Journal of Population Therapeutics & Clinical Pharmacology

RESEARCH ARTICLE
DOI: 10.53555/22dfz414

A RETROSPECTIVE STUDY OF BITES AND STINGS PRESENTING TO EMERGENCY DEPARTMENT

Dr. Spoorthy M.[1*], Dr. Deepak T. G.[2]

[1*]Junior Resident, Department of Emergency Medicine, Shridevi Institute of Medical Sciences and Research Hospital, Tumkur, Karnataka, India.
[2]Associate Professor, Department of Emergency Medicine, Shridevi Institute of Medical Sciences and Research Hospital, Tumkur, Karnataka, India.

Corresponding Author: Dr. Spoorthy M.
*Junior Resident, Department of Emergency Medicine, Shridevi Institute of Medical Sciences and Research Hospital, Tumkur, Karnataka, India.

ABSTRACT

INTRODUCTION: Despite increasing health effects of bite and stings and their associated consequences, research on their frequency is limited. The aim of present study is to estimate the proportion of bites and stings cases, to describe the clinico-demographic of bites and stings presenting to emergency medicine and to estimate the outcome of exposure.

MATERIAL AND METHODS: The present retrospective study was conducted at Shridevi Institute of Medical Sciences and Research Hospital, Tumkur among the 120 patients of bite and sting exposure during the period of April 2022 to March 2023. The information relevant to Bite and sting cases was noted down and results were analyzed using SPSS version 25.0

RESULTS: The number of patients in the age group of 20-30 years was 22, in the age group of 30-40 years was 30, in the age group of 40-50 years was 48 and in the age group of 50-60 years was 20. The number of female patients was 45 whereas that of male was 75. Different bite and stings found were bee/wasps sting (27), unknown insect bites (12), dog bites (54), cat and rat bites (7), snake bite (2) and scorpion sting (3). 8 patients belong to urban region where as 112 patients belong to rural area. 98 patients had local symptoms at presentation and 22 patients had systemic symptoms.

CONCLUSION: The majority of cases presenting to the emergency department are due to dog bites and bee stings. Physicians must possess comprehensive knowledge of of bites and stings that occur in their specific geographic area in order to effectively handle such situations.

KEYWORDS: Arthropod, Bite, Emergency, Management, Snakes, Stings.

INTRODUCTION

Individuals who have sustained injuries, disabilities, or fatalities as a result of coming into touch with animals frequently seek medical attention at the emergency room. These incidents represent significant public health concerns.[1]

Arthropods constitute the largest segment of the animal kingdom. The classifications Insecta, Arachnida, and Chilopoda are responsible for causing significant illness and death globally. These classes include many organisms such as lice, fleas, bedbugs, flies, bees, mosquitoes, spiders, scorpions, ticks, mites, and centipedes.[2] The incidence of poisonous bites and stings caused by

arthropods varies geographically. The incidence of bites and stings in all instances of poisoning has been documented to be 2.1% and 1.8%, globally.[3]

Aside from pain, localized erythema and edema are commonly noted near the site of the bite or sting. Depending on the venom's properties, additional clinical symptoms such as nausea, vomiting, low blood pressure, high blood pressure, rapid heartbeat, seizures, anaphylaxis, and bleeding disorders may also occur. Pediatric patients, especially those affected by scorpion envenomation, may experience severe systemic symptoms and even death.[4,5] The snake venom contains neurotoxins that can directly harm tissues, impair cellular components, and disrupt nerve communication.[6,7]

In all cases of bites and stings, the standard strategy entails providing symptomatic support therapy along with local wound care, pain relief treatment, and tetanus prevention. Anti-venom should be delivered based on the appropriate systemic and local indications for cases of scorpion sting and snake bite.[8]

There is a limited amount of information available on the effects of bites and stings, with only case reports and a few studies conducted in specific regions. There is limited knowledge regarding the exact types of bites and stings, their epidemiological characteristics, the frequency of emergency department visits, clinical aspects, and the resulting financial burden on the emergency department. Few studies have been conducted on this topic.

Hence the present study was done retrospectively to estimate the proportion of bites and stings cases, to describe the clinico-demographic of bites and stings presenting to emergency medicine and to estimate the outcome of exposure.

MATERIAL AND METHODS

The present retrospective study was conducted at Shridevi Institute of Medical Sciences and Research Hospital, Tumkur among the patients of bite and sting exposure during the period of April 2022 to March 2023. Ethical clearance was taken from institutional ethics committee before commencement of study.

Convenience sampling was done and all patients presented with bite and sting exposure were taken for the study on the basis of inclusion and exclusion criteria.

Inclusion Criteria

- All patients who presented to ED with bites and stings.

Exclusion Criteria

- Patient data with missing data.
- Patients who got primarily treatment elsewhere before presenting.

The information collected included the specific insect species the patient was exposed to, demographic details such as age and gender, any existing medical conditions, clinical observations, requests for additional tests, the results of those tests, treatments provided in the emergency department, the need for further consultation, and the patient's outcome in the emergency department.

The software SPSS version 25 was utilized for statistical analysis. Statistical procedures such as the chi square and t test were employed. If the p-value is less than 0.05, it signifies statistical significance. Result values were presented in the form of mean ± SD and frequency (percentage).

RESULTS

The total number of patients who visited to Emergency department during the study period was 14341. Out of these 122 (0.85%) cases were due to exposure of bite and stings. After removing the patients with incomplete data in the record (2) the final number of patients analyzed were 120 (0.83%). Out of 120 cases 66 (55%) were due to mammal bites, 30 (25%) were due to arthropod bite/stings, 12 (10%) were due to reptile bites and 12 (10%) were due to other reasons as shown in figure 1.

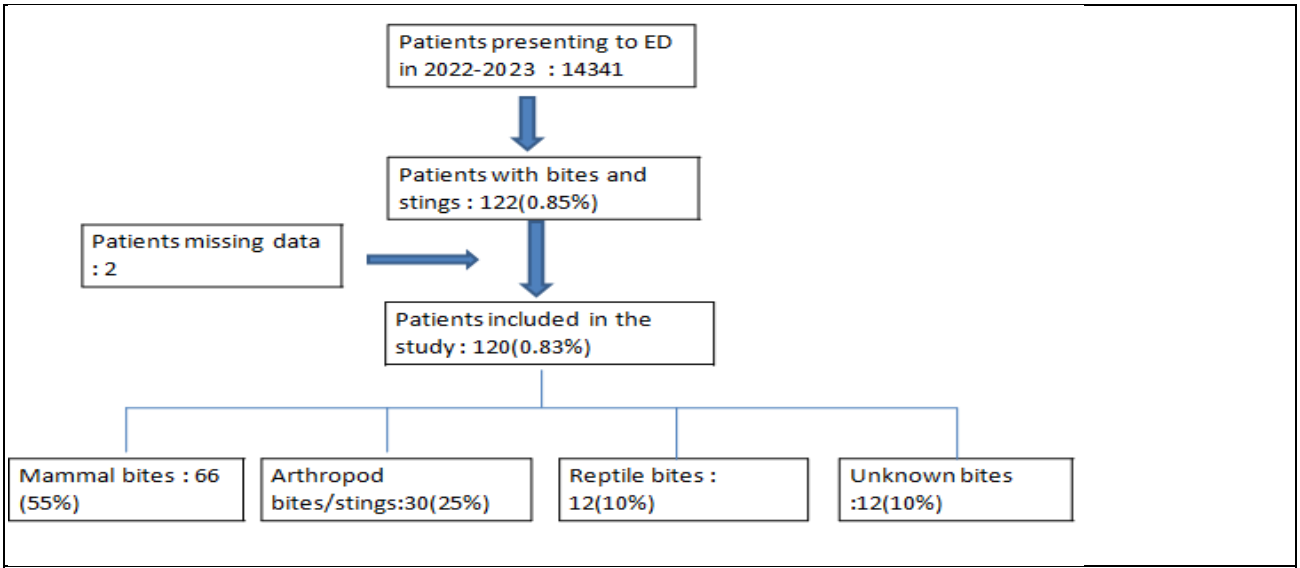

Figure 1: Hierarchy of patient selection

The number of patients in the age group of 20-30 years was 22, in the age group of 30-40 years was 30, in the age group of 40-50 years was 48 and in the age group of 50-60 years was 20 as shown in table 1.

Age in number	**Number**
20-30	22
30-40	30
40-50	48
50-60	20

Table 1: Distribution of patients according to age

The number of female patients was 45 whereas that of male was 75 out of 120 as shown in figure 2.

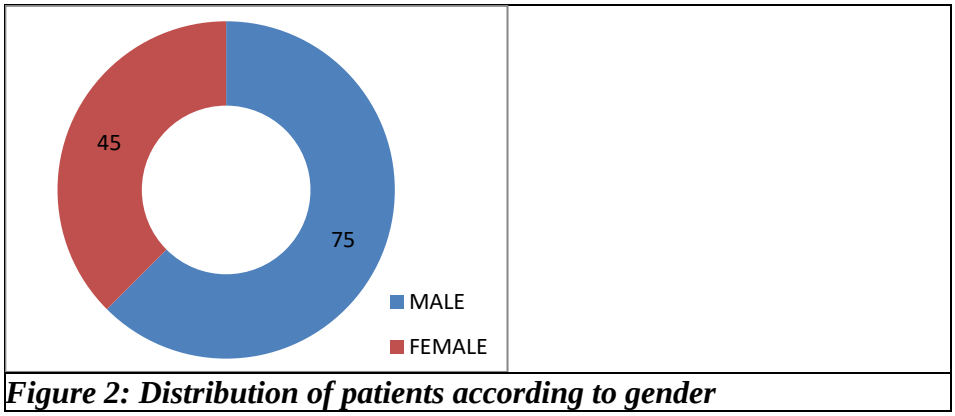

Figure 2: Distribution of patients according to gender

Different bite and stings found were bee/wasps sting (27), unknown insect bites (12), dog bites (54), cat and rat bites (7), snake bite (2) and scorpion sting (3). Baseline characteristics of different bites and stings are shown in table 2.

	Bee/wasps sting(27)	**unknown insect bites(12)**	**Dog bites(54)**	**Cat and rat bites(7)**	**Snake bite(12)**	**Scorpion sting(3)**
Mean age in years	45.6	33.5	42.3	29.7	42.2	38.2
Male sex	18	5	40	3	7	2
In-patient admissions	7	2	3	1	8	1

In-hospital mortality	0	0	0	0	1	0

Table 2: Baseline characteristics of different bites and stings

98 patients had local symptoms at presentation and 22 patients had systemic symptoms as shown in figure 3.

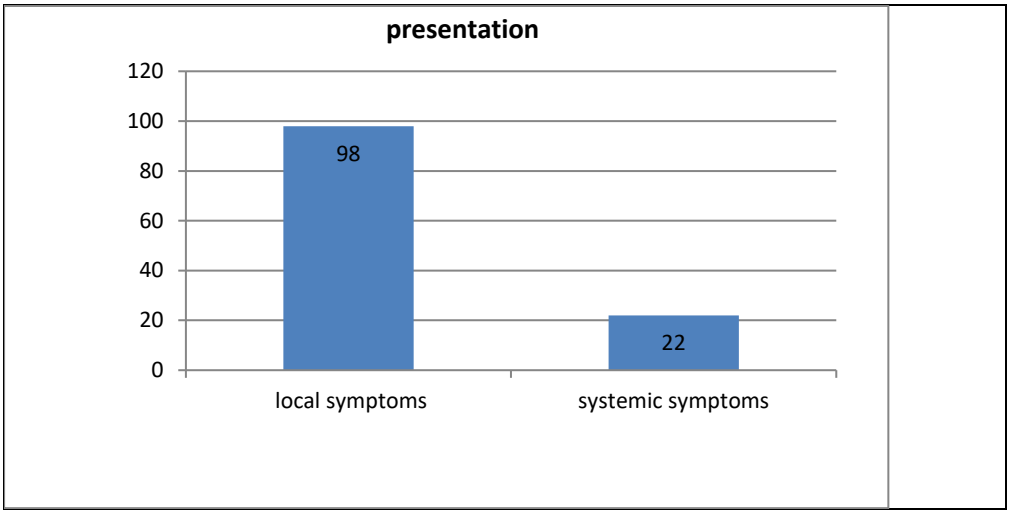

Figure 3: Percentage of local and systemic symptoms

8 patients belong to urban region where as 112 patients belong to rural area as shown in table 4.

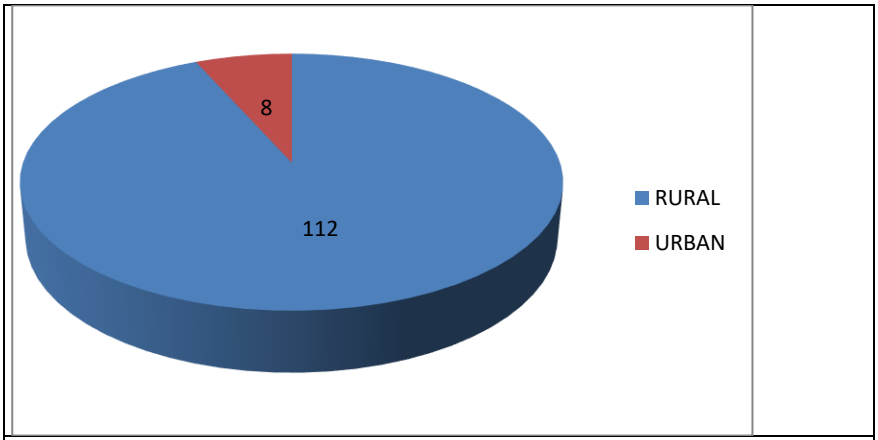

Figure 4: Percentage of population with bites and stings

DISCUSSION

Instances of biting and stinging accounted for 0.8% of all instances of observed in the emergency room. According to epidemiological data from several research, the percentage of bite and sting cases among emergency presentations is roughly 0.7%.[9,10] While our findings align with the information found in existing literature, it is not possible to precisely determine the exact incidence rate. This is due to a substantial portion of bite and sting incidents, which are frequently found in rural regions, being managed only at home with traditional remedies, resulting in these patients not seeking medical attention at a hospital.[6] In our study dog bites formed the majority of bites and stings forming about 81.8% of all mammalian bites, whereas WHO sponsored study involving 18 states of India showed annual incidence of 91.5 % dog bites followed by 4.7% cat bites. Bee stings being second most common presentation forms 25% of bites and sting. A retrospective analysis conducted at the Dokuz Eylul University Poison Information Center examined bite and sting cases over a 17-year period. The study revealed that scorpion stings accounted for approximately one-third of these cases, followed by snake bites, centipede stings, spider bites, and Hymenoptera (bee

and wasp) stings. The proportion of snake bite cases was found to be relatively low. Based on the majority of study conducted thus far, scorpion stings have been identified as a significant fraction of envenomation. Nevertheless, a comprehensive epidemiological study conducted on all instances of bites and stings that were treated in emergency rooms across the United States from 2001 to 2004 revealed that insect bites and stings accounted for the majority of cases, constituting 39.0% of the total. Bee and wasp stings were the second most prevalent cause, accounting for 17.0% of cases, followed by spider bites at 13.5%.[10] The variations in the levels indicated in these studies may be attributed to factors such as regional climate conditions, vegetation cover, and socioeconomic and cultural variations in the population being studied.[11]

Maximum number of patients in our group belongs to 40-50 years of age which means middle age people are most prone this could be related to the fact this age of people lives more in our region where study is conducted. Most of the patients were male and had local symptoms. In an arthropod-based study conducted in northwest Sri Lanka, localized pain was observed in 56% cases, including 70% centipede cases, 60% scorpion cases, 59% spider cases, 52% hymenoptera cases and 45% patients with exposure to unidentified arthropods.[2]

In our study the in hospital mortality was found only in one patient which was due to snake bite. In a study conducted in the USA between 2008 and 2015, bee and wasp (Hymenoptera) stings were responsible for 478 deaths.[12] Similar to our study, a Sri Lanka-based study showed that the main factor responsible for anaphylaxis was hymenoptera bites and it did not report any fatal cases after arthropod exposure.[2]

Aberrant laboratory test outcomes in instances of bites and stings are vital in the management of patients.[13] In accordance with a prior investigation,[14] blood tests of the patients should be done primarily consisting of a complete blood count, biochemistry profile, and cardiac indicators. Administering analgesics, antiemetic, and fluid resuscitation is a vital overall strategy for managing instances of bites and stings.[15] Despite being often recommended for bites and stings, corticosteroids and antihistamines have limited empirical evidence to support their effectiveness.[16]

Public health authorities and policy makers involving emergency physicians should ensure the adequate antidote availability in any given region. More research initiatives by emergency medicine physicians to determine the burden of bites and stings.

Limitations

We relied on others for accurate documentation and recording. It was conducted in a single center, so the population size is small and might not be adequate to apply to whole of general population.

CONCLUSION

The present study concluded that the majority of cases presenting to the emergency department are due to dog bites and bee stings. Emergency physicians must possess comprehensive knowledge of the many manifestations of bites and stings that occur in their specific geographic area in order to effectively handle such situations.

REFERENCES

[1] Langley R, Mack K, Haileyesus T, Proes Choldbell S, Annest JL. National estimates of noncanine bite and sting injuries treated in US hospital emergency departments, 2001–2010. Wilderness Environ Med 2014;25(1):14-23.

[2] Kularatne S, Shahmy S, Rathnayake SS, Dawson A. Clinico-epidemiology of arthropod stings and bites in primary hospitals of north western province of Sri Lanka. Clin Toxicol (Phila) 2018;56(10):880-5.

[3] Mowry JB, Spyker DA, Brooks DE, Zimmerman A, Schauben JL. 2015 Annual report of the American association of poison control centers' national poison data system (NPDS): 33rd annual report. Clin Toxicol (Phila) 2016;54(10):924-1109.

[4] Goldfrank L, Flomenbaum N, Lewin N, Howland MA, Hoffman R, Nelson L, eds. Goldfrank's Toxicologic Emergencies. 10th edn. New York, NY: McGraw-Hill 2013.

[5] Warrell DA, Cox TM, Firth JD, eds. Oxford Textbook of Medicine. Vol 2, 2nd edn. Oxford: Oxford University Press 2003:1202-8.
[6] Warrell DA. Venomous bites, stings, and poisoning. Infect Dis Clin North Am 2012;26:207-23.
[7] Köse R. The management of snake envenomation: evaluation of twenty one snake bite cases. Ulus Travma Acil Cerrahi Derg 2007;13:307-12.
[8] de Silva HA, Ryan NM, de Silva HJ. Adverse reactions to snake antivenom, and their prevention and treatment. Br J Clin Pharmacol 2016;81:446-52.
[9] Tang N, Stein J, Hsia RY, Maselli JH, Gonzales R. Trends and characteristics of US emergency department visits, 1997-2007. JAMA 2010;304:664-70.
[10] O'Neil ME, Mack KA, Gilchrist J. Epidemiology of non-canine bite and sting injuries treated in U.S. emergency departments, 2001-2004. Public Health Rep 2007;122:764-75.
[11] Arici A, S. Hocaoglu, N. Tuncok Y. Bites and stings reported to the Dokuz Eylul University Drug and Poison Information Center. Turkish Pharmacology Association, 21st National Pharmacology Congress 2011.
[12] Forrester JA, Weiser TG, Forrester JD. An update on fatalities due to venomous and nonvenomous animals in the United States (2008–2015). Wilderness Environ Med 2018;29(1):36-44.
[13] Quan D. North American poisonous bites and stings. Crit Care Clin 2012;28(4):633-59.
[14] Çağlar A, Köse H, Babayiğit A, Öner T, Duman M. Predictive factors for determining the clinical severity of pediatric scorpion envenomation cases in Southeastern Turkey. Wilderness Environ Med 2015;26(4):451–8.
[15] Şahin A, Arıcı MA, Hocaoğlu N, Kalkan S, Tunçok Y. Antivenom use in bite and sting cases presenting to a public hospital. Ulus Travma Acil Cerrahi Derg 2018;24(4):343-50.
[16] Walker JP, Morrison R, Stewart R, Gore D. Venomous bites and stings. Curr Probl Surg 2013;50(1):9-44.