

An Epidemiological Study of Snake Bite Cases in Children of Nepal

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Abstract

Introduction: Snakebite is common in the Terai region of Nepal. Injury and mortality of humans due to Snake envenomation is a serious public health problem in Southeast Asia and Nepal. It has been thought that at least 50,000 people in the region die of snake bites (this includes India, Bangladesh and Nepal and Pakistan) per year. There are abundant venomous snakes present in the region. Studies in Nepal have identified 4 species of snake responsible for the majority of fatal bites. These are the Indian cobra (*Naja naja*), common krait (*Bungaris caeruleus*) Russell's viper (*Viper ressellii*) and greenpit viper. The incidence of snakebite varies from 300-500 bites per 100,000 human populations in forested regions to 50-100 bites per 100,000 in Sahara. **Objective:** To study the epidemiology of snakebite in the endemic regions of the terai, to analyse the morbidity and mortality data of snakebite cases in children for the year 2008. **Method:** National Zoonoses and Food Hygiene Research Centre (NZFHRC) started collection of secondary and primary information on snakebite cases in children recorded and reported by different media and hospitals, health post in Nepal during the year 2008. The data had been compiled, tabulated and analysed. This is the regular surveillance study carried out on snakes in general and venomous snakebite human cases recorded in Nepal. The team visited in 6 mid, hill districts and 24 terai districts of Nepal. **Results:** Total snakebite cases in children were 540 during the year 2008. Of which 10 cases were from six mid hill districts and 530 were from 24 terai and inner terai districts of Nepal. Total morbidity was 406 (75.19%) and mortality 134 (24.81%). Seasonal incidence of snakebite cases recorded in Bheri zonal hospital and medical college Banke district. Highest morbidity were recorded during the month of Jestha (May) to Aswin (August). Morbidity 12 (25%) and mortality 3 (20%) were recorded in the month of May/June 2008. **Conclusions:** Snakebite cases in children and deaths were recorded and reported along with adult cases of snakebite. Total adult cases were 2190 of which children were 540 (24.66%) during the year 2008. This means that about 25% of all cases of snakebites were seen in children every year in the endemic areas of snakes. Mass awareness school education programme about snakebite especially in endemic area of terai and inner districts should be advocated regularly so that parents along with children will take necessary precautions.

Key words: Snakebite, Epidemiological surveillance, Anti-snake venom, Poisonous and envenomation.

Introduction

For the first time in the history of Nepal a baseline epidemiological study on snakebite treatment and management was conducted in 12 districts (Terai) of Nepal by the Zoonotic Disease Control Section of the Department of Health Services during the year 1984/85. People aged 10 to 40 years and particularly of male

sex were more affected with a mortality rate of 5.6% annually¹.

In collaboration with WHO a baseline epidemiology study was conducted from 1980 to 1985 in fifteen district hospitals and 3189 snakebite cases were treated of

which 144 died with Case Fatality Rate (CFR) of 4.5.² Snakebite cases are observed mostly during summer and rainy seasons and males with ages ranging from 11 years to 50 years are mostly affected. This was studied in Nepal from east to west terai region of which most poisonous cases were recorded during the period from April to September. About 60% cases are bitten by venomous snake. The mortality is 27%. However the maximum recorded snakebite cases are in June, July and August and that is the time when maximum agricultural field activities are being carried out. This has also been found also in India and other South East Asia countries. In Nepal polyvalent anti-snake venom serum (ASVS) produced by Halffkine Pharmaceutical Company, Bombay, India has been used in different hospitals^{3,4}.

Different studies⁵ in Nepal suggested that the Indian cobra and common krait are the problem snakes in the Terai region, while Russell's viper and the green pit viper (*Trimeresurus albolabris*) constitute a threat in the hill and mountain forest areas of Nepal.

Fear and dislike of snakes often leads to indiscriminate killing of snakes on sight, even though the great majority of snakes are non-venomous. In addition to the ecological impact of decimating snake populations, there are economic impacts to farmers of such actions. It has been suggested that 20-50% of Nepal's food grain crop is being destroyed by rodents.

Nationwide case fatality rate of snakebite was studied⁶. The average Case Fatality Rate (CFR) is 8% and total cases bitten were 1917 and death 151. CFR is also calculated for hospital wise during different hospitals are not recorded and not available properly.

Objective: To study the epidemiology of snakebite in the endemic regions of the terai and to analyse the morbidity and mortality data of snakebite cases in children for the year 2008.

Materials and Methods

National Zoonoses and Food Hygiene Research Centre (NZFHRC) started collection of secondary and primary information on snakebite cases in children recorded and reported by different media and hospitals, health post in Nepal during the year 2008. The data had been compiled, tabulated and analysed. This is the regular surveillance study carried out on snakes in general and venomous snakebite human cases recorded in Nepal. The team visited six mid, hill districts and 24 terai districts of Nepal.

The following methodology was applied during the survey by the study team:

1. Collection of information on environment and snakes.
2. Collection and identification of snakes.
3. Epidemiological aspects of human snakebite.
4. Collection of morbidity and mortality record of human snakebite cases.
5. Observation of symptoms of snakebite cases.
6. Observation of snakebite case management and treatment.
7. Data compilation, tabulation and analysis.
8. Finally report writing.

Results

Snake bite cases in children, recorded in mid-hill district of Nepal during the year 2008

Snake Bite cases recorded in mid-hill district of Nepal during the Year 2008 from the media publication and NZFHRC survey team is presented in Table 1 and Figure 1. The total children (1-15 year) snakebite cases were 10 of which mortality 7 (70%) and morbidity 3 (30%). The most affected districts were Palpa, Syangja, Lamjung, Dailekha and Taplejung respectively during the year 2008.

Month wise total snake bite cases in children reported and recorded in Bheri zonal and medical college teaching hospital in Banke by Media publication and NZFHRC survey team in five Development Regions of Nepal for the Year 2008 is presented in Table 2 and Fig. 2. Most children bitten by snakes through out the year were in the month of Baisakha (n=5), Jestha (n=12), Ashad (n=11), Srawan (n=8) and Bhadra (n=6).

Snakebite cases in children and deaths reported and recorded in Terai and Inner Terai districts of Nepal during the year 2008 is presented in Table 3 and Fig 3. The total snakebite cases in children were 530 of which most of the affected districts are Rupandehi (n=82), Banke (n=62), Saptari (62), Morang (n=43), Nawalparasi (n=32) and Sindhuli (n=26).

Jestha to Bhadra months were the main season for snakebite cases, although snakes could be seen in all 12 months of the year. There are 3575 types of species and sub-species of poisonous and non-poisonous snakes found in the world, of which 77 types of species of poisonous and semi poisonous snakes are found in Nepal out of which about 21 types of species are

poisonous and semi poisonous snakes are present in all terai districts of Nepal. There is always a threat of snakes in terai districts during summer and rainy seasons of the year. Generally cobra (Goman), King Cobra (Rajgoman), Krait, Munga, Russel-viper, pit viper (green pit viper and

brown colour pit viper and yellowish green pit viper) are in the list of poisonous snakes in Nepal. About 100-150 people die due to snakebite annually reported here in Nepal. In India and Sri Lanka 3000 and 1000 people die annually respectively.

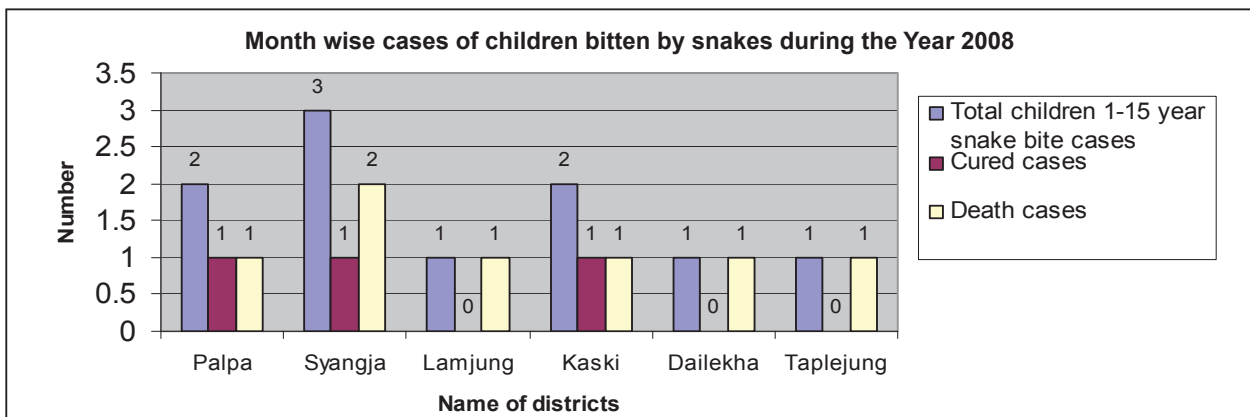


Fig 1: Cases of snakebite in children and deaths reported and recorded in mid hill districts of Nepal during the year 2008.

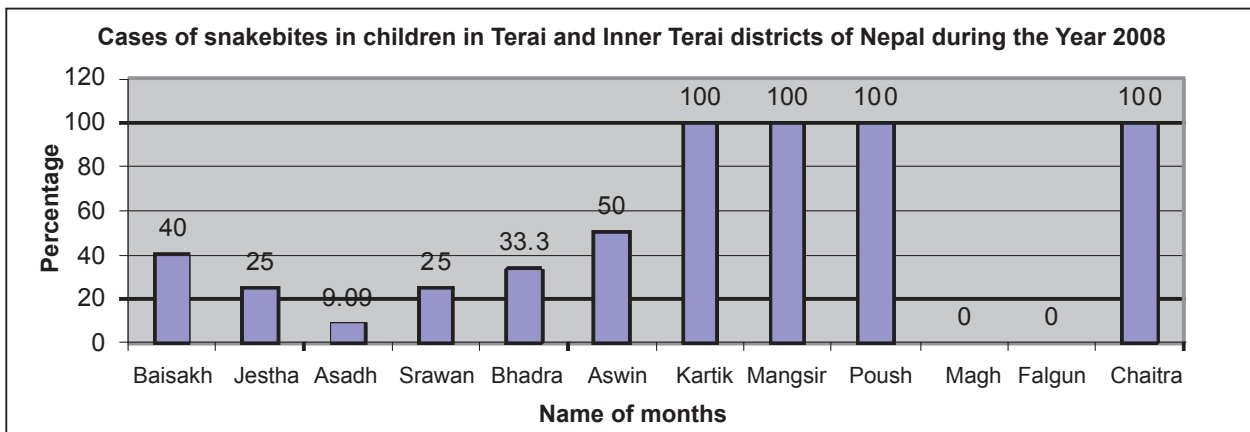


Fig 2: Month wise total children bitten by snakes reported and recorded in Bheri Zonal and Medical College Teaching Hospital in Banke District in 2008

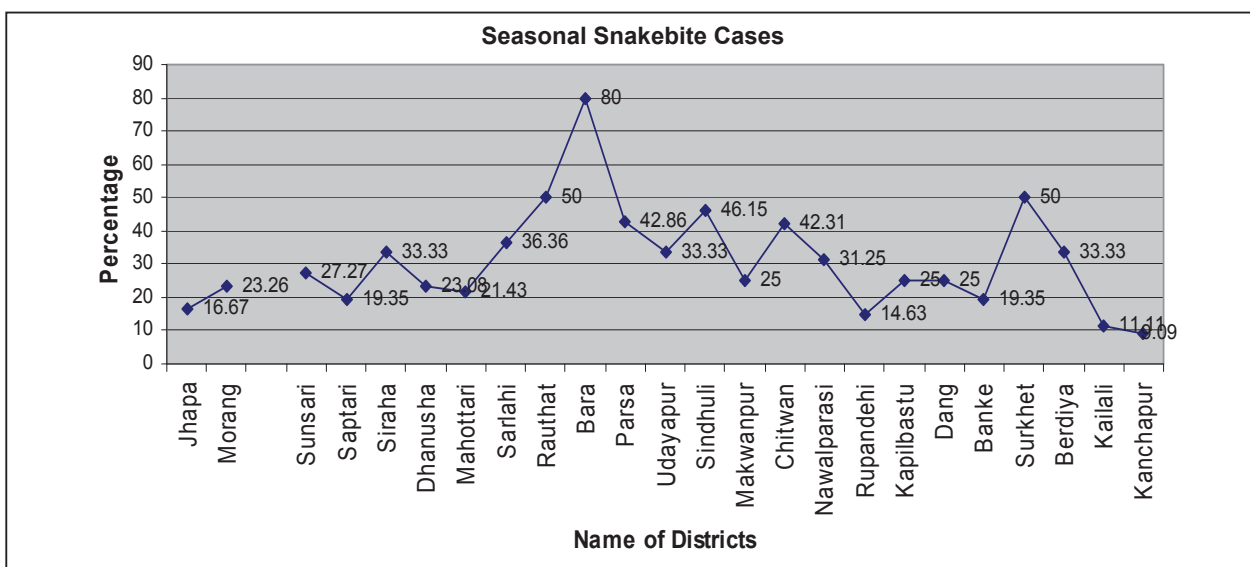


Fig 3: Snakebite cases in children and deaths reported and recorded in Terai and Inner Terai districts of Nepal during the year 2008

Table 1: Showing snakebite cases in children and deaths reported and recorded in mid hill districts of Nepal during the year 2008

S.N.	District	Total Adult and children	Total children 1-15 years age group	Cured	Death	Percentage
1.	Palpa	52	2	1	1	50.0
2.	Syangja	25	3	1	2	66.67
3.	Lamjung	11	1	0	1	100.0
4.	Kaski	10	2	1	1	50.0
5.	Dailekha	6	1	0	1	100.0
6.	Taplejung	1	1	0	1	100.0
Total		105	10	3	7	70.0

Table 2: Month wise total children bitten by snakes reported and recorded in Bheri Zonal and Medical College Teaching Hospital in Banke District in 2008

S.N.	Months	Total Adult and Children	Total Children 1-15 years age group	Cured	Death	Percentage
1.	Baisakh	14	5	3	2	40.0
2.	Jestha	36	12	9	3	25.0
3.	Asadh	54	11	10	1	9.09
4.	Srawan	29	8	6	2	25.0
5.	Bhadra	12	6	4	2	33.3
6.	Aswin	13	2	1	1	50.0
7.	Kartik	5	1	0	1	100.0
8.	Mangsir	1	1	0	1	100.0
9.	Pous	1	1	0	1	100.0
10.	Magh	0	0	0	0	0.0
11.	Falgun	0	0	0	0	0.0
12.	Chaitra	2	1	0	1	100.0
Total		167	48	33	15	31.25

Table 3: Snakebite cases in children and deaths reported and recorded in Terai and Inner Terai districts of Nepal during the year 2008

S.N.	District	Total Adult and children	Total children 1-15 years age group	Cured	Death	Percentage
1.	Jhapa	82	12	10	2	16.67
2.	Morang	163	43	33	10	23.26
3.	Sunsari	24	11	8	3	27.27
4.	Saptari	204	62	50	12	19.35
5.	Siraha	52	18	12	6	33.33
6.	Dhanusha	36	13	10	3	23.08
7.	Mahottari	44	14	11	3	21.43
8.	Sarlahi	82	11	7	4	36.36
9.	Rauthat	14	4	2	2	50.0
10.	Bara	36	5	1	4	80.0
11.	Parsa	66	7	4	3	42.86
12.	Udayapur	17	6	4	2	33.33
13.	Sindhuli	130	26	14	12	46.15
14.	Makwanpur	18	4	3	1	25.0
15.	Chitwan	111	41	30	11	42.31
16.	Nawalparasi	158	32	22	10	31.25
17.	Rupandehi	186	82	70	12	14.63

18.	Kapilbastu	102	16	12	4	25.0
19.	Dang	24	4	3	1	25.0
20.	Banke	167	62	50	12	19.35
21.	Surkhet	32	2	1	1	50.0
22.	Berdiya	70	15	10	5	33.33
23.	Kailali	136	18	16	2	11.11
24.	Kanchanpur	86	22	20	2	9.09
Total		2040	530	403	127	23.96

Discussion

Snakebite is a medical and public health problem in Nepal⁷. There are approximately over twenty thousand people bitten by snakes each year leading to death in less than 200 cases⁸. The reported number of snakebite cases are usually under estimated. Over 70% of victims of snakebites need only careful observations and symptomatic treatment and not requiring antivenom treatment. During the survey of snakebite cases in Terai area of Nepal, it has been observed that there are too many non-venomous snakebite patients visiting hospitals⁹. As an example, in Bharatpur hospital, the number of patients who visit emergency ward is eight times of that treated as venomous snakebite cases¹⁰. Because the medical doctors in the hospital knew about snakebite cases, the patients visiting hospitals were placed under observation. If systemic symptoms occurred, treatment for envenomation, including anti-venom therapy started¹¹. When no symptoms occurred several hours after arrival, the patients returned to their home without treatment^{12,13}. Similarly, many non-venomous snakebite patients visit hospitals or traditional healers. When people find snakes, they tend to kill the snakes only due to fear^{14,15,16}.

There are numbers of paper written on snakebite by different authors who have suggested different guidelines for the treatment and snakebite management of the patients^{17,18}.

Guideline for the management of snakebite for physicians in Nepal was prepared by NZFHRC which ables to answer and manage the following questions: 1) Is it a poisonous snake? 2) Are there any signs of systemic envenoming? 3) Which is the choice of antivenom and dosage? Finally, 4) How to treat the bitten wound and its complications? All these questions have to be answered and the patients properly treated.

Conclusion

Snakebite cases in children and deaths were recorded and reported along with adult cases of snakebite. Total adult cases were 2190 of which children

were 540 (24.66%) during the year 2008. This meant that about 25% of the total snake bite cases constituted children in the endemic regions of snakes. Mass awareness and school education programme about snakes and snakebite, especially in endemic area of terai and inner districts should be advocated regularly so that parents along with children can take necessary precautions.

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