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Psychiatric Manifestation of Snake Bites in Southern Bangladesh

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Abstract

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Background: Snake bites are a significant public health issue, especially in tropical and subtropical areas, affecting 4-18 million people annually and causing up to 120,000 deaths. The burden is mainly in rural communities of South Asia, Africa, and Latin America. Bangladesh faces about 800,000 snake bites yearly, with 52 of the 200 poisonous species. Snake bites can cause severe physical and psychological effects, like PTSD and anxiety. Despite its impact, snakebite remains underreported due to high non-venomous incidents. Efforts aim to halve snakebite-related deaths and disabilities by 2030. **Aim of the study:** This study aimed to examine the psychological effects of snakebites in Southern Bangladesh. **Methods:** This observational study focused on snakebite incidents in five districts of southern Bangladesh: Khulna, Jashore, Satkhira, Bagerhat, and Gopalganj. The study was conducted from August 2022 to March 2023 and included 50 individuals who survived venomous snakebites, selected through purposive, convenience sampling. Inclusion criteria were any age and gender with venomous bites, while non-venomous cases and fatalities were excluded. Data collection involved face-to-face interviews and questionnaires, analyzed using SPSS version 26.0 for Windows. Demographic details and clinical symptoms were documented, with continuous data presented as mean±SD and categorical data as frequency and percentage. **Results:** The study analysed 50 snakebite patients, with 30% aged 16-30 and 28% aged 46-60. The average age was 34.59 years. Men comprised 64% of participants, and 52% had only a primary education. Occupationally, 36% were farmers, and 12% were students. Socioeconomically, 64% were lower class, and 76% were Muslims. A significant 58% sought primary care, often trusting in traditional healers (76%) over medical treatment (12%). Post-bite, 82% avoided hospitals, and 82% reported psychological issues. 34% had moderate depression, 36% had mild anxiety, and 70% had moderate to severe PTSD, with 12% experiencing immune system effects. **Conclusion:** The study examines psychiatric issues after snakebites in Southern Bangladesh, where victims often seek traditional healers instead of medical care. Mainly affecting young males in agriculture, 72% experienced anxiety, 58% depression, and 70% PTSD. The study highlights the need for awareness and early psychological intervention for recovery.

Keywords: Psychiatric manifestation, Survivors, Snake bites.

Introduction

Snake bites are a significant public health issue in many regions worldwide, particularly in tropical and subtropical areas where venomous snakes are common. Snakebite is not just a health issue but a pressing concern in the rural tropics that demands immediate attention. Classified as a neglected tropical disease (NTD), snakebite affects an estimated 4-18 million people annually, resulting in up to 120,000 deaths and approximately three times as many amputations and other permanent disabilities each year.^{1,2} The burden of snakebite is predominantly concentrated in rural and tribal (Indigenous) communities across South Asia, Africa, and Latin America.³

In recent years, snakebite has gained increased attention, with the World Health Assembly passing a resolution to address it in 2018, followed by a strategy aiming to reduce death and disability due to snakebite by 50% by 2030.⁴ With its dense population and diverse snake fauna, Southern Bangladesh is one of the regions where snake bites pose a substantial health risk. It is estimated that there are approximately 800,000 snake bites annually in Bangladesh, with a significant number occurring in the southern region.⁵ According to Hossain et al., each year, an estimated 15,372 (10.98/100,000) snakes bite individuals, and 1,709 (1.22/100,000) die from these bites in Bangladesh.⁶ Out of over 3,500 species of snakes, only 250 are venomous.⁷ Due to the low death rate and high incidence of nonvenomous snake bites in South Asia, less than 25% of cases are reported to hospitals for management.⁸ In Bangladesh, there are about 200 snake species, of which 52 are poisonous.⁹ Only five species are considered dangerously poisonous to humans: King Cobra, Common Cobra, Common Krait, Russell's Viper, and Saw Scaled Viper. The immediate physical effects of snake bites can range from mild to severe, depending on the species of snake, the amount of venom injected, and the time taken to receive medical treatment. Common physical symptoms include local pain and swelling, bleeding, neurological impairments, and, in severe cases, death.¹⁰

Beyond these physical effects, snake bites can also lead to significant psychiatric and psychological consequences. Survivors of snake bites often suffer permanent or long-term physical and psychological consequences due to myotoxicity, renal damage, neurotoxicity, coagulopathy, and psychiatric manifestations.^{11,12} Long-term psychological consequences include post-traumatic stress disorder

(PTSD), generalised anxiety, avoidance of situations where they could be bitten again, health-seeking behaviour, and somatisation. Most studies on snakebites only estimate the number of bites, acute complications, and deaths, with very little data on the long-term physical and psychological consequences experienced by victims. Research has shown that snake bite victims often experience a range of psychiatric symptoms, including anxiety, depression, PTSD, and somatic symptom disorder.^{13,14}

This situation is unfortunate, as most snakebite victims are in the economically productive age group, and the economic impact of any disability is likely to be high. Snakebites are sudden and unexpected, and the element of surprise and the associated threat to life may cause extreme stress and anxiety in the victim.¹⁴ Addressing psychological manifestations is crucial to provide snakebite survivors with the opportunity to create a positive change, enabling them to lead normal, happy, and productive lives.¹⁵ This study aimed to examine the psychological effects of snakebites in Southern Bangladesh.

Materials and methods

This observational study was conducted in the southern region of Bangladesh, specifically focusing on five districts: Khulna, Jashore, Satkhira, Bagerhat, and Gopalganj. The study spanned from August 2022 to March 2023. Throughout the study, a total of 50 individuals who had experienced a snake bite and were still alive were included in the analysis. Participants were selected using a purposive, convenience sampling technique. Those exhibiting either local or systemic symptoms of envenomation, as outlined in the 'National Guideline of Management of Snake Bite,' were classified as cases of poisonous snake bites.¹³ Before data collection commenced, written consent was obtained from all participants, and measures were taken to ensure the confidentiality of the data collected.

Inclusion criteria:

- Participants of any age and gender who had experienced a venomous snakebite were eligible to participate in this study.

Exclusion criteria:

- Participants who had previously experienced non-venomous snakebites and death cases.
- Patient with Delirium condition.
- Patients who did not provide written informed consent.

This study gathered demographic information such as age, gender, occupation, and economic status. A team of three researchers collected data from snakebite victims using face-to-face interviews and questionnaires. The psychiatric evaluation of the patients was based on the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition: DSM-5.¹⁶ In cases where victims could not provide information, their parents or neighbours were approached as respondents. An analysis plan was devised to align with the study's objectives. The collected data underwent standard descriptive statistical analysis using the Statistical Package for the Social Sciences (SPSS, Version-26.0) software on the Windows platform. Measures such as mean, standard deviation, frequency, and percentage were utilised as appropriate. Following data collection, thorough checks and edits were conducted. Information regarding neurotoxic snakebites' clinical manifestations and socio-demographic profiles was gathered, documented, and analysed using SPSS version 26.0 for Windows. Continuous parameters were presented as mean $\pm$ SD, while categorical parameters were expressed as frequency and percentage.

Results

The present investigation included 50 snakebite patients. The distribution of snakebite patients by age group found that the age range of 16-30 years had the highest number of cases (30%), followed by 46-60 years with 28%. The average age of snakebite patients was 34.59 years, with a standard deviation of ± 17.14 (Table 01). In this study, 64% of the participants were men and 36.0% were women. The majority (52%) had primary education, with only 6% having further education. There were 36% farmers, 12% students, and 46% from other occupations. Socioeconomic position revealed that 64% belonged to the lower class and 24% to the lower middle class. In terms of religion, 76% were Muslims and 24% were Hindus (Table 01). Among the affected patients, 58% sought primary care, with the majority putting their trust in Qjha (76%) and only 12% seeking medical treatment. After being bitten by a snake, the majority of people (82%) refused to go to the hospital (Table 02). The majority of the respondents (82%) have experienced psychological illness (Figure 01). Overall, the majority of participants (34%) experienced moderate depression, while 24% reported mild depression. 12% believed they had no depression at all (Table 03). Thirty-six percent of respondents expressed mild anxiety, while the

remaining 36% reported moderate anxiety. 18% of the subjects experienced no anxiety at all. 70% of patients reported moderate to severe PTSD, with 12% reporting immune system effects (Table 03).

Table 01: Socio-demographic status of the study population (n=50).

Variables	Frequency (n)	Percentage (%)
Age group (in years)		
0-15	9	18.00
16-30	15	30.00
31-45	12	24.00
46-60	14	28.00
Mean±SD	34.59±17.14	
Gender		
Male	32	64.0
Female	18	36.0
Education		
Primary	26	52.0
Secondary	21	42.0
More	3	6.0
Occupation		
Farmer	18	36.00
Student	6	12.00
Housewife	3	6.00
Others	23	46.00
Economic Status		
Lower class	32	64.0
Middle class	3	6.0
Upper class	3	6.0
Lower middle class	12	24.0
Religion		
Muslim	38	76.0
Hindu	12	24.0

Table 02: Treatment and hospitalisation status of the participants

Variables	Frequency (n)	Percentage (%)
Primary treatment		
Yes	29	58.0
No	21	42.0
Type of primary treatment		
Medical treatment	6	12.0
Ojha	38	76.0
Both	6	12.0
Hospitalization		
Yes	9	18.0
No	41	82.0

**Figure 01: History of psychiatric illness.****Table 03: Psychiatric effects of snake bite.¹⁶**

Psychiatric condition	Frequency (n)	Percentage (%)
Level of Depression		
Very mild	12	24.0
Mild	12	24.0
Moderate	17	34.0
Severe	3	6.0
None	6	12.0

Level of Anxiety		
Mild	18	36.0
Moderate	18	36.0
Severe	5	10.0
None	9	18.0
Level of PTSD		
Moderate to severe	35	70.0
Possible	9	18.0
Affecting the immune system	6	12.0

Discussion

Snakebite is a leading cause of accidental fatality in Bangladesh, and its public health significance has been systematically underestimated. We have documented the findings in this study on the psychiatric manifestations of snakebites conducted in five districts of Bangladesh's southern part, which is vital for raising awareness. Our study has analysed 50 snake bite survivors. In our study, snakebite patients had an average age of 34.59 years with a standard deviation of ± 17.14 . The age group with the highest prevalence was 16-30 years. In contrast, similar studies conducted in Bangladesh, Nepal, and Malaysia revealed that people of younger ages are impacted in most cases.¹⁷⁻¹⁹ Our study found that primarily males (64%) are disproportionately victimized than females, which is similar to other studies as well.^{6,20} Both could be attributed to these populations' increased interest in outdoor activities. Due to poor education, most of the victims were farmers and other jobs that are compatible with the outcome of an Indian study.²¹ This could be because less educated people work in farming and labour, where they are more likely to come into contact with snakes.

Traditional healers, herbal medicine practitioners, and Ojhas have traditionally managed Snakebite treatment in Bangladesh. In the current study, 58% of victims sought primary care, with the majority (76%) relying on Ojhas and only 12% seeking medical attention. Over 80% of those bitten refused to go to the hospital. A study in Bangladesh found that 61% of casualties sought help from traditional healers or herbal medicine practitioners, while 17.4% turned to government

institutions or certified doctors for initial treatment.⁶ Similar patterns have been observed in neighbouring countries, where traditional healers and Ojhas commonly provide the first level of treatment.²²⁻²⁴ In a Kenyan community-based study by Snow, 68% of snakebite patients sought care from traditional healers, with 98% initially relying on these methods. Sloan et al. reported that 80% of victims first used traditional remedies in South Africa, with 63% later consulting a traditional healer.²⁵ Distance to medical facilities significantly influenced health-seeking behaviour; those who sought medical treatment travelled longer distances, likely due to more accessible access to traditional care near the bite site or the severity of symptoms prompting them to seek medical help. A community-based study in Sindh, Pakistan, found that fewer than 75% of snakebite victims sought medical attention, opting instead to manage their injuries themselves.²⁶

Snake bites, though primarily a physical health emergency, can also lead to significant psychiatric manifestations. The acute psychological response often begins with intense fear and anxiety immediately following the bite, stemming from the uncertainty and potential lethality associated with snake venom. This can escalate into panic attacks, acute stress reactions, or even post-traumatic stress disorder (PTSD). In our study, we observed that most participants (82%) had no history of psychological issues (Figure 01). However, snake bite victims can develop chronic anxiety disorders, depression, or persistent PTSD. Factors such as prolonged hospitalisation, disfigurement, and potential long-term disabilities can worsen the psychological impact. Islam et al. reported psychological symptoms like depression, anxiety, and PTSD in snakebite victims.⁸ In their study, 34% of individuals experienced moderate depression, while 24% had mild depression. Regarding anxiety, 36% experienced mild anxiety, and an equal number reported moderate anxiety (Table 03). Islam et al. also noted a higher frequency of depression (33.9%) among Indigenous people in Bangladesh's hilly regions.⁸ Other studies in Sri Lanka and Nigeria found that snake bites caused various psychological effects, including depression, anxiety, and PTSD.^{14,27,28} The prevalence of PTSD among snakebite survivors varies. In Iran, 8% of survivors had PTSD, with half experiencing chronic PTSD, which is more common in younger individuals and females.²⁹ A Sri Lankan study reported a mean Post-traumatic Stress Symptom Scale-Self Report score of 10.5 (SD 12.7), with 21.6% meeting PTSD criteria.¹⁴ Among tribal populations in Bangladesh, the PTSD prevalence was 27.3%.⁸ In contrast, our study

found that 70% of patients experienced moderate to severe PTSD, while 12% reported immune system issues (Table 03).

Additionally, neurotoxic venom can directly affect the central nervous system, potentially leading to confusion, hallucinations, or delirium. These neuropsychiatric symptoms can complicate the clinical management of snake bite victims, necessitating a multidisciplinary approach that includes both medical and psychological care. Effective treatment requires addressing both the physical and psychological aspects of snake bites. Early psychological intervention, counselling, and, if necessary, psychiatric treatment are crucial in mitigating long-term mental health consequences and improving overall recovery.

Limitations of the study

The study on snakebite psychiatric manifestations in Southern Bangladesh faces several limitations. The sample size of 50 participants is relatively small, potentially affecting the generalizability of the findings to the broader population. Using purposive, convenient sampling might introduce selection bias, as the sample may not represent all snakebite victims. The exclusion of non-venomous snakebite cases and fatalities limits the scope of the study to more severe incidents, potentially overlooking less severe yet psychologically impactful cases. Additionally, reliance on self-reported data for psychological symptoms could introduce recall bias and inaccuracies, affecting the reliability of the results.

Conclusion

The study highlights the significant psychiatric manifestations following snakebites in Southern Bangladesh. Despite being a severe health threat, many victims prioritise traditional healers over medical facilities, resulting in untreated psychological trauma. Most snakebite victims were males aged 16-30, with limited education and economic status, primarily working in agriculture. These victims experienced high levels of anxiety (72%) and depression (58%), with 70% reporting moderate to severe PTSD. The study underscores the urgent need for increased awareness, early psychological intervention, and access to mental health care for snakebite victims to address these critical mental health consequences and enhance recovery outcomes.

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