



A STUDY OF CLINICOETIOLOGICAL, EPIDEMIOLOGICAL AND OUTCOME OF SNAKE BITE IN PEDIATRIC POPULATION OF RURAL HARYANA.

Paediatrics

Dr Preeti Raikwar Professor Bhagat Phool Singh Medical College For Women (Khanpur Kalan)

Dr Ritika Jain DNB Second Year Resident Bhagat Phool Singh Medical College For Women (Khanpur Kalan)

Dr Dhiraj Parihar Professor, Pediatrics Surgery BPS GMC Khanpur Kalan.

ABSTRACT

Background: Snake bite is a major medical and public health problem in tropical agricultural areas .A high incidence of snake bite are reported from rural India ,many times they are underestimated due to lack of epidemiological information .The present study analyzed the clinicoepidemiological ,etiological, management and outcome of patients with snake bite in below 14 years pediatric population of eastern part of rural Haryana. **Methods:** This study is retrospective descriptional type conducted in department of pediatrics BPS GMC (W) Khanpur kalan Haryana from January to September 2024 including 23 patients ,who presented with history of snake bite .clinical data about age, sex ,socioeconomic status ,admission duration after bite, clinical manifestations requirement of antsnake venom (ASV),oxygen support ,management and outcome of patients were analysed. **Results:** In our study of 23 patients ,maximum snake bites incidents were noted in age group of 4-14 years of rural population ,children of migratory laborers of lower socioeconomic status with male preponderance(73%).Most of bites occur during monsoon season (60%).Most of bites were non poisonous(41%) followed by neurotoxic(37%) and maximum cases responded to 10 vials of ASV. Mortality was one with case fatality ratio of 8.3%. **Conclusion:** Snake bite is life threatening emergency. The key in minimizing morbidity and mortality is aggressive management of sick patient and timely as well as judiciously administration of ASV, ventilatory support, blood products. There is urgent need to spread awareness among the community for avoidance of traditional treatment and any delay in medical intervention in snakebite incidents.

KEYWORDS

Snake envenomation, Neurotoxic, Vasculotoxic, Anti snake venom (ASV)

INTRODUCTION

Snake envenomation is a preventable public health hazard often faced by rural population in tropical and subtropical countries .Snake bite is an acute medical emergency requiring timely intervention. It remains an underrated cause of accidental death in modern India, especially in rural India. It is even more underestimated as people fail to reach out to modern medicine and fall victim to the handful of quacks using traditional healing methods.[1]

According to new analysis , snake bite is a recent inclusion to the list of neglected tropical diseases by WHO.INDIA is largest single contributor to the global tally of snake bite deaths ,with numbers ranging from between 15k and 50k a year.[2]

An estimated 5.4 million people worldwide are bitten by snakes each year with 1.8 to 2.7 million cases of envenomings.[3]

Around 81, 410 to 1,37, 880 people die each year because of snake bites, and around three times as many amputations and other permanent disabilities are caused by snake bites annually.[3]

Bites by venomous snakes can cause paralysis that may prevent breathing, bleeding disorders that can lead to a fatal haemorrhages , irreversible kidney failure and tissue damage that can cause permanent disability and limb amputation.[3]

A very major uncommon presentation in our study is of sudden onset pain in abdomen with vomiting and progressive weakness of limbs and loss of consciousness, which were on suspicion given ASV and they improved well.

People in countries like India prefer traditional healers rather than trained doctors, mainly because of ignorance and monetary issues as a result of which 77% of snake bite victims in rural areas die outside the health care setup.[1]

The data on the morbidity and mortality of snakebite are unreliable due to an improper reporting system, as many victims of snakebite choose village-based traditional therapists

Our nationally representative mortality study documents about 1.2 million snakebite deaths from 2000 to 2019. Most occurred at home in the rural areas.[4]

The greatest burden of snakebite morbidity is in India and Southeast Asia. Globally, there are an estimated 421,000 envenomings each year (about 1 in 4 snakebites) and 20,000 deaths, but snakebites often go

unreported.[2]

As per a nationally representative mortality study in 2020, 70% of deaths in India occurred in eight states: Bihar, Jharkhand, Madhya Pradesh, Odisha, Uttar Pradesh, Telangana, Rajasthan and Gujarat.[4] The major families of poisonous snakes in India are Elapidae which includes common cobra (Naja naja) , king cobra and common krait (Bungarus caeruleus) , viperidae includes Russell's viper, Echiscarinatus (saw scaled or carpet viper) and pit viper and hydrophidae (sea snakes)[1]

This study has been planned as there is scarcity of data about incidence, clinical presentation , major type of snake envenomation ,their effect and outcome of such envenomation in eastern part of rural Haryana so as to know the clinical epidemiological presentation and outcome of snake envenomation in pediatric patient.

MATERIALS AND METHODS

The present retrospective, descriptive study we have collected data about snake bite cases admitted to the Dept of Pediatrics BPS GMC (W) Khanpur kalan from JANUARY to SEPTEMBER of year 2024. A total of 23 pediatrics patients below 14 years of age with a history of snake bite were included in this study.

A detailed information about demographic parameters such as age ,sex distribution , residence, site of bite and place of bite , the interval between the bite and medical consultation, a pattern of toxicity ,need of oxygen support . A detailed systemic and local examination was carried out in all the patients.The institutional protocol included a blood workup including Complete blood count ,organ function tests ,urine routine and microscopy ,hematuria ,bleeding and clotting time,20 min whole blood clotting time and chest radiograph .

After the initial clinical evaluation and informed consent ,patients were given intravenous polyvalent antsnake (ASV) venom and supportive care depending upon the system affected.

The number of ASV required per patient was recorded and outcome was recorded based on need of ventilator, blood products, focal neurological deficits and discharge of patients.

Statistical Analysis

Statistical tests were applied to calculate the frequencies and means of different variables studied.

RESULTS

In our study total 23 patients under the age group of 14 years,who

reported to hospital with suspected history of snake bite were included.Among them 73% were males and rest 26% were females ,majority of them were of age group 8-11 years (30%),4-7. &12-14 years(26%) each.

Most of them were from lower socioeconomic class(74%) and rest belongs to upper lower and lower middle class(13%) each according to modified kuppuswamy scale (chart 1). Mostly population are of labourers, migratory workers residing in plains, farms and sleeping on floor. Most of the bite were non provocative and occurs during night or early morning implicating the sleeping habits of victims. Lower limb was the commonest site of bites followed by upper limb.

Most patients reported In 4-8 hrs after the bite (65.2%) few 30.4% reported in 2-4 hrs and only 4.3% i.e. 1 out of 23 reported within 2 hrs of bite(table 2).

Regarding clinical types 37.1% were neuromparalytic snake bites,6.9% were hemolytic while 41.4% were non poisonous bites (fig 1)

Various symptoms were observed in patients from which the majority presented with vomiting(43%),pain in abdomen(39%) and respiratory distress (39%).

Other complaints were bleeding from a bite or any other site (29%) ,ptosis and weakness in all over the limbs (34%) also local symptoms such as swelling and tenderness were present in 29% of patients.(fig 1) The majority of the patients were maintaining vitals and hemodynamic stability but 39% of them having respiratory distress,21% presented with shock(table2),while 2.6% of them presented in cardiorespiratory arrest .

For the treatment 82% of patient given ASV ,majority 52% of them requires 10 vials to show improvement, out of which 5 patients i.e.26% shown reaction to ASV and been desensitised for the same,and majority 52% requires <10 vials of atropine and neostigmine(table 3) . For maintaining hemodynamic stability 30% of patients require transfusion of blood products, majorly FFP then blood and platelets as well(table4).

Table 1

ADMISSION AFTER BITE		
<2hrs	1/23	4%
2-4hrs	7/23	30%
4-8 hrs	15/23	65%

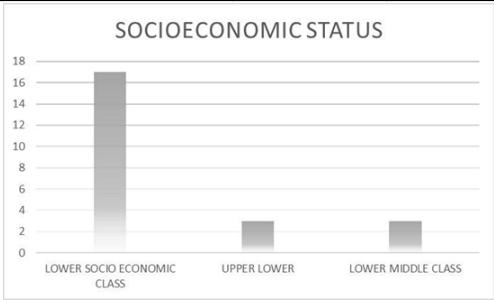


Chart 1 showing socioeconomic profile

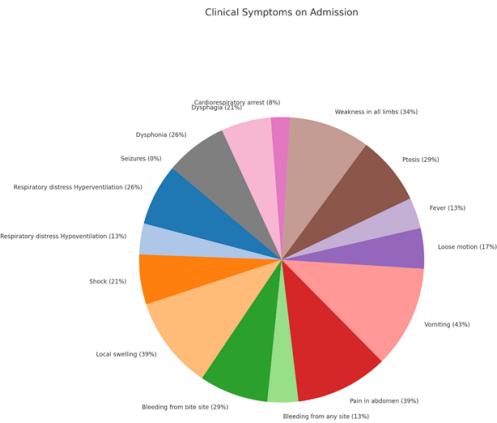


Fig 1 showing clinical symptoms on admission .

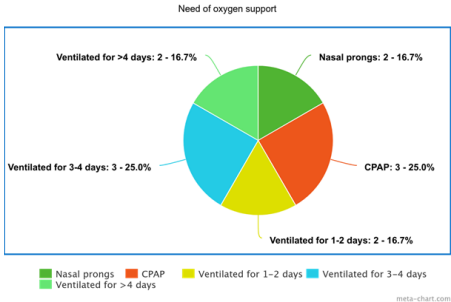


Fig 2 showing need of oxygen support.

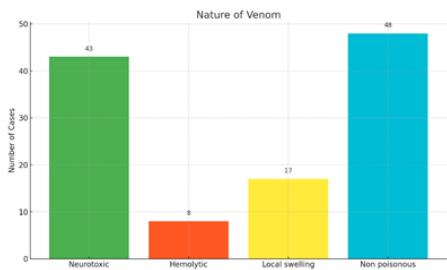


Chart 2 showing nature of venom

Table 2 Showing Clinical Stability On Presentation

Vitals spo2 >95	19/23	82%
<95	4/23	17%
Heart rate >95%	8/23	34%
50-90%	13/23	56%
<3%	2/23	8%
Respiratory rate >95%	7/23	30%
50-90%	12/23	52%
<3%	4/23	17%
Blood pressure >95%	6/23	26%
50-90%	14/23	60%
<3%	3/23	13%

Table 3 showing use of ASV and atropine neostigmine

no of ASV vial used	19/23	82%
30-20	3/19	15%
20-10	6/19	31%
10	10/19	52%
Reaction to ASV	5/19	26%
No of atropine and neostigmine doses	12/23	52%
<10	5/12	41%
10-20	3/12	25%
>20	4/12	33%

Table 4 showing need of transfusion

Transfusion of blood products	7/23	30%
Packed red blood cells	5/23	21%
Fresh frozen plasma	6/23	26%
Platelets	3/23	13%

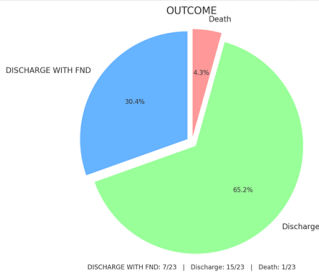


Fig 3 showing outcome of patients

DISCUSSION

India has been one of the leading countries with increased mortality associated with snake bite[5].Snake bite is a medical emergency where timely intervention can save all lives .Literature on snake envenomation in children is scarce[6].Children are more prone to severe envenomation and complication due to their larger surface area,

smaller extracellular fluid volume and less protein to bind to the circulating venom[7].

Our study found that snake bite was more commonly seen in males with 73% ,similar to other studies[8,9].This is probably because of more outdoor activities amongst male as compared to females.

Prominent age group in our study, majority of victims were of age group (4-14 years), similar to other studies.

These demographic features were in accordance with previous studies Biswajit Pattnaik et al(62%)[10]shivaprakash sosale et al(83%)[11].

We also noticed that 60% of snake bites occurred from July to September due to the rainy season when snake burrows in the soil.[12]similar to other studies.In our study mostly patients were from rural areas and from lower socioeconomic class, most of the family have sleeping habit of sleeping in open and on floors, snakes are nocturnally active hence incidence of snake bite is more in night time,as compared to other studies where most bites while playing followed by walking [1,6,9]similar to other studies.

Most bites were non poisonous(40%),followed by neurotoxic(37%) and then vasculotoxic (7%) as compared to studies of other areas like Maharashtra and eastern sides [9,11] where vasculotoxic type is more prevalent.This reflects that many victims get panicked and are brought in EMG even though do not have poisonous manifestation.This also reflects increased awareness about snake bite mortality among general population.

Only 4% of patients reported within 2 hrs of bite and maximum 65% after 4 hours.This shows in rural India,due to mentality of people to seek treatment from quacks they present to hospital late after the bite,also due to lack of availability of transport facility to primary health centre during night hours or non availability of ASV in PHC centre.

Fortunately suction and incision were not made in any of our patients.

Most of the envenomous bites developed respiratory distress, vomiting and pain in abdomen followed by local site edema and weakness in limbs. The majority showed edema and bleeding which was also reflected in other studies suggesting primary wound care to be of utmost import to avoid grievous complications like gangrene and compartment syndrome.[13].

In our study 82% of patients given ASV,most of the cases requires 5-10 vials which is comparable to Kumaravel and Stone et al ,of which 19% showed reaction to it underwent desensitization ,intravenous steroids and antihistaminics injection,a finding similar to other reports [14].

In our study respiratory distress is the main presenting symptom for which 30% requires nasal prongs and similar amount of patients required ventilator for 3-4 days.2 of our patients presented late in cardiorespiratory arrest condition required ventilatory support showed the timely intervention required for decreasing morbidity and mortality due to snake envenomation.

Our study showed preferential use of Fresh frozen plasma to maintain hemodynamic stability in vasculotoxic bites as compared to other blood products ,similar to other studies.

In our study mortality is due to extensive bite in the right neck region showing symptoms of vasculotoxic type consumption coagulopathy presented in 4 hours after the bite couldn't survive .

In terms of outcome 60% of patients were discharged healthy,30% with some focal neurological deficits, showed importance of seeking treatment in a medical facility.

CONCLUSION

When patients came readily<4 hrs to hospital for treatment have fairer outcome out of 23 only 1 had mortality which have hemotoxic envenomation .48% were non poisonous bites while rest having neuromuscular symptoms

Mostly in our institute are patients of low socioeconomic status, illiterate and residing in rurals in open fields which prefers quacks as

first choice hence awareness and education among local public and health care workers about the snake bite poisoning and complication is a need of hour. Hence every rural health care worker should be trained.

So snake bite still is a great problem , leads to increased admission in PICUs during rainy seasons which has been neglected and leads to high mortality due to delay in seeking medical care, indulging in traditional practices, as 30% of total patients presented late .

Some of the referred patients are referred to in view of non availability of ASV in peripheral centres. This problem should be given importance as earlier treatment has a great impact on morbidity and mortality.

Peripheral centres should be equipped with ASV which is a life saving measure in such situations.

Financial Support And Sponsorship

Nil

Conflict Of Interest

None

REFERENCES

1. Mohapatra B, Warrell DA, Suraweera W, Bhatia P, Dhirga N, Jotkar RM, et al. Snakebite mortality in India: A nationally representative mortality survey. *PLoS Negl Trop Dis*. 2011;5:e1018
2. Jarwani B, Jadav P, Madaiya M. Demographic, epidemiologic and clinical profile of snake bite cases, presented to Emergency Medicine department, Ahmedabad, Gujarat. *J Emerg Trauma Shock*. 2013 Jul;6(3):199-202. doi: 10.4103/0974-2700.115343. PMID: 23960378; PMCID: PMC3746443.
3. WHO website data published about snake bite envenomation on 12/10/23
4. Suraweera W, Warrell D, Whitaker R, Menon G, Rodrigues R, Fu SH, et al. Trends in snakebite deaths in India from 2000 to 2019 in a nationally representative mortality study. *Elife*. 2020;9:e54076.
5. Kasturiratne A, Wickremasinghe AR, de Silva N, Gunawardena NK, Pathmeswaran A, Premaratna R, et al. The global burden of snakebite: A literature analysis and modelling based on regional estimates of envenoming and deaths. *PLoS Med*. 2008;5:e218.
6. Le Geyt J, Pach S, Gutiérrez JM, Habib AG, Maduwage KP, Hardcastle TC, et al. Paediatric snakebite envenoming: Recognition and management of cases. *Arch Dis Child*. 2021;106:14-9.
7. Aggarwal R, Thavaraj V. Snake envenomation. *Indian Pediatr*. 1994;31:1309-13.
8. Sanjay HR, Khan HU, Jaidev MD, Hegde P. Clinical profile and outcome of snake bite in children at a tertiary care centre in South India. *Sri Lanka J Child Health*. 2021;50:704-8.
9. Meshram RM, Bokade CM, Merchant S, Bhongade S. Clinical profile and outcome of snake bite in children. *Int J Contemp Pediatr*. 2017;4:910-4.
10. Pattanaik B, Mahapatra C, Karthika IK, Satapathy AK, John J, Das RR, Dwivedi B, Mahapatro S, Gulla KM. Clinical, laboratory profile and outcomes in children with snakebite from Eastern India. *J Family Med Prim Care*. 2023 Aug;12(8):1588-1592. doi: 10.4103/jfmpc.jfmpc_1965_22. Epub 2023 Aug 29. PMID: 37767426; PMCID: PMC10521854.
11. Chandrasekharaswamy SS, Verghese D, Reddy C. Clinical profile and outcome of snake bite in children admitted in a tertiary care institute in the metropolitan city of Karnataka, India. *Int J Contemp Pediatr*. 2020;7:2295-300.
12. Jamieson R, Pearn J. An epidemiological and clinical study of snake-bites in childhood. *Med J Aust*. 1989;150:698-702.
13. Rao KV, Ramesh G, Acharya A. Clinicopathology, clinical profile and outcome of venomous snake bite in children in Konaseema region of Andhra Pradesh, India. *Int J Contemp Pediatrics*. 2019;6:625.
14. Halesha BR, Harshavardhan L, Lokesh AJ, Channaveerappa PK, Venkatesh KB. A study on the clinico-epidemiological profile and the outcome of snake bite victims in a tertiary care centre in southern India. *J Clin Diagn Res*. 2013;7:122-6.