

A Clinico-Epidemiological Study on Snakebite among Children in a Rural Medical College and Hospital

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Abstract:

Background: The burden of snakebite envenoming causing both morbidity and mortality still has a great impact on the population and on health-care systems. Hospital records fall far short of the actual number owing to dependence on traditional healers and practitioners.

Objectives: Clinicoepidemiological profiling of snake bite cases admitted in a tertiary care hospital in rural South Bengal over a period of 1 year (2016-17).

Materials & Methods: Prospective hospital based observational descriptive study design.

Results: Occurrence of snakebite according to age distribution shows below 4 years is maximum 51.4%, followed by 4-8 years 31.4% & lastly 8-12 years 17.1%; 49 (70%) are male and 21 (30%) of female; 64 (91.4%) patients are from rural in compare 6 (8.6%) patients come from urban population; 70% patients are from tribal community & 30% are from non tribal community; maximum patients belonged to upper lower class. Bites were more in monsoon & post monsoon season. Most of the patient admitted within 230 mint of bite approximately 65.7%, 230-460 mint: 15.7%, 460-690 mint: 12.9%, >690 mint: 5.7%. Most of the bites are due to non poisonous snake bite (44), followed by neurotoxic bite (14) & lastly hematotoxic bites (12). Site of bite were more in lower limb 50 followed by upper limb 14 & other sites 6.

Conclusion: Snakebite in children has remained one of the major cause of mortality & morbidity. Increase mass awareness, early hospital arrival remains the cornerstone of preventing snakebite related mortality.

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I. Introduction

Snake is legless, cold blooded reptiles found every part of the world except the Arctic, New Zealand, and Ireland (1). It has been estimated that 5 million snake bite cases occur worldwide every year, causing about 100,000 deaths (2). India is reported to have the highest number of snake bites (81,000) and deaths (11,000) per year (3). Snakebite is a serious public health hazard in many regions, particularly in tropical and subtropical countries (4). The burden of snakebite envenoming causing both morbidity and mortality still has a great impact on the population and on health-care systems, especially in Africa, Asia, Oceania, and Latin America (5). However, there is very little hard evidence of a numerical nature to enable us to understand the issue in detail and assess the magnitude of mortality and morbidity. In the tropical developing countries where snakebites occur most commonly, there are few reliable incidence data. Subsequent work has revealed gross under reporting of deaths. One reason is that records of patients treated by traditional methods are missing from official databased statistics. Accepting these limitations, the fragmentary evidence available suggests that several million bites and envenoming occur worldwide each year, with thousands of deaths (4,6). The reasons for high levels of snake bite mortality in tropical developing countries include scarcity of anti venoms, poor health services, blind belief in myths & difficulties with rapid access to health centers (7). Large numbers of victims survive with permanent physical & psychological sequelae mostly due to the tissue damaging effects of snake venoms.

There are about 250 species of snakes are found in India of them 52 species are known to be venomous. However the majority of snakebites and consequent mortality is attributed to only 5 species in India, which includes King Cobra (Ophiophagushannah), Common Cobra (Najanaja), Russel's Viper (Viperarusellii), Common Krait (Bungaruscaeruleus), and Saw Scaled Viper (Echiscarinata). Accurate records to determine the exact epidemiology or even mortality in snakebite cases are also generally unavailable (8). Hospital records fall far short of the actual number owing to dependence on traditional healers and practitioners of witchcraft so called "ojha", "tantric" etc. The outcome also depends on various factors like-time between bite and attend the health facility, early sign of envenomation, bite marks, type of snake bite as for examples krait bites occur

mostly in night during sleep and bite marks may not be there and last but not the least the general condition of the patient.

Aims and objectives:

1. To assess the no of snakebite cases admitted in Paediatric emergency in a tertiary hospital in South Bengal .
2. To analyse the snakebite cases by sex, age, ethnicity, location, time between bite & attending health facility, identify the group of population that is more susceptible to snakebite.
3. To evaluate the mortality rate & morbidity among children having snake bite in this institution.
4. To assess the seasonal pattern of snake bite.
5. To analyse the site of bite.

II. Materials And Methods

This prospective hospital based observational descriptive study design aims to ascertain ages, sex, ethnicity, socio economic status, mode of presentation, complications and outcome in patients of snake bite in paediatric age group in a rural Medical college & Hospital. This study conducted in the emergency Paediatric Department of BankuraSammilani Medical College & Hospital, West Bengal, India. The data were collected using predesigned proforma and were analysed using standard statistical techniques in microsoft excel.

Table no 1: Frequency distribution of study patient according to age bands in years ((0-4],[4-8],[8-12]) (n=70)

Age	Frequency	Percent(%)
below 4 years	36	51.4
4 to 8 years	22	31.4
above 8 years	12	17.2
Total	70	100.0

Figure 1: Bar diagram showing frequency distribution of snakebite patient according to age bands in years of (0-4],[4-8],[8-12])

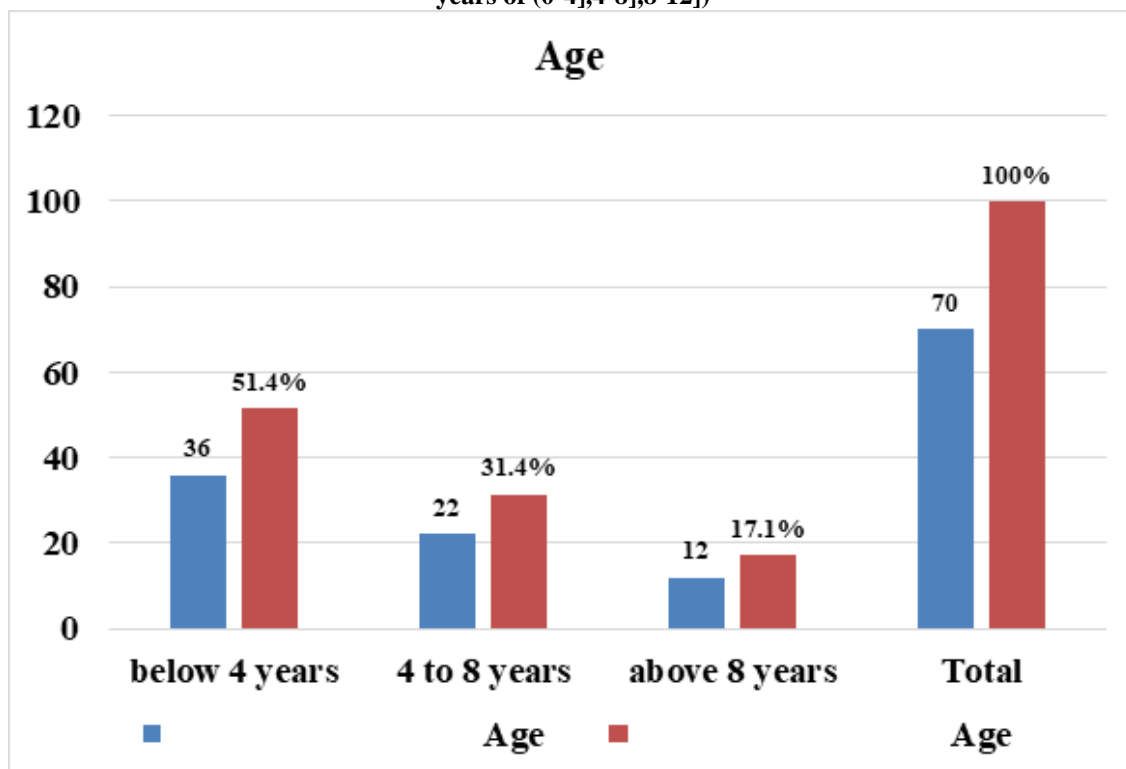


Figure 2: Bar diagram showing distribution of snakebite patient according to gender (male, female)

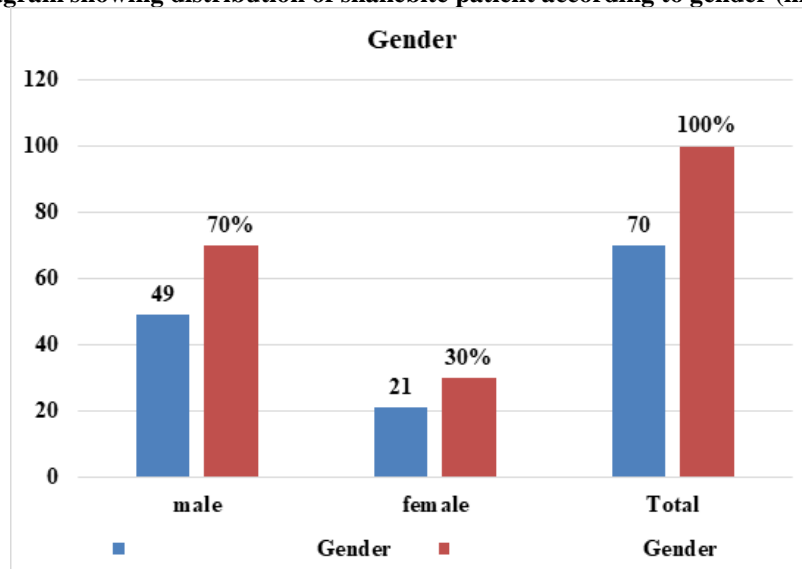


Figure 3: Bar diagram showing distribution of snakebite patient according to locality (rural, urban) (n=70)

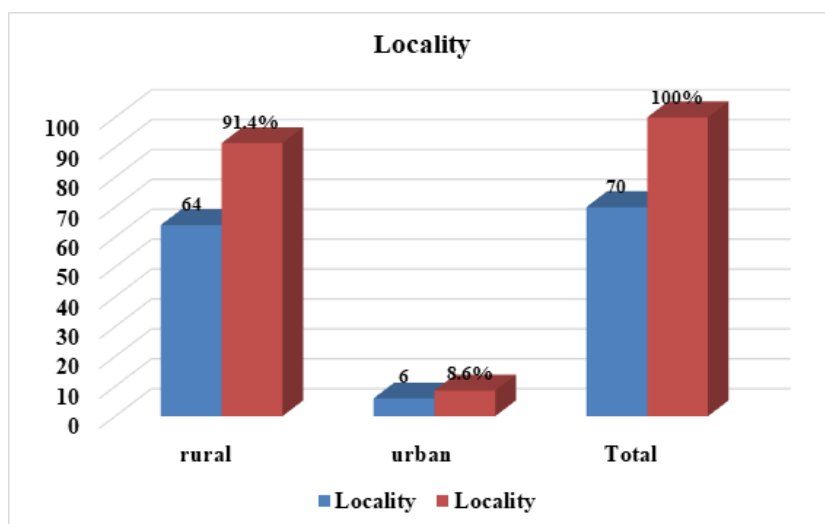


Figure 4: Bar diagram showing distribution of snakebite patient according to their ethnicity(tribal,non tribal) (n=70)

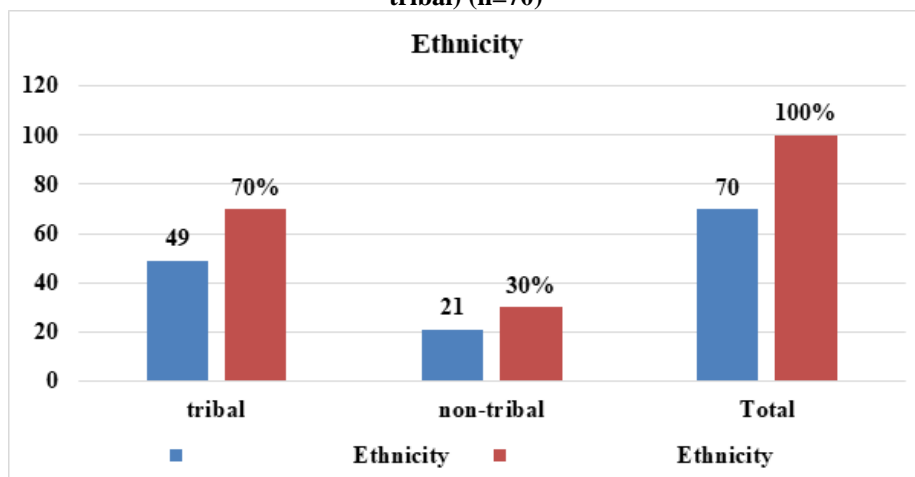


Figure 5: Bar diagram showing distribution of snakebite patient according to their socioeconomic status. (n=70)

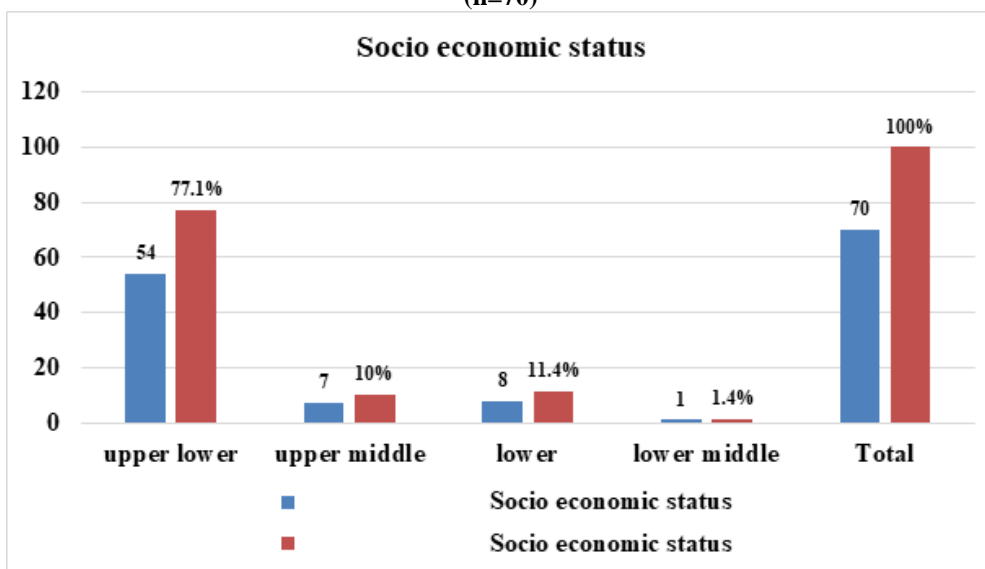


Figure 6: Bar diagram showing distribution of snakebite patient according to monthwise . (n=70)

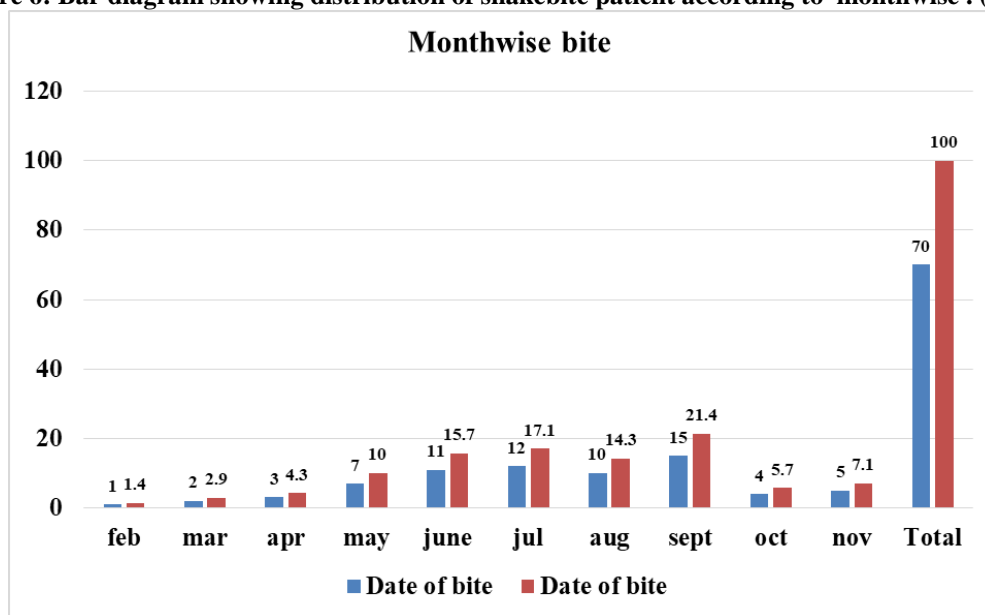


Table 2 : Frequency distribution table of study patient according to the time interval (min) between time of bite & time of admission. (n=70)

Time in minutes	Frequency	Percent
below 230 min	46	65.7
230 to 460 min	11	15.7
461 to 690 min	9	12.9
above 691 min	4	5.7
Total	70	100.0

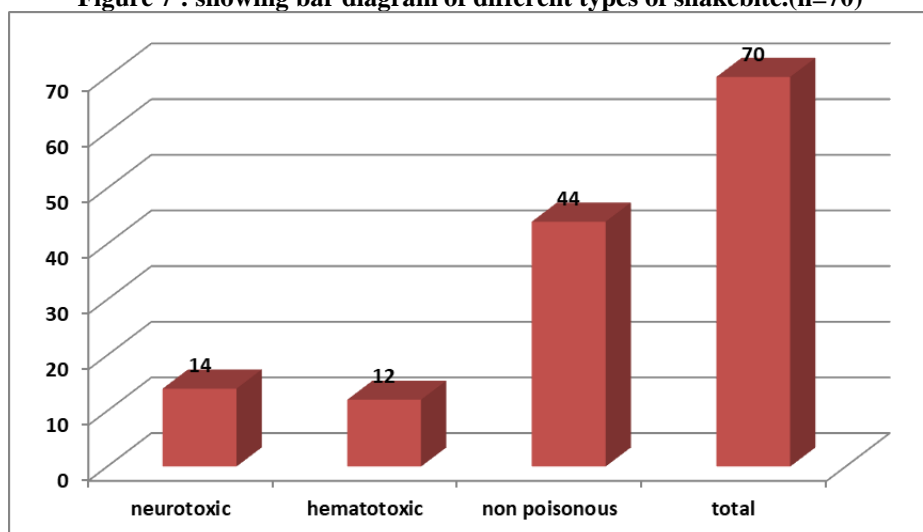
Table 3 : Frequency distribution table of study patient according to outcome –survived/not survived. (n=70)

Final outcome	Frequency	Percent
survived	66	94.3
not survived	4	5.7
Total	70	100.0

Table 4 : Frequency distribution table of study patient according to site of bite. (n=70)

Site of bite	frequency	Percent(%)
Other	6	8.6
Lower limb	50	71.4
Upper limb	14	20
Total	70	100

Figure 7 : showing bar diagram of different types of snakebite.(n=70)



III. Discussion

Snakebite in children is important cause of morbidity and mortality. We got 70(n=70) cases of snakebite patients upto 12 years of age as patient admitted in Pediatrics department in BankuraSammillani Medical College & Hospital below 12 years of age which satisfy the inclusion criteria of this study. We got data of clinico-epidemiological profile of poisoning in children below 12 year of age which is discussed here. In our study occurrence of snakebite according to age distribution shows below 4 years is maximum 51.4%,then 4-8years 31.4% & lastly 8-12years 17.1%.As because below 8 years children are more involved in outdoor games and their curiosity,risky behaviour like digging the whole or putting hand in to whole they became the victim. This also explains the 14 bite marks on the upper limbs.(9) .But Gopal Shankar Sahni et. al showed in their study that snake bite was most common (75%) in the age group 8-14 years, followed by the 5-7 year age group (25%). (10)In my study we got 49(70%) of male child out of 70 patients and 21(30%) of female child. Comparison of proportion test revealed statistically significant p-value =0.049.This is probably due to male childs have more tendency of outdoor game than girl child.(11,12) Gopal Shankar Sahni in his study showed similar pattern of sex distribution as among 85 snake bite patients, 55 (64.70%) were male and 30 (35.29%) were female, ratio being 2:1.(13). In my study we got out of 70 total snakebite patient 64(91.4%) patients are come from rural in compare 6(8.6%) patients come from urban population . As because my study is a rural based study.It is due to habitat of snakes in rural areas due to presence of jungles and crop fields.(14)In this study we got out of 70 total snakebite patient 70% patients are from tribal community in compare to 30% are from non tribalcommunity.This is because BankuraSammilani Medical College & Hospital is a rural medical college and the coverage area of this college is mostly belongs to tribal community,more over the tribals are more involved in outdoor games,collecting sticks for fuel,grazingcattles in the field,harvesting crops in field & pond bathing. We classified the admitted snakebite patient according to modified KuppuSwamy Scale which showed maximum patients belonged to upper lower class,as they are mostly reside in rural areas and most of them are invoved in small field work like grass cutting,fishing,cattle-feeding,sleeping without mosquito net and bare footed walking(15,16,17), cattle grazing and firewood collection etc. Rathore S et al showed that incidence of poisoning in children was more in lower income group in compare to higher income group (83). My study is corroborating with this study. When we distributed the no of snakebite cases according to monthwise it shows more prevalent in monsoon & post monsoon season(may,june,july,august& September).(18). There is no snake bite during winter and autumn as snake are cold blooded so they are less available during this season due to hibernation as they are cold blooded animal so they are not available during winter season and during monsoon due to flood the snake are loss their resting place and they easily enter into house and bite the people most probably. In this study most of the patient admitted within 230 mint of bite approximately 65.7%,230-460 mint 15.7%,460-690 mint 12.9%,>690 mint 5.7%.This did not clarify any significance of delay because some patient comes from distant remote area getting primary treatment from gov. P.H.C or B.P.H.C,but till now some of the

patients first going to so called Ojhas , Tantriks&mandirs etc. In this study most of the bites are due to non poisonous snake bite 44 in no,neurotoxic bite 14 in no & lastly hematotoxic bites 12 in no. Whereas Khadgawat R et al showed that out of 20 cases of snake bite patient 15 patient were non poisonous and 5 cases were poisonous and 3 patients were heamatotoxic and 2 patients were neurotoxic (19). So this study is not corroborating with my study. In our study we got no of bite according to site of bite as follows –lower limb 50,upper limb 14,other sites 6.The maximum no is lower limb probably due to easy access of the reptiles during the bite attack.This happened due to most of the rural children walk bare footed,walk in the night without torch. Gopal Shankar Sahni et al showed in their study that bites occurred on a lower limb in 42 (49.41%) cases and an upper limb in 6 (7.05%) cases. Less common sites were the trunk in 1 (1.17%) and other parts such as the neck or buttock in 1 (1.17%) cases.(78,85,96). Children are very curious and have the habit to explore various holes and crevices which may be the hiding places of snakes. This explains the 12% bite marks on the upper limbs.(20,21,22,23). The common krait is a nocturnally active, terrestrial snake which lives close to human dwellings; it creeps into houses over the ground or through the roof and exhibits arboreal tendencies (24,25). Similar to our studies, it has also been observed by others that the bites occur at night while the victims are asleep (26). While asleep, humans may be bitten either due to accidental handling or rolling over the snake, or exposed parts of the human body might be misidentified as prey. In our study among the total the total 70 admitted snakebite patients- 66(94.3%) survived and 6(5.7%)patient not survived. Neurotoxic bites, “without tissue damage,” occur more frequently at night, and this frequency matches the habits of the common Krait that usually hunts between midnight and 6 am. Conversely, the neurotoxic bites with tissue damage, consistent with cobra bites, are more likely to occur in the daytime.Case fatality rate calculated 8.57% in our study. The prognosis for snake bites depends on factors besides hospital treatment: Whether first aid is given immediately after the bite, early initiation of appropriate treatment, and the type of venom.Among the admitted only 2 patient required mechanical ventilation. Whereas Basu M et al showed that 3 cases of snake bite need mechanical ventilation out of 59 cases in children (24). And Tarvadi PV et al showed that out of 34 patient of venomous bite no needs of mechanical ventilation (25). And Rathore S et al showed that out of 31 cases 2 patients was required mechanical ventilation (26). So my study is not corroborating with these three study in respect to mechanical ventilation requirement in snake bite case probably due to these studies were urban based study.

IV. Summary

Snake bite is thus an important and serious medical problem in many parts of West Bengal, mainly the rural areas of Bankura where this study was conducted. A significant number of venomous bites occurred indoors while sleeping; therefore, sleeping on beds with well tucked in mosquito nets may help prevent snakebites and walking with shoes covering the foot & with light in hand so that no accidental stampede while walking or playing in the dark. Early diagnosis with a high index of suspicion (Krait bite) with no bite mark at all, early treatment with polyvalent AVS and other supportive care and close monitoring of children for the development of complications and its prompt management can reduce the mortality. This study reveals that the occurrence of snake bite is more in rural population belongs to lower socioeconomic status & tribal community than urban children as due the habitat of snakes are more in the rural area where they can complete their life cycle and last but not the least the typical life style of rural people leads them more vulnerable for bite. Most of the bites occurred in the lower limb but some of the cases involve the upper limb also due to curious behaviour of the children like digging whole, putting hand in the whole in a playful mood. Male children are more affected than female as because male children are more involved in outdoor activity. Most of the patient admitted within approximate 4 hours as the coverage area of our Medical College is large enough & mostly rural area with poor communication and transportation. Some of the patients were till taken to mandir or ojha or tantric due their false belief causing delay in admission and treatment. This study shows that maximum cases of snakebites occurred in the monsoon & post monsoon seasons, probably due to flooding the snakes came out of the whole and took shelter at house or nearby to the human being. In this study two patients of neurotoxic snakebite required mechanical ventilation for respiratory support. So after discussing all the pros & cons of our study ,we can say that still in this era of modernisation snakebite in children has remained one of the major cause of mortality & morbidity. So we have to increase mass awareness by IEC materials so that victims can reach the hospital as early as possible instead of seeking the help of ojha& tantric. We can also prevent the bite by taking care of the children, teaching them what to do & what not to do.

Authors' Contribution:

Dey S¹ conceived the idea and actually conducted the study. He collected the data and finally drafted the manuscript. Das PS² helped in every step of the study including data analysis & manuscript review and maintained co ordination with other departments whenever necessary. Both the authors were attached to BSMC&H during the study period.

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