



## Incidence of Snake Bites in Kashan, Iran During an Eight Year Period (2004-2011)

Rouhullah Dehghani <sup>1</sup>, DavarKhah Rabani <sup>1</sup>, Morteza Panjeh Shahi <sup>2</sup>, Mehrdad Jazayeri <sup>2</sup>, Mohammad Sabahi Bidgoli <sup>3\*</sup>

<sup>1</sup> Nursing Trauma Research Center, School of Health, Kashan University of Medical Sciences, Kashan, IR Iran

<sup>2</sup> Deputy of Health, Kashan University of Medical Sciences, Kashan, IR Iran

<sup>3</sup> Department of Public Health, School of Health, Kashan University of Medical Sciences, Kashan, IR Iran

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### ABSTRACT

**Background:** Snake bites are one of the significant health problems in the tropical and subtropical regions. Snake bite is a common medical emergency in Iran, and the epidemiological features and management of such cases vary from region to region.

**Objectives:** This present research study was conducted to obtain new information about the epidemiology of snake bites in the region of Kashan, located in the central part of Iran.

**Patients and Methods:** This research was a descriptive retrospective study. Data from 2004 to 2011 of snakebite cases were collected from case reports. Information included; age and sex of the victim, district, month of incident, mortality, and time of bite.

**Results:** The results of this study showed that the majority of snake bite patients were male (96%). The age distribution of patients indicated that the greatest rate of snake bites occurred among the 15-24 year old group. Data collected in this study revealed that the highest incidence of snake bite cases took place in summer (60%) and the lowest number occurred in winter, with no snake bite cases being recorded. The peak number of snakebite cases was seen during June-September.

**Conclusions:** It was concluded that snake bite cases in Kashan are similar to other areas in Iran from an epidemiological point of view, including; age distribution rates, gender and site of the bites. The existence of *Macrov ipera lebetina*, a dangerous venomous snake, can cause a range of clinical effects among residents in central parts of Iran, such as Kashan area.

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### ► Implication for health policy/practice/research/medical education:

Snake bites are a significant health problem in tropical and subtropical regions. Snake bite is a common medical emergency in Iran and the epidemiological features and management of these cases varies in any region.

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\* Corresponding author: Mohammad Sabahi Bidgoli, Department of Public Health, School of Health, Kashan University of Medical Sciences, Kashan, IR Iran. Tel: +98-3615550111, Fax: +98-3615550111. E-mail: sabahibidgoli@kaums.ac.ir

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## 1. Background

Venomous snakes of medical importance have a pair of enlarged, hollow teeth, called fangs, located in the front of their upper jaw. These fangs contain a venom channel (like a hypodermic needle) or groove, along which venom can be introduced deep into the tissues of their prey. If a human is bitten, venom is injected either subcutaneously or intramuscularly. Venomous animal bites are one of the significant health problem in rural populations in many parts of the world (1, 2). The consequences of snake bites, such as pain and infection can be localized or systemic, they can also induce; shock, acute kidney injury, coagulation disorders of the vascular system, rhabdomyolysis and cardiac muscle damage (3-5). More than 3500 species of snakes have been found around the world, less than 10% of which are venomous (1, 6-8). On average, venomous snake bite incidents occur at a rate of 2.1 to 5.5 million per year, which lead to 125000 deaths and tens of thousands of chronic disabilities, mostly in Southeast Asia (9-11). In Asia alone, it has been estimated that four million snake bites occur each year, with 50% of these envenomation attacks resulting in 100000 deaths annually (12). Snake bites occur all over Pakistan, and there are 72 species of snakes which can be found in different parts of the country (13). India has been reported to have a high annual rate of snakebites, which can reach up to 200000, and these result in between 35000 to 50000 deaths per year (3). In Nepal, an estimated 20000 snake bites occur annually and less than 200 deaths have been reported, predominantly in hospitals in eastern Terai (14, 15). In Vietnam from 1992 to 1998, an estimated 300000 snake bites were recorded per year, resulting in a death rate of 22%, which was predominantly seen among manual workers. Most of the victims were bitten by *Malayan pit vipers* (*Calloselasma rhodostoma*) (15). Papua New Guinea is the country which has one of the highest number of snake species in the world (16). In Iran, 69 species of snakes have been identified, of which 36 species are non-venomous, 25 species are venomous and 8 species are semi-venomous (17-19). Snakebite is a serious public health problem in different parts of Iran, especially in rural areas. The recorded number of snakebites from 2001 to 2009, were approximately 5000 to 7000 per year, of which, approximately 7 deaths were reported each year in this country. Snake envenomation patterns, depending on the species, can vary among the four different families common in Iran, namely; Colubridae, Elapidae, Viperidae and Hydrophiidae, which can cause a range of symptoms, mild envenomation, neurotoxicity, vasculotoxicity and myotoxicity (20). The severity of envenomation is divided into three levels: mild, moderate and severe. In mild envenomation symptoms include; swelling, pain, and tenderness. A moderate envenomation includes local effects such as; swelling, pain, tenderness, and systemic effects such as; nausea, vomiting, tremor, mild hypotension with evidence of coagulopathy, but no clinical bleeding. In severe

envenomation local complications develop, including all organs with systemic effects such as: shock, severe bradycardia, tachypnea, or respiratory failure and coagulation disorders characterized by bleeding, and other manifestations (14, 21). The mainstay in the treatment of envenomation is antivenin, and this may be monovalent for specific species, or polyvalent, which is effective against different species. Using antivenin is only recommended for severe envenomation, since it can cause hypersensitivity reactions and these may become life-threatening (22). In some references antivenin is only recommended for moderate to severe envenomation. In the treatment of mild cases 2 to 5 vials of antivenins are normally given, in moderate cases 5 to 10 vials, and in severe intoxications 10 to 20 vials of antivenin may be needed, although in extreme cases of envenomation 45 vials may be required. In Iran, three types of antivenin, including mono, tetra and polyvalent, are produced by the Razi Vaccine and Serum Research Institute, which are used in the treatment of snake bite. The polyvalent product can neutralize the venom of six different venomous snakes (18). Due to the importance of snake bites and the small amount of epidemiological data about this public health problem, the present research study was conducted to obtain new information about snake bites in these regions. This would enable local authorities to plan strategies to reduce and eliminate snake bites among the residents of these regions.

## 2. Objectives

The purpose of this project was to conduct a retrospective study to describe the incidence and geographic location of snakebite injuries in Kashan region, and to assess the magnitude and distribution of the problem in order to optimize prevention and treatment.

## 3. Patients and Methods

This research was a descriptive retrospective study. The data of the present research came from the files of outpatient or hospitalized persons referred to the health centers and hospitals of Kashan city during an eight year period, March 22<sup>nd</sup> 2004 to March 21<sup>st</sup> 2011. In the current study, data from snake bites was studied from an epidemiology view point including; gender and age of the snake bite victim, patient background, antivenom treatment, month of snake bite, part of body bitten, and geographical location (rural/urban). The information was gathered and recorded in questionnaires. The results are presented in *Tables*. The frequencies of epidemiological parameters were converted to percentage ranks. During this study, many of the located viper snakes and some non-venomous snakes were collected alive, and their mouth, fangs and teeth were studied in the laboratory, to enable correct identification of the various non-venomous and venomous snakes.