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Dispelling Snake Bite Myths in Sri Lanka: Ensuring Proper Management and Safety

Disipando los mitos sobre las mordeduras de serpiente en Sri Lanka: garantizar una gestión y seguridad adecuadas

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Abstract

Snake bites remain a significant public health issue in Sri Lanka due to prevalent myths and misconceptions that can hinder effective treatment and increase the risk of complications. This study aimed to debunk common myths and provide accurate information to guide appropriate responses and ensure proper management. A cross-sectional study was conducted in a village in Sri Lanka's North Central region, interviewing heads of households using a pre-designed questionnaire. Key findings revealed several harmful misconceptions. The belief that cutting and sucking the bite site removes venom is ineffective and can introduce bacteria, while applying a tourniquet can restrict blood flow and lead to severe complications. Identifying the snake species is not crucial for antivenom treatment, as most antivenoms are polyvalent. Additionally, the notion that snake charmers can safely handle and cure snake bites is unfounded, and the belief in the effectiveness of certain plants or herbs for neutralizing venom is scientifically unsupported. These findings highlight the urgent need for public health interventions to address snake bite myths and promote evidence-based practices. By disseminating accurate information and improving access to healthcare, the burden of snake bites in Sri Lanka can be significantly reduced.

Keywords: snake bites, misconceptions, public health.

Resumen

Las mordeduras de serpiente siguen siendo un problema de salud pública en Sri Lanka debido a los mitos y conceptos erróneos que dificultan el tratamiento eficaz y aumentan el riesgo de complicaciones. Este estudio busca desmentir mitos comunes y proporcionar información precisa para guiar respuestas adecuadas y garantizar un manejo adecuado. Se llevó a cabo un estudio transversal en una aldea de la región centro-norte de Sri Lanka, entrevistando a jefes de familia mediante un cuestionario prediseñado. Los hallazgos clave revelaron varios conceptos erróneos dañinos. Creencias erróneas como cortar y succionar el sitio de la picadura para eliminar el veneno: la aplicación de un torniquete para restringir el avance del veneno; la identificación de la especie de serpiente para el instaurar tratamiento con antídotos; además, la noción de que los encantadores de serpientes pueden manejar y curar de manera segura las mordeduras de serpiente, y la creencia en la efectividad de que ciertas plantas o hierbas para neutralizar el veneno. Estos hallazgos resaltan la necesidad de intervenciones de salud pública para abordar los mitos y promover prácticas basadas en la evidencia, mediante la difusión de información precisa y la mejora del acceso a la atención sanitaria, se puede reducir significativamente la carga de las mordeduras de serpiente en Sri Lanka.

Palabras claves: mordeduras de serpientes, malentendido terapéutico, salud pública.

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Introduction

Snake bites, a prevalent and often ignored public health issue in tropical and subtropical regions, disproportionately impact individuals of lower socioeconomic classes, particularly farmers and those working outdoors. Considered an occupational hazard, snake bites have only recently received global attention, being added to the WHO's list of neglected tropical diseases in 2017 [1]. In Sri Lanka, an estimated 15,000 snake bites occur annually, with 10% leading to envenomation and a further 10% mortality rate among those bitten by venomous snakes [2]. These instances are more common in the North Central Province, which is in the dry zone [3]. Though recent measures involving enhanced supervisory visits to reporting sites attempt to address this issue, under-reporting is still a concern. Sri Lanka can save lives and enhance the general well-being of its people by acknowledging the seriousness of snake bites as a public health emergency and putting into practice efficient preventative measures [4]. This entails creating focused interventions in high-risk areas like the North Central Province, offering treatment options that are easily accessible, and promoting awareness through educational initiatives. Widespread misunderstandings about snakes and snake bites have a negative effect on patient prognoses and treatment outcomes in Sri Lanka.

Traditional healers frequently end up being the initial point of contact for snake bite victims despite developments in modern medicine, which can worsen results by delaying necessary medical intervention [5]. It has been stated that identical circumstances exist in India and even China, therefore this negative trend is not exclusive to Sri Lanka [6]. It is demonstrated by traditional medical systems such as Ayurveda, Ahikuntaka, Sidda, and Unani that Sri Lankans have long been aware of colubrid snakes, which are non-venomous [7]. These systems give snake bite treatment recommendations and characterize the properties of snakes. But there's still a big misconception: these snakes are very venomous, according to most old local literature. Seneviratne's 1967 book even went so far as to name "Mapila" snakes as the most deadly and venomous, endangering the lives of innocent people [8]. The actual situation differs greatly. Even though there are an estimated 80,000 snake bites and 400 fatalities in Sri Lanka each year, snake bites can be effectively treated with timely and appropriate medical attention [9].

In order to improve patient outcomes and lower fatality rates, it is imperative to debunk damaging myths and enlighten communities about accurate facts regarding snake identification, bite management, and first-aid protocols. In human history, snakes have always held a complicated place that evokes both dread and devotion. A complex web of myths and beliefs about snake bites is entwined with this complex relationship, impacting how we view and react to these potentially fatal situations. Regrettably, a lot of these ideas are based on false assumptions that raise the danger of snake bites and make therapy ineffective. This investigation explored the domain of these myths, looking at their genesis, enduring power, and implications for human health in the context of Sri Lanka. We revealed the ways in which these deeply embedded ideas impact both personal behavior and public health procedures, with the ultimate goal of dispelling falsehoods and opening the door to well-informed and efficient reactions to snake bites.

Method

The most frequent offending snakes and their bite sites were examined in this investigation, which took place in the rural First Mile Post-Padaviya community in Sri Lanka's North Central Province in April 2023. In the North Central region of Sri Lanka, at the village of First Mile Post-Padaviya, a cross-sectional observational study was conducted. An interview with the family head was conducted using a pre-tested and pre-designed timetable. In order to arrive at a comprehensive understanding, 124 people were interviewed and questionnaires were used to study complete families. This method made it possible to record a range of viewpoints and experiences—focused on families—relating to snake bites. Three participants actively participated in data collecting, including the study author, to ensure thorough and accurate information acquisition. This study investigated possible causes of snake bites in the Padaviya area around the first milepost. 124 adults between the ages of 18 and 70 were interviewed by the researchers; those with speech or hearing problems or those dealing with mental health issues were not included. A maximum of two adults from each family willingly participated in order to guarantee a diversity of opinions. Some homes were not included because the residents were not present when the data were gathered. Of the participants, 65 people (52%) had personal experience with snake bites; these people will be analyzed as the "victim" group. The research team analyzed the data gathered and found substantial correlations between snake bites and other risk variables using Minitab 16.0 and Statistical Analysis Software. P-values of less than 0.05 in the log-linear model, which was employed, denoted statistically significant relationships.

This study aimed to identify key factors that contribute to this public health concern by shedding light on the local context of snake bite episodes within Padaviya. The study aimed to educate targeted actions and preventive strategies to lower the incidence of snake bites in the community and similar settings by analyzing the data and finding meaningful relationships. Inclusion criteria was set as timely transportation to the nearest medical facility, along with antivenom administration. Furthermore, who accepted the decision to participate for this study was included. We excluded the individuals with severe pre-existing conditions that could interfere with the study or impact data interpretation. With respect to the decision of individuals who choose not to participate in the study, they were excluded as well. The world of snake bites is shrouded in a web of myths, passed down through generations like tangled vines. From applying ice to sucking out venom, these misconceptions can be more dangerous than the bite itself. Consent was obtained from the study

participants before administering the questionnaire. We had adhered to the Declaration of Helsinki in enrolling our participants. The study was ethically approved by the Ethics Review Committee, Faculty of Medicine, General Sir John Kotelawla Defense University (IRB number is RP/S/2022/10) before commencing the study.

Results

While a large majority of the population (76.61%-80.64%) correctly identified several venomous snakes, their understanding of snake bite treatment remains concerning (Table 1). Despite 95.56% seeking hospital treatment, a significant 80% subscribed to myths related to snake bites. This highlights the need for comprehensive educational programs to dispel harmful myths and empower communities with accurate knowledge about snake bite prevention, identification, and treatment. A significant lack of awareness about the venom potency of certain snakes was evident, with the majority misidentifying some venomous snakes as either mild or highly venomous. While 96.77% correctly identified the Cobra as highly venomous, only 17.74% recognized the moderately venomous Green Pit Viper, and a surprising 79.83% mistakenly classified the mildly venomous Cat Snake as highly venomous (Table 1). This highlights the need for targeted education campaigns to equip communities with accurate information about snake venom strength and mitigate risks associated with misidentification.

Table 1. Belief and myths about snake bites

Variables	Frequency (%)
Belief about Myths by the community	
Believe myths	97 (78.22%)
Not believe myths	27 (21.77%)
Treatment preference of the community	
Indigenous physician	04 (3.22%)
Hospital	119 (95.56%)
Home medicines	01 (0.8%)
Ability to identify the snakes	
Russell's viper	95(76.61%)
Saw scaled viper	01(0.8%)
Ceylon krait	53(42.74%)
Common krait	62(50.0%)
Green pit viper	70(56.45%)
Cobra	100(80.64%)
Hump nosed viper	89(71.77%)
Knowledge about venom	
Russell's viper	108 (87.09%)
Saw scaled viper	99 (79.83%)
Ceylon krait Common krait	80 (64.51%)
Green pit viper	22 (17.74%)
Cobra	120 (96.77%)
Hump nosed viper	47 (37.90%)

Nearly 62% of analyzed homes were overgrown with grass, potentially harboring snakes. Further, 42.74% of dwellings were cluttered with coconut husks and firewood, providing ideal hiding places for these reptiles. Additionally, 18.54% of homes were frequented by frogs and rats, attracting snakes seeking prey. Notably, 55.64% had tree palms near roofs, allowing snakes easy access to dwellings (Table 2). Anthills, present in 54.03% of homes, are also known to attract snakes. These environmental factors create a high-risk environment for snake encounters. Analysis of sleeping habits revealed that while 57% of people utilized mosquito nets, potentially offering some protection from insect-borne diseases, a significant portion (19%) slept on temporary beds in watch huts, 23% on mats on the floor, and 2% directly on the verandah floor. These sleeping arrangements offered minimal protection from snakes. Occupational analysis showed that 55.64% of the population are paddy cultivators, 2.41% were Chena cultivators, and 4.83% were involved in gardening/cultivation, indicating a close connection to the outdoors, where snake encounters are more likely. Nighttime activities also revealed potential risks: 62.9% stayed at home, 33.87% looked after their cultivation, 0.8% used to go hunting, and 2.41% went out often (Table 2). These activities increase exposure to snakes. These combined insights provide valuable information about the environmental and behavioral factors contributing to snake bites in this region. Addressing these factors through vegetation clearing, utilizing protective gear, and adopting safer sleeping habits can significantly reduce the risk of snake encounters and enhance community safety.

Table 2. Risk factors among the whole population about snake bites

Variables	Frequency (%)
Risk factors among the whole population	
Overgrowth with grass	77 (62.09%)
Full of coconut husks, fire wood	53 (42.74%)
Full of frogs and rats	23 (18.54%)
Tree palms near the roof	69 (55.64%)
An area with anthills	67 (54.03%)
None of the above	2 (1.61%)
Sleeping place at night	
Bed with a mosquito net	71 (57%)
Temporary bed in the paddy field	23 (19%)
Mats on the floor	28 (23%)
The floor of the verandah	2 (02%)
Occupation	
Paddy cultivation	69 (55.64%)
Chena cultivation	03 (2.41%)
Gardening/cultivation	06 (4.83%)
Forces &none	46 (37.09%)
Visiting place at night	
Hunting	01 (0.80%)
To look after your cultivation	42(33.87%)
Go out often	03 (2.41%)
Stay at home	78 (62.9%)
Nature of the House	
Thatched	08 (6.4%)
Mud hut	28 (22.5%)
Plastered – wall	52 (41.9%)
Walls not plastered	36 (29.03%)

When asked about the most common highly venomous snake responsible for bites, 57.25% of people identified the Russell's viper, followed by the hump-nosed viper at 29.03%. Cobras and kraits received significantly lower responses (5.64% and 1.61%, respectively). Notably, paddy fields were perceived as the most common risk area by

76.6% of respondents. Despite this awareness, footwear usage for protection was low, with only 8.06% wearing boots and 4.83% wearing long trousers (Table 3). Interestingly, 75% reported not wearing any protective gear when entering paddy fields. While a high percentage used torches as a preventive measure during travel, further analysis using Log-linear models is recommended to comprehensively assess the association between snake bites and various risk factors.

Table 3. Snake bites and prevention methods in Sri Lanka

Variables	Frequency (%)
Snake that bites the most	
Cobra	07 (5.64%)
Russell's viper	71 (57.25%)
Kraits	02 (1.61%)
Hump nosed viper	36 (29.03%)
Cat snake	08 (6.45%)
Location most of the attacks are recorded	
In the house at night	23 (18.54%)
In the paddy field	95 (76.61%)
At the chena	05 (4.03%)
When traveling at night	01 (0.8%)
When go to paddy field or night wear	
Wear boots	10 (8.06%)
Wear long trousers	06 (4.83%)
Wear slippers	15 (12.09%)
None	93 (75.0%)
Preventive method from bites at night	
Using an electric torch	117 (94.35%)
Using a flame	3 (2.41%)
Tapping with stick	3 (2.41%)
Using another method	1 (0.8%)

The association between the snake bite victims with the risk factors was investigated using Pearson's correlation coefficient test as shown in Table 4.

Table 4. Victims' relationship with risk factors

Variables	Pearson's correlation analysis
Incidental area	0.1
Occupation	0.7
Bitten place of the body	0.6
Wearing boots	0.7

Discussion

A staggering number of people (78.22%) hold onto harmful myths about snake bites. These myths can be deadly as they prevent victims from getting proper medical treatment. The reasons for such widespread misinformation are varied: lack of access to accurate information, fear of snakes, and deeply ingrained cultural beliefs [10]. To combat this issue, it's crucial to spread accurate knowledge through community talks, social media campaigns, and awareness initiatives [11]. This will empower everyone with the knowledge to respond appropriately to snake bites. The data reveals a clear preference for seeking treatment at hospitals in the event of a snake bite, with 95.56% of respondents choosing this option. Home remedies and indigenous doctors are far less common; only 3.22% and 0.8% of people choose them, respectively. The overwhelming majority of the data indicates that hospital care is the best course of action for treating snake bites, even though some communities use home cures or traditional medicine. This is probably caused by a number of things, such as the accessibility of skilled medical personnel who are knowledgeable about the treatment procedures for snake bites and have the means to provide antivenom if needed [12]. Hospitals also give patients access to cutting-edge medical devices like dialysis machines and ventilators, which are essential for treating severe cases [13].

Lastly, a widespread belief in the efficacy of contemporary medicine encourages people to visit hospitals right away for emergency care. Consequently, hospitalization is the best and most efficient course of action for treating snake bites due to the availability of highly qualified medical personnel, cutting-edge equipment, and public confidence in contemporary medicine. Although home remedies and traditional medicine have a long history of being used to treat snake bites, their use is still somewhat restricted [14]. This can be due to a number of things, such as a lack of knowledge about their effectiveness, apprehension about possible harm from unfamiliarity, accessibility issues, and unfavorable opinions. But it's important to recognize that native tribes have a great deal of experience and knowledge when it comes to using traditional treatments to cure snake bites [15]. For certain communities, these techniques have great cultural significance in addition to being efficacious. Therefore, a more holistic and culturally conscious approach to treating snake bites can be made possible by bridging the gap through awareness campaigns, research, and cooperation between traditional healers and medical experts [16].

To combat snakebites, it is imperative to adopt a multifaceted strategy that respects the knowledge of indigenous traditions as well as the effectiveness of contemporary treatment [17,18]. Holistic treatment can be facilitated by cross-cultural research on traditional practices, collaborative training between healers and doctors, and customized community education [19,20]. Building up the infrastructure for rural healthcare, equipping people with first aid skills, and making sure it's affordable are all necessary to guarantee access. Recall that although traditional methods are very valuable, seeking medical assistance right away is still crucial to preserving lives [21]. Together, we can create a world in which everyone has access to secure and efficient snakebite care [22]. According to research showing that over 80% of respondents acknowledged these links, overgrown areas, waste heaps, and the presence of possible prey including frogs and rodents emerge as important environmental risk factors for interactions with snakes [17,20]. This ecological consciousness is essential for prevention because it gives communities the ability to modify their environment (removing vegetation, storing goods appropriately, and reducing encounter hazards). Even if environmental awareness is important, getting medical help right away is still crucial in cases of snakebite [23].

An increased likelihood of encountering snakes is associated with dense vegetation, easily accessible prey, and hiding areas, according to data examining environmental factors that contribute to snake bites [24]. Additionally, the presence of anthills and tree palms adjacent to rooftops draws these reptiles nearer to populated areas, increasing the likelihood of encounters. Remarkably, most responders recognize these environmental factors, indicating a good degree of understanding of the hazards associated with snake bites. To mitigate these risks and prevent encounters, clearing overgrown vegetation, storing materials securely, controlling rodent populations, and trimming tree branches are strongly recommended [25,26]. By implementing these measures and fostering awareness through education and outreach programs, communities can significantly reduce the risk of snake bites. Be extra cautious in areas known for high snake densities. Equipping communities with knowledge about snake bite prevention and first-aid is vital. These measures, coupled with increased awareness, can significantly decrease encounters and enhance safety. Remember, this data reflects risk perceptions within a specific context. Further research and analysis are crucial for developing comprehensive risk maps and implementing targeted snake bite prevention strategies.

While most identify venomous snakes, alarming myth adherence among 80% seeking hospital care underlines the urgent need for educational programs to dispel misinformation and empower communities with accurate snake bite knowledge. Overgrown dwellings, animal presence, and unprotected sleeping arrangements in 62% of analyzed homes paint a worrying picture of high snake encounter risk, necessitating urgent environmental and behavioral adaptations. While paddy fields are recognized as high-risk areas (76.6%), inadequate protective measures like footwear (8.06% boots, 4.83% long trousers) expose a majority (75%) to potential snake bites in these crucial work zones, despite awareness of common venomous snakes (57.25% Russell's viper, 29.03% hump-nosed viper).

Conflict Relationships and Activities

The authors state that the research was conducted in the absence of business or financial relationships that could be construed as a possible conflict of relationships and activities.

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MF: methodology, drafting-preparation of the original draft, writing-review and editing. **HP:** conceptualization, formal analysis, data curation, **BB**: methodology, investigation, supervision, planning and execution, **AM:** supervision, planning and execution, project administration, **BS:** supervision, planning and execution, project administration, Funding acquisition.