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Epidemiological Survey on Scorpion Sting Envenomation in South-West, Iran

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Abstract

***Background*:** Scorpion stings cause a serious problem all over the globe. This study aimed to trace the epidemiological profile of scorpion stings and some common clinical symptoms in Dezful County.
***Materials and Methods*:** Our work is an analytical cross-sectional study of scorpion stings based on medical files of stung patients referred during 2007- 2008.
***Results*:** During 2007-2008, 820 cases were registered. 59.9% of the cases were from rural areas. The stings had the most frequency in spring months, particularly in June, when yearly temperature was favorable.
***Conclusion*:** Based on the results of this study, scorpion sting envenomation is of clinical importance in this area.

Introduction

Scorpion envenomations are of the main health problems in various parts of the world. Medically important scorpions cause strict envenomations as a result of their defensive stings [1]. Scorpions have an important role in threatening cases of human envenomation in different areas of Iran. Based on the reports of the national strategy against scorpionism, nearly about 50,000 stung cases are reported annually, in Iran that put Iran in the second grade after Mexico [2, 3]. Epidemiological information collected by the antivenom of Razi Research Vaccine and Serum Institute, Iran showed that scorpion stings are the leading cause of poisoning [4]. Therapy with species-specific antivenom is a main strategy for scorpion envenomations in Iran [5- 8]. The Khuzistan province has high scorpion sting incidence and lethality and is famous for its richness of scorpion species including *Androctonus crassicauda*, *Mesobuthus eupeus* of Buthidae family, and *Hemiscorpius lepturus* of Liochelidae family. In 1807, Oliver stated the clinical aspects of middle areas of Iran such as Kashan city and reported the scorpion species [5- 8]. The main purpose of this survey is to describe epidemiology of scorpionism in one of the most important endemic region, Dezful to report the specific epidemiological aspects of scorpionism in this city.

Materials and Methods

The county of Dezful located between 32º24'N Latitude and 048º23'E longitude with the elevation of 150 m (490ºft). Its area is 4100 sq km and has been located in north of Khuzistan province. Dezful sits close to the foothills of the Zagros Mountains on the main north-south highway from Tehran to Ahvaz, the provincial capital of Khuzistan. Based on the reports of the 2011 census, the county's population was 420,000.

In this analytical cross-sectional survey, data were collected from medical files of all stung cases that experienced scorpion sting during 2007-2008. For this purpose, medical files of stung patients bitten by scorpion were checked. The data including sex distribution of patients, sting site of biting, time of the month, geographical locality of the event, the incidence rate of stings, probable type of the scorpion, treatments including antivenom and other drugs administered and final outcome of the patients were derived and reported in a researcher-made questionnaire.

Data were analyzed using SPSS software version 18, by analysis of Spearman method; differences were considered significant with less than 5% of the associated probabilities.

Results

Analysis of questionnaire data showed the distribution of the scorpion sting cases according to gender, body location, and month of sting and location of cases. During this descriptive cross-sectional study period, from 2006-2007, totally 820 stung cases with an average incidence of 2.05% had been reported from the study area. 491 stung cases (59.9%) were from rural areas and 329 cases

(40.1%) were reported from urban areas of the county (Table. 1).

Statistical analysis showed that there were positive correlation between the place of sting in rural areas in spring and summer and urban areas in autumn (p<0.01). Most of the patients were male (52.6%) and 47.4% were female. In the study period, the sex ratio favored females (F/M, 0.89: 1), because in this city men are often in the outdoors, especially the farmland. Statistical analysis showed that the different seasons are important key factor for different sexes (p<0.01).

Results showed that there was correlation between cases of stings in women in relation to season (autumn) (p<0.01). Results of the study revealed that the most prevalence of scorpion sting occurred on feet and hands. Result explains that 43.6%, 35.8% and 20.6% of the stings have been taken place in the feet, hands, trunk and head, respectively (Table. 1).

Statistical analysis showed that there were correlations between sting locality in head in spring and summer, and hands and feet in autumn (p<0.01). Frequencies of most common scorpions that had bitten the patients were 67.2%, 14.8%, and 18% for yellow, black and other scorpions respectively and in none of the cases the species identification hadn't been done (Table. 1).

Statistical analysis showed that unidentified scorpions were responsible for the most stings in autumn (p<0.01) and black and yellow scorpions were most active and responsible for the stings mainly in spring and summer (p<0.01). 19.1% of the patients were bitten more than one time. 153 stung cases had used the antiserum in their historical medical files. The scorpion stings occurred most often during the summer months, peaking in June (16.5%) and August (13.6%) and the least were seen in January (1.3%) and February (0.6%) (Table 1). Frequency of scorpionism in summer, spring, autumn and winter were 34.3%, 32.6%, 23.9% and 6%, respectively. Results of sex distribution frequency in different months of the study showed that of 820 stung cases in different regions of Dezful, most of the women stung cases had been occurred in autumn and winter (Fig.1).

Results of the study based on history of receiving the serum showed that 21.7% of the patients had received the serum. As to the post-sting time, the results showed that 98.6%, of patients were able to receive medical attention including antiserum. All patients treated with injection of intramuscular antivenom and 98.5% of them recovered in contrast 1.3% of the patients were recovered without receiving antivenom. There were no reports of death cases during the study period (p<0.001). The use of antivenom made in Razi Research Vaccine and Serum Institute, Iran therefore resulted in a significant reduction of mortality rate, thereby showing the antivenom to be cost-effective. The scorpion species responsible for the stings in Dezful was unclear, because of the lack of physicians' knowledge about scorpion identification, and unavailability of scorpions in most stings.

Table 1. Distribution of scorpion stings cases by months, stung location, site of stings, and scorpion body color, in 820 stung patients in Dezful, Khuzestan Province, South-West of Iran (2006-2007)

Month	Number of patients	Location		Site of sting			Scorpion body color		
		Rural areas (%)	Urban areas (%)	Head and trunk (%)	Hand (%)	Foot (%)	Yellow (%)	Black (%)	Other (%)
April	30	37.5	62.5	6.6	50	43.4	56.6	13.4	30
May	102	63.8	36.2	8.8	49	42.2	65.5	23.5	11
June	136	71.4	28.6	21.3	39.7	50	50	19.2	30.8
July	88	48.8	51.2	26.1	34	39.9	73.8	6.8	19.4
August	112	68.7	31.3	28.5	24.1	47.4	68.7	16.1	15.2
September	106	67	33	24.5	25.5	50	63.2	10.3	26.5
October	98	59.2	40.8	18.3	38.7	43	71.5	21.4	7.1
November	75	53.4	46.6	28	36	36	84	6.6	9.3
December	23	53.5	43.5	8.6	30.4	61	87	4.4	8.6
January	11	36.4	63.6	0	36.3	63.7	54.5	27.3	18.2
February	5	60	40	20	0	80	100	0	0
March	34	29.5	70.5	17.6	47	35.3	76.4	6	17.6

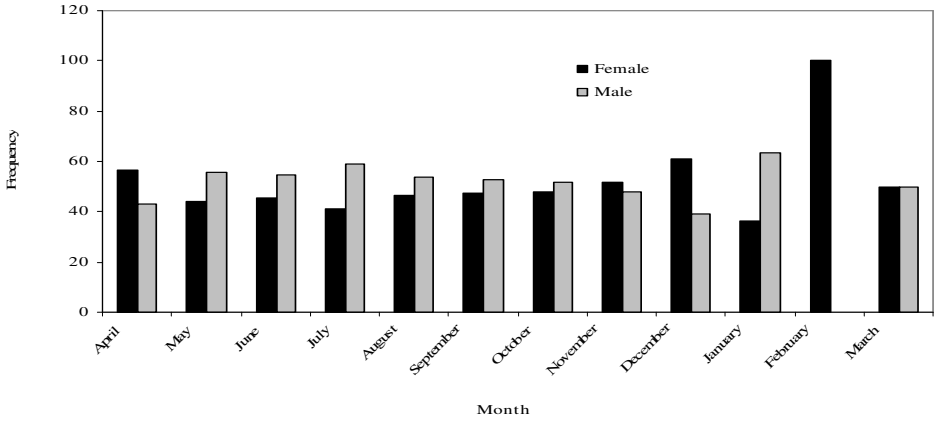

Figure 1. Sex distribution of 820 stung cases in different regions of Dezful

Discussion

This study is the case series to describe the epidemiological features of scorpionism in Dezful, Khuzistan province, Iran. Of the 820 patients in the study, none died. The results of this study approved that the 46.7% of scorpion stung people have been recorded in urban areas which are similar to the results of the scorpionism cases in another parts of Khuzistan [9]. Other researchers documented that in the mountainous eastern regions of Turkey nearly about half of the reported cases occurred in urban areas [10]. It is noteworthy that there was difference in stings among the sexes. Most of the patients were males (52.6%) and 47.4% were females. This rate is equal with the results of the reports of Dehgani et al. in Kashan that they documented that the scorpion stung people were males (53.04%) than females (46.95%) [11]. This finding is in accordance with the findings of previous researches in Tunisia [12] too, that indicated more frequent male contacts in comparison to female gender [13-15]. Epidemiological surveys have reported that the afflicted body parts are mostly the extremities including hand, arm, leg, thigh, foot [14-15]. In parallel we found that 43.6% of the investigated patients were stung in their feet. These findings may be explained on the basis that the exposed hands and arms are usually used in most manual activities and farm activities [14-15]. This and other studies all point out that the frequency of stings increase in the warmest months of the year throughout the world especially in August [13-15] and the activity of this scorpion is enhanced during this hot month and comes in agreement with other reports [13, 15] and the incidence of scorpion poisoning wasn't high in winter.

Hot months of the year with mild or sunny weather are the period that leads to most envenomation accidents [12, 15]. In the present study, the scorpion species responsible for the stings in Dezful was unclear, because of the lack of physicians' knowledge about scorpion identification, and unavailability of scorpions in most stings. But results showed that yellow scorpions were responsible for the most stings. Therefore the most scorpionism emergencies among the inhabitants in Dezful should be paid to different species.

Result of the study confirms that using the antivenin is useful to treat the exposed cases. This is almost accordance to the results of studies that made a pessimist conclusion in the effectiveness of using the earliest species- specific antivenin because it reduces mortality and morbidity of scorpion stings in the cases of definite envenomation with scorpions [13]. Studies have reported that some epidemiological characteristics of different scorpions vary from one part of the world to another [13-14].

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Authors' Contributions

All authors had equal role in design, work, statistical analysis and manuscript writing.

Conflict of Interest

The authors declare no conflict of interest.

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