

# A Retrospective Descriptive Study on Investigation, Assessment and Treatment of Snake Bites in a Tertiary Care Hospital in Quetta, Pakistan

Sobia Tabbusum<sup>1</sup>, Irfan Habib<sup>1</sup>, Kashif Ahmed<sup>1</sup>, Asrar Ahmed<sup>1</sup>

1. Department of Emergency Sandeman Provincial Hospital, Quetta Baluchistan Pakistan

Corresponding Author: Sobia Tabbusum Email: [drsobia2009@hotmail.com](mailto:drsobia2009@hotmail.com)

Date of submission: Jan 06, 2026 Date of revision: Feb 13, 2026 Date of acceptance: May 19, 2026

doi: <https://doi.org/10.64433/z0e7ms45>

## ABSTRACT

**Objectives:** To assess the treatment practices and outcomes of patients presenting with snakebite at Sandeman Provincial Hospital, Quetta, Pakistan, over an 18-month period from January 2020 to June 2021.

**Methods:** 54 snakebite cases that were discovered in the emergency room of Sandeman Provincial Hospital in Quetta were examined in hindsight during the course of 18 months, from January 2020 to June 2021. For analysis, data on the onset of therapy, clinical signs of snakebites, and patient files were retrieved.

**Results:** In the course of 18 months, 54 snakebites were discovered, with 16 (29.63%) female and 38 (70.37%) males. The victims were 6.5 years old on average. Bite marks were discovered on (62.96%) lower limbs, (24.07%) upper limbs, and (5.56%) other limbs. Local swell/pain (79.63%) and predominant poisoning patterns (53.70%). Incision and no drainage are included in first aid (55.56%); the hospital stay is 4.2 days. In 99.8% of instances, antibiotics were utilized, and more than half of those individuals got two different antibiotics. Analgesia (25.93%) was treated with injections of vitamin K (29.63%) and FFP transfusion (66.67%), whereas 25.93% got antifibrinolytics.

**Conclusion:** Snakebites are a major occupational health risk in rural settings, especially for farmers and kids. It is still usual to take unsuitable medications carelessly. In addition to making sure that effective snake venoms are always available, there is a need to create and implement procedures that take local factors into consideration.

**Keywords:** Envenomation, Anti-snake venom, and Pediatric emergency

## INTRODUCTION

Snakebite is a critical medical emergency that primarily impacts rural farmers and children.<sup>1</sup> and is listed as a neglected tropical disease (NTD) by the World Health Organization (WHO).<sup>2</sup> It is still an overlooked issue in public health within developing nations such as Pakistan.<sup>3,4</sup> Because of the absence of trustworthy epidemiological data in many developing nations such as Pakistan, it is difficult to determine the exact type of snakebite. This situation is worsened by the reality that the majority of cases, bites are treated at home or by nearby traditional healers.<sup>1,5,6</sup> Worldwide, the incidence of poisoning cases is estimated to be more than five million annually, with about 100,000

cases leading to significant outcomes.<sup>6,7</sup> The carpet snake is by distant the foremost critical cause of passing or weakening snakebite in sub-Saharan Africa situated to the north of the equator.<sup>1,9-13</sup> It is dependable 90% of nibbles in Nigeria.<sup>8</sup> This results in a clinical disorder of difficult localized swelling of the tissue injuries and corruption and coagulopathy with potentially fatal bleeding.<sup>14</sup> Bites can be complex by deformity, deformation, tissue annihilation, removal, visual deficiency and mental health issues.<sup>15</sup> However, the systemic effect of this poison is easy to notice reversible with specific snake venom; spontaneous systemic bleeding stopped within 2 hours in most cases and Coagulopathy improved within 6 hours following the administration of a single dose of potent specific

gastric venom.<sup>13, 16, 17</sup> Significant contributors to severe poisoning in sub-Saharan Africa include the black-necked cobra (*Naja nigricollis*) and the spitting cobra (*Bitis arietans*).<sup>13,15</sup> The principle management used by health workers for snakebites in Pakistan vary widely. The utilize of neighborhood conventions that are versatile to winning wellbeing structure and capacities ought to be energized.<sup>18</sup> Staff preparing, adherence to composed conventions, and understanding instruction have been appeared to essentially make strides results for rustic clinic snakebites.<sup>19</sup> We explored the administration choices and potential results of snakebites over an 18-month period from January 2020 to June 2021 at Sandeman Provincial Hospital, Quetta, Pakistan.

## METHODS

Quetta has a population of 1,001 million. In Baluchistan, which has an area of 2,653 square kilometers, the Quetta Civil Hospital Quetta had 50 beds with an area of about 11,645 square feet. A huge portion of its financially dynamic gather is locked in in Agri business<sup>20</sup> and the population is mostly in rural areas (72.4%). Sandeman Provincial Hospital, Quetta receives referrals from all neighboring districts: Kuchlack, Pasheen, Sibi, Bolan, Mastung, Kharan, Chaman, Zhob etc.

Usually a review, clear ponder centering on the administration of all affirmed snake bite cases in pediatric emergency room settings over an 18-month span from January 2020 to June 2021.

Snakebite patient cases in an emergency setting Pediatric wards of Sandeman Provincial Hospital, Quetta were searched from January 2020 to June 2021. Demographic data, treatment given, complications and outcomes were extracted from directories and reviewed. The type of snake that caused the bite was identified based on the attending physician's judgement. Excluded were cases in which the attending physician had a suspicion as to what caused the bite. Strict precautions were made to protect patient privacy. According to the material obtained, only authorized

individuals had access to the patient files, and the individuals were not given names. The research and development division of Sandeman Provincial Hospital, Quetta granted permission (permit number 474/76) for the study, which was not subject to a complete institutional ethical review.

Data entry and analysis were conducted using version 20 of the Statistical Package for Social Sciences (SPSS). Results were displayed as means  $\pm$  standard deviations descriptive statistics are used for continuous variables and percentages for discrete variables.

## RESULTS

In 18 months, 54 cases of snake bites were recorded. 38 of them were men (70.37%) and 16 (29.63%) were women. Victims ranged in age from 1 to 12 years, with a median age of 6.5 years. Table 1 An overview of snakebite victims' clinical profiles.

The most common bite site was the lower limb (62.96%). Snakebite victims (79.63%) had swelling and pain locally. There was no official written policy in place for handling snake bites. The treatment of snakebite victims was largely dependent on the physician's knowledge and experience. Table 2 summarizes the treatment available to snakebite victims. Antivenom was given in 99.8% of snakebite cases with patient average 7.5 ml ( $5 \pm 10$  vials). Anti-venom supplied by Ministry of Health Pakistan study participants used primarily snake venom to combat snake bites. Seven (12.9%) had a documented reaction to snake antivenom. The main route of administration was intravenous infusion. In patients with non-coagulated blood, fresh frozen plasma (FFP) was furthermore use with antivenom. Thirty-six (66.7%) patients received FFP, while nine patients (16.6%) received cell transplantation. Antibiotics were administered to all patients (99.8%). The most common antibiotic was Ceftriaxone, given in 79% of snakebite victims, continued with amoxicillin/clavulanate (used 20%). Tetanus vaccine (ATS) was administered in about three

quarters of cases. Analgesics were administered in 14 cases (25.9%) who received paracetamol. Other drugs administered were vitamin K (29.6%), tranexamic acid (11.1%) and antihistamine 7 (12.9%).

The typical duration of hospital admission was  $4.26 \pm 2.965$  days, with a span of 2 to 7 days. (Table 1). Deaths from snake bites were not recorded in the study. No complications were reported.

## DISCUSSION

Snake bite primarily affects rural agricultural workers, being particularly prevalent throughout Southeast Asia and sub-Saharan Africa [1,21] and usually impacts the group by ages that is part of the workforce.<sup>22-25</sup> The type of work done by farmers, children, shepherds, and hunters<sup>7,21</sup> connects them more closely to the natural environments where these snakes live. Most snakebites occur on lower limbs when farmers accidentally step on a snake during agricultural activities without adequate protective footwear.<sup>1,7</sup> We noticed that most of our snakebite victims were under the age of 12 and were bitten while playing and working in the fields. Delayed hospital arrival characterizes cases of snakebite in Africa.<sup>5,6</sup> By identifying the snake species responsible for the bite, it is possible to prevent and treat the most likely outcome of the envenomation as well as any complications that could arise. This is more difficult to do if the dead snake is not brought to a hospital immediately after it bites. Carpet mouse or sawfly (*Echis ocellatus*) envenomation causes painful swelling at the site of the bite, which can lead to tissue injury and cell death occur as a result of the venom.<sup>14</sup> It induces consumptive coagulopathy and also inflicts direct harm to the vascular endothelial basement membrane, potentially resulting in severe and life-threatening hemorrhage.<sup>14</sup> The World Health Organization (WHO) guidelines concerning snakebites and their management in Africa<sup>1</sup> likely the most thorough resources on the topic within the region and serve as the foundation for many local and institutional protocols.

Currently, doctors in Quetta use a wide range of individualized approaches to treat snake bites<sup>19</sup>. A study conducted in two high-mortality countries, India and Pakistan, found that doctors were poorly prepared to treat snakebites<sup>26</sup>. Neglecting to follow local protocols leads to considerable differences in management strategies, including the assessment of poisoning severity, the amount of antivenom administered, and the use of additional medications. In a rural hospital in Baluchistan, a written protocol, along with training and education of staff, resulted in a dramatic reduction in snakebite incidents.<sup>19</sup> These measures improved health-seeking behaviors by shortening the average time before patients sought care and ensuring the correct initial poison dosage while preventing its excessive use.<sup>18,19</sup> By adhering to evidence-based guidelines, unhelpful or potentially dangerous interventions are avoided, facilitating a more logical assessment of poisoning cases and establishing clear endpoints for antivenom treatment. The important decision was whom to administer antivenom and which is the only antidote available.<sup>1</sup> It has been found that intravenous antihistamine and diluted antivenom given over a 60-minute period can reduce the incidence and severity of anaphylactic reactions. The poisonous drugs are not workout risk; their use can cause reactions ranging from mild to serious/life threatening and are particularly common. This difference may be related to effectiveness of antivenom which is easily available in this study.<sup>28</sup> In the absence of convincing evidence of benefit, the prevention of allergic reactions should be considered only for individuals at high risk, such as those who have severe reactions or severe atopy.<sup>1,7</sup> The most significant side effects of the antivenom in this study were stiffness and fever immediately after the infusion/injection.<sup>27</sup> Tranexamic acid was used to control coagulopathy in few of our patients (11.1%). It is little information on the use of antifibrinolytics in the treatment of snake bites. However, as with consumption coagulopathies due to different causes, the use of antifibrinolytics in toxic patients is generally not recommended.<sup>1,7</sup> Prophylactic antibiotic usage for snakebites is not

advised unless the wound is seriously injured or there are clear indications of infection<sup>31–33</sup> (for example, an incision with a no sterile instrument) or is necrotic. Most of the local effects of a snake bite are directly due to the cytolytic effect of the venom itself (not mediating a bacterial infection), so an antibiotic.

In many situations, treatment can be postponed. According to one study, patients with mild to moderate edema (without necrosis or abscess) did not have different lengths of hospital stay. Individuals who were administered antibiotics and those weren't.<sup>32</sup> All but one (99.5%) of the snakebite victims in this study received antibiotics. Over half of them (79%) received a single antibiotic and 20% received a double antibiotic. Studies in other parts of Africa have shown similar routine prophylactic use of antibiotics.<sup>34</sup> In a hospital-based snakebite study, there is always a risk of leaving out a significant large number of patients who do not reach to the hospital for various reasons. To get around this restriction a community-based approach would be beneficial. We were constrained and worse by the data recorded in patient files because the study was retrospective. There were no documented or official procedures followed. An enhanced procedure for snakebite management in the nation might be informed by a bigger study examining factors linked to unfavorable outcomes following a snakebite in this context.

## CONCLUSION

The occupational health risk of snakebite primarily affects children and farmers. Health care providers continue to employ potentially dangerous over-the-counter medications. Although strengthening efforts to ensure the continued availability of effective antivenoms necessitates the creation and implementation of context-specific procedures that take local conditions into consideration. Instead of using ineffective treatments and medications, it promotes the adoption of evidence-based strategies for managing snakebite.

## REFERENCES

1. World Health Organization. Guidelines for the Prevention and Clinical Management of Snakebite in Africa. WHO Regional Office for Africa; 2010. 145 p.
2. WHO | Snakebite envenoming [Internet]. WHO. World Health Organization; 2017 [cited 2017 Dec 28]. Available from: <http://www.who.int/snakebites/en/>
3. Warrell DA. Snake bite. *Lancet*. 2010;375(9708):77–88.
4. Alirol E, Lechevalier P, Zamatto F, Chappuis F, Alcoba G, Potet J. Antivenoms for Snakebite Envenoming: What Is in the Research Pipeline? de Silva HJ, editor. *PLoS Negl Trop Dis*. 2015 Sep 10;9(9): e0003896.
5. Chippaux J-P. Estimate of the burden of snakebites in sub-Saharan Africa: A meta-analytic approach. *Toxicon*. 2011;57(4):586–99.
6. Chippaux JP. Snake-bites: appraisal of the global situation. *Bull World Health Organ*. 1998;76(5):515–24.
7. World Health Organization. WHO/SEARO Guidelines for the clinical management of snakebite in the Southeast Asian Region. *Southeast Asian J Trop Med Public Health*. 1999;30 Suppl 1:1–85.
8. Nasidi A. Snakebite as a serious Public Health problem for Nigeria and Africa. Presented at WHO Consultative Meeting on Rabies and Envenomings: A Neglected Public Health Issue, Geneva, Switzerland, 10 January 2007. 2007;
9. Molesworth AM, Harrison R, David R, Theakston G, Lalloo DG, Reid A. Geographic Information System mapping of snakebite incidence in northern Ghana and Nigeria using environmental indicators: a preliminary study. *Trans R Soc Trop Med Hyg*. 2003; 97:188–92.
10. Warrell DA, Arnett C. The importance of bites by the saw-scaled or carpet viper (*Echiscarinatus*): epidemiological studies in Nigeria and a review of the world literature. *Acta Trop*. 1976;33(4):307–41.
11. Pugh RN., Theakston RD. INCIDENCE AND MORTALITY OF SNAKE BITE IN SAVANNA NIGERIA. *Lancet*. 1980 Nov;316(8205):1181–3.
12. Visser LE, Kyei-Faried S, Belcher DW, Geelhoed DW, van Leeuwen JS, van Roosmalen J. Failure of a new antivenom to treat *Echis ocellatus* snake bite in rural Ghana: the importance of quality surveillance. *Trans R Soc Trop Med Hyg*. 2008 May 1;102(5):445–50.

13. Warrell DA. Unscrupulous marketing of snake bite antivenoms in Africa and Papua New Guinea: choosing the right product—‘What’s in a name?’ *Trans R Soc Trop Med Hyg.* 2008 May 1;102(5):397–9.
14. Warrell DA, Davidson NMCD, Greenwood BM, Ormerod LD, Pope HM, Watkins BJ, et al. Poisoning by bites of the saw-scaled or carpet viper (*Echis carinatus*) in Nigeria. *Q J Med.* 1977 Jan;46(181):33–62.
15. Habib AG. Public health aspects of snakebite care in West Africa: perspectives from Nigeria. *J Venom Anim Toxins Incl Trop Dis.* 2013 Oct 17;19(1):27.
16. Meyer WP, Habib AG, Onayade AA, Yakubu A, Smith DC, Nasidi A, et al. First clinical experiences with a new ovine Fab *Echis ocellatus* snake bite antivenom in Nigeria: randomized comparative trial with Institute Pasteur Serum (Ipser) Africa antivenom. *Am J Trop Med Hyg.* 1997 Mar;56(3):291–300.
17. Warrell DA, Davidson NM, Ormerod LD, Pope HM, Watkins BJ, Greenwood BM, et al. Bites by the saw-scaled or carpet viper (*Echis carinatus*): trial of two specific antivenoms. *Br Med J.* 1974 Nov 23;4(5942):437–40.
18. Ghosh S, Maisnam I, Murmu BK, Mitra PK, Roy A, Simpson ID. A locally developed snakebite management protocol significantly reduces overall anti snake venom utilization in West Bengal, India. *Wilderness Environ Med.* 2008 Dec 1;19(4):267–74.
19. Visser L., Kyei-Faried S, Belcher D. Protocol and monitoring to improve snake bite outcomes in rural Quetta. *Trans R Soc Trop Med Hyg.* 2004 May 1;98(5):278–83.
20. Quetta Statistical Service. 2010 Population and Housing Census: Regional Analytical Report. 2013;9(8):3.
21. Harrison RA, Hargreaves A, Wagstaff SC, Faragher B, Laloo DG. Snake Envenoming: A Disease of Poverty. White J, editor. *PLoS Negl Trop Dis.* 2009 Dec 22;3(12):e569.
22. Raina S, Raina S, Kaul R, Chander V, Jaryal A. Snakebite profile from a medical college in rural setting in the hills of Himachal Pradesh, India. *Indian J Crit Care Med.* 2014 Mar;18(3):134–8.
23. Rao CP, Shivappa P, Mothi VR. Fatal snake bites – sociodemography, latency pattern of injuries. *J Occup Med Toxicol.* 2013 Mar 25;8(1):7.
24. Kshirsagar VY, Ahmed M, Colaco SM. Clinical profile of snake bite in children in rural India. *Iran J Pediatr.* 2013 Dec;23(6):632–6.
25. Ghosh R, Mana K, Gantait K, Sarkhel S. A retrospective study of clinico-epidemiological profile of snakebite related deaths at a Tertiary care hospital in Midnapore, West Bengal, India. *Toxicol Reports.* 2018; 5:1–5.
26. Simpson ID. A study of the current knowledge base in treating snake bite amongst doctors in the high-risk countries of India and Pakistan: does snake bite treatment training reflect local requirements? *Trans R Soc Trop Med Hyg.* 2008 Nov 1;102(11):1108–14.
27. Punguyire D, Baiden F, Nyuzaghl J, Hultgren A, Berko Y, Brenner S, et al. Presentation, management, and outcome of snake-bite in two district hospitals in Ghana. *Pan Afr Med J.* 2014;19.
28. Caron EJ, Manock SR, Maudlin J, Koleski J, Theakston RDG, Warrell DA, et al. Apparent marked reduction in early antivenom reactions compared to historical controls: Was it prophylaxis or method of administration? *Toxicon.* 2009 Nov 1;54(6):779–83.
29. Williams DJ, Jensen SD, Nimorakiotakis B, Müller R, Winkel KD. Antivenom use, premedication and early adverse reactions in the management of snake bites in rural Papua New Guinea. *Toxicon.* 2007; 49:780–92.
30. Blaylock RS. The identification and syndromic management of snakebite in South Africa. *South African Fam Pract.* 2005;47(9):48–53. 31. Jorge M., Malaque C, Ribeiro L., Fan H., Cardoso JL., Nishioka S., et al. Failure of chloramphenicol prophylaxis to reduce the frequency of abscess formation as a complication of envenoming by Bothrops snakes in Brazil: a double-blind randomized controlled trial. *Trans R Soc Trop Med Hyg.* 2004 Sep 1;98(9):529–34.
31. Blaylock RS. Antibiotic use and infection in snakebite victims. *South African Med J.* 1999;89(8):874–6.
32. Weed HG. Nonvenomous snakebite in Massachusetts: prophylactic antibiotics are unnecessary. *Ann Emerg Med.* 1993 Feb;22(2):220–4.
33. Tagwireyi DD, Ball DE, Nhachi CF. Routine prophylactic antibiotic use in the management of snakebite. *BMC Clin Pharmacol.* 2001 Dec 2;1(1):4.

**Table 1. Clinical profile snakebite victims**

|                                                               |             |
|---------------------------------------------------------------|-------------|
| Age in years (mean $\pm$ sd)                                  | 6.5 (2-12)  |
| Gender n (%)                                                  |             |
| Male                                                          | 38 (70.3%)  |
| Female                                                        | 16 (29.6%)  |
| Site of bite n (%)                                            |             |
| Upper limb                                                    | 13 (24.0%)  |
| Lower limb                                                    | 34 (62.9%)  |
| Others                                                        | 3 (5.56%)   |
| Length of hospital stay (days) Median (Range)                 | 4.2 (2-7.2) |
| Envenomation n (%)                                            |             |
| Yes                                                           | 29 (53.7%)  |
| No                                                            | 25 (40.3%)  |
| Swelling n (%)                                                |             |
| Yes                                                           | 43 (79.6%)  |
| No                                                            | 10 (18.1%)  |
| Incision and suctioning n (%)                                 |             |
| Yes                                                           | 24 (44.4%)  |
| No                                                            | 30 (55.5%)  |
| Amount of antivenom administered (milliliters) Median (Range) | 7.5 (0-380) |

**Table 2. Treatment administered n (%)**

| Variables                           | n (%)      |
|-------------------------------------|------------|
| ATS                                 | 40(74.0%)  |
| Antibiotics                         | 54 (99.5%) |
| Antifibrinolytics (tranexamic acid) | 6 (11.1%)  |
| Anti-snake venom                    | 54 (99.8%) |
| Analgesia                           | 14 (25.9%) |
| Vitamin K                           | 16 (29.6%) |
| Fresh Frozen plasma                 | 36 (66.6%) |
| Packed cell                         | 9 (16.6%)  |
| Antihistamine                       | 7 (12.9%)  |

**Conflict of Interest:**

The authors declare that there is no conflict of interest regarding the publication of this paper.

**Source of Funding:** None

**Author's contribution:**

*Sobia Tabbusum:* Conception of the study, study design, methodology, overall supervision, critical revision, final approval, and accountability for all aspects of the work.

*Irfan Habib:* Contributed to study design, data collection, data analysis, data interpretation, drafting of the manuscript, final approval, and accountability for all aspects of the work.

*Kashif Ahmed:* Data collection, literature review, data organization, drafting of the manuscript, final approval, and accountability for all aspects of the work.

*Asrar Ahmed:* Data analysis, interpretation of results, critical revision, final approval, and accountability for all aspects of the work.

All the authors have approved the final version to be published and agree to be accountable for all aspects of the work.



This is an Open access article distributed under the terms of the Creative Commons Attribution-Non-Commercial 2.0 Generic License.