"Exploring Sociodemographic Trends Among Snakebite Victims: An Observational Study"

1Dr. Ritesh R. Bhabhor, 2Dr. Anil R. Pandey, 3*Dr. Milind singh Yadav, 4Dr. Amit P. Parmar,

1 Assistant Professor, Department of Forensic Medicine, and Toxicology, Zydus Medical College and Hospital, Dahod, Gujarat, India. Email Id- riteshbhabhor1812@gmail.com
2 Professor, Department of Forensic Medicine and Toxicology, Zydus Medical College and Hospital, Dahod, Gujarat. Email Id: ankush6987@gmail.com
3 Assistant Professor, Department of Forensic Medicine and Toxicology, Pramukhswami Medical College and Shrikrishna Hospital, karamsad, Anand Gujarat. Email Id: connectdrmilind@gmail.com
4 Professor & Head, Department of Forensic Medicine and Toxicology, Government Medical College, Bhavnagar, Gujarat, India. Email Id: kda2308@yahoo.com
***Corresponding Author:**Dr. Anil R. Pandey,
Professor, Department of Forensic Medicine and Toxicology,
Zydus Medical College and Hospital, Dahod, Gujarat.
Email Id: ankush6987@gmail.com

Abstract:

Introduction: Snakebites present a significant health threat, particularly in regions where human and snake habitats overlap. In India, a high incidence of snakebites is observed in rural areas due to farming practices and urbanization displacing wildlife. Although only a fraction of snake species are venomous, they can cause severe medical emergencies requiring prompt treatment. This study aims to explore the sociodemographic profile of new snakebite cases in Gujarat.

Materials and Methodology: This retrospective, observational study analyzed medical records of patients admitted to a Gujarat hospital between June 2021 and December 2021 with a confirmed snakebite. A structured data collection form was used to gather demographic and clinical details through personal interviews with patients and attendants. Descriptive statistics were applied using GraphPad version 8.0.

Results: The study included 100 patients, predominantly male (72%) and aged 21-40 years (54%), with a mean age of 38.17 ± 11.65 years. A significant 63% of patients were from rural areas, and 81% were from lower socioeconomic backgrounds. The most commonly identified

snakes were kraits (34%), followed by cobras (19%) and vipers (8%), with 39% of cases involving unidentified snakes.

Conclusion: The findings indicate that snakebite patients in Gujarat are mostly male, aged 21-40, and from rural and lower socioeconomic backgrounds. The high incidence among agricultural workers suggests a need for targeted preventive measures and interventions in rural and economically disadvantaged communities to address the elevated risk of snakebites.

Keywords: Snakebite, Cobra, Krait, Viper

Introduction:

Snakes are a significant threat to humans, especially when their habitats overlap with human environments. Although there are thousands of snake species, only about 15% pose a danger to humans [1]. In countries like India, particularly in rural areas where farming is often done without protective footwear, snakebites are common [2]. The ongoing urbanization of rural regions has led to the displacement of snakes and other wildlife, heightening the risk of encounters with humans. Most snakes are non-venomous, but in India, the Colubridae family (including cobras, kraits, and pit vipers) and the Viperidae family (true vipers) are primarily responsible for venomous bites [3]. Snakebites can be medical emergencies that require immediate diagnosis and treatment to prevent serious outcomes. The lower limbs are frequently the sites of such bites [3].

Due to the lack of reliable population-based studies on incidence and mortality, these estimations have large variability. [4-6] The WHO recently re-recognized snake bites as one of the neglected tropical illnesses due to the significant burden of mortality and morbidity caused by snake bites. [7,8] The majority of snakebites and consequent deaths worldwide occur in

India. [4] India was estimated to have 46,000 snakebite deaths annually, with an age-standardized snakebite fatality rate of 4.1 per 100,000 people based on a major population-based countrywide survey conducted over 15 years ago. Gujarat has an annual snake-bite death rate of 3.5 per 1,00,000 population and is one of the 13 states with high prevalence of snake-bite deaths [9].

Understanding the socio-demographic characteristics of individuals affected by any disease is crucial for effective healthcare planning and intervention. Therefore, this study was conducted to explore the socio-demographic profile of new snakebite cases in the Gujarat region.

Materials and Methodology:

This is a retrospective, observational, descriptive study based on the medical records of the patients presented with a history of snakebites to Hospital, Gujarat. A structured data collection form was developed to record demographic and clinical details of patients hospitalised at hospital and included between 1 June 2021 and 31 December 2021.

All patients, regardless of gender, age >16 years, who were admitted to the hospital between June 2021 and December 2021 with a confirmed history of snakebite were included in this study. Cases with incomplete or missing data in medical records were excluded. Demographic information for the 100 selected cases was collected using predesigned standard study forms through structured personal interviews with the patients and their attendants. The data obtained were analyzed using GraphPad version 8.0, employing descriptive statistics for the analysis.

Result:

Table 1. Demographic data of snakebite patients

Parameters		N (%)
Age group	16-20	12 (12%)
	21-40	54 (54%)
	41-60	34 (34%)
Gender	Male	72 (72%)
	Female	28 (28%)
Demographic area	Rural	63 (63%)
	Urban	37 (37%)
Socio-economic status	Lower	81 (81%)
	Middle	17 (17%)
	Upper	2 (2%)

The demographic data of the snakebite patients included in the study revealed that the majority of patients fell within the age group of 21-40 years, accounting for 54% of the cases, followed by 34% in the 41-60 age group, and 12% in the 16-20 age group. In terms of gender distribution, 72% of the patients were male, while 28% were female. Regarding the demographic area, 63% of the patients were from rural areas, with the remaining 37% from urban regions. The socio-economic status of the patients indicated that a significant proportion, 81%, belonged to the lower socio-economic class, 17% were from the middle class, and only 2% were from the upper class.

Table 2. Mean age of snake bit patient

Age	Mean ± SD
Mean age	38.17 ± 11.65

The mean age of the snakebite patients in the study was 38.17 years, with a standard deviation of 11.65 years.

Table 3. Age and Gender wise distribution of study participant

Age group	Male	Female
16-20	8	4
21-40	39	15
41-60	25	9

The age and gender distribution of the study participants showed that in the 16-20 age group, there were 8 males and 4 females. The 21-40 age group had the highest number of participants, with 39 males and 15 females. In the 41-60 age group, there were 25 males and 9 females.

Table 4. Type of snake

Type of snake	%
Cobra	19%
Krait	34%
Viper	8%
Unknown	39%

The distribution of snakebite cases by the type of snake revealed that 19% of the bites were attributed to cobras, 34% to kraits, and 8% to vipers. Notably, 39% of the snakebites involved snakes that were unidentified.

Discussion:

The table shows that in the 16-20 age range, there were 8 male and 4 female patients. In the 21-40 age group, the numbers were 39 males and 15 females, while in the 41-60 age range, there were 25 males and 9 females. A study by [10] reported that 58% of snakebite cases were women among 121 patients, which is inconsistent with the findings of this study. However, other studies have reported that 74.2% and 52.4% of their cases were male, while 25.8% and 48.6% were female [11,12].

The gender distribution in the studies mentioned aligns closely with the gender distribution observed in the present study, indicating a higher susceptibility of males to snakebites compared to females. These results suggest that males, particularly those aged 16-40 years, are a vulnerable group for snakebites in the Gujarat region. The prevalence of snakebites among younger individuals may be attributed to their increased outdoor activities. Additionally, females aged 21-40 years were found to be more susceptible to snakebites compared to those in other age groups [13,14].

The mean age of snakebite patients in the present study was 38.17 ± 11.65 years. In comparison, a study reported a median age of 41.5 years [13-15], while another study found the mean age to be 42.8 years [11,14,15]. Additionally, a different study reported a mean age of 42.2 ± 15 years [10]. These findings are consistent with the results of the present study.

The study also found that 63% of the cases were from rural areas, highlighting that snakebites are a significant issue in these regions. This observation is consistent with other research conducted on snakebites in India, which also reported a predominance of cases from rural areas [11,15].

The sociodemographic analysis revealed that 81% of the patients were from lower socioeconomic backgrounds, 17% were from middle socioeconomic backgrounds, and 2% were from upper socioeconomic backgrounds. This suggests that individuals from lower socioeconomic groups are more frequently affected by snakebites. This increased vulnerability

is likely due to their engagement in occupations involving raw materials, fieldwork, cultivation, or other primary sector activities. Similar findings have been reported in other studies [12,16]. The present study also found that the majority of cases were from lower socioeconomic status and rural areas [17]. It can be inferred that young tribal individuals from rural regions with lower socioeconomic status are particularly susceptible to snakebites, as their work in agriculture and cultivation often exposes them to forested and nearby areas. Many studies have documented that snakebites are a common occupational, environmental, and climatic risk in rural areas, with agricultural laborers frequently sustaining bites to their lower legs, ankles, and feet, as well as their family members [4-6].

Conclusion:

The study reveals that most snakebite patients in Gujarat were male (72%) and aged 21-40 years, with a mean age of 38.17 ± 11.65 years. About 63% were from rural areas, and 81% were from lower socioeconomic backgrounds, indicating higher risk among those in primary sector jobs, especially agriculture. These findings highlight the need for targeted interventions and preventive measures in rural and economically disadvantaged communities.

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