

CLINICO-EPIDEMIOLOGICAL PROFILE AND OUTCOME OF POISONOUS SNAKE BITES IN CHILDREN USING THE WHO TREATMENT PROTOCOL IN WESTERN NEPAL

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Abstract

Background: Snake bite among children is an important public health problem in many tropical and subtropical countries. Limited studies are found on snake-bite in Nepal using the WHO snake-bite management guidelines. This study assessed the clinico-epidemiological profile and their outcome in snake-bite among children using the WHO Guidelines for treatment of snake bite.

Methods: This is a descriptive study among 75 children less than 14 years of age admitted in Emergency Room (ER) of Lumbini Zonal Hospital from 2011-2012 with the history of poisonous snake bite.

Results: More than half (56%) of the cases were males and 3/5th (58%) were above 10 years of age. About 40% of the patients were brought to ER within 6-12 hrs of snake bite. Common site of snake-bite was lower limbs (32%) followed by upper limbs (29%). Abdominal Pain (44%) was observed as most common sign/symptom of snake-bite poisoning after local pain followed by ptosis (17.3%). The case fatality rate (CFR) was 16.0%.

Conclusion: Use of WHO treatment guideline for snakebite case management among children showed low CFR. However further studies need to be done to compare the treatment outcomes between WHO guideline and the National Guidelines among snakebite cases among children.

Key words: *Case fatality rate, Envenomation, snake bite Nepal*

Introduction:

The incidence of snakebite is high in warmer regions where snakes are found abundantly and agriculture is the main economic source.² In the South East Asia Region, snakebite is a common medical emergency and an important cause of hospital admissions. There are 200 poisonous species of snakes from the known 3000 species of snakes around the world.

All the snakebite cases do not reach the health facility, comprising of non poisonous snake bites, less severe cases, and the cases that have died in the field. There are reported cases of seeking treatment from traditional healers. Thus data available so far cannot give

precise data on the snakebite incidence. There is an estimate of more than 5 million snakebites associated with more than 100 thousand deaths due to snakebites each year. South East Asia and Sub Saharan Africa report highest burden of snakebite in the world. Estimated 4 million snakebites are reported from Asia alone.

While Cobra and Krait are the commonest poisonous snakes in the terai region of Nepal, there are 22 species of snakes that are known to be poisonous. Annual morbidity due to snake bite is 162/100,000 people in Nepal. There are 1000 deaths in hospital every year from an estimated 20,000 snake bites that

occur each year in Nepal.⁶ Before the introduction of the National protocol for the management of snakebite in 2003, the case fatality of poisonous snakebite was as high as 58% in Nepal. The management of snakebite before the protocol was released varied from center to center.⁸ The case fatality rate (CFR) among the snakebite in children was reported as 25% even after the introduction of the national protocol for treatment of snakebite in Nepal.

After the implementation of the National Protocol in 2007 in India has resulted in lowering the morbidity due to snakebite and expenditure related to snakebite treatment.^{17,18}

The WHO guideline on treatment of snakebite for the South East Asia has been released for use for use by countries for the management of snakebite in the region.¹⁹ Studies reporting on the use of WHO guidelines for snakebite among children was not found in context of Nepal. Hence this study was conducted to assess the socio-epidemiological profile and evaluate the outcome of snake bite poisoning with the use of WHO 2010 guidelines in Western Nepal.

Materials and Methods

A Cross sectional study was conducted among the under 14 years children presenting in the emergency department of Lumbini Zonal Hospital, a tertiary referral hospital in western Nepal. Total snake bite cases recorded at Lumbini Zonal Hospital during the study period were 2318, out of which 297 developed signs and symptoms of envenomation. Of which 75 patients belonged to less than 14 years of age which were included in this study. The study was conducted over a period of 1 year from 2011 to 2012. We included children 14 years and below who showed signs of envenomation. Snakebite cases that were brought dead cases and referred cases of snakebite were excluded from the study. Informed consent was taken prior to the study after explaining the

objective of the study to the patient's guardian. Patients were treated by the clinicians and the paramedics using WHO snake envenomation management guidelines. Anti-snake venom manufactured by Haff kine Pharmaceutical Company, Bombay which was distributed by Ministry of Health and Population, Epidemiology and Disease Control Division for government health centers were used for the treatment of the snakebite cases. The permission was taken from the Medical Superintendent of the Hospital to conduct the study. The data were entered in Microsoft Excel 2007 and analyzed using SPSS 17.0 version.

The diagnosis of snake-bite was established on the basis of a history, clinical examination of the patient, observation of the killed snake if available or recognition of the snakes by patient / observers. Snake bite cases admitted in the observation ward were monitored for eight hours to rule out the signs of envenomation. Those who developed signs of envenomation with evidence of neurotoxicity like ptosis, external ophthalmoplegia, respiratory paralysis and other signs of hemotoxic poisoning—were managed with ASV according to the WHO guidelines 2010. As per the guidelines, 10 vials of polyvalent anti-snake venom (ASV) serum were administered by intravenous infusion over an hour to patients with signs of envenomation. Among those with no improvement in ptosis, another 10 vials of ASV repeated over another two hours and then decreased to 2 vials infused slowly with reference to body mass. Similarly, intravenous fluids and antibiotics were also given to children on the basis of body weight.

Results

More than half (56.0%) of the children were male. About 58.8% were from the age group 10-14 years. Among the patients, it was observed that most of the patients (89.3%) belonged to low socioeconomic background

with poor housing and surrounding making them vulnerable to snake bite.

Table 1: Characteristics of patients with poisonous snake bite (n=75)

Characteristics	Categories	Number (n)	Percentage (%)
Gender	Male	42	56
	Female	33	44
Age group (years)	< 10	31	41.33
	≥ 10	44	58.67
Socio-economic status	Low	67	89.3
	High	8	10.7

More than half (58.6%) of the snakes responsible for bites in our study were unknown followed by Krait (27%) and Cobra (15%) as seen in fig 2. Above mentioned known bites, were presented to ER with the dead snake or as according to the observers. It was found that more than 1/3rd of the patients were brought to hospital within 6-12 hours of snake bite while 20% of cases were brought to ER within 6 hrs of snakebite.

It was seen that lower limbs (32%) and upper limbs (29.33%) were commonest site for snake bite among the patients.

Table 2: Distribution of patients according to type of snake bite, bite site, time to reach hospital after bite

Characteristics	Categories	Number (n)	Percentage (%)
Type of snake bite	Krait	20	26.67
	Cobra	11	14.67
	Unknown	44	58.67
Bite sites	Lower limbs	24	32
	Upper limbs	22	29.33
	Head	5	6.67
	Body	4	5.33
	Others	20	26.67
Time gap between bite	1-6	15	20
	6-12	30	40

and arrival (hours)	12-18	13	17.33
	>18	17	22.67

As shown in Table 3, following snake bite, pain abdomen (44%) was the most common clinical presentation after the local pain followed by vomiting (27%) and ptosis (22.67%). Only one patient was found unconscious. The number of ASV used ranged from 10-38 vials with average of 24.37 vials.

Table 3: Distribution of Sign / Symptom of envenomated patients in ER (n=75)

Characteristics	Frequency*	%
Local pain	75	100
Pain abdomen	40	53.3
Ptosis	17	22.7
Vomiting	20	26.7
Difficulty in breathing	15	20.0
Salivation	10	13.3
Throat pain	7	9.3
Swallowing difficulty	6	8.0
Slurring speech	3	4.0
Unconsciousness	1	1.4

*Multiple responses

Of which 75 snakebite cases in the study, there were 12 deaths among the children during treatment resulting in a case fatality rate (CFR) of 16%.

Discussion:

Snakebite among the children in our study occurred more among the above 10 years of age. This finding is similar to other studies.^{12, 19} Children above 10 years engage in outdoor activities more compared to the younger children.²² Findings from retrospective study in Western Nepal are in line with our study findings, where male children were more affected by snakebite.²² This finding is seen in other previous studies as well.^{12, 13, 19-21} This observation could be due to male children playing and working outside with sleeveless shirts more frequently than their female counterparts.

In this study, the highest incidence of snakebite poisoning was seen during the months of June, July and August which corresponds to the monsoon season in Nepal. This is also a hot season and the snakes come out of their shelter due to increased humidity and temperature. This seasonal pattern of poisoning was seen in other studies as well.^{9,14,15,21}

The study found that the most common site for snake bite were upper limbs and lower limbs. This finding is comparable to previous studies.^{9,10,12,18,20,21} This may be because the children have accidentally stepped over the snake while walking and playing and also the curious young children, while playing, put their fingers and hands into the blind holes or pits where the older children may come across the snakes when they are cutting the grass. Abdominal pain followed by ptosis as a common sign was also reported by a previous study.¹²

Ptosis is easily noticeable by the health workers as well as the family members. A fifth of the children developed respiratory distress in our study which is similar to a previous study.²² Early administration of anti snake venom is very important in management of cases with poisonous snake bite to reduce the development of respiratory distress.

The average number of vials of ASV used during treatment was 24.37 vials per case. Studies in Nepal have reported 19.6 vials per case²⁰, 14.4 vials per case¹² and 18.2 vials per case.²² These differences in numbers of vials of anti snake venom vials could not be further investigated at the moment. Case fatality rate (CFR) was high (16%) in this study. This finding is in agreement with earlier studies^{12,14,15}. The total case fatality rate in different studies before the introduction of WHO protocol ranged from 3 to 58%. The CFR in our study can be explained as children are at a greater risk of severe envenomation due to their smaller body size and volume for

venom distribution, and outdoor playing behaviors.³ Secondly, in this study, only the poisonous snakebite cases have been included. Anti snake venom is more effective when delivered within 4 hours of the bite.³ More than 3/4th of the children in our study were brought for treatment after 6 hours of the snakebite.

With use of WHO guidelines, the CFR in our study was 16.0%, which is lower than the CFR of 28.2% in a study among 301 snakebite cases using the national snakebite treatment protocol.

The use of WHO guidelines for the management of snake bite resulted in a lower CFR among the snake bite cases in children. There however is need for further studies using the WHO guidelines among the children to generate evidence on the applicability of WHO guideline for snakebite management among children in the Nepalese context.

Conflict of Interest: None

Funding: None

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