Perspective

Snakebite Management in India: Challenges Remain

Kaushik Bharati
Health Policy Consultant – UNESCO New Delhi

CORRESPONDING AUTHOR
Dr Kaushik Bharati, Health Policy Consultant – UNESCO New Delhi
E Mail ID: dr.kaushik.bharati@gmail.com

CITATION
Bharati K. Snakebite Management in India: Challenges Remain**.** EFI Bulletin. 2023;4(1):32-34.
https://doi.org/10.56450/EFIB.2023.v3i01.008

ARTICLE CYCLE
Received: 16/03/2023; Accepted: 21/03/2023; Published:31/03/2023

Snakebite continues to be a major problem in tropical countries, especially so, in India. India still has the highest number of deaths, which accounts for approximately half of the global burden. Management of snakebite victims remains a constant challenge in India, especially in rural settings. Even after the inclusion of snakebite envenoming in the priority list of neglected tropical diseases (NTDs) by the World Health Organization (WHO) in 2017, there is still a long way to go to reach the goal of halving the number of cases and deaths by 2030.

Snakebite in India: A long neglected tropical disease

Snakebite is a neglected public health problem in many tropical and subtropical countries worldwide, especially so in India. It is arguably the 'most neglected' of the NTDs. In fact, it is so neglected that until very recently, it wasn't even categorized as an NTD. In 2017, WHO recognized snake envenoming as a NTD, and included it in its list of top-20 priority NTDs (1). This is the result of intensive lobbying by snakebite activists around the globe who had pushed hard for a long time for categorizing snakebite envenoming as a NTD.

The snakebite problem

Snakebite is a very serious problem in many parts of the globe, including India. It is estimated that approximately 5 million snakebites occur annually worldwide, with up to 2.5 million envenomings. It is estimated that on average, 100,000 deaths occur annually around the globe (range: 81,000 – 138,000), while approximately 300,000 are maimed or permanently crippled for life (2).

Notably, the above data are hospital-based and therefore, a gross underestimate as many snakebite deaths occur in remote places, primarily in rural areas. Many of these victims die on the way to hospital to receive antivenom therapy. Therefore, the lion's share of snakebite fatalities go unreported (3).

Snake envenomation is a medical emergency as it often results in severe hemorrhage, rhabdomyolysis, shock, blood clotting defects, acute kidney injury (AKI), necrosis, paralysis of respiratory muscles, among other complications that require immediate medical attention. Sadly, permanent disability in the affected limb sometimes require amputation. The most vulnerable group are the agricultural workers, who venture into the paddy fields and often get bitten by venomous snakes. Children are also highly vulnerable as the same amount of venom causes much greater damage due to their small body size, compared to adults.

The first line of treatment for snakebites is administering first aid, which should be short, simple and quick. Not much time should be wasted on first

aid. It is very important to transport the victim as quickly as possible to a hospital, where antivenom is available, which is the only definitive treatment for snake envenomation. Indian snake antivenom is polyvalent, meaning that it is raised against more than one species of snake. In fact, Indian antivenom is manufactured from a cocktail of venoms from the 'Big Four' that are responsible for the highest number of deaths in India. These include the Indian cobra (*Naja naja*), Russell's viper (*Daboia russelii*), saw-scaled viper (*Echis carinatus*), and the common krait (*Bungarus caeruleus*).

The Indian scenario

The most influential role is played by India in the context of the global snakebite mortality and morbidity statistics. India, being a vast and highly populous country, strongly influences the national snakebite epidemiological pattern. Notably the major chunk of the population (~70%) resides in rural areas, where snakebite incidents are more rampant. A landmark study, termed as the "Million Death Study", was conducted between 2001 and 2003, that used verbal autopsy to gather and analyze data. This study conducted a detailed nationwide snakebite mortality survey using data from 123,000 deaths from 6,671 randomly selected areas of India. This study found that approximately 45,900 snakebite fatalities occur annually in India, which is the highest in the world. Importantly, most of the deaths occurred in rural areas, accounting for 97% of all snakebite deaths in India. The states where the largest number of deaths occurred annually were Uttar Pradesh (8,700), Andhra Pradesh (5,200), and Bihar (4,500) (4).

The ground reality is that most of the primary health centers in rural India have suboptimal infrastructure and lack of trained doctors and nurses for tackling a snake envenomation emergency. As a result, many rural folk either turn to traditional healers such as *"Ojhas"* for help or don't seek medical care at all. This clearly hints at the fact that the number of snakebite victims is likely to be much higher than the official figures. Hence, due to this gross underestimation, snakebites should definitely be considered as a neglected problem in South Asia in general and India in particular (5,6).

What can be done?

Firstly, categorization of snake envenomation as a NTD, has given its due importance on the global health agenda of health policymakers, which it previously lacked. The proactive role of WHO has ensured increased allocation of global funds for the management of snakebites. This has allowed India to leverage funds for training medical personnel, community mobilization, snakebite advocacy, as well as increasing the quality and quantity of antivenom production.

Currently, only seven Indian companies manufacture snake antivenom, which collectively provide approximately 1,958,000 vials (10 ml antivenom per vial), as per 2012 data (7). These companies should be provided incentives by the government to increase capacity-building, so that there isn't a shortfall of these life-saving medicines.

More public-private-partnerships (PPPs) and hand-holding among the various stakeholders will facilitate manufacture, testing, and quality control of snake antivenom. Moreover, leading vaccine manufacturers and start-ups should be roped-in and coaxed to produce snake antivenom. Linking these vaccine manufacturers to government organizations, such as the Central Research Institute (Kasauli, Himachal Pradesh) in a PPP mode will boost production capacity.

More international collaborations in the domain of medical research should be encouraged for developing novel and innovative ways of fighting the snakebite menace. Moreover, research strategies should also be focused on developing new therapeutic molecules and point-of-care rapid diagnostic tests (RDTs) for use in low-resource settings.

Therefore, there is an urgent need for a holistic approach, encompassing community participation, education of vulnerable populations, adequate training for medical staff to tackle snakebite emergencies, and ensuring availability, accessibility and affordability of snake antivenom, especially in rural areas. This multi-pronged approach is likely to drastically reduce the number of snakebite deaths in India.

REFERENCES

1. World Health Organization. The NTD road map: Together towards 2030. Available from: https://www.who.int/teams/control-of-neglected-tropical-diseases ; Accessed 12 March 2023.
2. World Health Organization. Snakebite envenoming. 17 May 2021. Available from: https://www.who.int/en/news-room/fact-sheets/detail/snakebite-envenoming ; Accessed 12 March 2023.
3. Groneberg DA, Geier V, Klingelhöfer D, Gerber A, Kuch U, Kloft B. Snakebite envenoming – A combined density equalizing mapping and scientometric analysis of the publication history. PLoS Negl Trop Dis. 2016; 10(11): e0005046.
4. Mohapatra B, Warrell DA, Suraweera W, Bhatia P, Dhingra N, Jotkar RM, Rodriguez PS, Mishra K, Whitaker R, Jha P and for the Million Death Study Collaborators. Snakebite mortality in India: A nationally representative mortality survey. PLoS Negl Trop Dis. 2011; 5(4): e1018.
5. Alirol E, Sharma SK, Bawaskar HS, Kuch U, Chappuis F. Snake bite in South Asia: A review. PLoS Negl Trop Dis. 2010; 4(1): e603.
6. Warrell DA. Snake bite: A neglected problem in twenty-first century India. Natl Med J India. 2011; 24: 321-24.
7. Whitaker R, Whitaker S. Venom, antivenom production and the medically important snakes of India. Curr Sci. 2012; 103(6): 635-43.