

# A STUDY OF SNAKE BITES AND PREVENTIVE MEASURES

S. S. Pokale

Department of Zoology

Dr.B.N. Purandare Arts, Smt. S.G. Gupta Commerce and Science College, Lonavala -  
410403. Maharashtra, India

(Affiliated to Savitribai Phule Pune University)

Email: - [spokale7@gmail.com](mailto:spokale7@gmail.com)

---

## Abstract: -

Snake-bite is an occupational disease of farmers, plantation workers, herdsmen, fishermen, restaurant workers and other food producers. It is therefore a healing problem that has important implications for the nutrition, economy of the countries where it occurs commonly. However, it is clear that this is an essential component of any community public health programmer. Community education about venomous snakes and snake-bite is strongly recommended as the method most likely to succeed in preventing snake bites.

This study was carried out to evaluate sufferer of snake bite in Maval and its public fitness significance. Data on sufferer of snake bites from the Primary Health Center record were utilized using a structured questionnaire designed for the study

**Keywords:** - Snake bite, Venom Maval.

## Introduction

Snakebite information is a fatal condition during tropical and sub-tropical regions in South Asia, Southeast Asia, Africa, and South America ([Kasturiratne et al, 2008](#)). Although high snakebite mortality is often reported to occur in India ([Westly, 2013](#)), the highest incidence of venomous snakebites is in Asia (162 annual deaths per 100,000 population) : southeastern Nepal ([Sharma et al, 2004a](#)). Among the 18 described type of venomous snakes in Nepal ([Sharma et al, 2013](#)), the Common Krait (*Bungarus caeruleus*) and the Common Cobra (*Naja naja*) account for the majority of morbidity and mortality ([Magar et al, 2013](#)). Case fatality ratios range from 3% to 58% (see [Table 1](#)), yet snakebite has not been a delegated as a public health issue in Nepal ([Nepal Health Research Council, 2013](#)). Published studies of snakebites in Nepal are scarce and

mostly retrospective in nature ([Joshi, 1983](#));.This may be because documentation of snakebites is often incomplete ([Magar et al, 2013](#)).

An exact measure of the global burden of snakebite envenoming is yet to be ascertained. The mortality due to venomous snakebite in India is estimated between 35,000 to 50,000 per annum, which is the highest in the world according to the World Health Organization (WHO). Most of the estimates of incidence, morbidity and mortality associated with venomous snakebite are extrapolations from a few regional studies and the actual incidence and burden would only be known from community-based studies. 70 bites per 100,000 populations per year was recorded in Maharashtra, one of the states of India with a high cases of snake bites. The principle effects of information are on the, kidneys, heart, nervous system lungs, liver, blood coagulation system, vascular endothelium and local effects at the site of bite.

**Discussion: -**

Snake bite injuries are a common and important problem in emergency remedy availability. Some ministries of health in the region have begun to organize training of doctors and other medical workers in the health center management of snake-bite patients. However, healing personnel throughout the region would benefit from more formal instruction on all aspects of the subject. This should include the identification of medically-important species of snakes, clinical diagnosis and the appropriate use of antivenoms and ancillary remedies.

Health center patterns of envenoming by snakes in Symptoms and signs vary species to species of snake answerable for the bite and the amount of venom injected. Sometimes the identity of the biting snake can be confirmed by examining the dead snake. It may be strongly suspected from the patient's condition or the circumstances of the bite or from knowledge of the health center effects of the venom of that type. This information will enable the doctor to select an appropriate antivenom, anticipate the likely complications and, therefore, take appropriate action. If the biting type is unknown, the patient should be inspected closely to allow recognition

of the emerging pattern of symptoms, signs and results of laboratory tests (the health center syndrome) together with other evidence, that may suggest which type was bitten.

**Local symptoms and signs in the bitten part:**

Fang marks, local pain, local bleeding, bruising, lymphangitis (raised red lines tracking up the bitten limb), lymph node enlargement, inflammation (swelling, redness, heat), blistering, local infection, abscess formation, necrosis, Generalized (systemic) symptoms and signs General Nausea, vomiting, malaise, abdominal pain, weakness, drowsiness, prostration, cardiovascular (Viperidae) visual disturbances, dizziness, faintness, collapse, shock, hypotension, cardiac arrhythmias, pulmonary oedema, conjunctival oedema (chemosis) etc.

All levels of the health service can contribute to the employers of patients with suspected snake-bite. Since the treatment of severe envenoming is a healing emergency that may require a range of healing skills, equipments, antivenom and other remedy, referral should be to the highest level of care that is readily available. However, in the rural areas where snake-bites are most frequent, transfer to a hospital may not be feasible within the reasonable time frame of a few hours. In that sufferer, a lower level of fitness facility services must cope with the emergency as suggested below.

At the village level Check history of snake-bite and look for obvious evidence of a bite (fang puncture marks, swelling of the bitten part etc.). Immobilize the patient as far as possible by laying him/her down in a relaxed but safe position (e.g. the recovery position), immobilize especially the bitten limb and give confidence. Arrange transport of the patient to healing care as quickly, safely and passively as possible by vehicle, boat, bicycle, motorbike, stretcher etc. Ideally the patient should lie in the recovery position (prone, on the left side) with his/her airway protected to minimize the risk of shock and inhalation of vomit. Discourage time-wasting and potentially dangerous traditional treatments such as tight ligatures (tourniquets), incisions, suction and application of herbs, ice, chemicals, snakestones etc. If the snake answerable has

already been caught or killed take it with the patient but ensure safety by avoiding direct contact. At the rural clinic, dispensary or health post carry out a simple healing assessment including history and simple physical examination – local swelling, painful tender and enlarge local lymph glands, persistent bleeding from the bite wound, blood pressure, pulse rate, bleeding (gums, nose, vomit, stool or urine), level of consciousness, drooping eyelids (ptosis) and other signs of paralysis, 20 minute whole blood clotting test, urine examination (appearance, sticks testing for blood etc.). Identify the snake type (if brought). Assess the need and feasibility of transporting the patient to a higher level of the health service peritoneal dialysis. If this is not available, transfer to a specialized hospital. If the patient is bleeding severely or is already seriously anemic, consider blood transfusion. Administer simple rehabilitation (exercising of bitten limb)

Most traditional first aid methods (incisions, tattooing, tourniquets, black snake stones, electric shocks, suction, herbal remedies) are inadequate, insufficient and even detrimental. The most fruitful methods are immobilization of the bitten limb and transport to hospital on a stretcher. For Russell's viper bites, pressure pad with immobilization has proved safe and worthy of preventing systemic uptake of venom. For neurotoxic elapid bites (Krait, Cobra, King cobra) pressure - immobilization using a long crepe bandage is recommended.

It is difficult to make comparisons, snake bites represent 3.15% of all ED presentations. Young people were more likely to attend for snake bite and more likely to be admitted for further treatment. The most common site of injury was to the hand or arm (49%). Children younger than nine years were at risk of being bitten on the face or scalp. Most patients received antibiotic treatment (87%) and 75% of adult patients received tetanus prophylaxis.

Most of the familiar methods for first-aid treatment of snake-bite, both western and “traditional/herbal”, have been found to result in more risk than good (benefit). Their use should be averted and they should never be permitted to delay the movement of the patient to medical care at the hospital or dispensary. Recommended first-aid methods emphasis reassurance,

immobilization of the whole patient and particularly the bitten limb and movement of the patient to a place where they can receive medical care as soon as possible.

Diagnosis of the type of snake responsible for the bite is important for optimal clinical employers. This may be achieved by identifying the dead snake or by inference from the “clinical syndrome” of envenoming. A syndromic approach should be developed for diagnosing the type responsible for snake-bites in different parts of the region. Preventive is the only effective antidote for snake venom. Preventive treatment for snake-bite was first introduced by Albert Calmette at the Institut Pasteur in Saigon in the 1890s (Bon and Goyffon 1996). Antivenom is immunoglobulin [usually pepsin-refined F(ab')<sub>2</sub> fragment of whole IgG] purified from the plasma of a horse, mule or donkey (equine) or sheep (ovine) that has been immunized with the venoms of one or more type of snake. “Specific” remedy, implies that the antivenom has been raised against the venom of the snake that has bitten the patient and that it can therefore be expected to contain specific antibody that will neutralize that particular venom and perhaps the venoms of closely related species (Para specific neutralization). Monovalent (monospecific) antivenom neutralizes the venom of only one type of snake. Polyvalent (polyspecific) remedy neutralizes the venoms of several different type of snakes, usually the most important species, from a healing point of view, in a specific geographical area. Antivenom treatment can be expected to neutralize free circulating venom, prevent progression of envenoming and allow recovery. However, these processes take time and the severely envenomed patient may require life support systems such as treatment of shock, assisted ventilation and renal dialysis until the severely damaged organs and tissues have had time to recover employers of snake-bites a different level of the health service

It is an essential element for treatment of systemic envenoming but may be insufficient on its own to save the patient’s life. Preventive may be expensive and in short supply. It is recommended that antivenom should be used only in patients in whom the benefits



of treatment are considered to exceed the risks of remedy reactions. Indications for remedy include signs of systemic or severe local envenoming. Skin conjunctival hypersensitivity testing does not reliably predict early or late antivenom reactions and is not recommended. It is advised that whenever possible remedy should be given by slow intravenous injection or infusion. Epinephrine (adrenaline) should always be drawn up in readiness in sufferer of an early anaphylactic remedy reaction.

### **Methodology**

A retrospective audit of the health center records of all patients attending the emergency department of PHC Maval with a complaint of snake bite injury between 2010 and 2015 was obtained. For each sufferer the information collected included age, sex of the patient, the anatomical site of the injury, a description of the injury. Information on treatment was also collected including time since bite, antibiotics used, tetanus immunization, suturing, and if the patient received a referral or operating theatre treatment.

### **Prevention Strategies and Measures: -**

Snakes have adapted to a wide range of habitats and prey type. All snakes are predatory carnivores, none is vegetarian although some eat eggs. Since snakes are preyed upon by other animals, they tend to be secretive and have evolved many survival strategies. By understanding something about the habits of snakes, simple precautions can be adopted to reduce the chance of encounters and consequently bites. One must know the local snakes, the sort of places where they prefer to live and hide, the time of year and time of day or night and the kind of weather when they are most likely to be actively out and about. Many species are mainly nocturnal (night hunters) e.g. kraits, but other type is mainly diurnal (day-time hunters). One must be especially observant about snake-bites after rains, during flooding, at harvest time and at night. Snakes prefer not to bother large animals such as humans so give them the chance to slither away.

**In house Prevention: -**

Snakes may enter the house in search of food or to find a hiding place for a while. Do not keep livestock, especially chickens, in the house, as snakes may come to hunt them. Store food in rat-proof containers. Regularly check houses for snakes and, if possible, avoid those types of house construction that will provide snakes with hiding places (e.g. thatched roofs with open leaves, mud and straw walls with large cracks and cavities and large unsealed spaces beneath floorboards). If possible, try to avoid sleeping on the ground. If you have to sleep on the ground use an insecticide-impregnated mosquito net that is well tucked in under the mattress or sleeping mat. This will protect against mosquitoes and other biting insects, centipedes, scorpions and snakes (Chappuis et al., 2007). No chemical has yet been discovered that is effectively repellent to snakes without being so toxic as to threaten the life of children and domestic animals.

**Precaution in Gardens and Farmyard: -**

Try not to provide hiding places for snakes. Clear termite mounds, heaps of rubbish, building materials etc. from near the house. Do not have tree branches touching the house. Keep grass short or clear the ground around your house and clear low bushes in the surrounding so that snakes cannot hide close to the house. Keep your granary away from the house, it may attract rodents that snakes will hunt. Water sources, reservoirs and ponds may also attract prey animals such as frogs and toads. Listen to wild and domestic animals, especially birds, as they warn of a snake nearby. Use a light when you walk outside the house.

**Prevention in Countryside: -**

Firewood collection at night is not recommended. Watch where you walk. Prefer at her walking bare-footed or wearing sandals, use proper shoes or boots and long trousers, especially when walking in the dark or in undergrowth. Step on to rocks or logs rather than straight over them – snakes may be sunning themselves on the sides. Do not put hands into holes

or nests or any hidden places where snakes might rest. Use a light (torch, flashlight or lamp) when walking at night, especially after heavy rains. Be careful when handling dead or apparently dead snakes – even an accidental scratch from the fang of a snake’s severed head may inject venom. Snake restaurants pose a threat of bites to staff and customers. Many snake-bites occur during ploughing, planting and harvesting and in the rainy season. Rain may wash snakes and debris into gutters at the edges of roads, and flush burrowing type out of their burrows. Hence, be careful when walking on roads after heavy rain, especially after dark.

**Prevention on the road: -**

Drivers or cyclists should never deliberately run over snakes on the road. The snake may not be instantly killed and may lie injured and pose a risk to pedestrians. The snake may also be injured and trapped under the vehicle, from where it will crawl out once the vehicle has stopped or has been parked in the house compound or garage.

**Prevention in rivers, estuaries and the sea: -**

To prevent sea snake-bites, fishermen should avoid touching sea snakes caught in nets and on lines. The head and tail are not easily distinguishable. There is a risk of bites to bathers and those washing clothes in the muddy water of estuaries, river mouths and some coastlines.

Avoid snakes as far as possible, including those displayed by snake charmers who are frequently bitten. Never handle, threaten or attack a snake and never consciously trap or corner a snake in an enclosed space. Keep young children away from areas known to be snake-infested. In occupations that carry a risk of snake-bite, such as rice farming and fish farming, employers might be held responsible for providing protective clothing and wearing boots.

The above recommendations for preventing snake-bite can be disseminated for national or local use as guidelines, training modules, leaflets, video clips and posters that can be exhibited on the walls of hospital and clinic waiting areas for the attention of patients and their families. At the village level, drama and puppet shows have been used successfully to portray snake-bite



scenarios. Media such as radio and TV can be used for health promotion and advantage can be taken of FM radio phone-ins to publicize the problem. Increasingly, young people and advertisers use mobile phones and social networking (YouTube, Twitter) to communicate information.

## RESULTS

Present prospective observational study was conducted at tertiary level hospital in Maval block for detection of predictors in the management of snake bite by observing demographic, laboratory parameters and specific treatment with anti-snake venom, correlating them with the outcome in the form of mortality and survival.

The aim of this work was to assess the epidemiological burden of snakebite, including the incidence, mortality, population at risk and main explanatory characteristics of their frequency and severity: season, environment, altitude, density of human population, management.

Snakebite is a common healing emergency and an occupational hazard especially in tropical countries like India. In the present study spread over 05 years (2010-2015), it is observed that the snakebite affected 653 case recorded.

2010-2011	140
2011-2012	80
2012-2013	155
2013-2014	111
2014-2015	167

## CONCLUSIONS

It is recommended that education and training on snake-bite should be included in the curriculum of medical schools and should be addressed specifically through the organization of special training courses and other educational events.

Although most of the findings were not statistically significant, marked health center significance was observed in the tests compared to the controls. The findings of this study also confirmed the effectiveness of prevention in snake bite as a first aid measure in the field in the employers of snake bite patients.

**Table:** Organization unit wise progress report of- Snake Bite sufferer in Maval Block PHC center Adale, Karla, Khadkala, Takave,,Talegaon and Yelase conducted in the year 2010-2015.

Sr.No	PHC Center	2010-2011	2011-2012	2012-2013	2013-2014	2014-2015
1	Maval Block	140	80	155	111	167
	Total	140	80	155	111	167

Graphical representation of Snake bite data report at various center of Maval region is presented below



## ACKNOWLEDGEMENT

The author is thankful to Medical officer Primary Health Cente Maval for providing necessary data and Taluka Health officer Panchayat Samiti Maval for helping in Data .

## **REFERENCE**

1. Chippaux JP. Snake-bites: appraisal of the global situation. Bull World Health Organ 1998; 76:515–524.
2. Inamdar IF, Aswar NR, Ubaidulla M, Dalvi SD. Snakebite: admissions at a tertiary health care center in Maharashtra India. S Afr Med J. 2010; 100:456–458.
3. Joshi DD. An epidemiological survey of snakebite cases in Dhanusha District. J Nepal Med Assoc. 1983; 21:1–11
4. Magar CL, Devkota K, Gupta R, Shrestha RK, Sharma SK, Pandey DP. A hospital based epidemiological study of snakebite in Western Development Region Nepal. Toxicon. 2013; 69:98–102.
5. Nepal Health Research Council, 2013. *National health research priority areas*, Nepal Health Research Council, Kathmandu, Nepal, Second ed
6. Pandey DP. Epidemiology of snakebite based on hospital survey in Chitwan and Nawalparasi Districts Nepal. J Nepal Health Res Counc. 2006; 4:51–57.
7. Sharma SK, Khanal B, Pokhrel P, Khan A, Koirala S. Snakebite- reappraisal of the situation in eastern Nepal. Toxicon. 2003; 41:285–289.
8. Sharma SK, Pandey DP, Shah KB, et al. *Venomous snakes of Nepal: a photographic guide*, B. P. Koirala Institute of Health Sciences, Dharan, Lalitpur, Nepal, First ed 2013.

9. Kasturiratne A, Wickremasinghe AR, de Silva N, et al. The global burden of snakebite: a literature analysis and modelling based on regional estimates of envenoming and deaths. *PLoS Med.* 2008;5: e218.
10. WHO list, it should be a part of primary health care package in areas where snake bites are common thereby referral to higher centers can be minimized
11. Westly E. One million deaths. *Nature.* 2013; 504:22–23.
12. World Health Organization. 2010. *Guidelines for the management of snakebites*, World Health Organization, New Delhi, 2nd ed
13. World Health Organization Zoonotic disease control: baseline epidemiological study on snakebite treatment and management. *Wkly Epidemiol Rec.* 1987; 42:319–320.

