



An Epidemiological study on Snakebite in Karwar

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Abstract:

According to the World Health Organization, snakebites cause more death and disability and are more notorious than some tropical diseases. Snakebite is a leading medical emergency in Asia/Pacific. It is one of the major causes of mortality in India. The objective of the study was to gather epidemiological information on snakebite that will help to guide/design a snakebite prevention and treatment intervention in Karwar. A retrospective study was conducted, in which we have collected data of snakebite cases admitted to the district hospital from October 2010 to October 2014. Epidemiological and demographic profiles of three hundred victims were noted. Data was analyzed by using descriptive statistics. Three hundred snakebite cases were admitted to district hospital, Karwar over the period of four years. Incidence was highest in post monsoon (n=97). Victims affected were mainly in third decade. Male preponderance was clearly seen. Farmers or people involved in farming related activities accounted for more than half of the victims (n=196). Eighty seven percent (87%) (n=261) occurred on the lower limb. Snake bite is an important neglected health problem in Karwar and surrounding rural areas. Using this study as a guiding tool, awareness and education programs on prevention of snakebite can be planned. It is important to educate people regarding first aid treatment, dos and don'ts in case of snakebite. Medical personnel should be trained; facility should be improved in Karwar district hospital so as to manage even complicated cases.

Key words: Snake bite, Epidemiology, Karwar

Introduction:

Snake bite is one of the most neglected public health issues in poor rural communities living in the tropics. Because of serious misreporting, the true worldwide burden of snake bite is not known. South Asia is the world's most heavily affected region^{1,2}, due to its high population density, widespread agricultural activities, numerous venomous snake species and lack of functional snake bite control programs. India has the highest number of deaths due to snake bites in the world with 35,000–50,000 people dying per year according to World Health Organization (WHO) estimates.^{1,2} Envenoming and deaths resulting from snakebites are a particularly important public health problem in the rural tropics. Populations in these regions experience high morbidity and mortality because of poor access to health services, which are

often suboptimal, and in some instances, a scarcity of antivenom, which is the only specific treatment. A large number of victims survive with permanent physical sequelae due to local tissue necrosis and, no doubt, psychological sequelae. Because most snakebite victims are young³, the economic impact of their disability is considerable. Despite the scale of its effects on population, snakebite has not received the attention it deserves from national and international health authorities, and may therefore be appropriately categorized as a neglected tropical disease.

Snake bite is an important occupational injury affecting farmers, plantation workers, herders, and fishermen. Open-style habitation and the practice of sleeping on the floor also expose people to bites from nocturnal snakes.

The objective of this study was to study the epidemiology of snakebite in Karwar by focusing on socio-demographic profile of snakebites. We found it essential to work on snake bites as only a few studies have been done on this in India to the best of our knowledge. This study is important as it may act as a guiding tool for assessing the magnitude of the problem, planning healthcare resources (particularly antivenom), and training medical staff to treat snakebites.

Materials and methods:

The retrospective research was conducted in the district civil hospital, Karwar Institute of Medical Sciences, Karwar. This place is the district headquarters of Uttara Kannada, Karnataka. It is situated in the foot hills of Western Ghats, known for a variety of snake species.

We have conducted a retrospective study, in which we have collected data about snake bite cases admitted to the district hospital from October 2010 to October 2014. Usually only about 50% of people bitten by snakes were envenomed. The “dry bites” result from mechanically ineffective or perhaps “defensive” bites. Such cases were excluded from the study. Epidemiological and demographic profiles of three hundred victims were noted. Age, sex, educational background, occupation, time of bite, gap between bite and admission, season etc. were recorded.

Data was analyzed by using descriptive statistics.

Results:

Three hundred snake bite cases were admitted to district hospital, Karwar over the period of four years. Incidence was highest in the post monsoon (n=97). But it is not significantly higher than the incidence in monsoon (n= 95). Incidence of snakebite in various seasons is given in **Table I**. The common age group of victims is 30-45 years with mean age

being 32.5 yrs. Pediatric patients affected were in the age group 10-15 years. There is a clear preponderance of males (n=212) (70%) as compared to females (n=88) (30%). Pediatric population is affected in a small proportion (7%). This problem is found to affect people of lower socioeconomic group. Farmers or people involved in farming related activities accounted for more than half of the victims (n=196). Eighty seven percent (87%) (n=261) bites occurred on the lower limb, foot, ankle or legs. Thirteen percent (13%) (n=39) victims had upper limb bites. 78% & 80% of the accidents happened outdoors and during the day respectively. Demographic profile of victims is shown in **Table II**.

The time gap between the bite and the treatment varied greatly. 80% of the victims from the nearby villages managed to reach the hospital within 12 hours and 20% of them went to local healers first and sought the medical facility after 12 hours. This group constituted the victims who manifested with complications. More than 60% victims had used first aid methods. Tourniquets were used by 95% of patients. Local envenoming (swelling, bruising, blistering, and necrosis) was severe in bites by vipers and cobras, and was minimal in krait bites. Victims presented with vomiting, confusion, difficulty in breathing at the time of admission. Blurring of vision, ptosis, ophthalmoplegia, dysarthria, muscular weakness, respiratory weakness were other complaints. Systemic envenoming was presented as shock, bleeding, incoagulable blood, acute renal failure (Russell's viper); paralysis (krait); paralysis with local envenoming (cobra); muscle breakdown and paralysis with renal failure (sea snake).

Table I: Season wise distribution of snakebite cases

| Season | 2010 | 2011 | 2012 | 2013 | 2014 |
|------------------------|------|------|------|------|--------------|
| Summer (March-May) | - | 13 | 24 | 21 | 27 |
| Monsoon (June-Sept) | - | 24 | 23 | 20 | 28 |
| Post monsoon (Oct-Dec) | 23 | 24 | 14 | 26 | 11(only Oct) |
| Winter (Jan-Feb) | - | 28 | 14 | 6 | 5 |

We could not quantify or categorize patients based on clinical features as majority of them were referred to the nearest tertiary care hospitals for further treatment. Data could not be traced as these cases were medico-legal in nature.

Discussion:

Snakebite is a common acute medical emergency faced by rural populations in tropical and subtropical countries with heavy rainfall and humid climate^{4,5}. Since Karwar is situated in the foot hills of Western Ghats, surrounded by thick forest it fulfills all the criteria for high snake bite incidences.

High risk of snakebite is in ambulant population involved in farming and related work. Age group of 30-45 years with a peak incidence of the victims in their third decade has been observed in the earlier studies^{6,7}. A study by Alirol E et al shows male preponderance (2:1 ratio) which supports our results. A few Indian studies have their reports in favour of our study⁸⁻¹⁰ with male dominance in snakebite incidence whereas studies with female preponderance have also been reported in India^{11,12}.

Farmers are busy round the clock in the farm, resulting in high incidence of snake

bite. The majority of snakebite victims are thought to be farmers, with cases peaking in the paddy harvest season from October to December, and the cultivation season from May to July. This justifies high incidence of the cases in monsoon and post monsoon.

Mud houses with grooves in walls and the basement give easy shelter for snakes and rats particularly huts with a loose stone basement. Villagers usually dwell in such places and because of restricted space they avoid to use cot and prefer to sleep on a floor bed make them more prone for krait bite poisoning⁷.

Rural people live in huts, wattle and daub houses or mud houses under unsanitary conditions. Waste material, dry cow-dung, dry fire wood and farm tools are often kept close to their houses. This encourages rats, mice and lizards, which are the prey of snakes.

Table II: Demographic profile of snakebite victims

| | |
|----------------------------|--|
| Gender | Male: 70% (n=212) Female: 30% (n=88) |
| Education | Below Primary : 60% Primary/above : 40 % |
| Occupation | Farmer/ farming related work : n= 196 Others: n=104 |
| Season of snakebite | Summer (March –May) : 85 Monsoon (June – Sept) : 95 Post monsoon (Oct – Dec) : 97 Winter (Jan-Feb): 23 |
| Time of bite | Day : 78% Night : 22% |
| Place | Outdoors : 80% Indoors : 20% |
| Site of bite | Upper limbs : 13% (n=39) Lower limbs : 87% (n=261) |

Moreover because of the heavy rain during monsoon, the holes and burrows occupied by snakes and rats are filled with water. During this period, grass is grown up due to water-logging and mud; it is a routine practice to walk bare foot, blindly in grown grass and crops, causing snakes to be trodden. Thus, in rural people snake bites are more likely to occur during essential activities, such as agricultural work, and are thus hard to avoid.

During night hours fast transport is not available; victims are carried in a bamboo basket, bullock cart or on the back. This enhances the time gap between the bite and the treatment. At times, vital time is often lost by taking victims to the village healers resulting in delayed medical treatment¹³.

Lower limbs are commonly affected in our victims which can be attributed to the accidental stamping in the fields. Upper limbs are involved in people who are cutting the grass or women who blindly try to remove the dry ashes from their mud furnaces.

Delay in treatment is due to the approach to the traditional healer first. The patients who reached after 12 hours developed complications. Limitation of our study is lack of information on the treatment and follow-up of patients as majority of them developed complications. Due to lack of medical facility, they were shifted to nearest tertiary care centre.

Snake bite is an important issue to be addressed due to inadequate reporting, non-availability of anti-venom in rural area and lack of other medical facility leading to delay in treatment, causing complications and deaths. If managed in proper time, life from a snake bite can be saved. The cost of snake antivenom should be reduced and its availability should be assured by the government particularly in rural areas.

Conclusion:

We can conclude from the study that snake bite is a major neglected public health problem in Karwar and surrounding rural areas. Our study may be used as a guiding tool in planning awareness and education programs for prevention of snakebite. It is important to educate people regarding first aid treatment, dos and don'ts in case of snakebite. To reduce risk of complications of snakebites all these informations should be scaled up and widely disseminated. Health personnel should be trained in managing snakebite cases. Medical facilities should be improved in Karwar district hospital as well as PHCs of the taluk so as to manage even complicated cases.

References:

1. Chippaux JP. Snake-bites: appraisal of the global situation. Bull World Health Organ 1998; 76:515–524.
2. Kasturiratne A, Wickremasinghe AR, de Silva N, Gunawardena NK, Pathmeswaran A, Ranjan P et al. The global burden of snakebite: A literature analysis and modelling based on regional estimates of envenoming and deaths. PLoS Med 2008; 5(11):1591-604.
3. Joshi H, Mahmood SE, Joshi M, Iram Shaifali, Srivastava P. Clinico-Epidemiological Profile of Snake Bite Cases in Western Nepal. TAF Prev Med Bull 2012;11(1):57-62.
4. Banerjee RN. Poisonous snakes and their venoms, symptomatology and treatment. In: Progress in clinical medicine, second series, Ahuja, MMS (editor).India:Heinemann,1978;136-79.
5. Bhat RN. Viperine snake bite poisoning in Jammu. J Indian Medical Association 1974;63: 383-92.
6. Alirol E, Sharma SK, Bawaskar HS, Kuch U, Chappuis F. Snake bite in South Asia: A review. Negl Trop Dis 2010; 4: e603.
7. Bawaskar HS, Bawaskar PH. Profile of Snakebite Envenoming in Western Maharashtra, India. Trans R Soc Trop Med Hyg 2002; 96:79-84.
8. Kulkarni ML, Anees S. Snake venom poisoning: experience with 633 cases. Indian Paediatr 1994; 31:1239-243.
9. Saini RK, Sharma N, Singh S, Pathania NS. Snakebite Poisoning: A preliminary report. J Assoc Physicians India 1984; 32(2): 195-197.
10. Sharma N, Chauhan S, Faruqi S, Bhat P, Varma S. Snakebite envenomation in a North Indian Hospital. Emerg Med J 2005; 22:118-120.
11. Bhardwaj A, Sokhey J. Snakebites in the hills of North India. Natl Med J India 1998; 11(6):264-265
12. Bawaskar HS, Bawaskar PH. Envenoming by the common Krait and Asian Cobra: Clinical Manifestations and their Management in a Rural Setting. Wilderness Environ Med 2004; 15(4): 257-266.
13. Singh J, Bhoi S, Gupta V, Goel A. Clinical profile of venomous snake bites in north Indian Military Hospital J Emerg Trauma Shock 2008 ; 1(2):78–80.

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