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Therapeutic Pathway for Snake Bite in the Municipality of Bassila in North-Eastern Benin

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Abstract

Introduction: Snake bites mostly affect poor rural communities in Asia and sub-Saharan Africa, causing permanent damage like physical disabilities from injuries and amputations. Even though it's a big deal in rural Africa, victims still prefer to go with traditional medicine. The main objective of the study was to analyse the sociocultural and health determinants of the therapeutic pathway of snake bite victims in the commune of Bassila in north-eastern Benin. **Method:** This was a cross-sectional study of victims of snake bites admitted to the district hospital in the municipality of Bassila in 2024 and their relatives. A total of 85 people were surveyed. All 30 snake bite victims admitted to the Bassila district hospital in 2024 from the five (05) localities with the highest incidence were surveyed. The relatives of both deceased and surviving victims (36), health workers (11) and socio-cultural actors such as traditional therapists (5) and community leaders (5) residents in these localities were interviewed. The interview content was analysed using NVIVO software. **Results:** According to the populations surveyed, snake bites are not only a natural occurrence but can also be caused by a spell cast by an enemy or as punishment for a social transgression. As a result, these populations mainly seek treatment for snake bites from local traditional therapists. Although most respondents visited a traditional healer or sometimes a hospital where they remained until they recovered, some patients chose to be treated successively in both places. The reasons given were treatment failure or a loss of confidence in the effectiveness of the first course of treatment. **Conclusion:** It is important that, in the management of snake bites in the municipality of Bassila, sociocultural considerations that discourage the use of medical facilities should be taken into account.

Keywords

Treatment Pathway, Snake Bite, Beliefs, Benin

1. Introduction

In June 2017, snake bite envenomation was classified as a Category A neglected tropical disease and was the subject of a resolution adopted by the World Health Assembly in May 2018 [1]. Snake bites are a major public health problem affecting approximately 1 million (421,000 - 1,841,000) [1] people per year with permanent sequelae in the form of physical disability due to injuries, amputations [2] [3] or psychological trauma [3]. Globally, snake bites cause at least 20,000 deaths per year, with this figure potentially reaching 94,000 [4]. Snake bites mainly affect poor rural communities in Asia and sub-Saharan Africa, where socio-economic status and agricultural and other practices contribute to increased interaction between snakes and humans [4]. Indeed, according to data from several studies, the highest number of envenomations was recorded in South Asia (121,000), followed by Southeast Asia (111,000) and East Sub-Saharan Africa (43,000) [4]. The highest number of deaths from snake bites was also recorded in South Asia (14,000), followed by West Sub-Saharan Africa (1500) and East Sub-Saharan Africa (1400) [4]. Thus, in Africa, snake bite envenomation is a public health problem that unfortunately remains poorly assessed. Despite its growing scale and high lethality, the affected populations (especially in rural areas of Africa) prefer to rely on traditional remedies. This practice, which explains their delayed recourse to medical care, exposes them to significant but avoidable risks of complications, sequelae and death. Despite the efforts made by the Ministry of Health to reduce the incidence of cases in high-incidence regions, the analysis of the therapeutic pathway and its determinants has not received the attention it deserves from national health authorities. Few studies are available to help understand the therapeutic rationale behind the care choices made by victims of ophidian envenomation, especially in rural tropical areas where snake bites are most common. Yet such studies are essential to improving policies aimed at increasing the use of medical care centres in the event of snake bites and reducing the death rate in these regions. Thus, the main objective was to analyse the sociocultural and health determinants of the therapeutic pathway of snake bite victims in the commune of Bassila in north-eastern Benin.

2. Method

Type of study

This was a cross-sectional study focusing on victims of snake bites admitted to the district hospital in the municipality of Bassila in north-eastern Benin in 2024 and their close relatives.

Study population and selection criteria

The study participants were snake bite victims treated at the Bassila district hospital between one year prior to and one year after the date of the survey. They all came from areas with a high incidence of snake bites. These localities had been identified on the basis of an analysis of health data available at the district hospital on cases of snake envenomation treated in 2024. The municipality of Bassila has

a total of 26 localities. According to data from the Bassila district hospital, 548 cases of snake bite envenomation were admitted between 2020 and 2024. The five localities with the highest number of cases, in order of importance, were Bassila1 (15.65%), Manigri-oke (9.11%), Firihoun (7.71%), Kikele (7.01%) and Manigri-ikanni (6.78%). These are the five localities with the highest incidence of snake bite envenomation cases treated at the Bassila district hospital. These localities alone account for nearly 50% of snake bite victims admitted to the district hospital. These high-incidence localities were therefore selected to host the study. This approach offered a better chance of obtaining information on the victims' treatment pathways and their determinants during the study, due to the high incidence of cases in these localities. All 30 snake bite victims admitted to the district hospital who resided in the localities targeted by the study were interviewed. However, two (02) of the victims to be surveyed had died from snake bites, while one victim was 4 years old. Their parents or close relatives were nevertheless surveyed.

The close relatives of the deceased or surviving victims (36), health workers involved (11) in the management of snake bite cases, as well as socio-cultural actors such as traditional healers (5) and community leaders (5) who had been living in these localities for at least three (03) years were interviewed.

Only victims of ophidian envenomation that occurred less than a year ago or other study participants who gave their free and informed consent were included in the survey population.

Sampling method

For the selection of subjects to be included in the study, a purposive sampling method was used. To this end, the selection criteria were defined on the basis of the inclusion criteria in order to ensure the relevance and quality of the data to be collected. All snake bite victims admitted to the Bassila district hospital in 2024 from the five (05) high-incidence localities were surveyed. Close relatives of minor or deceased victims were also included in the study. Health workers who had been working in these localities for at least three years and who were involved in the management of snake bite cases, as well as community and religious leaders, were also interviewed. In each of the five (05) localities selected for the study, a leader and a traditional therapist were selected to be interviewed. In each of these localities, we conducted a focus group with community members who had been close to snake bite victims.

Data collection

Two data collection techniques were used, including semi-structured interviews and focus groups. A series of one focus group of approximately seven participants was conducted in each of the five localities selected for the study. Focus group participants consisted of community members who had a relative who was a victim of a snake bite and was admitted to the Bassila district hospital during the past year 2024. The interview guides developed enabled data to be collected from the study targets after obtaining their free and informed consent. The discussion sessions were recorded using a tape recorder. All audio recordings were listened out

again to ensure the accuracy of the guides completed during the interviews. The data collected during the interviews and focus groups were systematically transcribed manually from the audio recordings. The guides used in this study were coded and entered into NVIVO software to facilitate their analysis. The audio recordings were destroyed after analysis.

Study variables

- Demographic and behavioural characteristics of victims, including age, occupation, gender, educational level, place of residence, ethnicity, care pathways and time taken to seek medical care.
- Socio-cultural factors such as religious beliefs associated with snake bites and social representations of snake bites.

The questions raised during the individual interviews and focus groups enabled us to gather reliable information about their experience throughout the incident, the quality of the medical care they received in hospital, but above all their beliefs in relation to snakebites and the prospects for ensuring better survival for the victims and a better quality of life for the survivors. Table 1 presents the main questions addressed.

Table 1. Main questions asked during the interviews.

Main questions asked	Comments
Real-life experience	
How did your body feel after the bite? And how did it change from the moment you were bitten until you recovered?	This question enabled the participants to express their trauma and suffering.
What did you do from the moment you noticed the bite?	Participants were asked to provide details of their care pathways or itineraries and the reasons behind each choice.
Quality of care	
What do you remember about your treatment in the hospital from the time you were admitted until you recovered?	The aim was to gather participants' opinions on the quality of medical care, including reception on admission and satisfaction throughout the care process.
What is your opinion of the effectiveness of current and past antivenom serums administered to patients treated at your centre for ophidian envenomation?	Participants gave their opinions on the perceived effectiveness of antivenom serums in restoring the health of victims of ophidian envenomation.
What do you think of the effectiveness of modern medical treatment compared with traditional methods?	This question asked participants to comment on the effectiveness of medical care compared with traditional care.
Beliefs and practices associated with snakebite	
In the locality, what are the social representations when a person is bitten by a snake?	Secular endogenous causes.
What are the endogenous practices for snakebites?	Endogenous attitudes and practices.
Prospects for improvement	
What difficulties do you encounter when dealing with snakebites?	Problems encountered and possible solutions.

Statistical analysis

The interview content was processed using NVIVO software. The processed content was grouped into themes and sub-themes. These included socio-cultural representations of snake bites, therapeutic approaches and pathways, the quality of care in healthcare centres, and the social living conditions of survivors.

Content analysis techniques such as triangulation and saturation of the data collected were used to reduce information bias. The insights from the focus groups helped to clarify and expand on the data collected during the individual interviews. It also made it possible to assess the completeness and saturation of the information gathered from participants. Some of the comments gathered from the respondents (in the form of verbatim quotes) were used to illustrate the results of the analysis. Some qualitative variables were expressed as percentages, while others were grouped by theme.

Ethical concerns

All approvals required by the health authorities were obtained prior to the implementation of the study. Furthermore, we ensured that the dignity and integrity of the respondents were respected, including the confidentiality of oral or written data collected throughout the study. Thus, no data collection was undertaken without informed consent, which was written for primary targets and verbal for other secondary target groups.

3. Results

Characteristics of people surveyed

A total of 27 snake bite survivors were surveyed. Indeed, among the 30 victims selected, two (02) had died, while one was four (04) years old. For these three (03) victims, interviews were conducted with their parents, who had been at their side since the incident occurred until its final outcome. Table 2 presents the characteristics of respondents. Overall, 11 healthcare workers were surveyed, with at least two per locality. Among the healthcare workers surveyed, most were nurses (5/11), while there were four doctors (two general practitioners, one paediatrician and one emergency doctor). Midwives (3/11) were also surveyed. During the study, all age groups were represented.

Table 2. Characteristics of respondents.

	n (%)
Categories surveyed (n = 85)	
Local leaders	05 (5.89)
Traditional therapists	05 (5.88)
Health workers	11 (12.94)
Survivors	27 (31.76)
Relatives of victims	36 (42.35)
Head or representative of the Water and Forestry Directorate	01 (1.18)

Continued

Age of victims (n = 27)	
1 - 10	02 (7.41)
11 - 17	05 (18.52)
18 - 30	09 (33.33)
31 - 59	08 (29.63)
60 and more	03 (11.11)

Socio-cultural beliefs reinforcing delayed access to healthcare

In the municipality of Bassila, prevention efforts and decisions made regarding the treatment of snake bite envenomation cases take into account local knowledge about snakes. People generally rely on traditional healers to treat snake bites. Among the local population, a snake bite is not only a natural incident, but can also signify a message, a spell cast by an enemy, or punishment for a social transgression. According to I.T:

"*A snake bite is natural and it is God's will. But it can sometimes be a case of bewitchment. The victim or those close to him must quickly ward off the spell to avoid death*". (*I.T, traditional therapist*)

So, the treatment should deal with the effects of the venom, but also the perceived cause of the damage. The healer works out the underlying cause of the accident and then takes action to get the patient back to good health. A.E. backed this up with what he said:

"*We must first correct and cancel the spell before touching and healing the victim. Otherwise any effort at healing will be in vain... And it's sometimes very difficult*". (*A.F, traditional healer*)

The results obtained therefore made it possible to understand that there are many traditional beliefs that influence first aid and victims' healthcare-seeking behaviours in the municipality of Bassila.

These beliefs strongly influenced the perspectives and practices of the victims and their relatives who were surveyed. The treatment procedure mentioned by traditional healers requires the victim to ingest the roots and leaves of various plants. Recurrent vomiting after ingestion indicated a "bad bite", synonymous with bewitchment. However, the healers did not disclose specific details about the mentioned plants.

Previous positive treatment experiences, home services, and sometimes treatment at agreed-upon costs encouraged victims to seek traditional care:

"*I receive around five snakebite cases every month that I treat. They know me and they trust me. My role is to treat them. And even if some come with nothing... if they are cured they pay me what they have...*". (*A.F, traditional therapist*)

Therapeutic approaches

A snake bite, whether venomous or not, is an emergency that is often life-threatening. The people surveyed during the study understood the seriousness

and urgency of a snake bite. Their main fears were the rapid spread of venom and the often fatal outcome for the bite victim. These fears stem from centuries of innate predispositions and socio-cultural conditioning during which humans have developed a deeply ingrained survival instinct towards snakes.

"*A snake is very dangerous... Like everyone else here, I knew that and I was very wary of it... But I nearly died. When it bites you, you feel like you're gradually losing your life to the poison it injects into you. Suddenly you feel everything from nausea to intense pain in the bitten limb. You feel your condition worsening with every passing minute. It's an experience you dread even more after you've been through it...*". (*I.A, surviving victim*)

Building on this, all participants in the study indicated that delays in treating snake bite victims represent a mistake that could be fatal. The consequences can be numerous and sometimes irreversible. These consequences vary mainly according to the type of snake and the time taken by the victim to receive appropriate care.

The healthcare workers surveyed reported significant cases of delayed access to medical care. Some snake bite victims had delayed seeking care for more than seven (07) days. The consequences described included poor clinical outcomes, longer hospital stays, and sequelae that sometimes led to limb amputation.

"*My most recent experience was of a child who was brought here to hospital in a comatose state after being bitten by a snake at home... This child was referred to the departmental hospital for treatment. This child was referred to the departmental hospital. But despite our efforts, the parents went back home to look for other solutions... Unfortunately, this child, who could have been saved, died the same day...*". (*N.A, health worker*)

Although victims and their families are aware of the urgency and necessity of receiving adequate treatment in the event of a snake bite, it was clear that those bitten prioritised treatment by a traditional healer rather than going to a health facility. Interviews revealed several reasons that could explain this decision.

The municipality of Bassila has 27 peripheral health centres to ensure access to medical care for the entire population. However, they are rarely used by beneficiaries due to the quality of the care services offered there. All of the people surveyed were very dissatisfied with the care offered by the health centre in their locality of residence. The main reasons were the inadequacy of medical facilities and previous experiences at these centres. In addition, only three (03) of the 27 health centres had the antivenom needed to treat snake bite victims. Aware of these realities, victims often choose other alternatives that are sometimes harmful to them. This is the case for B.W. and M.I., whose stories illustrate the dilemma faced by victims:

"*I wasn't sure if the centre in my locality could help me... People in the past have gone there but they were eventually sent back to the big area hospital... I prefer to go straight to the healer. It's quick*". (*B.W, surviving victim*)

"*What will I do if I wasted my time going to the health centre here and then*

had to look for myself somewhere else? *That's why they took me straight to… a local healer*". (*M.I*, *surviving victim*)

One of the reasons cited was also the high cost of medical care. Victims were unable to pay for and continue treatment, especially when it became long-term. Medical procedures, prescriptions and hospitalisation costs exacerbate victims and their families, who mostly live in poverty and have low purchasing power. For families, this reality makes it difficult for them to pay for antivenom and treatment, even when these are available.

Like many other victims, M.M., an 11-year-old schoolgirl, was bitten at the entrance to her home on her way back from school and had to interrupt her medical treatment at the local hospital due to lack of financial resources. Her mother, D.K., aged 39, said:

"*…it was very difficult for us because we couldn't pay the hospital any more. According to my brother, it was a problem that the healer was going to solve quickly. Which we finally did, and she was completely saved. Treatment is expensive for us*".

The high cost of treatment for snake bites is one of the reasons for scepticism towards medical services. At Bassila Regional Hospital, antivenom costs 57,030 CFA francs (€76). This is beyond the financial means of most victims, who are mainly extremely poor seasonal workers, such as farmers, who are the most affected.

Far from these realities, analysis of beliefs and behaviours surrounding snake bites varied greatly among the population of Bassila. However, the use of traditional medicine or techniques such as tourniquets or herbal remedies at the site of the bite was observed in almost all of the people surveyed. This is evidenced by the responses collected from respondents J.O. and K.R.:

"*In case of a snake bite, people panic… They often tie up the bitten finger or foot and many apply crushed or chewed leaves to the area…*". (*J.O*, *health worker*)

"*When snakebites occur, many are taken to well-known healers in the community… they specialise in snakebites, whatever the type of snake…*". (*K.R*, *mother of surviving child*)

Immediately after being bitten by a snake, victims receive first aid from their family, friends and sometimes strangers, and are then taken to the place where they will be treated. The first aid received before going to a traditional healer or hospital included, among other things, the application of a tourniquet to slow the spread of the venom (often using long grasses, a cloth or a piece of clothing), the consumption of herbal decoctions, scarification with razor blades to remove snake fangs, and the application of urine to the wound:

"*People came running… they tore off my clothes and tied them to my foot, biting it, then chewed a leaf and put it in the wound, which was already bleeding… the leaves stopped the bleeding.* (*C.A.M*, *surviving victim*)

The use of traditional treatments as a first resort and a lack of knowledge about correct first aid procedures in cases of snake bites are important factors contrib-

uting to the heavy burden of morbidity and mortality due to snake venom poisoning in the commune of Bassila.

Overall, survey respondents described several care pathways (Figure 1).

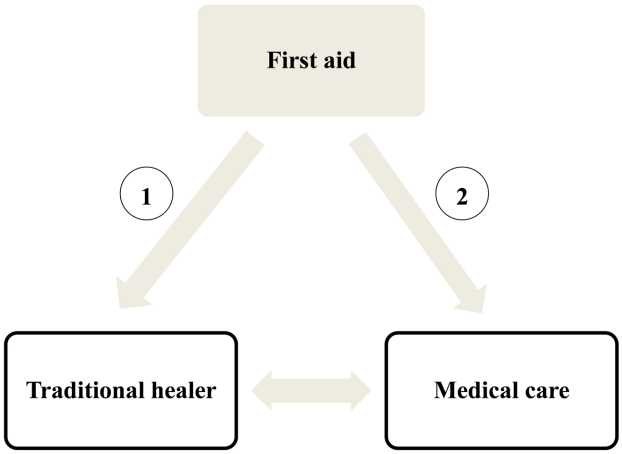

Figure 1. Therapeutic itineraries for snakebite victims.

The treatment pathways identified in order of importance are as follows:

1) Seek immediate treatment from a traditional healer until complete recovery;

2) Seek treatment from a traditional healer, then be transferred to a healthcare facility if the condition worsens, until complete recovery;

3) Seek care at a healthcare facility, then be transferred to a traditional healer until complete recovery;

4) Immediately seek formal care (public or private healthcare facilities) and remain there until complete recovery.

Thus, although most respondents went to the hospital or a traditional healer where they remained until recovery, some patients chose to be treated in both healthcare systems successively. The reasons given were treatment failure or loss of confidence in the effectiveness of the first option. B.S. first went to the hospital but had to continue his treatment with a traditional healer:

"*After I came to the hospital, they sent us to pay for bottles of injections. Then the health workers decided to refer us to the departmental centre... So I decided to leave the hospital and go and see some traditional healers to ask for their help. So I decided to leave the hospital and went to see some traditional healers to ask for their help.*" (*B.S, surviving victim*)

M.A., on the other hand, only tried to get formal care after traditional medicine didn't work:

"*I was taken straight to the traditional healer who, they said, was an expert in treating snakebite victims... At first I felt better but he couldn't help me heal... My condition worsened after* 17 *days... I finally went to hospital where I was treated*". (*M.A, surviving victim*)

Quality of medical care

The quality of medical care is crucial to reducing the burden of mortality from

snake bite envenomation. Indeed, the frequent use of traditional treatments, often as a first resort, delays access to modern care and worsens the prognosis. Thus, rapid and high-quality care reduces complications (necrosis, haemorrhages, renal failure) and mortality, which remains high in contexts where care is inadequate or inaccessible. This requires the availability of appropriate and affordable anti-venoms, training for healthcare personnel, geographical accessibility to care, effective organisation of services and awareness-raising among the population.

Most of the victims surveyed who went to the Bassila district hospital received first aid immediately after admission.

According to F.A., healthcare personnel are aware of the urgency and necessity of rapid treatment for snake bites:

"*The reception service was good at the area hospital. A few minutes after my arrival I started receiving first aid*". (*F.A*, *surviving victim*)

Some cases of delays in seeking care were recorded, but the reasons for these delays were not attributable to the victims themselves. These included the distance between where they lived and the hospital, and the difficulty in getting transport, including a lack of ambulances to take patients from outlying health centres. This was the case for B.S., who had to deal with transport issues to get to the local hospital where he needed proper care:

"*I felt really bad when the health worker referred us to the local hospital*, *but our relatives who could take us there were not nearby... It took us* 3 *hours to get to the hospital to be treated*". (*B.S*, *surviving victim*)

In most cases, victims did not know exactly what treatment they were receiving and described the treatments as tablets, injections, ointments and skin incisions:

"*It was like pills*, *they gave me pills again*, *also an injection*" (*B.S*, *surviving victim*)

Nevertheless, patients who sought hospital care were largely satisfied with the care they received, whether they experienced delays or made a full recovery.

"*I was satisfied with the treatment I received at the hospital*, *because if I hadn't gone there*, *I wouldn't have survived*". (*S.B*, *surviving victim*)

They were satisfied and pleasantly surprised by the quality of care they received at the hospital, to the point that some patients were surprised that doctors could treat snake bites:

"*I was satisfied*, *because there's a myth that says that in hospital they don't treat snakebite and that traditional healers are the ones who can treat it... I was very surprised by the welcome*, *but I was especially happy with the way I was healed in hospital*". (*R.A*, *surviving victim*)

Patients seeking treatment from traditional healers were largely influenced by the success or failure of the treatment they received at the hospital. Those who made a full recovery after a period of time were satisfied, while those who suffered long-term effects requiring longer-term care were not. This was the case with B.S., who had to seek the services of a traditional healer for rehabilitation care:

"*I was walking normally before the bite. During the* 4 *months I was ill*, *I couldn't*

walk for long. But after the hospital, I couldn't walk like I used to. I'm currently receiving treatment from a traditional healer". (*B.S, surviving victim*)

In conclusion, most of those surveyed would recommend hospital treatment to their loved ones in case of a snake bite, even though they themselves had consulted a traditional healer:

"*I can encourage them to go to hospital... in hospital, they have been trained to treat people and they do it well*". (*S.B, surviving victim*)

4. Discussion

Socio-cultural beliefs and practices

This study has produced results describing the extent and severity of morbidity and mortality due to snake bites in the municipality of Bassila. A total of 602 cases of snake envenomation were recorded at the Bassila district hospital between 2020 and 2024. Snake bites are a serious condition which, depending on the species of snake involved, can quickly lead to death. All participants in the qualitative study recognised the seriousness and urgency of a snake bite. They also recognised the need for urgent treatment to prevent death. However, all had insufficient knowledge of first aid methods, as was the case in the study conducted by Michael *et al.* [5] in Nigeria in 2011. It revealed the existence of practices such as the use of tourniquets, incisions in the affected area and the use of substances of various origins, which are considered by patients to be a means of removing the venom or preventing its spread throughout the body. These procedures are contraindicated in cases of snake bites due to the risk of necrosis and secondary bacterial infection.

Traditional oral medicines, such as herbal preparations, were frequently mentioned by participants in our study. These treatments are considered an alternative to hospital care, or a form of first aid to relieve symptoms while travelling to the hospital.

This set of practices originates from the community itself or from traditional healers. The use of these self-care practices, which are often harmful, has been documented in several studies around the world as being the cause of delayed medical assistance and poor prognosis in snake bites [6]-[8]. Awareness of the need for antivenom treatment is therefore a good starting point for alerting the Bassila community to the dangers of certain practices, but above all for educating them on first aid measures in the event of a snake bite.

For some of the snake bite victims surveyed, it was a case of bad luck or a spell. These beliefs are common in African societies, as demonstrated by Romaric Zarambaud *et al.* in their study on the popular perception of snake bites in savannah and forest areas in the Central African Republic. In this study, the majority of respondents perceived snake bites as accidents, while a quarter of them considered them to be bad luck linked to witchcraft.

Socio-cultural and health-related reasons for treatment

Our study sought to understand the treatment pathways of snake bite victims, particularly in the municipality of Bassila. The analysis revealed that people bitten

by snakes sought treatment from a traditional healer as a first resort rather than going to a health facility. Several studies conducted in the Brazilian Amazon region corroborate this reality and demonstrate the effect of delays in the effective treatment of snake bites as a risk factor for complications and even death [9].

The multiple reasons for this initial choice identified by the present study were the lack of adequate medical facilities in the locality of residence and the inability to pay for treatment, especially when the treatment became lengthy. Beyond these reasons, delays in treatment are generally attributed to the long distances patients must travel to reach the Bassila regional hospital.

Apart from these reasons identified in this study, some snake bite victims attribute their delayed access to medical care [1] to cultural factors that lead them to choose traditional treatment [8]. According to the information gathered during this study, traditional healers occupy a position of influence within the community as respected and trusted individuals. According to the study participants, they are socio-cultural actors who have proven themselves in the management of snake bite cases. These results lead to the conclusion that the use of traditional treatments as a first resort contributes to the heavy burden of mortality due to snake venom poisoning in the commune of Bassila.

When participants understand that a snake bite is life-threatening, they often seek help from the hospital more quickly because they are afraid of leaving their loved ones without support and condemning them to death. In our study, educational attainment was slightly higher in the group receiving early medical assistance. We did not specifically study the effect of this variable on the time taken to obtain care, but it is possible that more educated participants tend to be better informed about the procedures to follow after a bite and have more financial resources to go to the hospital. Some of the patients surveyed began their journey to the hospital immediately after the bite, revealing their understanding of the need for professional treatment. However, the vast majority prefer care at the referral hospital rather than at the centre in their area of residence. According to the victims surveyed, this behaviour is linked to previous frustrations with the low effectiveness of peripheral healthcare centres in their localities in resolving their health problems. The same findings have been reported for many health problems [10], [11]. It is important to realise that a programme to decentralise antivenom treatment to less complex health facilities in localities is necessary. In Ecuador and Tanzania, successful management of snake bite envenomation has been achieved in a region with severely limited resources. However, this initiative has improved access to treatment for snake bites in clinics, including those run by nurses [12] [13]. Initiatives in this direction must therefore be evaluated urgently in the municipality of Bassila.

Limits

The findings from this study cannot be generalised to the entire population of Bassila because the sample was not representative due to a selection bias that consisted of including only patients received in the care services of the district hospi-

tal. Another important aspect not addressed in this study is the impact of first aid in deaths from envenomation.

Furthermore, the retrospective nature of the study may have introduced a recall or memory bias during the face-to-face interviews with participants. In addition, it should be noted that not all individuals eligible for the selection criteria could be interviewed because some had died, which may have led to information bias on the part of their relatives.

5. Conclusion

This study has enabled us to identify therapeutic approaches used by victims of snake bites in the municipality of Bassila in north-eastern Benin. As with most health issues, therapeutic pathways and access to healthcare in cases of snake bite envenomation are the result of numerous complex processes. Access to appropriate healthcare requires considerable effort on the part of victims. Snake bites are a worrying public health problem in this region. However, the majority of people surveyed systematically resorted to traditional healthcare, both to ward off bad luck and for reasons of logistical and financial accessibility to traditional healers. Our study found that the community in high-incidence areas lacks knowledge of first aid for snake bites. Medical care is sometimes inadequate in peripheral health facilities, especially those without emergency services. It is important that, in the management of snake bites in the municipality of Bassila, socio-cultural considerations that discourage the use of medical facilities be taken into account. The main obstacles identified from the in-depth analysis are the high cost of care, including antivenom treatment and hospitalisation, poor access to healthcare, and low acceptability of the healthcare currently offered in rural areas, to the detriment of the service offered at the hospital. Public health interventions should focus on health education and improving rapid access to antivenom serum for victims by promoting immediate and rapid transport to appropriate treatment centres. Strategically located antivenom serum distribution points among existing health centres in Bassila could be a solution that maximises coverage and minimises the time spent on care. It is therefore important to develop a social communication strategy for these populations on snake bites and to reconcile modern medical interventions through the availability of affordable antivenom serum in health facilities with traditional care of proven effectiveness in order to optimise the quality of care in the management of ophidian envenomation in the municipality of Bassila.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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