



Epidemiological study of snake bite in some local government areas of Plateau State, Nigeria (1989-2001)

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Abstract

Envenomation is a common public health problem in many local government areas of Plateau state in Nigeria. Its incidence has increased over the years as reported by the outpatient departments of the General Hospitals in Shendam and Langtang local government areas. In Shendam alone, the increase was from 192 in 1989 to 1576 in 2001 and in Langtang, 7 in 1995 to 152 in 2001. The farm settlement areas are identified as snake infested with increased number of cases being reported every year. A seasonal pattern was observed in the study areas, peaking in January (12.2%) and between April - August (42%) for Shendam, with a similar pattern also for Langtang, although higher in Shendam. Data collected showed that snakebite incidences were frequent (80%) in the age group above 15 years in both sexes. Most of the victims (60%) were bitten in their farms, majority of which were bitten on the hand (40%), the lower extremity (50%) and other body parts (10%). Most of the victims (40%) were brought to the emergency unit more than two hours after the bite due to bad roads, for distance from the hospital and lack of transportation. Data Analysis for the study areas showed that the death rate of 304 (17.6%) from 1723 cases was alarming. This represents about one-tenth of the unreported cases of snake bite in the study areas.

Keywords: Snake bite, Langtang, Shendam, *Echis carinatus*

Introduction

The burden of snakebite in the developing world continues to exact a huge price burden both in human suffering and in contributing to poverty and under-development of rural areas. In line with the WHO policy on alleviation of poverty and development of the third world countries, there is need therefore for the discovery and development of candidate vaccine for the immunization of man and animals in snake infested areas for entry into product development. Venomous snakes are found

throughout most of the world and are believed to cause in excess of 3 million bites per year with more than 150,000 deaths (White, 2000). The venomous snakes in Africa are known to belong to four main families namely, the colubridae, elapidae, viperidae and hydrophidae (Warrel, 1984). Snakebite is wound inflicted by the mouth of a snake. A wound from a snake with short teeth and no fangs may look like a series of scratches or tiny punctures. The twin puncture wounds usually associated with snakebites appear

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when the paired fangs of a fanged snake break through the skin.

Snakebites from non-poisonous snakes are not serious, but should be cleansed with an antiseptic to prevent infection. The bite of a poisonous snake, which can inject venom into the body, may cause severe illness and sometimes death. Symptoms generally include swelling, discoloration and pain at the site of the bite. Victims may feel weak and dizzy with symptoms of shock i.e. perspiration, nausea and vomiting (Blackman, 2002).

In the Shendam and Langtang local government areas of Plateau State of Nigeria in particular, the incidence of snakebite is alarming and mortality in the rural farming areas is very high. However, the use of plants forms the main or part of treatment used by traditional healers in these areas. Anti-snake venom (ASV) is the reliable treatment for serious snakebites. It is derived from antibodies created in a horse's blood serum when the animal is injected with snake venom. Since ASV is obtained from horses, snake bite victims are in this case exposed to foreign proteins and so must be carefully managed. The danger is that they could develop an adverse reaction or even a potentially fatal allergic condition called anaphylactic shock. This problem therefore calls for the development of a thermo-stable, cheap, non-toxic anti-snake venom remedy from natural source. In the search for new methods for the vaccination against snakebites in the farming areas of this country, efforts have been made to discover an anti-snake venom vaccine agent of plant origin without teratological potential.

Studies have shown that there are about 240 kinds of snakes with about 3,500 species found all over the world out of which about 500 species are poisonous. The non-poisonous are also referred to as blind snakes and are quite harmless. Of the 500 poisonous species, 200 species have been known to

cause death or permanent disability. There is great variation in the geographical location of snakes. They have been found from the ocean to the Himalayas at an altitude of 4,877meters (16,000ft). Snakebite is not only a problem of developing countries in the tropical and sub-tropical regions, but also that of developed and industrialized countries. In India, it is estimated that 15,000 – 20,000 people die each year from snakebite. In Myanmar, it is the fifth most common cause of all deaths. In Sri Lanka, the incidence of snakebite is 6 out of 100,000 in a year. In Brazil, recent figures indicate an average of 20,170 bites and 122 deaths per year. In the USA, there are 7,000 bites each year with 12 – 15 deaths, and in Australia, 1,000 – 2,000 bites per year with an average of 2 deaths per year (Warrel, 1996). In Nigeria, it is estimated that 80,000 – 100,000 people die each year from snake bite (Theakston, 1998).

Snakebite is also a serious medical problem in Nigeria and other West African states. The incidence and type of snake seem to vary according to the geographical zone, the occupational practices of the population and the season. It has been observed that the incidence of snakebite is seasonal with peak period during the rainy season – a time when frogs and toads emerging from their hibernation are preyed on by snakes that thereby come in frequent contact with humans, and when farmers engage in intense farming activities that also bring them frequently in contact with snakes in the bush (Warrel, 1999; Ojala and Obaro, 1999). This preventable occupational public hazard also occurs among hunters in tropical and sub-tropical countries, which abound with dense vegetation.

In Nigeria, the most common poisonous snakes are the elapids and the vipers. These include the *Naja melanolema* (black cobra) and *Naja nigricolis* (spitting cobra), and the *Viperid echis carinatus* (carpet viper) and *Bilis asietaurs* (puff adder)

(Akubue, 1997; Omogbai *et al.*, 2002). However, studies in Plateau state of Nigeria have shown that snake bites are mainly caused by two species of snakes namely Cobra (*Naja nigricollis*) and Carpet Viper *echis carinatus* (Aguiyi *et al.*, 1999) and majority of the snakes found in the agricultural areas of the state are harmful. In Shendam and Langtang local government areas of Plateau State there have been reported cases of snakebites, which constitute a serious public health hazard. The situation is the same in Taraba, Adamawa and Enugu states of Nigeria. The common features of these areas are the high altitude of up to 2,300 meters. As in other tropical countries, in Nigeria and indeed Plateau state, where snakebite is a serious problem there is very little report.

Experimental

Snakebite has been a common public health problem in Shendam and Langtang local government areas of Plateau state. Although cases of snakebite have been reported in these areas, the actual prevalence data has not been documented. This is a retrospective study designed to assess the prevalence, morbidity and mortality of snake bite cases in the two areas. The data covers

over a period of twelve years at the outpatient department (OPD) of the general hospitals in Langtang and Shendam town as supplied by their medical record offices. It covers the period 1989-2001 (Langtang) and 1995-2001 (Shendam). The information was analyzed on the basis of the epidemiological features of snakebite on presentation, age and number of deaths and seasonal incidence of cases treated by the hospitals.

Results and Discussion

In Nepal, majority of snakes found in agricultural areas, marshy lands, lakes and rivers are harmless and some of them are useful as rodent eaters. Depending on the geography and climate, 70 species of snakes are reported from Nepal of which 20 are known to be poisonous, whereas in India, 216 species of snakes have been identified (Joshi, 1985). The most commonly found poisonous snakes from the Terai areas include cobras, common kraits, banded kraits and Russell's viper. The Himalayan pit viper has been reported at an altitude of up to 2,300m (Devkota *et al.*, 2000). According to a WHO report, more than 20,000 cases of snake bites with 1,000 deaths occur every year in Nepal (WHO, 1987).

Table 1: Snakebite profile - Shendam Local Government Area, 1989 – July 2001

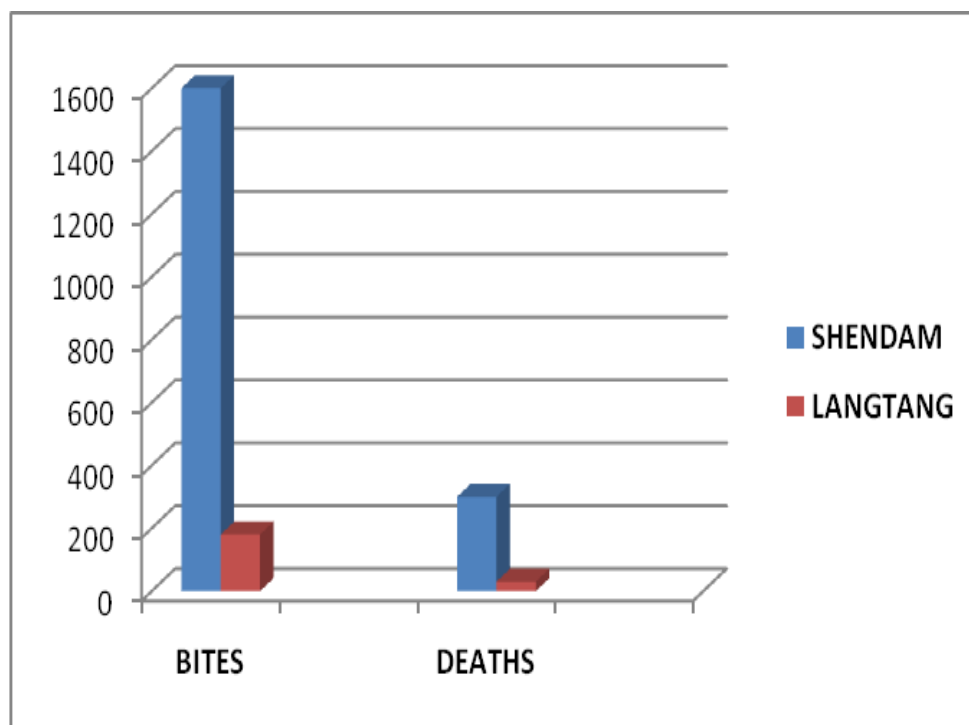
Month	Number of bites	Number of deaths	Number of survivors	Treatment
January	192	38	154	Asv
February	141	23	118	Asv
March	139	33	106	Asv
April	167	23	144	Asv
May	175	38	137	Asv
June	176	32	144	Asv
July	151	22	129	Asv
August	127	14	113	Asv
September	96	23	73	Asv
October	96	17	79	Asv
November	79	8	71	Asv
December	32	5	27	Asv
Total	1571	276	1295	

ASV – Anti-snake venom

Table 2: Snakebite profile - Langtang Local Government Area, 1995 – July 2001

Month	Number of bites	Number of deaths	Number of survivors	Treatment
January	7	-	7	ASV
February	9	1	8	ASV
March	11	-	11	ASV
April	12	4	8	ASV
May	17	3	14	ASV
June	15	5	10	ASV
July	17	3	14	ASV
August	15	2	13	ASV
September	16	-	16	ASV
October	12	3	9	ASV
November	4	1	3	ASV
December	7	1	6	ASV
Total	152	28	124	

ASV – Anti-snake venom

**Fig. 1:** incidences of deaths in the two study areas

In many parts of the tropics, especially the developing countries, snake bite cases are treated either by traditional healers at home or by orthodox practitioners in hospitals. Many cases therefore remain unreported except where the traditional healer fails to effect a

cure and the victim survives long enough to be taken to a hospital (Reid and Lam, 1957). Hospital records may therefore not fully reflect the exact prevalence of snake bites in the community.

Studies by Omogbai *et al.* (2002) however showed that despite the high morbidity indicated by the cases of prolonged confinement in the hospital of many patients, was the apparent absence of mortality. Although, the fate of 8.7% of the victim was not recorded, no mortality was indicated. In a study of snake envenomation in children covering a period of ten years, Lovecchio and DeBus (2001) recorded no mortality among sixty-six victims of rattlesnake bite in a metropolitan area of Arizona in the United States of America and Chen *et al.* (2000) recorded no mortality among 130 victims of poisonous snake bites in Northern Taiwan during a 3-year period. The global mortality rates from snakebites is 5% of all snake-bitten victims (White, 2000). Ojala and Obaro, (1999) reported a 3.9% mortality rate among children bitten by snakes in Zaria, Idoko and Ibekwe (1984) recorded a mortality rate of 5.7 in 175 recorded cases over a two- year period in Makurdi, Nigeria. However, other researchers have reported lower mortality rates among victims of snakebites in different parts of the tropics (Onuaguluchi, 1960: Swaroops, 1954, Reid, 1987). It has been suggested that snakebites in the tropics are mainly “escape” bites in which only small amounts of venom are injected into the victims as opposed to “business” bites in which larger amounts of venom are injected (Reid, 1961; Reid, 1972).

Furthermore, most of the offending snakes reported in a study carried out in Zaria (a city located in the Northern part of Nigeria) were unidentified and 69.6% of those identified belonged to the viperidae family whereas 30.4% were cobras (*Colubridae*) (Ogala and Obaro, 1999). It was found that snakebites are not confined to bush encounters as a significant number of victims were known to be bitten in their abodes; some while sleeping indoors (Omogbai *et al.*, 2002).

“*Gobe da nisa*”, a Hausa phrase meaning “tomorrow is far” refers to the carpet viper. Bites from carpet vipers and cobras are the highest causes of deaths from snakebites in Plateau State. The venoms of viperidae and elapidae are to be complex mixtures of toxins and enzymes and cause haemorrhage, myonecrosis, neurotoxicity and prolongation of blood clotting time (Akubue, 1997, Markland 1997, Aguiyi *et al.*, 1999).

In humans, anti-snake venom (ASV) is administered either intravenously or intramuscularly and the efficacy of the serum is dependent on the rapidity of the treatment. This represents an important limitation to this kind of therapy (Guerranti *et al.*, in press) especially in our society and particularly in the two study areas where there is inaccessibility to hospital facilities.

Results from the study areas have shown clearly that in Shendam General Hospital, a total of 1571 cases of snake bites with 276 deaths have been reported between 1989 and 2001. A maximum increase of snake bite cases was recorded in the months of January as a result of bush clearing in preparation for farming and between April-May to July, during harvest of farm produce. The records from the Langtang General Hospital shows that 152 snake bite cases and 28 deaths were reported within the study area. This is far less than the finding in Shendam. Nevertheless, cases of snake bite also occurred during bush clearing and harvest season and thereafter, decreased from August to December and remained at this level till the next clearing and harvest season.

From this study, it was also observed that both sexes and all age groups had been victims of snake bite. 70% of the victims belonged to the age group 15-45 years who are the active farmers. The 5-14 years age group formed 20% of the total cases while age 45 and above formed 10%. The bites occurred over 24 hours before hospital presentation. The highest incidence of snake

bites were recorded between 12noon – 6pm and 7pm – 9pm in both Shendam and Langtang areas. Victims were bitten mainly on the hands (40%) and legs (50%). 10% represents all bites on other body areas. Most of the victims were not taken to the hospital earlier than 6 hours after their encounter. 80% of cases were discharged not less than one week after admission.

Conclusion

From the findings of this study, it is pertinent to note that snakebite is a big threat to farmers and livestock in the rural areas of Langtang and Shendam Local Government areas where there is a high prevalence of snakebite especially among the farmers. This may affect the productivity and so the economy of the rural dwellers of these areas. Moreover, poor recording of cases at the hospitals and health centers have made it difficult to ascertain the magnitude of the problem.

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