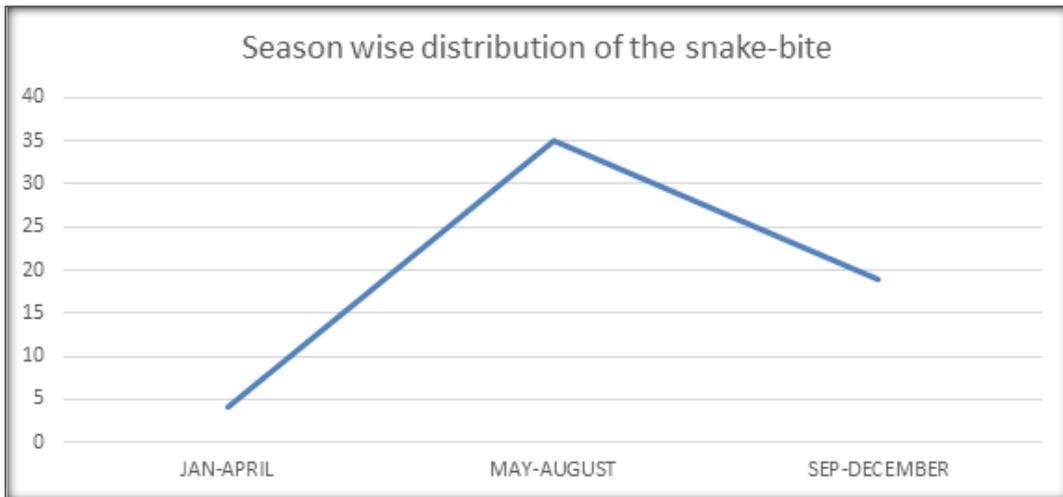


Figure 2: Seasonal distribution of the snake-bite cases

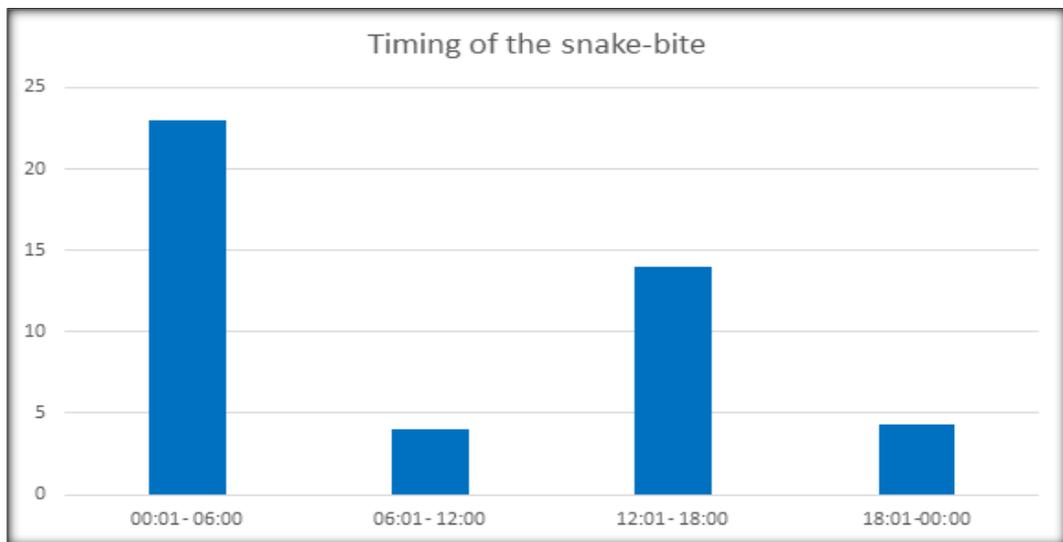


Figure 3: Timing of the snake-bite

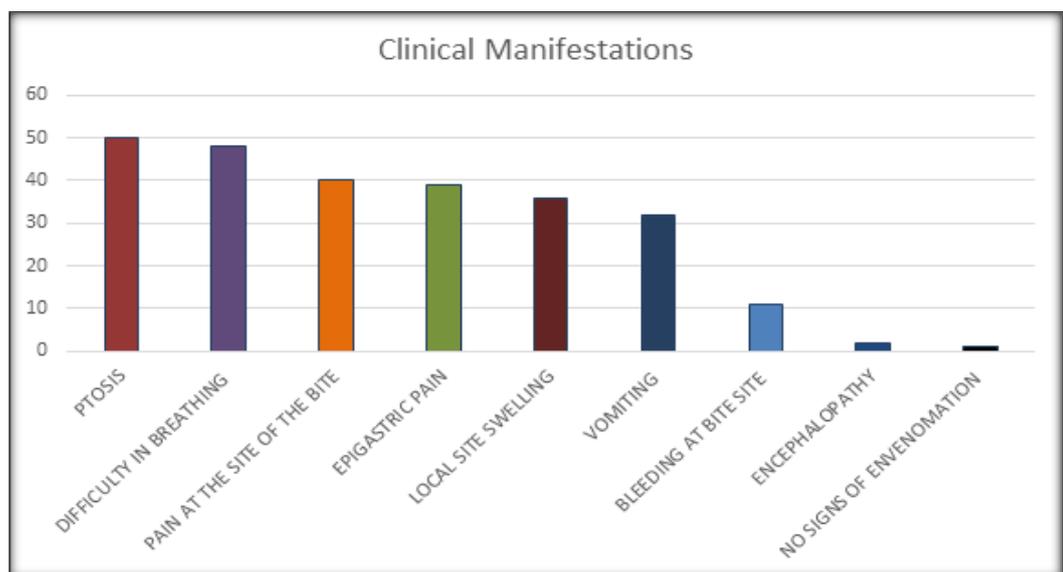


Figure 4: Clinical manifestations of the snake-bite cases.

DISCUSSION

Snakebite remains one of the major public health problems throughout the world. According to World Health Organization (WHO), nearly 81,000–138,000 people die each year from snakebites worldwide.

A total of 58 patients presented with a history of snake bite to the department of Pediatrics, SVS Medical College and Hospital, Mahabubnagar, Telangana were analyzed systematically. The incidence of snakebite was common in boys (63.8%) as compared to girls (36.2%). Similar findings were noted by Dr Sivagami A et al.^[2] As boys indulge in more outdoor games and explorative behavior, they may be at increased risk of snakebite as compared to girls.

In our study, we found, that 41% of cases were in the age group of 5-10 years. Similar findings were seen in a study done by Hanumanna AK et al.^[7] This may be due to their outdoor activities, but in our study majority of snake-bite happened in the house.

Most of the bites (60.3%) happened from May to August. Similar findings were observed in studies done by Kshirsagar et al,^[5] and Chandrashekaraswamy SS et al,^[10] The higher incidence of snake-bite during this period coincides with the arrival of monsoons as their holes and burrows fill with water, and snakes come out of them in search of alternate shelter.

The majority of the snake bites happened between 00:01-06:00 (39.7%) hours of the day, followed by 18:00- 00:00 hours (29.3%). These results were in concordance with studies done by Dr Sivagami A et al,^[2] and Pandala P et al.^[9] Most bites occur during the night times because snakes are naturally active during the night-time in search of their prey. Most of the snake bite cases (82.8%) were from a rural background and around 17.2% were from urban areas. Similar findings were seen in the studies done by Hanumanna AK et al,^[7] and Chandrashekaraswamy SS et al.^[10]

The majority of children had snake bites inside the house (62 %), out of this 91.7% of them were sleeping on the floor and among these cases, 72.2% of bites happened between 00:01 to 06:00 hours of the day. The remaining 38% of snake bites happened outside their house, back yards, and farm fields. In contrast to our study, studies done by Pandala et al,^[9] and Chandrashekaraswamy SS et al,^[10] found more snake bites happened outside the house. A study done by Mandal RK et al,^[13] observed a higher number of snake bites (58%) happening inside the house.

In our study, the majority of the snake-bite was by common krait, followed by unidentified snakes and cobra. Common kraits are naturally more active in search of their prey during the night-time. Lower limbs were the most common site of bites (44%). Similar results were observed in studies done by Kshirsagar et al,^[5] Meshram RM et al,^[6] and Chandrashekaraswamy SS et al.^[10]

The majority of the cases were admitted within 6 hours of the bite (88%). Similar findings were observed by Hanumanna AK et al,^[7] Pandala et al,^[9] and Chandrashekaraswamy SS et al.^[10] Of 58, only 7 children presented after 6 hrs. This delay was due to a lack of transportation facility during night hours, the primary center was not approachable, to seek treatment from quacks, belief in the local native traditional treatment, and the patient's ignorance.

No first aid was received in 58.62% of snake-bite cases. Only 25.8% of children received first aid at Primary Health Centre and 15.6% from local quacks. Our findings were comparable to the study done by Meshram RM et al,^[6] and Pandala et al.^[9] Out of 58 cases, 55 cases (94.8%) required anti-snake venom. Most of the cases were given 10 vials of ASV (81.4%), which is comparable to studies done by Chandrashekaraswamy SS et al.^[10]

In our study, features of neurotoxic envenomation were observed the majority of snake-bite victims. The clinical findings observed included ptosis (86%), difficulty in breathing

(82.8%), pain at the bite site (68.9%), epigastric pain (67.2%), swelling at the bite site (62%), vomiting (55%), bleeding from the bite site (18.9%). Similar manifestations were reported in the study done in Nepal by Mandal RK et al,^[13] whereas studies by Dr. Sivagami A et al,^[2] Meshram RM et al,^[6] and Chandrashekaraswamy SS et al,^[10] observed both vasculotoxic and neurotoxic envenomation, with nearly equal proportions.

In our study, 2(3.4%) children had encephalopathy, and 1 (1.72%) child developed acute renal failure, who presented to us 8 hours after the bite.

Respiratory paralysis was observed in 48 (82.7%) children, who required ventilatory support. Of these, the majority of them (75%) required ventilatory support for less than 3 days. Duration of hospital stay was less than 7 days in 75.9% of patients, which is comparable to a study done by Chandrashekaraswamy SS et al.^[10]

There were 3 (5.17%) deaths, 2 were neurotoxic envenomation and 1 had mixed features of neurotoxic and vasculotoxic. All the 3 children were hospitalized after 6 hrs of bite and received primary treatment from the traditional method or quack.

CONCLUSION

Snakebite is common in rural India. Although it is common in adults, children between 5-15 years are also vulnerable due to outdoor activity, particularly in rural areas. Most snake bites related deaths occur due to delayed administration of anti-snake venom and /or supportive care. There is an urgent need to increase awareness among the general public, especially in rural areas about the importance of early administration of anti-snake venom and avoidance of traditional treatment to prevent death due to snake bites. Training of healthcare providers is also essential to identify snake bite cases when the history of bite is not obvious and early administration of anti-snake venom before the referral. Premonitory symptoms such as abdominal pain and vomiting at midnight and early morning in individuals sleeping on the floor, followed by features of symmetric, descending neuromyotonia with /or without localizing features usually indicate krait envenomation. Awareness about this information needs to be percolated among healthcare providers.

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