AN EPIDEMIOLOGICAL STUDY OF SNAKE BITES IN AN AREA IN THE FOOTHILLS OF THE NORTH WESTERN HIMALAYAS

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ABSTRACT

Cases of snake bite amongst troops, families, and defence civilians admitted to a service hospital were consistently high from 1985-1988 (rate 1.24-1.56 per 1000). Study of the cases revealed simple measures could have prevented a large number of casualties which in fact became true in 1989 (rate 0.43 per 1000) when strict enforcement of preventive measures was practised.

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KEY WORDS : Snake bites; Primary prevention.

INTRODUCTION

The incidence of snakebites and envenomation in the Armed Forces has not been high except when troops are stationed in infested area [1]. For a soldier snake bite is an occupational hazard but it can be avoided. To the treating physician, a case of snake bite poses a therapeutic dilemma, whether to give anti-snake venom at all, if yes, then how much to inject and when [2]. To an epidemiologist, it can be a topic of an interesting study. The study can be more fruitful if results are carefully interpreted, risk factors identified, troops adequately educated and commanders motivated to issue and enforce appropriate preventive measures.

This study has sought to look into some of the aspects of unusually high number of snake bite cases among defence personnel and their families in the North-Western sector in the foot hills of the Himalayas by the saw scaled viper, *Echis carinatus*, commonly known as "Phoorsa". Efforts were made to incorporate simple preventive measures against the locally prevalent risk factors.

Materials and Methods

All cases of snake bites (troops, families,

and defence civilians) admitted in 1988 to the service hospital of a particular formation were taken up for study. The patients were interviewed by a Medical Officer on the circumstances of bite to identify the risk factors. After identification of risk factors, preventive measures were instituted and the hospital admission for 1989 were recorded for comparison. Records of the same hospital were scanned for the monthly admission during the previous 3 years (ie 1985-1987). This retrospective data was used to observe the time distribution of the cases and not used for drawing out the risk factors.

The following criteria were used to identify the saw-scaled viper :

- a. Small scales on the head similar to those on the belly.
- b. Broad plates extending right across the belly.
- c. Back marked with black blotches of inverted V shape.
- d. 'Pit' or conspicuous opening between the eye and nostril, not present.
- e. Small size, about 20-45 cm in length.

Results

Time distribution : The monthwise

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TABLE 1
Time distribution of cases

Year	Months												Total	Case rate per 1000
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
1985	—	—	2	2	1	5	3	5	6	3	2	—	29	1.56
1986	—	—	2	4	1	4	6	7	3	1	—	—	28	1.51
1987	—	—	2	3	3	4	3	5	2	1	—	—	23	1.24
1988	—	—	2	1	3	3	3	5	4	4	1	—	26	1.40
1989	—	—	—	—	—	2	4	1	1	—	—	—	8	0.43

distribution of cases is shown in Table 1. Retrospective records (1985-87) revealed that case rate was 1.24/1000 - 1.56/1000. Maximum cases were reported during summers and monsoons. After initiation of simple preventive measures the case rate declined to 0.43/1000 in 1989.

Results of interview : Since the interviews were conducted only in the year 1988, results pertain to this year.

Time of bite : The time of snake bite was ascertained (Table 2). Since over half of the cases occurred at night, the patients were also asked whether they possessed a torch at the time of bite. It was found that only one of the 14 patients carried a torch.

TABLE 2
Incidence of snake bites according to time of bite in 1988

Time of bite	No of cases	Percentage
Day	5	19.2
Night	14	53.8
Dawn	3	11.6
Dusk	4	15.4
Total	26	100.0

$X^2 = 15.5$ $p < 0.01$

Site of bite : On examination of the patients, the site of snake bite was ascertained. Over 80% of the cases were bitten by the snake on their lower limbs. The results are shown in Table 3.

Activity being performed at time of bite : The victims of snake bites were interviewed

regarding the specific activity they were performed at the time of bite. Maximum bites (80.8%) were in person either going to or coming back from toilets located outside their barracks. The results are shown in Table 4.

TABLE 3
Incidence of snake bites according to site of bite (1988)

Site	No of cases	Percentage
Lower limb	21	80.8
Upper limb	5	19.2
Trunk/Abdomen/ Head/Neck	Nil	—
Total	26	100

TABLE 4
Incidence of snake bites according to activity performed at time of bite (1988)

Activity	No of cases	Percentage
Going/coming from toilet	21	80.8
Cutting grass	2	7.7
Wearing shoes in dark	1	3.8
Bathing outdoors	1	3.8
Putting hand in bonnet of service vehicle	1	3.8
Total	26	100

Type of snake : Vipers were implicated in overwhelming number (80.8%) of cases. The results are shown in Table 5.

Discussion

With the army living in built-up camps, the incidence of snake bite has ceased to be of

TABLE 5
Incidence of snake bites according to the type of snake (1988)

Type of snake	No. of cases	Percentage
Viper	21	80.8
Cobra	2	7.7
Unidentified	3	11.5
Total	26	100

$X^2 = 40.2$ $p < 0.001$ (Highly significant)

much importance as can be seen by the small number of articles of snake bite in the MJAFI and by the lack of reports/returns required by the administrative authorities on the subject. However, troops located in snake infested areas are still at risk as is seen in the present study.

The present study revealed that the commonest poisonous snake encountered was the saw-scaled viper, which is small in size but strikes with lightning speed without any provocation [3]. It is gregarious in nature and is well camouflaged with its surrounding. It abounds in western India more than in any other part of our country. Maximum number of cases were reported from the general area of a village called Palanwala. The name of the village is derived from the Palan trees which abounds there. The sweet fruits of these trees attract numerous birds which also lay their eggs in the hollows of the branches of the palan trees and the vipers in turn take their share.

Keeping in view the aim of the study, certain risk factors were identified which contributed to the high incidence. These were - persons moving at night in chappals, not making use of a torch, and victims putting their hands in dark places outside their visual

range. Having identified the above risk factors, two pronged strategy was evolved in the subsequent year for minimising the incidence of snake bite. Health education of the population and motivation of the formation commander to enforce simple preventive measures through unit/subunit commanders was undertaken. Details are outlined as under :

- a. Boots to be worn by all ranks while leaving barracks.
- b. Boots be checked with a stick for presence of a snake.
- c. Torch and stick to be carried during hours of darkness.
- d. Limbs not be put in places outside visual field till such places are checked with a stick for presence of reptiles.
- e. Camp sanitation to be maintained.
- f. Trenches of 80 cm width and 60 cm depth with absolutely vertical sides to be dug around tents/huts.
- g. Above measures to be checked by Duty officers/JCOs of units.
- h. Army orders on "First-Aid for snake bites" to be explained by RMOs to all ranks.

The above measures proved quite fruitful. The case rate due to snake bite declined dramatically from 1.4/1000 in 1988 to 0.43/1000 in 1989.

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