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Epidemiological Survey and Clinical Presentation on Scorpionism in South-West of Iran

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Abstract: Scorpion stings comprise a serious problem throughout the globe, especially in regions where they are more frequent. In Iran, Khuzistan is one of the provinces most affected by this burden. This study aimed to trace the epidemiological profile of scorpion stings and some common clinical symptoms in Bagh-E-Malek in order to improve patient care and prevent both morbidity and mortality. Our work is an analytical cross-sectional study of scorpion stings based on medical files of stung patients referred during 2007- 2008. About 524 cases were registered in this county with an average incidence of 0.5 %. Prevalence of the scorpion victims from rural areas were 69.3%. The highest average age of victims was 15-24 years old. The most prevalent clinical signs and symptoms were local pain, erythema and necrosis. The stings were more frequent in summer months, particularly in August, when yearly temperature is the highest. Of all registered cases, 74.4% of the patients received medical aid in less than three hour after the sting. Based on the results of this study, scorpionism is of clinical importance in this area and public awareness and physician readiness along with the accessibility to effective antivenom significantly reduce scorpionism in this area.

Key words: Prevalence · Scorpion sting · Clinical symptoms · Bagh-E-Malek County · Iran

INTRODUCTION

Scorpion envenomations are of the most serious health problems in different parts of the world. Medically important scorpions cause severe envenomations because of their defensive stings [1, 2]. Scorpions have a main role in severe cases of human envenomation in various parts of Iran. Based on the data from the national strategy against scorpion stings, nearly about 50,000 stung cases are recorded annuallyand Iran isthe second grade after Mexico in stung cases [3, 4]. Epidemiological surveys compiled by the antivenom of Razi Research Vaccine and Serum Institute, Iran showed that scorpion stings are the leading cause of poisoning in Iran [5]. Species specific antivenom therapy is a main strategy for scorpion envenomations in different parts of Iran [6-10]. The Iranian scorpion fauna consists of more than 44 identified species from 23 genera in three families [11, 12]. The province of Khuzistan has high scorpion sting incidence and lethality and is known for its richness of scorpion species among which, those of the family Buthidae were the most implicated and threatening public health, in particular: *Androctonus crassicauda, Mesobuthus eupeus* of Buthidae family and *Hemiscorpius lepturus* of Liochelidae family. A review on the available medical literature on Iranian scorpionism consisting named scorpions reveals that the majority of severe cases have been caused by the *H. lepturus* [6-9]. The main

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purpose of this article is to describe a case series of scorpionism in one main endemic region, Bagh-E-Malek, to describe the specific epidemiological characteristics of scorpionism in this county and to define the factors having influences on the evolution of stung people. As little is known about the true magnitude and transcendence of scorpion stings in Bagh-E-Malek since few epidemiological data on the subject have been recorded.

MATERIALS AND METHODS

Study Area: The county of Bagh-E-Malek located at between 49°33' longitudes and 31°13' latitude with an area of 225,870 hectare. According to the reports of the 2006 census, the county's population was 103,217. The county is subdivided into three districts, the central, Seydon and Meidavoud and three cities including Bagh-E-Malek, Seydon and Qale toll. The climate of Bagh-E-Malek County that has located in Khuzistan province is generally hot and occasionally humid, while winters are much more pleasant and dry. Summer time temperatures generally are above 50°C and in the winter it can drop below freezing. Sand-storms and dust-storms are frequent with the arid and desert-style terrains.

Patients: In this descriptive-analytical cross-sectional study, data were obtained from all stung patients' medical files that experienced scorpion sting during 2007-2008. For the first step, medical files of patients bitten by scorpion were reviewed. The data including age distribution of patients, sex of patients, the main clinical signs and symptoms, sting site of biting, time of the day and 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 recorded in a researcher-made questionnaire.

Statistical Analysis: 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 based on age, gender, body location, month of sting, location of cases and local symptoms. During this descriptive-analytical cross-sectional study period, from 2007-2008, 524 stung cases with an average incidence of 0.5% had been registered from the study area. 363 (69.3%) and 161 (30.7%) of the stung caseswere reported from rural and urban areas of the county, respectively. The age group of 15-24 years old had the highest frequency of stung patients, in the study area. This shows that age is a risk factor in determining the prognosis of patients (Fig. 1). Most of the patients were female (57.6%) and 42.4% were male. During the study period, the sex ratio favored females (F/M, 1.4: 1), as women are often in the outdoors, especially the farmland and maybe their knowledge about scorpionism were lower than males (Table 1). Results of the study based on weight group showed that 57.5%, 26.5%, 12.6% and 3.4 of them were in weight group of 50-60 kg, 70-90 kg, 24-49 kg and 0-24 kg, respectively. Frequency distribution of scorpionism in patients based on their jobs has been presented in Fig. 2. Results of the Spearman Rank Correlation Coefficient showed that there was no correlation between the job and number of scorpion sting ($p>0.05$). Results of the study showed that the most prevalence of scorpion sting occurred on hands and arms. Result showed that 40.8%, 40.1%, 13% and 6.1% of the stings have been occurred in the hands and arms, feet, trunk and head and neck, respectively. Frequencies of most common signs and symptoms following stung are shown in the Fig. 3. The most frequent signs and symptoms data were local pain, erythema and sore. The most of the scorpion stings took place mainly during the summer months, peaking in August (Fig. 4). The stings often occurred at night (45.4%) between 24 a.m. and 6 a.m. when the victims were asleep and active in the farms. Results of the study based on sting time revealed that 45.4%, 31.8%, 18.3% and 4.5% of the patients were bitten at 0-6 a.m., 18-24 p.m., 12-18 p.m. and 6-12 a.m., respectively. Stings were observed occasionally among youths that were active outside. About 83% and 17% of the stung cases were bitten inside and outside of their home, respectively. As to the post-sting time, the results showed that 74.4%, 13.4% and 12.2% of patients received medical attention in less than

Table 1: Frequency distribution of scorpion sting among sex groups according to the region, Baghe-E-Malek county, South-west of Iran (2007-2008)

	Meydavoud		Seydon		Total	
Sex	n	%	n	%	n	%
Male	147	40.4	75	46.6	222	42.4
Female	216	59.6	86	53.4	302	57.6
Sex ratio (M/F)	0.68		0.87		0.73	

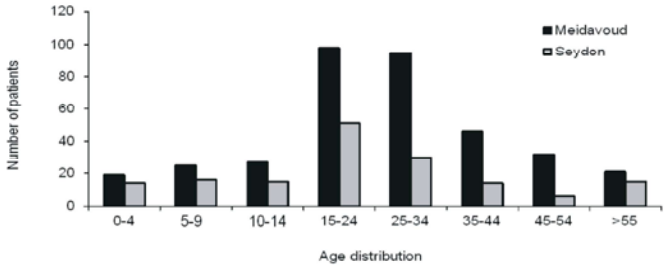

Fig. 1: Age distribution of 524 stung cases in different regions of Bagh-E-Malek County, Khuzistan Province, South-west of Iran (2007-2008).

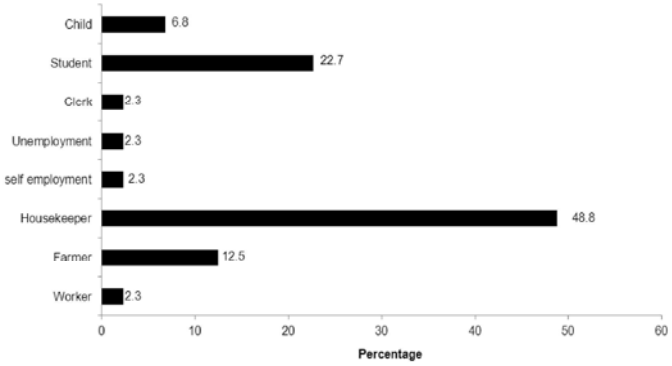

Fig. 2: Frequency distribution of scorpion sting among patients according to job in Bagh-E-Malek County, Khuzistan Province, South-west of Iran (2007-2008).

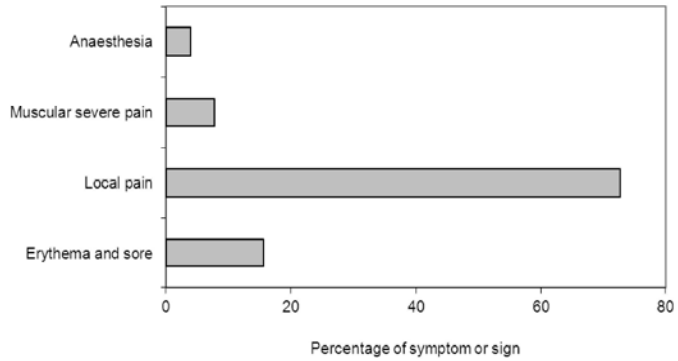

Fig. 3: Comparison between percentages of clinical signs and symptoms of stung patients in Bagh-E-Malek County, Khuzistan Province, South-west of Iran (2007-2008).

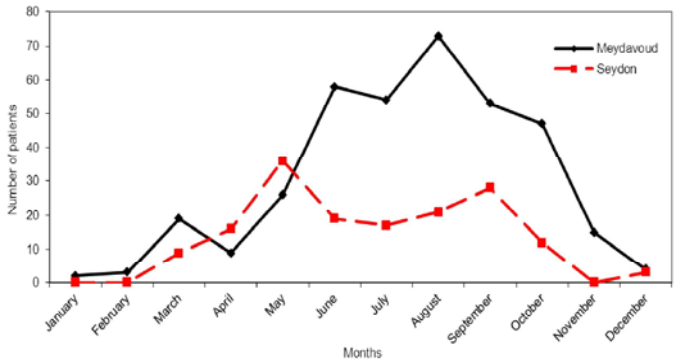

Fig. 4: Distribution of scorpion stings cases by months in Bagh-E-Malek County, Khuzistan Province, South-west of Iran (2007-2008).

3 hours, more than 6 hours and 3-6 hours, respectively. All patients treated with injection of intramuscular antivenom and all of them recovered. The medications that were used as treatments among the stung cases were 55.9%, 43.4% and 0.7% by antihistamine, corticosteroids and antibiotics, respectively. There were no reports of death cases during the study period (ρ<0.001). So, using antivenom made in Razi Research Vaccine and Serum Institute, Iran leaded to a significant reduction of mortality rate, thereby showing the antivenom to be cost-effective. The scorpion species responsible for the stings in Bagh-E-Malek County was not clear, because of the lack of physicians' information about scorpion identification and unavailability of scorpions in most stings.

DISCUSSION

This is the case series to describe the epidemiological features of scorpionism in Bagh-E-Malek county, Khuzistan province, Iran. Of the 524 patients in the study, none died. The results of this study approved that the 69.3% of scorpion stung people have been recorded in rural areas which are in contrast the scorpionism cases in another parts of Khuzistan [12]. Researchers documented that in the mountainous eastern regions of Turkey nearly about half of the reported cases occurred in urban areas [13]. Statistical analysis showed that the age group of 15-24 years old is the highest risk age group and age is a risk factor in stung patients. This is because these age groups are more active in the area and our results were not similar to the results of other researchers [14-17] that explain teenagers and pediatrics as high risk groups. The results of our study are in accordance with the results of other researchers that reported scorpion stings mostly seen in individuals of the age of 15 and over [18-20]. It is noteworthy that there was difference in stings among the sexes in all age groups of our study. Most of the patients were females (57.6%) and 42.4% were males. This rate is equal with the results of other researches in Khuzistan [21]. However, it is not accordance with the reports of Dehgani *et al*. in Kashan [22] that they documented that the scorpion stung people were males (53.04%) than females (46.95%) [22]. Although this finding is in accordance with the findings of previous researches in Tunisia [23], other studies indicated more frequent male contacts in comparison to female gender [24-26], while other studies reported that females accounted for the majority of victims [20, 27-28]. Our data showed that the 50-69 kg body weigh group had the highest risks. Statistical analysis showed that there was no correlation between the job and number of scorpion sting (p>0.05). Epidemiological surveys have reported that the afflicted body parts are mostly the extremities including hand, arm, leg, thigh, foot [19, 29-31]. In parallel we found that 40.8% of the investigated patients were stung in their hands and arms. Clinical observations of patients stung by various species of scorpions have shown that the patients in general display local symptoms including pain, hyperemia, swelling, burning and itching [19, 30-32]. Some patients experience severe toxicities which are mainly because of the painlessness of the sting and therefore late referral and its high incidence rate at night when the patients are asleep. The clinical reports from different scorpion species have indicated that patients stung show an immediate local pain [19, 24, 30]. 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, 16, 33] and the activity of this scorpion is enhanced during this hot month and comes in agreement with other reports [19, 24] and the incidence of scorpion poisoning was low in winter. Hot months of the year with mild or sunny weather, the period that leads to most envenomation accidents [34, 35]. The black scorpions *androctonus crassicauda* and *Hottentotta schach* and the yellow scorpions, *Mesobuthus eupeus*, *Hottentotta saulcyi*, *Odontobuthus doriae* and *Hemiscorpius lepturus*, are the most dangerous scorpions in Iran and are responsible for the majority of stings in Khuzistan province [32, 36]. In the present study, the scorpion species responsible for the stings in Bagh-E-Malek County was unclear, because of the lack of physicians' knowledge about scorpion identification and unavailability of scorpions in most stings. Therefore the most scorpionism emergencies among the inhabitants in Bagh-E-Malek should be paid to different species. Result of the study confirms that using the antivenin is useful to treat the exposed cases ($_{\rho<0.001}$). Following general approach to the management of scorpionism in the study area is suggested as it is a major medical problem. It is concluded that prevention of stings should be part of integrated primary health care. It is recommended to use different medicinal plants including *Mucuna* spp. and *Pistacia* spp. In order to treat the scorpion sting site (37, 38). It is necessary to investigate on Bagh-E-Malek county scorpion fauna, dissecting the collected scorpions in order to understand their food preferences and to expand molecular investigations to understand probability of presence of different populations in scorpions of the study area (39, 40).

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