Clinico-epidemiological profile and outcome of snakebite victims in South West of West Bengal: A District hospital based study

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ABSTRACT

Introduction: Poisonous snake bites are a serious health challenge in tropical regions due to their incidence, morbidity and mortality . More than 200,000 cases of snake bite are reported in India each year. Envenomation by poisonous snakes is an occupational hazard for the farmers and farm laborers, plantation workers, herders and hunters in tropical and subtropical countries . Hence the present study is undertaken to document the Clinico-epidemiological profile and outcome of snake bite victims admitted in a Deben Mahato sadar hospital, Purulia located geographically in South West of West Bengal.

Materials & Methods: Analysis and interpretation of the collected data will be done using chi-Square statistical association method . Windows excel and word 2013 is used for data entry and analysis. Descriptive statistical analysis will be done. Results on continuous measurements will be presented as Mean & Standard Deviation. Results on categorical measurements will be presented as Percentages.

Results: In this study sample, a majority of snake bite victims were aged between 31-45 years. Most of the cases were males (71.34%) compared to females (28.65%). A majority of the patients were village habitants and mostly farmers (54.87%) who lives in rural areas(89.02%).

Conclusion: As snake bite is an occupational hazard and awareness among farmers and plantation workers regarding wearing of foot wear.There is urgent need to create awareness among rural people regarding prompt reporting of snake victims and importance of effective treatment through mass media ,role plays and community health programs.

Keywords: Snake Bite, Antivenom,clinical profile, outcome.

INTRODUCTION

The evolutionary history of venomous snakes can be traced back to as far as 25 million years ago.[1] Snake venom is actually modified saliva used for prey immobilization and self-defense and is usually delivered through highly specialized teeth, hollow fangs, directly into the bloodstream or tissue of the target.India is often called the land of snakes and is steeped in tradition regarding snakes.[2] The actual incidence of snake bites may be much higher as majority of cases occurring in rural population go unreported.

The four common venomous land snakes which are found in Purulia region include the Common cobra (Naja naja), the Common krait (Bangarus caeruleus), the Russell's viper (Vipera russelli) and the Saw scaled viper (Echis carinatus) [3]. The principal effects of envenomation are on the nervous system, kidneys, heart, blood coagulability, vascular endothelium, and locally at the site of bite.[4] Envenomation due to cobra and krait bites causes paralysis of the ocular, bulbar, and limb girdle muscles whereas viper bites mainly cause bleeding from muco-cutaneous sites, hemolysis, acute renal failure, and occasionally shock.

Clinical Profile and outcome varies from region to region depending on snake type, venom composition and care facilities available in the locality. Although venomous snake bite is a life threatening emergency, it is rarely considered as a priority for health research in developing countries like India. No study on this subject has been conducted in this locality before.

MATERIALS & METHODS

A Prospective, descriptive Hospital based study, was conducted for a period of 2 years from January 2015 to December 2016. The following formula has been used for calculating sample size: $N=Z^2PQ/L^2$ Where P taken as 22.19% based on a previous study (Majumder et al 2014[6]). Q as 100-p (77.81) L as error (4.5%)Z as standard normal deviate (1.96) and corresponds to 95% confidence level $N=1.96^2 \times 22.19 \times 77.81 / (4.5)^2 = 328$. Hence the final sample size taken as 328.

Sampling Technique: Non probability consecutive sampling technique was used where all snake bite victims attending the Deben Mahato sadar hospital and meeting the inclusion criteria within the study duration were taken into the study.

All the victims admitted to the hospital due to snake bite aged 12 to 75 yrs and all the patients who gave consent for the study were included and victims brought dead due to snake bites and victims who did not give consent to be a part of the study were excluded.

The prospective study was conducted in the Department of General Medicine, Deben Mahato sadar hospital ,Purulia, West Bengal from January-2015 to December-2016. Purulia district comprise of forests and agricultural areas. Deben mahato sadar hospital.is a secondary health care center and the main referral center for cases of snakebite in the region.Clearance was obtained from the institutional ethics committee and ethical committee of Bankura Sammilani Medical College . All the patients admitted to Deben Mahato sadar hospital with history of snakebite will be followed up from the time of admission throughout their stay in hospital. Patients will be interviewed after obtaining an informed consent using a semi – structured questionnaire Snakes will be identified based on the description given by the patients/ relatives/ bystanders and by correlating the clinical manifestations. All the cases of Snake bite will be included in the study. Case details including age, sex and occupation of the victims, the site of bite, time of bite, delay in admission to the hospital, clinical manifestations, specific treatment, complications and outcome will be obtained from patients, their relatives and hospital records.

RESULTS

TABLE 1. SOCIO-DEMOGRAPHIC VARIABLES OF SNAKE BITE VICTIMS

Parameters		Number of cases (%) n=328	Percentage
Gender	Male	234	71.34
	Female	94	28.65
Sneezing	<=15yrs	30	9.14
	16—30	101	30.79
	31—45	137	41.76
	46—60	33	10.06
	>60	27	8.23
Occupation	Farmers	180	54.87
	Plantation workers	122	37.19
Residence	Others (Tailor, Nurse etc.)	26	7.92
	Rural	292	89.02
	Urban	36	10.97

Figure 1. Socio-demographic variables of snake bite victims

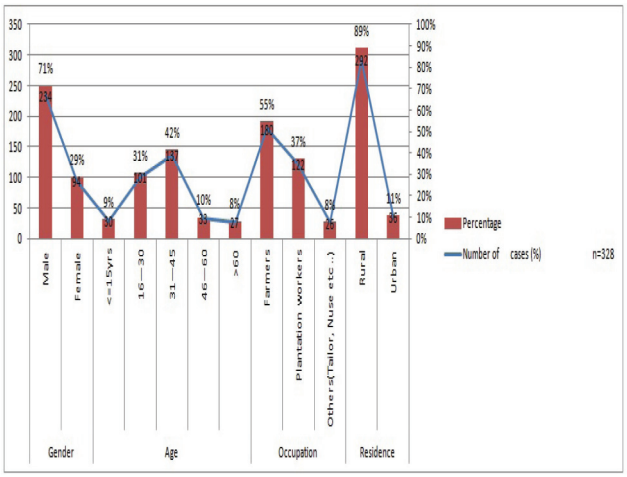

Figure 2: EPIDEMIOLOGICAL PROFILE OF SNAKE BITE CASES

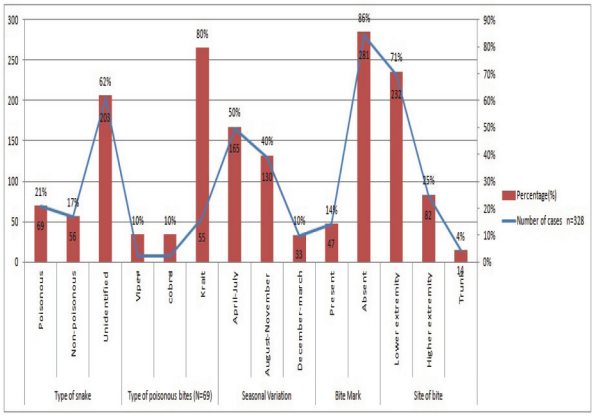

TABLE-2.EPIDEMIOLOGICAL PROFILE OF SNAKE BITE CASES

Epidemiological factors		Number of cases (%) n=328	Percentage
Type of snake	Poisonous	69	21.03
	Non-poisonous	56	17.07
	Unidentified	203	61.89
Type of poisonous bites (N=69)	Viper	7	10.14
	cobra	7	10.14
	Krait	55	79.7
Seasonal Variation	April-July	165	50.3
	August-November	130	39.63
	December-march	33	10.06
Bite Mark	Present	47	14.32
	Absent	281	85.67

Site of bite	Lower extremity	232	70.73
	Higher extremity	82	25
	Trunk	14	4.26
	Head and Neck	0	
	Genitalia	0	
	Multiple Sites	0	

TABLE 3. DISTRIBUTION OF SYMPTOMS AMONG SNAKE BITE VICTIMS

Symptoms	Frequency n=328	Percentage(%)
Swelling	61	18.59
Pain	110	33.53
Echymosis	3	0.91
Cellulitis	51	15.54
No Symptoms	103	31.4

TABLE 4. DISTRIBUTION OF SNAKE BITE VICTIMS ACCORDING TO THE TIME TAKEN TO GET TREATMENT AND DURATION OF THE HOSPITAL STAY

Type of treatment	Time taken to get treatment (Hours)	Number of cases N	Percentage
First Aid	Tourniquet	18	5.48
	No first aid	310	94.51
Bite to hospital time	< 3	42	12.8
	3-6	54	16.46
	6 – 8	112	34.14
	>8	120	36.58
Clinical Evaluation	Asymptomatic	263	80.18
	Neurological	51	15.54
	Hemotoxic	11	3.35
	Mixed	3	0.91
	Others	0	0

TABLE 5. DISTRIBUTION OF COMPLICATIONS AMONG THE SNAKE BITE VICTIMS

Complications	Frequency	Percentage(%)
Respiratory System	67	20.42
Gastro Intestinal system	42	12.8
Hematological System	3	0.9
Central nervous System	64	19.5
No complications	152	46.34

TABLE 6- DISTRIBUTION OF NUMBER OF ASV VIALS GIVEN AND DEVELOPMENT OF ALLERGIC REACTIONS

20M WBCT (N=7)	Variables	No. of cases	Percentage
20M WBCT (N=7)	POSITIVE	3	43%
	NEGATIVE	4	57%
TREATMENT DATA	OBSERVATION	263	45%
	PREMEDICATION	328	55%
DISTRIBUTION OF ASV VIALS GIVEN AND DEVELOPMENT OF ALLERGIC REACTION	<10	20	15%
	11-20	24	18%
	>20	21	16%
DEVELOPED ALLERGIC REACTION N=328	YES	17	13%
	NO	48	37%

TABLE 7: OUTCOME DATA

OUTCOME DATA	No. of cases	Percentage(%)
Uncomplicated on Observation	259	78%
Uncomplicated with ASV Treatment	21	6%
Complications requiring Tertiary Care	11	3%
Complications Treated conservatively	37	11%
Deaths	6	2%
Deaths due to poisonous snake bite	6	9%

DISCUSSION

Snake bite is one of the medical emergencies most commonly reported from the developing countries of the tropical region. Snake bite is a major public health hazard and neglected tropical disease in India[7]. The estimated annual death due to snake bite in India is nearly 50,000 persons. Persistent efforts thus have been made to make it a notifiable disease in the south-east asia region(SEAR) of the WHO[8].

This study explores the profile of 328 snake bite victims and analyzed their socio-demographic and epidemiological details. A meticulous history, clinical examination and laboratory investigation were carried out on the day of admission and regularly thereafter. Cases were followed till the final outcome in form of discharge or death.

In the present study, most of the snake bites were in the age group of 30 plus or minus 15 years. Representing the working class of population. According to Sujeet R et al., 71% were in the age group of 16-45 years[9]. The male to female ratio of the study participants was 2.48:1. Similar findings have been reported from the studies conducted in different parts of India. A higher male to female ratio was noted in studies conducted in Gujarat and Andhra Pradesh [10].

In the present study 61.89% snake were unidentified. This may be either due to patience ignorance, anxiety and poor visibility due to darkness. Similar finding was reported by studies done by Ganneru B et al ., and lograj et al.[11] Majority of snake bite cases (70.7%) involved the lower extremities which suggest that snake were stepped in inadvertently. This finding is comparable to previous studies[12].

Seasonal variation in incidence of snake bite was in accordance to I F Inamdar et al , D.P. Punde[13]. Most of the snake bites occur in April-July which is the monsoon season, with increased agricultural activity and also the time of increased activity of snakes as they come out of their shelters. Some variation may be due to geographic variation in rainy season.

Type of snake was identified by only 38.1% of the victims in the present study. Most of the snake bites in India are a result of common Krait cobra and Russels Viper that are the more commonly encountered species among the 13 known species of poisonous snakes. Our observations are in accordance with the studies conducted in Thailand and India [14]. The most common symptom reported was local pain followed by swelling which is similar to those reported in other studies [15-18].

We noticed that 36.5% of the patients had reached hospital after a delay of 8 hours. This delay in their arrival could be attributed to the poor transportation facility, lack of awareness of the hazards of snakebite, an Unrelenting belief in the traditional system of medicines and the patient's ignorance, which had contributed to substantial increase in the morbidity and the mortality. According to Haleesha B.R et al the patients reached the hospital after a delay of 6 hours [19,20]. In our study 94.5% of the patients had not received first aid treatment for the bitten site that is, tourniquet, incision and drainage, suction and indigenous herbal medicines [21,22].

Most of the snake bites in our study were neuroparalytic (15.5%) followed by haemotoxic (3.35%).In our study, the most common complication was respiratory paralysis, followed by acute renal failure, gangrene at the bite area. Laboratory parameters in management of snake bite were similar to those found in previous studies. Butt KZ et al ,[17] in his study notified that leukocytosis was most common followed by WBCT > 20 minute, raised SGPT and INR > 1.5. A significantly higher mortality was observed in cases with WBCT more than 20 minute as compared to those with normal WBCT. Myo-Khin et al , In his study noted that unclotted blood after 20 minute associated with higher incidence of mortality. Haemostatic disturbances are known to be the pathological mechanism causing fulminant disease in hemotoxic snake bite and bleeding tendency is well recognized as an indicator of greater risk of mortality [23,24,25].

ASV is the only effective and specific treatment which is available for snakebite envenomation. The anti-snake venoms may be species specific (monovalent/monospecific) or they may be effective agains several species (polyvalent/ polyspecific). As per the recommendations of the WHO, the most effective treatment for snake bite is the administration of monospecific ASV; however, this therapy is not always available for the snakebite victims because of its high cost, the frequent lack of its availability, and the difficulty in correctly identifying the snake. A proportion of the patients, usually morethan 10%, develop a reaction either early (within a few hours) or late(five days or more), after being given antivenom. The risk of the reactions is dose-related, except in rare cases in which there had been sensitization (IgE- mediated Type 1 Hypersensitivity) by a previous exposure to the animal serum, for example, to the equine antivenom, the tetanus-immune globulin or the rabies-immune globulin. In our study, we noticed that 13% of the patients had developed allergic reactions to ASV. The incorrect assessment of the risk versus benefit can lead to the unnecessary use of antivenom in patients with milder or even no envenoming, and in those who are bitten by snakes, whose venoms are not neutralized by the available antivenoms[26,27].

In the present study 3% developed complications who required tertiary care. Case fatality rate in the present study was observed as 2.0% which is much lower than that reported in other studies conducted in other parts of India. Case fatality rate due to poisionous snake bite in the present study conducted in purulia is 8.69%.This is due to Lack of awareness on snake bites and its potential hazards, delay in seeking timely medical advice, difficulty in identification of snakes, and lack of health care facilities in remote areas are some of the issues that need to be highlighted in tackling with the problem of snakebite and its treatment [28].

CONCLUSION

The present study clearly showed that the snake bite in the South West of West Bengal where rural population constitutes more than 80% is major occupational hazard of farmers and plantation workers . Immobilization and immediate transport of the snake bite victims to the hospital and anti snake venom administration remains the maintain stay treatment to decrease the morbidity and mortality which are associated with snake bite victims.

Common krait is the most common snakes identified among the identified snakes, and is the most common Snake bite reported in post monsoon season. As snake bite is an

occupational hazard and awareness among farmers and plantation workers regarding wearing of foot wear.

There is urgent need to create awareness among rural people regarding prompt reporting of snake victims and importance of effective treatment through mass media ,role plays and community health programs.

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