

Full Length Research Paper

The impact of traditional methods of managing snake bite in humans and livestock among the Hausa-Fulani communities of Sokoto State (North-western Nigeria)

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Traditional snake bite healers, farmers and Fulani cattle rearers in some local government areas of Sokoto State were interviewed through the use of structured questionnaires for the various ways they manage snake bite in their livestock. Almost all of them use plants either for prophylaxis, treatment or as repellants. Prophylactic treatment is only practiced in humans, while first aid treatment and post-treat mental care are given to both humans and animals. Most of the farmers and rearers (90%) interviewed directly or indirectly depend on traditional healers. Usually, a combination of two or three plants is mixed in acidic medium, usually sour milk (nono); and in some cases, a single plant is used. Dried leaves, roots or stem bark are the parts used. The most commonly used plants include: Tunfafiya (*Calotropis procera*), Marke (*Anogeissus leiocarpus*), Magarya (*Zizipus mauritiana*), Tafarnuwa (*Allium sativum*), Kukuki (*Sterculia tomentosa*), Chibra (*Randia nilotica*), Nunu/Danya (*Spondias* spp.), Bagaruwa (*Acacia nilotica*), Gwanda (*Carica papaya*), Kalgo, Kuna-kuna, gawasa, Kanya (*Ebenaceae Diospyros mispiliiformis*), Tsada (*Ximenia Americana*), Harwatsi and Taura (*Detarium senegalense*). Previous research showed that these plants contained anti-inflammatory, antibiotics, analgesic and other bioactive compounds that can be purified and further standardized for use in both human and animals, especially in the rural dwellings where anti-venom is almost absent, expensive and unaffordable.

Key words: North-western Nigeria, cattle rearers, medicinal plants, snakes, traditional healers, villages.

INTRODUCTION

Snake bite is a serious problem affecting man and his animals all over the world, especially in Asia and Africa. Global estimation of mortality reported from snake bite amounted to about 50,000 per year (Swaroop and Grab, 1954) and according to other reports, the number exceeds more than 100,000 yearly (Chippaux, 1998). These figures may be an under estimation due to the fact that most mortality caused by snake bite is not recorded. For instance, some other detailed population-based studies reveal higher rates of mortality ranging from 2

to 16 per 100,000 per year in Nigeria, Kenya, Senegal and West Bengal. In Nigeria, the incidence of snake bites may be high, because of the abundance of predisposing factors to snake bite; and particularly, in the Northern part of Nigeria, cases are higher, especially in the hot-dry seasons between the months of March to September. Poisoning by snake bite is a complex and often a life-threatening condition requiring an immediate and effective medical attention. The Fulani nomadic farmers travel a long way with their livestock from one grazing pasture to another and in villages where most of the livestock that are being reared are at high risk of coming in contact with snakes (Auda and Adeyanju, 1989); likewise, farmers in the process of farming or getting grasses and feed for their livestock. Bites occur more

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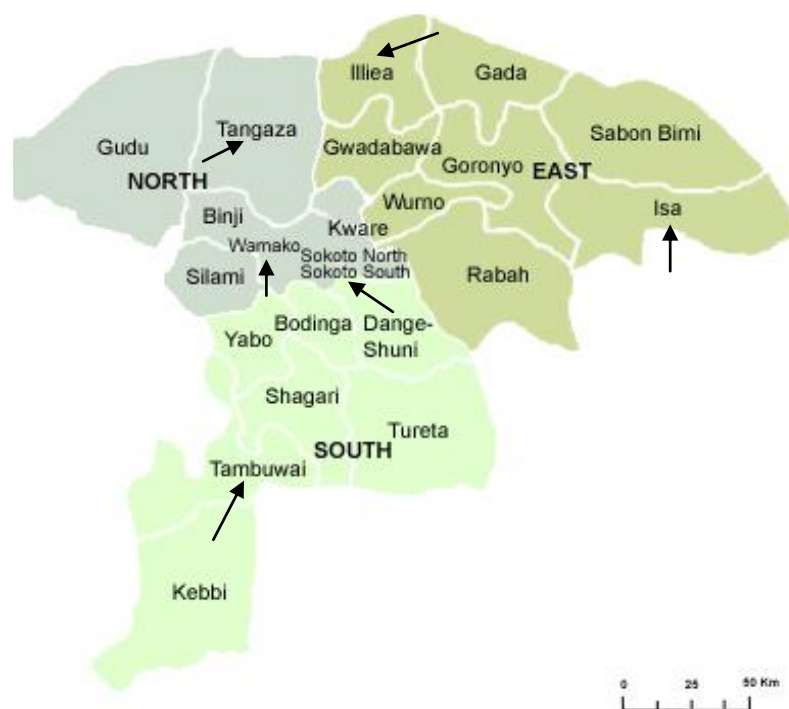


Figure 1. Location of the study area on an annotated map of Sokoto State, Nigeria.

often while victims are farming, herding or walking; although, the spitting cobra may bite victims who roll upon it in their sleep (Habib, 2001). Although, in most cases, incident of the bites occur in places where medical or veterinary care cannot be obtained. It has been documented that in Nigeria, a native doctor treats several hundred snake bite patients each year in his house, which is only one mile from a University Teaching Hospital which records only about 5 cases per year (Manson and Apted, 1982). This shows that, in most cases the victims, due to time factor, have no choice than to consult the traditional snake bite healers for treatment. The aim of this study, therefore, is to analyze the use of these phytotherapeutic agents used in the North-western part of Nigeria by the traditional healers and rearers. It is also aimed that this will aid further studies on their toxicity and bioactivity; and developing them into tinctures and proper calibrated drugs for use, especially for livestock bites, in underdeveloped countries (especially in remote areas) where access to anti-venom is either difficult or impossible.

MATERIALS AND METHODS

The study area is located in the Sudan Savanna zone of Nigeria. The state is located at the extreme North-western part of Nigeria between longitudes 4°8'E and 6°54'E and latitudes 12°N and 13°58'N. It shares common borders with Niger Republic to the north, Kebbi State to the Southwest and Zamfara State to the east (Figure 1). The total land area is about 32,000 km², while the total

population in 1999, is about 2,809,168 (Wikipedia, 2005). The rural dwellers of this part of the country are mostly farmers and cattle rearers, because of the low-land nature and the vast grass land of the area. Sokoto is well known throughout the world, especially for its production of the famous Moroccan leather from Sokoto red-goats, and being the home of Sokoto Gudalli, a breed of indigenous cattle of this area. A total number of 220 questionnaires were used for the study. 20 questionnaires were assigned to each of the 6 randomly selected local governments from different agricultural zones within the state. In each village, a stratified simple random sample was used to select the local governments area, which are Illiea, Tambuwai, Isa, Wamako, Tangaza and Sokoto-south. By the use of systematic sampling procedure, twenty respondents were selected and interviewed in each of the selected study area.

RESULTS AND DISCUSSION

From the 220 questionnaires distributed and the ones interviewed, we were able to retrieve 200 questionnaires. Among these people that were interviewed, 64 (32%) of them fall within the range of 40 to 49 years, followed by 30 to 39 years age group with 40 (20%) as shown in Figure 2 and Table 1. This may be due to the fact that these classes of individuals are the ones involved in the activities that may predispose individuals to snake bite, such as farming, grazing and hunting. And they are the groups that are actively involved in snake bite healing and cattle rearing. Table 2 shows a display of the botanical names of the various plants together with their vernacular names in Hausa Language, the part of the plant used, route of administration and whether it is used

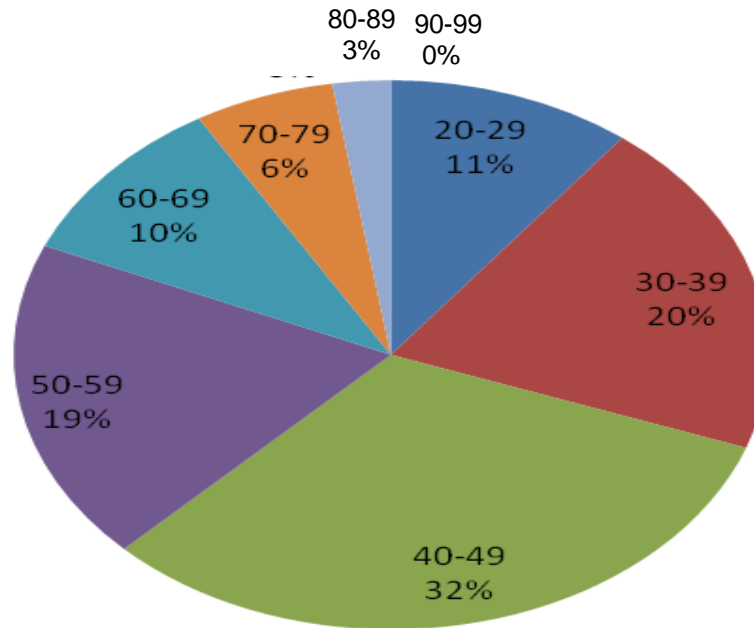


Figure 2. Pie-chart showing the percentage representation of the respondents in each age group.

Table 1. Number and percentage of respondents within each age group.

Age group (years)	Number of respondents	Percentage
20-29	21	10.5
30-39	40	20
40-49	64	32
50-59	38	19
60-69	20	10
70-79	12	6
80-89	5	2.5
90-99	0	0

for treatment, prophylaxis, spitting or both. Traditional ways of managing snakebite using plants and their method of application or administration in Northern Nigeria are closely related to some practices in other parts of the tropics. Similar plants with almost the same bioactivity, and same medium of delivery, like the sour milk had been reported (Jain et al., 2011). Previous studies have shown that acidic or basic catalyzed hydrolysis improves the yield of phenolics and antioxidant ability of these medicinal plants (Saadi et al., 1998; Choi et al., 2006; Kim et al., 2006; Moure et al., 2007; Ismail et al., 2011). These might justify the practice of using sour milk and other media in the administration of most of these plants by the traditional healers in most of these parts of the tropics.

Snake bite leads to inflammatory responses like pain, edema at the position of the bite, vomiting, diarrhea,

sweating, hyper salivation and bradycardia that occurs due to stimulation of the autonomic nervous system (Lans et al., 2001). Most of the plants reported in this survey in one way or the other inhibit these outcomes due to snake bite. *E. alsinoides*, for example, have been used as brain tonic in neurodegenerative diseases, asthma, amnesia; the smoke of the leaves also has effect on chronic bronchitis (Goyal and Singh, 2005). This indicates that it might have an effect on respiratory paralysis in case of snake bite. *Calotropis procera* is known for its analgesic and anti-inflammatory effects and in the management of skin diseases. The latex is shown to contain some bioactive compounds that have effects on inflammatory mediators (Anonymous, 1992; Sangraula et al., 2002; Dewan et al., 2000a, b). Phytochemical analysis of *C. cumis metuliferus* indicates that the plant contain alkaloids, tannins, flavonoids and

Table 2. Botanical names of various plants with their local names and their various applications in cases of snake bite and spitting.

Plant botanical name	Hausa name	Part of the plant used	Prophylaxis	Treatment	Repellant	Spitting	Mode of administration
<i>Allium sativum</i>	Tafarnuwa	bulbs		+	+	+	a, d
<i>Anogeissus leiocarpus</i>	Marke	Stem bark		+			c
<i>Balanite aegyptica</i>	Aduwa	leaves	+	+	+	+	a
<i>Bauhimia reticulata</i>	Kalgo	Stem bark		+			a, c
<i>Boscia angustifoha</i>	Anza	Leaves, stem				+	a
<i>Calotropis procera</i>	Tumfafiya	Latex, flower		+	+		b
<i>Chloris robusta</i>	Kasari	leaves			+	+	a, c
<i>Chrozophora senegalensis</i>	Damaigi	Leaves					d
<i>Combretum verticullatum</i>	Taramniya	Leaves, stem		+			a
<i>Cucumismetuliferus</i>	Nonon Kurciya	latex		+	+	+	c
<i>Detarium senegalense</i>	Taura	Stem	+	+			a
<i>Evolvulus alsinoides</i>	Kafi malam	leaves	+	+	+	+	c
<i>Merremia angustifolia</i>	Yarbururu	leaves		+			d
<i>Mitracarpum scarbrum</i>	Harwatsi	leaves	+	+			b
<i>Monordica balsamina</i>	Garahuni	leaves		+	+		a
<i>Parinarium macrophyllum</i>	Gawasa	Fruit, leaves				+	a
<i>Phyllantus pentadnes</i>	Geron tsuntsaye	Seeds	+	+		+	a
<i>Randia nilotica</i>	Cibra	Stem,	+	+			a
<i>Sida rhombifolia</i>	Miyar tcanya	Leaves, stem/root		+			c, d
<i>Spondias</i>	Nunu	Leaves, stem	+	+			a
<i>Sterculia tomentosa</i>	Kukuki	Leaves, stem	+	+			a
<i>Stylosanthes erecta</i>	Tsira	leaves		+		+	c
<i>Trianthema monogyna</i>	Gadon maciji	Leaves	+		+		
<i>Zizipus mauritiana</i>	Magarya	Leaves, fruits		+		+	a, b

A = Oral, b = topical, c = oral and topical, d = smoke or steam inhalation.

glycosides (Jimam 2008), which might be the reason for its anti-inflammatory, anti-pyretic and antispasmodic effects. Several studies indicate the sedative as well as the anticonvulsive effects of *Randia nilotica* (Chabra et al., 1991; Danjuma et al., 2009). *Zizipus mauritiana* has been reported to have effect on wound healing, skin diseases, burning sensation, nausea, vomiting and

also diarrhoea (Morton, 1987; Dahiru et al., 2006). Adejumobi et al. (2008) reported the antimicrobial effects of *Anogeissus leiocarpus* on *Candida albicans*, *Streptococcus mutans*, and *Staphylococcus saprophyticus*, all of which are known isolates accompanying snake bites. Phytochemical analysis of the leaves of this plant shows the presence of flavonoids, tannins and

polyphenols. It was reported that the root of *Sida rhombifolia* contains 450 ppm alkaloids and the presence of ephedrine and saponin (Southwest School of Botanical Medicine, 2002). Other workers reveal that, the root contains about 0.1% alkaloid, choline, pseudoephedrine, betaphenethylamine, vascini, hipaphorine and related indole alkaloids (Shaman Australis

Ethnobotanics, 2002)

Conclusion

Medicinal plants still play an important role in the management of ailments in tropical countries. In most of these countries especially in Africa and Asia, majority of the population patronize traditional snake healers in case of snake bites in Humans or live stock, since most of these bites occur in areas where anti venom is scarce or absent. Previous literature shows the ability of this plant to suppress most of the classical signs of snake bites in our environment. Therefore, there is a need for research in identifying and isolating the specific compounds responsible for the effect, with the aim of purifying and making them into one entity for easy application as a combined therapy for the use of our farmers and livestock rearers in remote areas.

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