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Epidemiological Study of Scorpion Sting in Lordegan City during the Years 2014- 2017

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ABSTRACT

Introduction: Scorpion sting is one of the major health risks in many countries around the world. . Lordegan is one of the areas where several reports of scorpion stings occur. The purpose of this study was to describe the epidemiological and demographic characteristics of selected scorpions for preventive measures.

Methods: This descriptive cross-sectional study was conducted to collect information about all the scorpion patients in Lordegan city health center during 2014-2017

Results: The results showed that the total number of scorpion stings was 2,422, of which 1,124 cases were female (46.4%) and 1,298 cases were male (53.6%). Of the total number of stings, 2 deaths occurred. Death rate of the cases in this area is about .01 % in 1000 people. It's worth noting that 2,060 of the cases were rural (85.1%) and 362 were urban (14.9%). 764 (31.5%) people's visits to the hospital lasted less than 1 hour and 30 minutes, and 749 people (31%) stayed between 1 hour and 30 minutes to 3 hours and 909 people (37.5%) stayed more than three hours. 39% of victims were stung on the leg, 35% on their arms, 20% on their trunks, 6% on their head and necks. 99.9% of victims recovered from the stings, and 0.01% died from the stings. The majority of recorded stings took place from April to October. The 15- to 24-year-old age group suffered the highest number of stings, and the 65-year-old and older age group suffered the lowest number. 80.6% of stings were by yellow scorpions and 19.4% by black scorpions.

Conclusion: Scorpion stings are common in Lordegan, especially in the summer months. Public education, as well as the risk-reduction strategies of individuals can prevent scorpion stings.

Keywords: Epidemiology, Scorpion Sting, Lordegan City

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Introduction

The scorpions are predatory arachnids and more than 2,000 species of the order scorpions have been classified [1]. Nowadays, scorpions are widely dispersed, and the have the most diversity in subtropical regions [2]. The venom of approximately 50 species have important uses in medical for medical treatments. Nonetheless, scorpion stings are a major health issue in many undeveloped tropical and subtropical countries, and causes a wide range of complications, including severe localized skin reactions, neurological, cardiovascular, and respiratory problems, and even death. Death by scorpion sting is associated with several factors, such as scorpion species, the age of the stung person, the sting season, the geographical area, and area in which the scorpion lives. This threat may also lead to heavy economic costs, and pose psychological risks to various members of society [3].

The danger of scorpion stings varies according to lifestyle, socioeconomic status, housing, the state of public health services, and species of scorpion found in each geographic region [4]. However, it is estimated that about 1 million stings occur annually worldwide [5]. Iran is among the countries where scorpions are found, and particularly dangerous species have been reported in this nation [6]. Among the scorpion species are more telling factor than the others [7]. According to information released by the Iranian Non Communicable Diseases Committee (INCDC), about fifty thousand cases of scorpion stings are recorded in Iran each year [8].

Epidemiological studies collected by the Razi Vaccine and Serum Research Institute in Iran, have shown the most common type of poisoning and envenomation in Iran is scorpion stings. Every year, there are about 250,000 recorded cases of venomous stings in Iran yearly) which lead to death of 50 people each year and puts Iran at the second place in the world after Mexico. It is estimated that the actual number of stings is 2 to 2.5 times the reported number [9, 10].

Lordegan is a city with an area of 3,421.1 square kilometers and a population of 224,958 people. It is located 31.5166° N, 50.8144° E in in southern Chaharmahal and Bakhtiari Province, and consists of three large sections, namely Janaki, Khanmirzza, and Felard. Janaki is located in the center of the city, and include southwest, west and northwest Lordegan. Felard and Khanmirzza are located in the southeast, and in the north and northeast of Lordegan respectively. Lordegan is bordered by three provinces: Khuzestan in the west, Isfahan to the east, and Kohgiluyeh and Boyer-Ahmad to the south.

Due to climatic conditions in Lordegan, some people rest outside the house in the open air in summer. The city is also less developed than other parts of the country, and many people live in rural areas. Therefore, it is evident that proper and targeted intervention would require an epidemiological study about living conditions of the residents of this city. As such, in this study, we sought to describe epidemiological and demographic characteristics of persons stung by scorpions in Lordegan city during a four-year period.

Methods

This study is a cross-sectional descriptive study was conducted to investigate the scorpion stings from 1992 to 1995. In this study, all cases of scorpion stings were treated at Shohada Hospital, the only place in Lordegan equipped to treat scorpion stings. Information was extracted and collected from patients' records, including age and gender of patient, when the sting took place (season and month), geographical area of the sting (urban or rural), how much time had passed between the sting and visit to the emergency emergency ward, and location of stings on the body. The information was encoded and entered into SPSS software version 21 and, to assess the relationships between variables, the chi-squared test was used. The significance level in the tests was 0.05.

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Results

The total number of scorpion stings was 2,422, of which 1,124 (46.4%) were female and 1,298 (53.6%) were male. Among all the sting cases, there were 2 deaths, which means that the fatality rate of the scorpion stings in the area was 0.01%. The two cases of death were male child aged 0–4 years and female child aged 5–9 years. Both cases occurred in month of September, there is no case of anti-venom serum being administered, and the intervening time between stings and death was more than 3 hours.

362 cases (14.9%) of stings occurred in urban areas and 2,060 (85.1%) in rural areas. In 764 (31.5%) cases, the victims got to the emergency ward in less than 1 hour and 30 minutes, in 749 cases (31%) it took between 1 hour and 30 minutes and 3 hours, and in 909 cases (37.5%) it took more than 3 hours.

156 cases (6%) were stung in head and neck, 860 cases (35%) on their arms, 922 cases (39%) on their legs, and 488 cases (20%) on their trunk. The difference between the number of outdoor scorpion and indoor was negligible, 50.1% and 49.9% respectively. (Table 1).

Table 1. Number of stings rates by sex, locality, report to the emergency department of hospital and parts of body

Sex	
Male	1,298
Female	1,124
Locality	
Urban	362
Rural	2,060
Report to the emergency department of hospital	
Less than 1 hour and 30 minutes	764
Between 1 hour and 30 minutes to 3 Hours	749
More than 3 hours	909
Parts of body	
Leg	39
Hand	35
Trunk	20
Head & Neck	6

ARDS (Adult Respiratory Distress Syndrome) which is a respiratory syndrome It was analyzed that 99.9% of patients recovered and were discharged, however, 0.1% died despite treatment. After the injection of the anti-venom serum, 972 cases (40.1%) recovered in a less than 6 hours, 930 (38.4%) between 6–12 hours, and 520 cases (21.5%) in more than 12 hours. The time period of most scorpion sting prevalence is from April to October.

Chart 1. Number of stings rates by the months of the year

Among the age groups, the highest and lowest stings belonged to the 15–24-year-old age group (25.8%) and the 65-year-old and older (2.6%) respectively. The average age of males is 25 and the average age of females is 27 years old.

The hospital was stocked 5 ml ampoules of antivenom immunoglobulin to counter the venom of six scorpion species. During the 4 years of the study, 2,945 doses were given: 625 intravenous injections and 2,320 intramuscular injections. Of all cases, 80.6% of stings by yellow scorpions and 19.4% by black scorpions.

Discussion

The present study is an ample study with 4 years duration which 2,422 cases of scorpion stings were referred to the only hospital in Lordegan city were assessed for demographics and clinical appearance and outcome of the treatment.

According to conducted survey, the severity of poisoning in people who were stung during early evening was more than any other time. (59.4% of the early evening injured had severe symptoms). Scorpions may have several other stings during the night. Therefore, the amount of poison will reduce gradually [11].

The majority of stings (33.6%) occurred between the hours 12:00 pm and 6:00 am. This makes sense considering scorpions are generally nocturnal. During the day, they usually take cover in small, enclosed spaces, such as gaps in walls, under pieces of wood, under mats, among leaves, under the loose bark of trees like eucalyptus, inside holes in palm trees, among garbage, and even inside shoes. At night, they leave their safe places for hunting [11].

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The 0–9-year-old age group suffered the highest proportion of severe symptoms (35.6%). The two cases of death that occurred during the four years were from this age group. Some factors such as age and weight of the patient, which part of the body was stung, time of sting, and scorpion species have an impact on the severity of envenomation. Envenomation is also more dangerous in older people and children. Victims with low body weight are at higher risk of severe complications [12].

There are few cases of stings on the head and neck (6.5%), which might explain the small proportion of casualties ($P < 0.05$). According to previous studies, head and neck stings are more dangerous than leg stings [13]. This result is consistent with Nazari et al. [8].

Among the cases studied, the majority (62.5%) were able to get to the emergency ward in less than 3 hours and, fortunately, 99.9% of victims recovered and were discharged. However, there were 2 cases of death from sting complications. In a study conducted in Turkey, there has been a death case as well, this one due to pulmonary edema. [14] Another study in Khuzestan reported, 3 death cases due complications of scorpion stings [15].

As for clinical manifestations, most cases, 89.6%, reported pain at the site of sting, as well as neurological symptoms, and 6.5% cases showed only neurological symptoms. Many species of scorpion are not fatal and their stings only cause severe pain or other sensation such as irritation, and often localized swelling followed by a tingling sensation. These cases end in completely recovery after a few hours without any complications. The venom of dangerous scorpion species causes lysis of red blood cells or neurological symptoms. [16].

The results of this study showed, out of all cases of scorpion stings, 2,060 people (85.1%) were stung in rural areas, and 362 cases (14.9%) in urban areas ($P < 0.05$), which is consistent with the findings of many researchers [17, 18]. Factors leading to stings in rural areas include sleeping on the ground and refusal to sleeping on beds, and leaving bedding and clothing on the ground that scorpions then use as a shelter during the day. [19]

Actions such as repairing cracks and holes in buildings, keeping firewood and brushwood away from the living space, and opting to sleep indoors rather than in open air may reduce number of cases of scorpion stings.

Conclusion

According to the results, in comparison with the cities of Chaharmahal and Bakhtiari province and other cities in Iran, high incidence of scorpion is associated with high economic cost. As a result in Lordegan city suggests the necessity of preventive programs for decreasing the incidence.

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Conflict of Interest

The authors declare that they have no conflicts of interest.

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