

Snakebites in Africa: a humanitarian and political fight

Julien Potet • Médecins Sans Frontières

This is an innovation probably ignored by the public at large and maybe even by some of the humanitarian actors. With 100,000 mortal bites per year, poisoning by snakes is now considered as a neglected tropical disease. Julien Potet explains to us how Médecins Sans Frontières has seized this issue to make a fight out of it that is both humanitarian and political.

The fight against neglected tropical diseases, such as visceral leishmaniasis and sleeping sickness, is one of the leading medical objectives of *Médecins Sans Frontières* (MSF)¹. All of these diseases mainly affect impoverished, mostly rural communities located in developing countries. For lack of any type of political influence, patients suffering from these afflictions most often go unnoticed by health authorities. And given their lack of any economic weight, they are disregarded by the pharmaceutical industry. Accordingly, in 1999, Hoechst (that subsequently joined the Sanofi group) unilaterally decided to discontinue the production of eflornithine, the least toxic drug that was then available against sleeping sickness, as a result of its poor profitability. However, a media campaign spearheaded by MSF and the World Health Organization (WHO) managed to have Sanofi/Hoechst reverse its decision: the production of eflornithine then resumed and the company pledged to supply eflornithine to patients in Africa at no cost for an indefinite period of time.

Same causes, same effects

Five years ago, a similar case at MSF sparked renewed interest in an other neglected tropical disease, a bit peculiar: poisoning caused by venomous snakebites. It is indeed a disease, with many possible symptoms depending on the species involved, a disease that requires specific treatment. Five years ago then, Sanofi – again on the scene – had just decided to stop manufacturing FAV-Africa, its snake antivenom marketed in Africa. Antivenoms are medications derived from animal plasma (see box). Most other antivenom sera sold in Africa were then either of poor or of undetermined quality. MSF lost no time in denouncing Sanofi’s decision in the media². At the same time, at MSF, we worked to improve the care of snakebite victims in our hospitals. The number of snakebite admissions rose rapidly, indicating there was a fundamental unfulfilled need that, until then, was addressed only by traditional healers. In Ethiopia, the Central African Republic, South Sudan, and Yemen, thousands of snakebite victims are now being treated in our hospitals every year. Projects in other affected areas are under study.

¹ Médecins Sans Frontières, *Sortir de l’oubli. Lutter contre la leishmaniose viscérale, la trypanosomiase humaine africaine, la maladie de Chagas et les autres maladies négligées*, rapport [in French], 2012, p. 9-12, www.msf.fr/sites/www.msf.fr/files/sortir_de_loubli_fr.pdf

² MSF Access Campaign, “Snakebite: How Sanofi slithered its way out of the neglected antivenom market”, July 2015, https://www.msfaccess.org/sites/default/files/NTDs_Brief_FavAfrique_ENG_2015.pdf

How are snake antivenoms produced?

Antivenoms are the only specific treatment for envenoming by snakebites, even though there is also an essential need for supportive care, especially assisted ventilation, when treating certain types of envenomation. Antivenom production is a technically demanding process, even today, now more than a hundred years after the basic principles for its development were first discovered by Calmette and other Pasteur associates. Animals, most often horses, are first inoculated with a mixture of venoms milked from representative snake species. The animal plasma is collected (no worry, no danger for the animals!), and the antibodies produced in the plasma are isolated, purified, and optionally subjected to fragmentation. Strict production guidelines are essential.

However, much is left to be done and MSF's action has just been a mere drop in the ocean. Indeed, an estimated 100,000 people in the world die each year from snakebites. Several hundred thousand other victims manage to survive but with severe disabilities. The Indian subcontinent is the most affected, followed by sub-Saharan Africa³. The actual number of victims is uncertain. Hospital records are poor indicators, as many snakebite victims simply do not seek hospital treatment. Local epidemiological surveys would need to be scaled up to accurately assess the number of cases and fatalities in a community and to identify the villages most exposed to risk. Prevention education programmes and better local hospital care could then be provided.

Making quality antivenoms available to patients

The financial burden is also a major hurdle. Antivenoms are very costly for victims. Quality treatment comes to at least fifty euros per patient and considerably more for a severe envenomation that requires a large number of doses. In sub-Saharan Africa, patients usually pay for the full cost of treatment, as stipulated by general cost recovery policies. For want of money, snakebite victims, mainly peasants, can only afford to buy one or two vials of antivenom. MSF recommends that they receive affordable care, either cost-free or at most for a minimal amount of money, like in the case of other life-threatening medical conditions, such as emergency caesarean sections. This seems especially valid considering that serious studies report that the use of an adapted and effective antivenom serum in Africa is an extremely cost-effective public health measure⁴. Some countries, such as Burkina Faso, having realized this, have decided to subsidize the cost of antivenom treatment. MSF calls on other countries concerned to follow this example.

At the same time, the quality control of antivenoms available on regional markets must be fundamentally upgraded. Inferior quality products still abound. Inadequately purified animal plasma products present substantial risks of causing adverse side effects. These products must also be checked to verify that they effectively correspond to the bites of the most venomous species of snakes in a given region, thus confirming their efficiency. Unfortunately, it is not uncommon to find African hospitals supplied with antivenoms active against Asian snake species yet ineffective against local species⁵. In Ethiopia, MSF was left with the sole option of using the only serum approved in the country, one that was manufactured in Egypt, but which does not match very well the predominant species of snakes in Ethiopia. MSF did not hesitate to

³ Jose Maria Gutiérrez *et al*, "Snakebite envenoming", *Nature Reviews Disease Primers*, October 2017, p. 1-20.

⁴ Nicholas Brown, "Antivenom: the most cost-effective treatment in the world?", *Toxicon*, June 2010, p. 1405-1407.

⁵ David Warrell, "Unscrupulous marketing of snake bite antivenoms in Africa and Papua New Guinea: choosing the right product – what's in a name?", *Transactions of The Royal Society of Tropical Medicine and Hygiene*, May 2008, p. 397-399.

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immediately contribute funds to the WHO Prequalification of Medicines Programme for a comprehensive evaluation of the antivenoms currently marketed in sub-Saharan Africa. We are keenly awaiting the results, hoping that African countries will follow WHO's recommendations and ban the marketing of poor quality antivenoms that fail to correspond to the predominant snake species in a country.

The training of health professionals is another challenge. Despite the actions of organizations like the Global Snakebite Initiative and the African Society of Venimology, health workers are inadequately trained to deal with envenomation. For example, many of them continue to recommend using a tourniquet as a first aid measure, even though this practice is deemed hazardous. We regard it as essential that the subject of envenomation be included as part of the training programme of physicians and paramedical staff, and especially hospital workers in the rural areas that are the most affected.

Lowering mortality rates is possible

When all conditions have been met, that is, first and foremost, well-trained staff and free access to quality care, plus the availability of suitable and effective antivenom, the mortality from snake bites can be reduced. This effectively occurred in Paoua in the North-West of the Central African Republic. MSF now admits more than 300 snakebite victims every year. Despite security risks, patients no longer delay going to the hospital, at most within 12 hours after having been bitten. The vast majority of cases are caused by vipers belonging to the species *Echis ocellatus* found everywhere in the West African savannah. This viper's venom disrupts the clotting of blood. In the absence of effective treatment, over 10% of victims of envenomation by this snake die from a haemorrhage. Since the introduction of a new and better adapted antivenom serum, mortality in Paoua has been held to under 1%.

Projects of this type, fully integrated into a hospital's overall activities, must be generalized. For this to happen there is no question that awareness must be generated at the political level. A first step was taken in 2017, when snakebite envenomation was added to WHO's official priority list of neglected tropical diseases⁶. In May 2018, the World Health Assembly [the decision-making body of WHO, editor's note] is expected to adopt a resolution on snakebites. At the end of this year, WHO will roll out a roadmap built around several key approaches: epidemiological surveys, prevention and community education, training of health professionals, improvement of health care systems, and access to quality antivenoms. The success of this plan depends primarily on the provision of substantial financial aid from the ministries of health in the countries that are most concerned, as well as from international donors, who, till now, have been rather hesitant or even indifferent.

A battle on several fronts

In summary, the fight against venomous snake bites entails greater involvement in the field, as well as in the political arena. Several challenges remain: to better man rural areas with trained health care workers, to further regulate the pharmaceutical market, to call into question cost recovery policies and user fees in health care systems, and to better target the most impoverished people in developing countries. MSF's actions against snakebites are part of a humanitarian and political crusade for forgotten people who are remote from decision-making centres. Supporting

⁶ Benjamin Waldmann, "WHO has added snakebite to the NTD list: these things need to happen next", *The Lancet Global Health Blog*, September 2017.

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the prevention and management of snakebite envenomation is a concrete step towards the universal health coverage that today's international decision-makers are calling for.

Translated from the French by Alain Johnson

Biography

Julien Potet • Julien Potet has been working on the Essential Medication Access Campaign of Médecins Sans Frontières since 2011. He advocates for access to treatments against neglected tropical diseases, such as Chagas disease, human African trypanosomiasis, visceral leishmaniasis, Ebola, and envenomation from snake bites. Previously, Julien worked with other NGOs, of which Sidaction, in the area of access to HIV treatment.

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