

Thoughts on Snake Species, Their Bites As Well As Management

Ashraful Kabir¹, Walid Fathy²

Corresponding Author Email: ashraful.mission@gmail.com

Keywords: Snake, Snakebite, Superstitions, Antivenom, Toxin, Snake charmer, Medical Colleges, Treatment, Management

ABSTRACT

Snakes are medically recognized creature all over the world. Snakebite is a much-neglected issue, but its management is urgent to the victims. Recently, Chittagong Medical College of Bangladesh has inaugurated a research section on the venom of snakes. This composition based on various reports, articles and books has been done for the multidisciplinary people. The review report suggested flood season is vulnerable to all sorts of people, and villagers are more prone to snakebite. The villagers do not get proper medications due to a lack of knowledge of first aid, and they are used to the treatment by traditional snake charmers.

INTRODUCTION

There are 3000 types of snakes in the world and only 15% are dangerous. According to World Health Organization globally there are 5 million cases of snake bites each year leading to 81000-183000 deaths, and 4000000 amputations [1]. The vipers, rattlesnakes, boas and most sea snakes give birth to offspring but colubrid and 70% of world snake species lay eggs. In 50% of cases, no venom is injected by the bite of snakes [1]. Many victims do not attend health centers or hospitals and they rely on traditional treatments. There is evidence that 4.5 - 5.4 million people a year are bitten by snakes that 1.4 - 2.7 million of them develop clinical illness (envenoming) after snakebites. The lowest incident was found in Europe, Australia and North America and the highest in sub-Saharan Africa, South Asia and Southeast Asia. Rural dwellers, agricultural workers, herders, fishermen, hunters, working children (ages 10-14), people with limited access to education and healthcare providers are the risky individuals to this snakebite.

¹ Department of Biology, Cantonment Public College, Saidpur Cantonment—5311, Nilphamari, Bangladesh

² Department of Biological and Geological Sciences, Faculty of Education, Ain Shams University, Roxy, Cairo 11566, Egypt

Pregnant women are extremely vulnerable to the risk of hemorrhage and miscarriage following a venomous snakebite. In Nepal, 56% of victims reported traditional medicine as primary health-seeking behavior, while in Kenya this figure is at least 68%. Some snakebite victims survive with permanent physical damage due to tissue necrosis, spat venom ophthalmia, nerve damage and sometimes psychological consequences. Snakebite is an important public health issue and is the second most common cause of death during floods. Natural disasters such as floods and earthquakes force them to come out of human settlements [2]. In cobras, mambas, kraits, vipers and pit vipers the toxins found in their venom differ from one group to another, or even between the same groups of snakes in a different region. This means the correct antivenom is often hard to identify and can be very expensive. A little amount of non-harmful amount of snake venom is injected into an animal-usually a horse or sheep. The best antivenom costs US dollars 140 to 300 with three to 10 vials usually required to save a victim's life [3]. Snake charmer cuts the poison sac or rubs the fangs of snakes for their safety [4]. There are many superstitions about snakes in Bangladesh [5]. A circus team could maintain an animal section where snakes could be available [6, 7]. Snake is not suitable as a pet animal [8]. The biting by cobra happens in the late afternoon [9, 10]. Most people know that snakes are harmful and when it comes out they are killed by people instantly [11]. The objective of this review is to enrich the knowledge about the types of snakes and their bites and ensure people provide medical support.

FLOOD SEASON, SNAKE SPECIES AND RESEARCH IN BANGLADESH

The rural area of Bangladesh is a vulnerable area to snakes and their bites, especially during flood time [1]. In Bangladesh (2010) report says there are 4.3 snake bites per 1000000 populations with approximately 2000 deaths annually [1]. A report says that 1064 cobras and 178 eggs were found in Rajshahi division of Bangladesh and in Satkhira and Tangail the number of cobras was remarkable [12]. The common krait is very aggressive at night but docile reptile during the day [13]. In Bangladesh out of 82 species, 28 are venomous and 12 of them are sea snakes [14]. IUCN Bangladesh [15] mentioned total 100 snake species of Bangladesh where most of them are non-poisonous. Some research works on snakes have been focused on the taxonomy, status and distribution and epidemiological survey on snakebite in Bangladesh [16, 17, 18]. Chittagong Medical College of Bangladesh has opened a section on the research of snake venom [19].

BITING SITES OF SNAKES

Sometimes snake bites in the home surrounding while people take care of their chicken or pet birds [20]. Snakes eat a huge quantity of live rodents annually that are usually considered a biological pest of crops [16, 17, 18]. Tota Mia, a snake charmer set up a snake farm in his home yard. He collected 67 snakes from nature. He died of biting of monocled cobra (*Naja kaouthia*) in 2008 when he was playing with snakes [6].

TYPES OF TOXINS

Snake toxins are classified as neurotoxins, hemotoxins, cardiotoxins, cytotoxins and myotoxins. A complex mixture of enzymes, proteins of various sizes, amines, lipids, nucleosides, carbohydrates, enzyme (hyaluronidase) and metal ions are available in snake venom [21].

VENOM RESISTS ANIMALS

Hedgehogs, skunks, ground squirrels and pigs have been shown resistant to venom [22]. Mongooses, badgers, opossums, California squirrels and garden dormice are not immune to all types of snake venom [23].

CAUSES OF SNAKE BITE AND ITS MANAGEMENT

There are several causes of snakebite in the world which are circus team/snake charming/teasing with snakes/exhibition, food storage in home, forest adjacent living and walking/profession, hunting/killing, photographing, importing/exporting/business, pet/vivarium, lack of knowledge, and swimming in the water, etc. Poor access to often inadequately equipped and staffed medical centers in rural areas, high cost of the treatment protocol and inadequate use of antivenoms are major concerns [24, 25]. One should call the nearest poison control center or zoo for identifying the snake that bite the patient [26]. In many cases, the biting snake cannot be identified or even misidentified [27, 28]. Currently available antivenoms are polyvalent that contain antibodies against cobra, Russell's viper, common krait and saw-scaled viper, but not against uncommon kraits, pit vipers and sea snakes [29]. As a first-aid measure, the bitten area should be cleaned with antiseptic or soap and water. A broad firm pressure bandage should be placed over the bitten area but not arterial tourniquets. The patient should be urgently sent to the hospital or health center where antivenom would be available. If there is clear evidence of systemic poisoning slow intravenous infusion of antivenom (20-100 ml diluted in 2-3 volumes of isotonic saline at 15 drops per minute) is given within 4 hours of bite to minimize local effects (necrosis). Children also require the same dose. However, one should be careful about possible allergic reactions and adrenaline (1:1000 solutions). Anti-tetanus and antibiotic prophylaxis must be given. Intravenous fluid (volume expanders in hypotension) should be given to support vital functions. In some forms of neurotoxicity and cholinesterase therapy with neostigmine and atropine may be required. Fright can produce collapse with a feeble pulse within minutes of the patients. Prevention of snakebite can be done by wearing boots, avoiding tall grass and fallen leaves and never trying to capture, or tease snakes. Most of the snakes will try to bite if they are cornered or frightened [1]. It is good to avoid keeping food items like paddy, poultry, and pigeon within the bedroom which might attract rats which in turn attract snakes. Piles of leaves, wood chips, mulch stacks of firewood and piles of cut grass are all comfortable places to hide from snakes. A dead snake should be handled with great care and may inflict a reflex bite. June-September is the epidemic season when 80% of bites may happen. Except for cobra biting, the identification of other snakes is relatively poor by the health service providers. The 10-19 year is the peak age group affected by

snakebites. 67% of bites occur on the feet and legs, 40% of bites between 1700—2200 hours, and 8% of bites occurred when people used to go to the field for defecation. The scientific management of snakebite envenomation requires appropriate first aid, quick transfer of victims to the hospital, training of health care professionals and availability of antivenom and other ancillary drugs and organ support systems. Venomous snakes sometimes fail to inject enough venom effectively during bites [30]. T or Y stick can be used for transferring snakes, Y stick is useful for making pressure on the head of those snakes, grab stick is used for catching speedy snake like kraits and king cobras [31].

CONCLUDING REMARKS

There are many snakes in the world, and among them, most are considered non-poisonous. Superstitions are very obvious about snakes all over the world. Due to playing with snakes, many biting incidents happen and the mortality rate of individuals and snakes is very remarkable. Hot weather, flood season and earthquakes influence to come to these snakes from the wholes. Deforestation and jungle adjacent dwelling and some unauthorized snake farms in the country may lead to this biting incident. All medical colleges could play a significant role to consummate a sufficient amount of antivenom and providing knowledge about snakes. In addition, it is possible to implement a chapter on 'Snakes, their Bites and Management' in all of the classes elaborately.

Table 1. Notes on the following features with the sources

Features	Examples	References
World statistics on snakebite and venom	We should know the world statistics about snakebite	Ahmed, 2019; SEARO, WHO, 2019; Casewell & Ainsworth, 2019
Superstitions	Superstitions on snake is higher than other animals in the world	Azam <i>et al.</i> , 2011; Kabir, 2014
Snake charmer and animals in circus team	Till now, snake charmers are available in Bangladesh	Kabir, 2013; Kabir, 2018; Kabir, 2020
Snake behaviors	Behaviors of snakes could help to protect us from their bites	Warrell, 1995; Whitaker and Captain, 2004
Biting season, species, and research	We should enrich research on snakes	Sarker & Sarker, 1993; Ahsan, 1998; Kularatne, 2002; Khan, 2004; Faiz <i>et al.</i> , 2008; IUCN Bangladesh, 2015; Ahmed, 2019; Kabir, 2019; Dey, 2022
Biting sites	To know those biting sites from their bites	Daniel, 1983; Sarker & Sarker, 1993; Ahsan, 1998; Khan, 2004; Kabir, 2013
Types of toxins	For proper treatment need to know the toxicity of snake venoms	Powell, 2005
Venom resists animals	Some animals could be used to produce antivenom	Bittel, 2016; Chris, 2021
Causes of bite and management	Causes of snakebite could help us to manage this neglected health issue	Khan, 1992; Taber, 2004; WHO, 2007; Simpson, 2008; Alirol <i>et al.</i> , 2010; Harris <i>et al.</i> , 2010; Amin, 2010; Ahmed, 2019; NCDC Guideline, 2019

REFERENCES

1. Ahmed, H. 2019. Snakes and snakebites. Stethoscope (Health and Medicine J.), the independent, 23 April 2019.
2. SEARO, WHO. 2019. Prevalence of snakebite envenoming. Stethoscope (Health and Medicine J.), the independent 23 April 2019.
3. Casewell, N. & Ainsworth, S. 2019. Why are so many people still dying from snake bites? Stethoscope (Health and Medicine J.), the independent 23 September 2019.
4. Kabir, M. A. 2018. Biography of a snake charmer in Saidpur, Bangladesh. *MOJ Biology and Medicine* 3 (4): 151-152.
5. Kabir, M. A. 2014. Superstitions and traditional uses of animal in Bangladesh. *Standard J. of Biological Sciences* 1 (1): 5-8.
6. Kabir, M. A. 2013. Circus tradition of Bangladesh and fate in its animals. *South Pacific J. of Pharma and Bio Science* (1): 51-57.
7. Kabir, M. A. 2020. Animal update in The Great Rowshan Circus of Bangladesh. *International J. of Research Studies in Zoology* 6 (1): 20-22.
8. Kabir, M. A. 2016. Human cruelty and love to animals. *International J. Research Studies in Zoology* 2 (2): 1-8.
9. Warrell, D. A. 1995. Clinical toxicology of snake bites in Asia. In: *Handbook of Clinical Toxicology of Animal Venoms and Poisons* (ed. White, M. A.), pp. 493-588. CRC Press.
10. Whitaker, R. & Captain, A. 2004. *Snakes of India: The Field Guide*. Chengalpattu: Draco Book. pp. 495.
11. Azam, M. S., Alam, S. S., Shah, M. R. 2011. Country report of Bangladesh CITES Asian snake trade workshop 2011, 11-14.
12. Kabir, M. A. 2019. Cobra killing statistics in Bangladesh 2017. *CPQ Medicine* 7 (1): 1-4.
13. Kularatne, S. 2002. Common krait (*Bungarus caeruleus*) bite in Anuradhapura, Sri Lanka: a prospective clinical study, 1996-98. *Postgrad. Med. J.* 78: 276-80.
14. Faiz, M. A., Hossain, M., Amin, R., Ghose, A., Basher, A. 2008. *National Guideline of Management of Snakebite* (2nd ed.), Dhaka: DGHS. pp. 208.
15. IUCN Bangladesh. 2015. *Red List of Bangladesh Volume 4: Reptiles and Amphibians*. IUCN, International Union for Conservation of Nature, Bangladesh Country Office, Dhaka, Bangladesh. pp. xvi+320.
16. Sarker, N. J. & Sarker, S. U. 1993. Observation of some snakes of Bangladesh. *Tiger Paper* 20 (3): 17-21.
17. Ahsan, M. F. 1998. Country report for Bangladesh-Herpetofauna of Bangladesh: present status, distribution and conservation. In: *Biology and Conservation of the amphibians, reptiles and their habitats in south Asia* (Proceedings of the International Conference on the Biology and Conservation of Amphibians and Reptiles of south Asia), (ed. de Silva, A.), August 1-5, 1996. Sri Lanka.
18. Khan, M. A. R. 2004. Checklist of the herpetofauna of Bangladesh. *Cobra* 57: 1-29.
19. Dey, A. B. 2022. Venom: let there be cure: CMC research center dedicated to finding anti-venom for the snake-bitten. *The Daily Star* (<https://www.thedailystar.net/chattogram/news/venom-let-there-be-cure-2993461>). (Accessed on 13 April 2022).
20. Daniel, J. C. 1983. *The Book of Indian Reptiles*. Bombay Natural History Society, Oxford University Press. pp. 141.

21. Powell, R. 2005. Snakes (Encyclopedia of Toxicology (2nd ed.)).
(<https://www.sciencedirect.com/topics/chemistry/snake-venom>). pp. 5220.
22. Bittel, J. 2016. The animals that venom can't touch. Smithsonian Magazine.
(<https://www.smithsonianmag.com/science-nature/animals-venom-cant-touch-180960658/>).
23. Chris. 2021. 7 amazing animals that are immune to snake venom.
(<https://faunafacts.com/snakes/animals-immune-to-snake-venom/>).
24. WHO. 2007. Rabies and envenomings: a neglected public health issue. Geneva. pp. 32.
25. Simpson, I. D. 2008. The "worldwide shortage" of antisnake venom: is the only right answer "produce more" or it is also "use it smarter?" Wilderness Environ Med. 19: 99-107.
26. Taber. 2004. *Taber's Cyclopedic Medical Dictionary (Vol. 2)*. F. A. Davis Company, Philadelphia, USA. pp. 2560.
27. Alirol, E., Sharma, S. K., Bawaskar, H. S. *et al.* 2010. Snakebite in south Asia: a review. PLoS Negl Trop Dis. 4(1): e603.
28. Harris, J. B., Faiz, M. A., Rahman, M. R. *et al.* 2010. Snake bite in Chittagong Division, Bangladesh: a study of bitten patients who developed no signs of systemic envenoming. Trans R Soc Trop Med Hyg. 104 (5): 320-7.
29. Amin, M. 2010. Antivenom for snakebite: critical supply in health care settings. J. of Medicine. 11 (1): 57-59.
(<http://www.banglajol.info/index.php/JOM/article/view/4274/3516>).
(Accessed on 14 April, 2022).
30. NCDC. 2019. NCDC Guideline: Management of snakebite in Bangladesh. Stethoscope (Health and Medicine J.), the independent 23 April 2019.
31. Khan, M. A. R. 1992. *Snakes of Bangladesh* (in Bangla). Bangla Academy, Dhaka, Bangladesh.