WILDERNESS & ENVIRONMENTAL MEDICINE, **25,** 35–40 (2014)

ORIGINAL RESEARCH

Victims' Response to Snakebite and Socio-epidemiological Factors of 1018 Snakebites in a Tertiary Care Hospital in Sri Lanka

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Background.—Although snake bite remains a major health problem in Sri Lanka, there is a dearth of baseline information that would be useful in education about and prevention of snakebite.

Objectives.—The purpose of this study was to describe the socio-demographic characteristics, behavioral responses, treatment seeking, and prehospital interventions of snakebite victims in an area with high snakebite burden.

Methods.—This prospective study was based on a cohort of snakebite victims presented to the Anuradhapura Teaching Hospital over a 1-year period from January 2010.

Results.—Of the total of 1018 snakebite admissions, 69% were male and 65.8% were aged 21 to 50 years. Most of the victims were farmers (40%). The offending snakes were seen by 549 victims (54%); of these, only 46% (255) presented with a dead snake specimen. Only 38 of 1018 (4%) had first sought some form of indigenous treatment such as locally applied medications, herbal decoctions, nasal insufflations ("Nasna"), or applying snake stone over the bitten site. Some form of first aid had been adopted by 681 victims (67%), of whom all had washed the bitten site, and 18 victims (2%) and 4 (0.4%) had applied a dressing or incised the bitten site, respectively. A tourniquet had been applied by 353 victims (35%) for mean duration of 26 minutes (range, 5 to 120 minutes). None of the patients had immobilized the bitten limb by splinting. Oral medications had been used for pain relief in 74 cases (7%), paracetamol by all.

Conclusions.—A proportion of patients still seek native remedies and use inappropriate first aid after snakebite in Sri Lanka.

Key words: snakebite, sociodemography, prevention, first aid, treatment seeking

Introduction

Snakebite remains a major, yet neglected health problem in the tropical world, with the most affected being developing countries in South Asia, Southeast Asia, Sub-Saharan Africa, and Latin America.[1] In confronting the global burden of snakebite, poor reporting, especially in the most affected regions, is considered a major setback.[2] Understanding of the socio-epidemiological determinants of snakebite unique to different populations is pivotal in implementing preventive, educational, and therapeutic approaches in these regions, especially at the community level.

Based on available hospital statistics, 37,000 snake bites occur annually in Sri Lanka, of which the highest number of snakebites are recorded from the dry zone.[3,4] Almost all the venomous snakebites in Sri Lanka are from Russell's viper (*Daboia russelli*), common Krait (*Bungarus caeruleus*), cobra (*Naja naja*), saw-scaled viper (*Echis carinatus*), and hump-nosed pit vipers

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(*Hypnale hypnale, H nepa,* and *H zara*).[4–6] Although clinical profiles of envenoming by these snakes have been somewhat well documented,[6–10] responses of the Sri Lankan victims to snakebite is less discussed in the literature. Improved understanding of victims' responses may improve the practicality of community-based snakebite prevention programs.

Based on a cohort of snakebite victims admitted over a 1-year period, we describe here some of the sociodemographics, behavioral responses, treatment, and prehospital interventions of snakebite victims presenting to a tertiary care facility in the Anuradhapura District of Sri Lanka.

Methods

The study was conducted from January to December 2010 in the emergency treatment unit of the Teaching Hospital Anuradhapura (THA), which is the largest tertiary care hospital in the North-Central Province and also the dry zone of Sri Lanka. All patients admitted with a history of snakebite were enrolled for the study, and data were prospectively collected from the patients through investigator-completed questionnaires. The information from patients with altered consciousness and children was acquired from the bystanders and relatives. Maximum effort was made to minimize the apparent reporting bias associated with obtaining information from a third party, by taking information only from those who accompanied the patient after the snakebite.

All the snake specimens brought with patients were collected and transported to the University of Peradeniya and were identified using identification keys in De Silva[11] and Maduwage et al.[12]

Ethical clearance for this study was obtained from the Ethics Review Committee, Faculty of Medicine, University of Peradeniya.

Results

DEMOGRAPHIC AND EPIDEMIOLOGIC CHARACTERISTICS

A total of 1018 snake bite victims were admitted to the emergency treatment unit of THA during the study period. The Table and Figure 1 describe the demographic characteristics of study participants and the epidemiologic characteristics of snakebites.

OFFENDING SNAKE

Of the participants, 549 (54%) had seen the offending snake after the bite. Of these, 266 (48.5%) had killed the snake, and 255 (46.4%) had brought the snake specimen to the local hospital or to THA. The 206 snake specimens brought to THA included 75 *H hypnale* (36.4%), 47 *D russelli* (22.8%), 22 *B caeruleus* (10.6%), and 7 *Naja naja* (3.4%). In addition, these specimens also included 1 specimen each of *Trimerusurus trigonocephalus* and *E carinatus*, and also 53 specimens of nonvenomous snakes (25.6%). Of the victims who brought the snake to the THA, 76.8% had attempted to identify the snake, and 65.8% of these were accurate.

PREHOSPITAL FIRST AID INTERVENTIONS

Of the victims, 841 (82.6%) had practiced at least a single prehospital remedy or intervention, which are described in the Table. Washing the bite site and applying a tourniquet were the most practiced interventions, and the median time spent for these interventions was 5 min (range 2–15 minutes) and 26 minutes (range 5–120 minutes, SD ± 13.33 minutes), respectively. Of the victims who had washed the bite site, 436 (64.0%) had used soap and 84 (12.3%) had used lime juice for washing. Among the authenticated viperine bites, 44.1% of the victims had applied a tourniquet to a limb. Among the snakebite victims who had applied substances over the bite site, 14 (50%) had used herbal leaves and 9 (32%) had used oil. Paracetamol was taken by 74 (7.2%) victims before admission.

TREATMENT-SEEKING BEHAVIOR

The vast majority of the snakebite victims had sought Western treatments as the first option, and only 38 victims (3.7%) had sought indigenous treatments before admission to hospital, for which they had spent a mean time of 54 minutes (range 10–360 minutes). "Nasna" (cleansing of the nose or insufflations) had been performed for 2 snakebite victims. Herbal decoctions taken by the victims included liquid forms such as Arista and Karapincha Kanji (Curry leaves, *Murraya koenigii*) and solid or semisolid forms such as Kalka. Arista is a form of herbal wine, prepared by fermenting herbs in sugary liquid preparation. The alcohol produced during the fermentation enhances extraction of the active components from the herbs. Kalka is prepared by adding jaggery, sugar, or sugar candy to the original herbal preparations and boiling. Both the Arista and Kalka are prepared using a range of herbal ingredients, and the compositions of these vary greatly from one practitioner to another.

CLINICAL OUTCOME

In the hospital setting, antivenom was administered for 397 patients and mechanical ventilation was required for