Original Article

Knowledge and Awareness of Medical Students Regarding Snakebite and Its First Aid Management in a Tertiary Care Hospital of Western Maharashtra

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Abstract

Background : Snakebite is a severe, time-sensitive medical emergency. It is a risk to public health that can be avoided. For the condition to have as little of an impact as possible, effective management is a must. In order to provide appropriate and effective care in the future, medical students and interns working in the medical field need to be fully aware of the latest guidelines.

Aims and Objectives : The aim of this study is to determine the knowledge and perception of Indian Medical Students about the features and first aid management of Snakebite.

Materials and Methods : A cross-sectional study was done on the medical students and interns of a Medical College of Pune, India to assess their knowledge and attitude about Snakebite first aid management. The sample size was calculated to be 157, but data was collected from about 171 students. The study was carried out using a semi structured questionnaire which was circulated among the students via google forms and the data was analyzed via Epi-infoTM 7.2.3.0 software.

Results : The mean age of the participants was 21.32 years. A majority of the participants that is 95.91% knew that all snakes are not venomous. Whereas 27.49% thought that the snake will catch the image of the victim in its eyes and take revenge later. Almost 74.56% had the idea to wash the bite site with soap and water. While 80.98% knew that there should be no incisions made at the bite site, 46.43% felt that anti venom therapy should not be given to the patient even if the patient is allergic to it

Conclusion : The current undergraduate medical education in India, about the management of Snakebite is leading to gaps in knowledge in several key areas. It is important to highlight a clinically oriented approach appropriate for the Indian context.

Key words : First Aid, Medical Students, Public Health, Snakebite.

When Alexander the Great conquered India in 326 BC, he was astonished by the knowledge of Indian physicians, especially in the treatment of Snakebites. Since that time, India has continued to be known as a country with deadly and poisonous snakes and the consequences of being bitten by one. More than 60 different venomous snake species may be found in India, some of which are common and can cause significant envenoming[1]. Snakes are very important for preserving the ecological harmony of the ecosystem. Because they are timid animals, snakes frequently bite when frightened or provoked. Snakes are frequently encountered in rural areas, where the majority of Indians live. In tropical and subtropical regions,

Editor's Comment :

- There are significant knowledge gaps among Indian medical students regarding snakebite first aid and management, including persistent myths and inadequate understanding of appropriate interventions.
- Strengthening practical, evidence-based education in undergraduate curriculum is crucial to improving early snakebite care and reducing preventable morbidity and mortality.

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Snakebites are a frequent and undertreated public health issue that mostly affects persons from lower socio-economic groups. It is one of the occupational injuries because it primarily affects farmers and those who work in the fields. Globally, Snakebite public health issues are often ignored[2]. leading to its addition to the World Health Organization's list of neglected tropical illnesses in June, 2017[3].

A Snakebite is a serious medical emergency that can cause anything from local tissue damage to the involvement of nearly all of the body's vital organs, which can threaten one's ability to breathe. It can also cause serious bleeding issues that can result in fatal hemorrhages, permanent renal failure, extensive local tissue destruction and even permanent disability or limb loss. Before going to the hospital, Snakebite sufferers frequently seek home medicines and receive inadequate first assistance. The lack of knowledge on how to treat victims properly is to blame for the death rate from Snakebites. One of the most efficient strategies to reduce death in snakebite patients is to administer proper first assistance. A timely first aid response is crucial in the management of life-threatening Snake-bite cases. Despite the existence of established national guidelines, it was deemed necessary to evaluate the clinical staff's knowledge with the national Snakebite management procedure since it might have an impact on the victims' clinical results[3].

The general public is less knowledgeable of the environment, behavior and potentially lethal outcomes of a Snakebite, which include the victim's death. Sometimes, spectators or the family members of snake bite victims squander time visiting traditional healers and administering ineffective first aid. Even while a sizable percentage of Snakebite victims seek medical attention, it is also clear that both the general public and medical students – the future doctors – have a very limited understanding of Snakebite, its prevention and how to handle first aid in such cases.

The significance of this study lies in its focus on a subject that offers a significant chance to enhance medical schools' quality of instruction in India by filling critical knowledge gaps. It aims to determine the knowledge and perception of Indian Medical Students about the features and first aid management of Snakebite.

Aims and Objectives

To assess medical students' knowledge about the diagnosis and the first aid management of Snakebite injuries and their perception about the Snakebite.

Materials and Methods

A cross-sectional study was conducted via semi structured questionnaire. The study population were the medical students of 1st year, 2nd year, 3rd year, Final year and Interns of a Tertiary Care Hospital and Medical College of Pune. The study was conducted over a period of 1 month that is July 2022.

Since the majority of gifted students in our nation are enrolled in medical schools who are the future doctors, who will serve the nation, we chose medical undergraduates (MBBS) students since their answers to questions about Snakebite knowledge would, if other streams were taken into consideration, show the highest percentage of students who correctly answered. In the third year of the MBBS, the students are taught Forensic medicine and Toxicology which acts as the formal education concerning Snakebite treatment as well as information on the various species of snakes and the myths and realities surrounding them. They have a platform through their internship where they were exposed to Snakebite management scenarios where they work in the health care sector.

Approval of Institutional Ethical Committee was obtained before the start of the study. Consent of the participants was taken before the start of the study.

Google form included questions about socio-demographic data, general information about snakes, knowledge about Snakebite, its first aid management. Considering the proportion of good knowledge among medical students "An assessment of medical students' proficiency in the diagnosis and management of Snakebites: a cross-sectional study from Palestine"[4] as 11.5 %, with a confidence interval of 95% CI and accepted difference of 5%, sample size calculated was 157. Software used was WinPepi version 11.38. The authors got in touch with the students after their regular classes ended to explain the study's goals and how to fill out the questionnaire. Students were advised to answer the form truthfully and as completely as possible. The students were also informed that the answers would be kept anonymous and that no identifiers would be used on the forms when filling out the questions in order to encourage them to respond confidently. Consecutive sampling was done and around 30 students from each

batch were selected. Data was collected using Google forms after obtaining consent. Consecutive sampling was done.

Statistical Analysis :

Data was entered in Microsoft-excel and analyzed using Epi-info TM 7.2.3.0 software.

Results

About 220 medical students and Interns of the Tertiary Care Hospital and Medical College, Pune was approached with the google form. Out of which, only 171 gave the consent and filled out the forms completely. The mean age of the respondents was 21.32 (1.72). Out of 171 participants, 67.25% were females. 21.63% respondents were of 2nd year and final year respectively, followed by 21.05% from 3rd year, with 18.12% from internship batch and 17.54% from 1st year.

In this survey we found out that 88 (51.46%) respondents had their knowledge from Medical Education, 26(15.20%) from internet, 22 (12.87%) from Television, 18 (10.53%) from books and magazines and 8 (4.68%) from family and friends (Table 1).

Among the study population, survey showed that 155 (90.64%) students were not able to identify the venomous snakes correctly. Further, majority of students 121(70.76%) were aware that, “The snake will catch the image of the victim in its eyes and take revenge later” is a misbelief (Table 2).

Survey revealed that regarding the knowledge about Snakebite and first aid 132 (77.19%) students had the knowledge that you should not put local incisions or pricks/punctures be made over the wound site. Whereas majority of students, 138 (80.70%) lacked the knowledge that you should not put tourniquets or other tight bands be applied to the limb closest. In 125 (73.10%) students had the knowledge that a healthy volunteer should not suck out the blood from Snakebite site. For the question of whether a victim should run towards first aid, 48 (28.07%) student had the right knowledge. Further assessing the knowledge regarding whether the wound should be washed with soap and water majority of students, 126(73.68%) students gave the right answer. 100 (58.48%) students expressed that alcohol application at the bite site is not beneficial. For assessing the right knowledge regarding use of topical instillations, application of herbs and usefulness of electrocautery at the bite site, 91 (53.22%) and 126 (73.68%) students had correct knowledge regarding such practices (Table 3).

Survey revealed that regarding the knowledge about first test to recommend in a case of Snakebite case, 80 (46.78%) students responded that it should be 20-minute whole blood clotting test, whereas 39(22.81%),

Table 1 — *Source of knowledge about Snakebite*

Source	N (%)
Medical Education	88 (51.46%)
Internet	26 (15.20%)
Television	22 (12.87%)
Books/Magazines/Newspapers	18 (10.53%)
Family/Friends	8 (4.68%)
Not Responded	8 (4.68%)
Kerala Forest Department	1 (0.58%)
Total	171 (100%)

Table 2 — *Knowledge about snakes*

	Yes [N (%)]	No [N (%)]	I don’t know [N (%)]	Total [N (%)]
Identify all the venomous snakes correctly	16 (9.35%)	155 (90.64%)	0	171 (100%)
The snake will catch the image of the victim in its eyes and take revenge later	47 (27.49%)	121 (70.76%)	3 (1.75%)	171 (100%)

Table 3 — *Knowledge about Snakebite and its First Aid*

	Yes [N (%)]	No [N (%)]	Not responded [N (%)]	Total [N (%)]
Should local incisions or pricks/punctures be made over the wound site?	31 (18.83%)	132 (77.19%)	8 (4.68%)	171 (100%)
Should tourniquets or other tight bands be applied to the limb closest to the bite site?	138 (80.70%)	31 (18.13%)	2 (1.17%)	171 (100%)
Should healthy volunteer suck blood out?	44 (25.73%)	125 (73.10%)	2 (1.17%)	171 (100%)
Should victim run towards first aid?	122 (71.35%)	48 (28.07%)	1 (0.58%)	171 (100%)
Should you wash with soap and water?	126 (73.68%)	43 (25.15%)	2 (1.17%)	171 (100%)
Is the application of alcohol at the site of bite beneficial?	64 (37.43%)	100 (58.48%)	7 (4.09%)	171 (100%)
Is topical instillation or application of herbs beneficial?	72 (42.11%)	91 (53.22%)	8 (4.68%)	171 (100%)
Is electric cautery at the site of bite useful?	37 (21.64%)	126 (73.68%)	8 (4.68%)	171 (100%)

24 (14.04%), 16(9.36%) of students responded that first test to recommend is full blood count, urinalysis for myoglobinuria and blood group and cross matching respectively.

Further to assess the knowledge of study population regarding the management of Snakebite, question on use of anti-venom to treat envenomation and whether anti-venom can be given for a person who is allergic to anti-venom was asked. 137 (80.12%) students correctly answered regarding use of anti-venom against envenomation and 35 (20.47%) students had right knowledge regarding use of anti-venom in a patient who is allergic to anti-venom (Table 4).

Discussion

The current cross-sectional, questionnaire-based study was carried out among students at a medical college and Tertiary Care Hospital in Pune with the intention of evaluating their familiarity with snakes and Snakebite, their ability to treat Snakebite victims, and their attitude toward snakes in general. The main goals of administering first aid for Snakebite victims are to preserve life, stop further damage and hasten recovery.

Avadhesh Singh Malik found from his study done on medical practitioners practicing in India that 36.4% knew to identify the venomous snakes whereas on the current study, only 9.35% could identify correctly. There is a dire need of proper knowledge which needs to be imparted to the upcoming doctors. The medical school is a medium to provide education that is integral in content, deep in its concern and sensitive to the issue[5].

A study was undertaken by Saad S Alqahtani, Senior Students (third year and above), Jazan University Medical, Pharmacy, Nursing or Emergency Medicine Colleges. However, this study also identified a knowledge gap in the students' understanding of first-aid measures for Snakebites, as evidenced by their answers to questions about recommending tourniquets, sucking venom from the wound, applying topical herbs, and whether pricks were to be made at the bite site. This knowledge gap could help determine the level of training that should be given in the future to the students. In comparison to the present study where there was a higher level of knowledge which was seen in these parameters[6].

Nuwadatta Subedi conducted a study in Gandaki Medical College, Nepal. 54.98% of the respondents obtained their knowledge from medical textbooks, whereas in the present study, around 51.46 % had their knowledge from medical textbooks which was almost of the same. But only 7.04 % had the belief that the victim who teases the snake will be captured in its vision, and it will avenge them, whereas in the present study 27.49% thought that. This is a grave misconception which needed to be clarified and corrected among the medical students[7].

In a study done by Sunil Sapkota, where all the healthcare professionals working in the emergency room and IPD (In-Patient) wards of a BHU, Dzongkhags, general hospitals, and referral hospitals in Bhutan, where they were interviewed by him who had the following findings that among the health professionals, 92% learned the fundamentals of snake identification and snakebite management from textbooks throughout their professional training, 20% of respondents claimed that discussions and folktales in their families and villages assisted them with snake identification and snakebite management, whereas 62% of respondents said they learned information through the internet, watching television, and listening to radio programs, where as in the present study, participants 15.20% from Internet, 12.87% from Television, 10.53% from Books and Magazines, 4.68% from Family and Friends[8].

Conclusion

Envenomation from Snakebites is a frequent cause of morbidity and mortality in India. According to World Health Organization, the best method of lowering Snakebite morbidity and mortality is to increase community awareness about Snakebite prevention. By offering region-specific guidelines and case management training regimens, adequate supply of anti-venoms, the existing burden of Snakebite morbidity can also be lessened. Support resources

Table 4 — *Knowledge about Snakebite Management*

	Yes [N (%)]	No [N (%)]	I don't know [N (%)]	Not responded [N (%)]	Total [N (%)]
Can envenomation be treated by anti-venom therapy?	137 (80.12%)	23 (13.45%)	0	11 (6.43%)	171 (100%)
Will you give anti-venom even if the patient is allergic to it?	35 (20.47%)	78 (45.61%)	55 (32.16%)	3 (1.75%)	171 (100%)

for medical professionals at all levels of the healthcare system could aid in the dissemination of accurate scientific information regarding the treatment of Snakebites[9,10].

This study suggests that, despite the failure or delay in getting the victims to medical facilities, the knowledge and awareness of medical practitioners acting as the first point of care is limited to concepts learned in undergraduate curricula, which are restricted to largely theoretical aspects with little or no practical exposure to clinical cases. Undergraduate medical education should cover the treatment of Snakebites using the most recent epidemiological and clinical recommendations that are uniquely justifiable to the Indian setting.

Limitations :

One of the study's drawbacks is that we only evaluated the participants' theoretical understanding of treating Snakebites; we neglected seeking information about their actual abilities, particularly with regard to first aid.

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Conflict of Interest : None.

References

1 Mohapatra B, Warrell DA, Suraweera W, Bhatia P, Dhingra N, Jotkar RM, *et al* — Snakebite mortality in India: a nationally representative mortality survey. *PLoS Negl Trop Dis [Internet]* 2011; **5(4):** e1018. Available from: http://dx.doi.org/10.1371/journal.pntd.0001018

2 Williams D, Gutiérrez JM, Harrison R, Warrell DA, White J, Winkel KD, *et al* — The Global Snake Bite Initiative: an antidote for snake bite. *Lancet [Internet]* 2010 [cited 2023 Feb 22]; **375(9708):** 89-91. Available from: https://pubmedncbi.nlm.nih.gov/20109867/

3 Neglected tropical diseases [Internet]. Who.int. [cited 2023 Jul 14]. Available from: https://www.who.int/news-room/questions-and-answers/item/neglected-tropical-diseases

4 Kharusha IK, Sulaiman SS, Samara AM, Al-Jabi SW, Zyoud SH — Assessment of knowledge about first aid methods, diagnosis, and management of snakebite among nursing students: A cross-sectional study from Palestine. *Emerg Med Int [Internet]* 2020 [cited 2023 Feb 22];2020:8815632. Available from: https://www.hindawi.com/journals/emi/2020/8815632/

5 Chatterjee K, Malik A — Awareness of Indian medical practitioners about snakebite and its management – Is there a need to re-evaluate medical training? *Med J Dr DY Patil Vidyapeeth [Internet]* 2020 [cited 2023 Feb 22];13(5):519. Available from: https://www.mjdrdypv.org/article.asp?issn=2589-8302;year=2020;volume=13;issue=5;spage=519;epage=524;aulast=Malik

6 Alqahtani SS, Banji D, Banji OJF, Syed MH, Syed NK, Meraya AM, *et al* — Knowledge and attitude of first-aid treatments for snakebites, and the perception of snakes among the students of health sciences at Jazan University, Saudi Arabia. Healthcare (Basel) [Internet]. 2022 [cited 2023 Feb 22];10(11):2226. Available from: https://www.mdpi.com/2227-9032/10/11/2226

7 Subedi N, Paudel IS, Khadka A, Shrestha U, Mallik VB, Ankur KC — Knowledge of first aid methods and attitude about snake bite among medical students: a cross sectional observational study. *J Occup Med Toxicol [Internet]* 2018; **13(1):** 26. Available from: http://dx.doi.org/10.1186/s12995-018-0210-0

8 Sapkota S, Pandey DP, Dhakal GP, Gurung DB — Knowledge of health workers on snakes and snakebite management and treatment seeking behavior of snakebite victims in Bhutan. PLoS Negl Trop Dis [Internet]. 2020;14(11):e0008793. Available from: http://dx.doi.org/10.1371/journal.pntd.0008793

9 Who.int. [cited 2023 Jul 11]. Available from: https://www.who.int/docs/default-source/searo/india/health-topic-pdf/who-guidance-on-management-of-snakebites.pdf?sfvrsn=5528d0cf_2

10 Researchgate.net. [cited 2023 Jul 14]. Available from: https://www.researchgate.net/publication/274707699_Snakebite_and_Envenomation_Management_in_Malaysia