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

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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 sting 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 32°24’N Latitude and 048°23’E longitude with the elevation of 150 m (490’ft). 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 Ahwaz, 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 sting cases that experienced scorpion sting during 2007-2008. For this purpose, medical files of sting 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 sting cases with an average incidence of 2.05% had been reported from the study area. 491 sting 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 cases 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.

![Figure 1. Sex distribution of 820 stung cases in different regions of Dezful](image)

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)

<table>
<thead>
<tr>
<th>Month</th>
<th>Number of patients</th>
<th>Location (%)</th>
<th>Site of stings (%)</th>
<th>Scorpion body color (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rural areas</td>
<td>Urban areas</td>
<td>Head and trunk</td>
<td>Hand</td>
</tr>
<tr>
<td>April</td>
<td>30</td>
<td>37.5</td>
<td>62.5</td>
<td>6.6</td>
</tr>
<tr>
<td>May</td>
<td>102</td>
<td>63.8</td>
<td>36.2</td>
<td>8.8</td>
</tr>
<tr>
<td>June</td>
<td>136</td>
<td>71.4</td>
<td>28.6</td>
<td>21.3</td>
</tr>
<tr>
<td>July</td>
<td>88</td>
<td>48.8</td>
<td>51.2</td>
<td>26.1</td>
</tr>
<tr>
<td>August</td>
<td>112</td>
<td>68.7</td>
<td>31.3</td>
<td>28.5</td>
</tr>
<tr>
<td>September</td>
<td>106</td>
<td>67</td>
<td>33</td>
<td>24.5</td>
</tr>
<tr>
<td>October</td>
<td>98</td>
<td>59.2</td>
<td>40.8</td>
<td>18.3</td>
</tr>
<tr>
<td>November</td>
<td>75</td>
<td>53.4</td>
<td>46.6</td>
<td>28</td>
</tr>
<tr>
<td>December</td>
<td>23</td>
<td>53.5</td>
<td>43.5</td>
<td>8.6</td>
</tr>
<tr>
<td>January</td>
<td>11</td>
<td>36.4</td>
<td>63.6</td>
<td>0</td>
</tr>
<tr>
<td>February</td>
<td>5</td>
<td>60</td>
<td>40</td>
<td>20</td>
</tr>
<tr>
<td>March</td>
<td>34</td>
<td>29.5</td>
<td>70.5</td>
<td>17.6</td>
</tr>
</tbody>
</table>
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 sting 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 sting 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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