

Short Communication

An Epidemiological Study on Scorpion Stings in Lordegan County, south-west of Iran

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ABSTRACT

Scorpion sting is a common important health problem in south-west of Iran. The present descriptive retrospective study was conducted to make new information on scorpionism in the Lordegan County (2002-2006). Data collected in this study revealed that the highest incidence of scorpion sting cases was taken place in spring (49.72%) in 2006. The scorpions which have brought by the patients to the Lordegan health centre, were identified as *Androctonus crassicauda*, *Hemiscorpius lepturus*, *Mesobuthus eupeus*, *Compsobuthus* sp. and *Scorpio maurus*. The epidemiology data suggest injection antivenin of scorpions to the victims as a good way to reduce the scorpion mortalities and injuries in this area.

Keywords: scorpion sting, Lordegan County, Southwest of Iran, epidemiology

INTRODUCTION

Scorpion sting is a common important health problem in Iran particularly in south and south-western of Iran. In Iran 192, 351 cases from 2001 to 2005 were reported in which 104 cases terminated in death (Deghani 2003, Dehghani *et al* 2004, Dehghani & Valaie 2005, Azhang & Moghisi 2006, Dehghani *et al* 2010, Zayerzadeh 2011). The most of mortality and cases of the stings have occurred in Khuzestan, a Southwest province of Iran (Azhang & Moghisi 2006)

and is endemic in Khuzestan (Pipelzadeh *et al*). Among 1500 species of scorpions which have been described around the world, venoms of 50 species are dangerous for human and most of these species are belong to genera *Buthus*, *Parabuthus*, *Mesobuthus*, *Tityus*, *Leiurus* and *Androctonus* of Buthidae and *Hemiscorpius* from Hemiscorpiidae (Cheng 2002). The Iranian scorpion fauna consists of over 44 named species from 23 genera in two families, Buthidae and Scorpionidae. But, *Hemiscorpius lepturus*, that belongs to the Hemiscorpiidae family, is the most medically important scorpion in Iran (Farzanpey 1987, Lorenzo

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2001, Lowe 2010, Zare Mirakabadi *et al* 2011). *H. lepturus* is the major cause of medical problem from scorpion sting in SW of Iran. *H. lepturus* is well known for having a potent cytotoxic venom that causes cutaneous necrosis, deep and necrotic ulcers, psychological problems, ankylosis of the joints, and severe systemic pathology leading to death, severe and fatal haemolysis, secondary renal failure and fatal failure of the kidney (Radmanesh 1998, Pipelzadeh *et al* 2007, Lowe 2010, Jalali *et al* 2010). Chahar Mahal and Bakhtiari province included Lordegan County is in the border line of Khuzestan and this species have been reported from this province too (Farzanpey 2001). Considerable epidemiological studies on scorpion stings have been performed in several countries, such as Morocco, Tunisia, Algeria, Iran, Brazil and Mexico (Keegan 1980). Information about scorpion envenomation in Iran is focused on Khuzestan region however the rate of scorpion stings in the other areas of Iran are still fragmentary and very little. One of these areas is Chahar Mahal and Bakhtiari, a south-west province of Iran, including Lordegan County where the present retrospective surveying of scorpion sting was conducted entomo-epidemiologically and medically for the first time. Lordegan, at 31° 30' 37" N, 50° 49' 46" E, is a city in and the capital of Lordegan County, Chahar Mahal and Bakhtiari Province in southwestern of Iran.

Therefore, the present research study was conducted to make new information due to scorpionism in these regions from point of entomo-epidemiologically and medically. This enables the local authority making the plans to reduce and eliminate scorpion sting among the residents of these regions.

MATERIALS AND METHODS

This research was a descriptive retrospective study. The data of the present research came from files of outpatient persons referred to the health center of city of Lordegan during five years (2002 - 2006). The data of 2002-2005 related to the frequency of scorpion sting incidence was available according to the seasons

and only the data of 2006 was analysed completely from point of epidemiologically. In the current study the data of scorpion stings was studied from points of epidemiological and medical parameters. They were included: sex of scorpion stung victims, scorpion stung part of body, month of scorpion sting, geographical location of scorpion stings, possible specimen of scorpion, medical parameters including: injection of scorpion antivenin, interval time after scorpion sting and injection of scorpion antivenin, anaphylaxis shock after injection of scorpion antivenin and route of injection. The information was recorded in a questioner. The frequencies of entomo-epidemiological and medical parameters were converted to the percentage rank. The scorpions which have brought by the patients were transferred to the department of medical entomology of Ahvaz Jundypour University of Medical Sciences (AJUMS) to recognize. The scorpion species were identified using Farzanpay's keys to the Iranian scorpions (Farzanpey 1987). The averages of mean daily, maximum and minimum temperatures and total precipitation per year were considered as the meteorological data during 2002-2006 in Lordegan (I.R. Iran Meteorological Organization 2012).

RESULTS AND DISCUSSION

The results of this study were based on 635 files that were admitted to the health centre of Lordegan during 2002-2006 with scorpion sting problem. Totally 177 files, belonging to the stung scorpion persons presented to the health centre of Lordegan in the year of 2006, were monitored. One hundred and sixty scorpion stung persons (90.40%) were from rural areas of Lordegan and the rest of 17 persons (9.60) were from the urban regions of Lordegan. The results of this study showed that 50.85% of scorpion-stung patients were males and the rest (49.15%) were females. The data of scorpion stings in 2006 is presented in the Table 1. Legs, as the lower parts of the body were targeted by scorpion stings (39.43%) more than the other parts followed by

Table 1. Frequencies of scorpion sting cases according to month, season, sex and age group, Lordegan County, 2006

Scorpion stung cases	Age group	Scorpion stung cases according to the season		Scorpion stung cases		month
				F	M	
۱۳ (8.13%)	۰-۴	۸۸)Spring(	۲۱ (11.86%)	۱۳	۸	April
۱۷ (10.63%)	۵-۹		۳۷ (20.90%)	۱۹	۱۸	May
۱۶ (10.00%)	۱۰-۱۴		۳۰ (16.95%)	۱۵	۱۵	June
۴۸ (30.00%)	۱۵-۲۴	۶۷)Summer(	۲۹ (16.38%)	۱۲	۱۷	July
۴۱ (25.63%)	۲۵-۳۴		۲۱ (11.86%)	۹	۱۲	August
۱۳ (8.13%)	۳۵-۴۴		۱۷ (9.61%)	۸	۹	September
۸ (5.00%)	۴۵-۵۴	۱۲)Fall(	۱ (0.57%)	۰	۱	October
۳ (1.86%)	۵۵-۶۴		۶ (3.40%)	۵	۱	November
۱ (0.62%)	+۶۵		۵ (2.82%)	۲	۳	December
160	Total	۱۰)Winter(	۰ (0%)	۰	۰	January
			۲ (1.13%)	۱	۱	February
			۸ (4.52%)	۳	۵	March
		177	87	90	Total	

Table 2. Incidence of scorpion stings in Lordegan County (2002-2006)

2002	2003	2004	2005	2006
Season/number (%)	Season/number (%)	Season/number (%)	Season/number (%)	Season/number (%)
Winter 5 (6.75)	6 (7.41)	3 (2.08)	4 (2.52)	10 (5.65)
Spring 19 (25.68)	40 (49.38)	76 (52.78)	61 (38.36)	88 (49.72)
Summer 37 (50)	33 (40.74)	58 (40.28)	83 (52.20)	67 (37.85)
Fall 13 (17.57)	2 (2.47)	7 (4.86)	11 (6.92)	12 (6.78)
Total 74	81	144	159	177

hands with 36% and head and trunk with 24.57%. The distribution rate of ages the scorpion victims presented that the greatest rate of scorpion stings victims belonged to the 15-24 year old persons (30%) and the lowest rate of scorpion stings were reported among the older than 65 year old patients (0.63%). The details of distribution rate of ages the scorpion victims are presented in Table 1. The scorpions brought to the medical centers by the patients or their relatives were identified as *Androctonus crassicauda* (Scorpionida: Buthidae), *Hemiscorpius lepturus* (Scorpionida: Hemiscorpiidae), and *Mesobuthus eupeus* (Scorpionida: Buthidae), *Compsobuthus* sp. (Scorpionida: Buthidae) and *Scorpio maurus*

(Scorpionida: Scorpionidae). There were two group data of seasonal incidence during this study. The first data group which were recorded during a five year period of 2002-2006 revealed that the highest incidence of scorpion sting cases were taken place in spring (44.72%), followed by summer (43.78%), fall (7.09%) and in the winter as the lowest incidence (4.41%) in Lordegan region (Table 2). The second data group which was recorded according to the month revealed that the highest incidence of scorpion sting cases were taken place in spring (49.72%) followed by summer (37.85%), fall (6.78%) and in the winter as the lowest incidence (5.65%) in Lordegan region in 2006. The most frequent of scorpion sting cases belonged to the

month of May (20.90 %) and the lowest to the October with 0.63%; however this rate was recorded zero in the January. The rates of incidence of scorpion stings in this study regarding to 2002-2006 according to the season/year are shown in the Table 2 and according to the months of 2006 in the Figure1.

Out of 177 scorpion sting cases in 2006, 161 cases (91.53%) were recovered with using antivenin serum including 1 cases (0.62) intra-venin and 160 cases intra-muscular (99.38%) injections. The interval time after stings and the times of injections were recorded as: 105 cases (71.92%) after 0-6 hours, 36 cases (24.66%) after 6-12 hours and 5 cases (3.42%) after more than 12 hours. All cases got back their recoveries and no case of death was reported in the present study. No case of anaphylaxis shock was reported after injection the scorpion antivenin serum too.

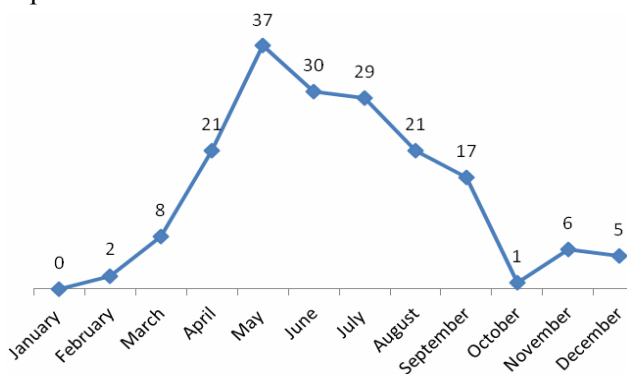


Figure1. Frequency of scorpion sting based on month in Lordegan County, South-West of Iran, 2006

The results of our study showed that there was not any difference between males and females among the patients who referred with scorpion stings to the health centers of Lordegan County. It is in accordance with Vazirianzadeh and Samie (Vazirianzadeh and Samie 2006) and Chitnis *et al* (Chitnis *et al* 1993) studies who have reported no difference between male and female victims of scorpion stings of Khuzestan. Our results are not in accordance with the results of in Saudi Arabia (Al-Sadoon and Jarrar 2003 and Jarrar and Al-Rowaily 2008) who reported that scorpion stings were greater in the males than the females. Then, it is suggested that the epidemiology of scorpion sting related to the sex of

scorpion sting cases is varied according to the year and location of different studies. There is a sociocultural point that the women work at homes and farms regarding post harvest treatments the crops such as make the bundle of vegetables or packaging the other crops of the area and agriculture treatments, like the men. During their works they are stung by scorpion species. There is an economical point that the urban region is going to be extended and developed with more speed in Khuzestan than in Chahar Mahal and Bakhtiari province. Because Khuzestan is an industrial province and more mass building are being constructed there. These building activities are being done in the areas which are included the nesting sites of scorpion species. But Chahar Mahal and Bakhtiari province is an agricultural economic based and the developing activities are being done slower than Khuzestan.

The results of this study revealed the legs (the lower limbs) as the moving parts of man are in the greater risk of scorpion stings than the hands and head and trunk. This agrees with studies in Saudi Arabia (Al-Sadoon and Jarrar 2003 , Jarrar and Al-Rowaily2008) and in Kashan, central of Iran (Dehghani *et al* 2010).This explains that using suitable wears during work in the fields is an important issue of reduction of scorpion sting cases. The greatest rate of scorpion stings were happened among the 15-24 year old people. This agrees with the findings in Kashan, central of Iran (Dehghani *et al* 2010) ,Ahvaz, south west of Iran (Emam *et al*) and north-west of Khuzestzn (Ghaderi *et al* 2006). It is assumed that scorpion sting effects the most active age groups including the youth as students and farmers in all of mentioned areas, if we pool two age groups of 15-24 and 25-34 years old (Vazirianzadeh *et al* 2008). Data collected in the current study revealed that the highest incidence of scorpion sting cases in 2006 was taken place in spring (49.72%) in the Lordegan County. This is in contrast to the studies in south-west of Iran (Chitnis *et al* 1993,Vazirianzadeh and Samie 2006), Saudi Arabia(Al-Sadoon and Jarrar 2003 , Jarrar and Al-Rowaily 2008) and in Turkey (Ozkan and Kat 2005 and Ozkan *et al* 2006). They have reported that 49.7% -

93.4% of scorpion sting cases occurred in summer. These differences were presumably due to the variation of geographical, climatologic and species distributions (Chowell *et al* 2005, Deghani *et al* 2010). However, the surveys in this area during 2002-2006 explain that there is not a consistency regarding the dominant of scorpion stings in the summer or spring. As the Table 1 shows that this consistency was due to the summer during years of 2002 and 2005 and due to the spring during 2003, 2004 and 2006. The most important data which is considered seriously is the increasing rate of scorpion stings during the period of 2002-2006 in Lordegan from 74 to 177 cases. The means of climatology data, 2002-2006, related to the degrees of temperature and total precipitation per year do not show any significant changes (I.R. Iran Meteorological Organization 2012). It means this increasing rate is an independent event of climatology data. Therefore, this increasing rate should be studied on the reducing the prevention agents against scorpion stings among the residents of this area. The collected species of scorpions in the current study were similar to the conducted studies in Khuzestan, southwest of Iran (Radmanesh 1990, Radmanesh 1998, Radmanesh Vazirianzadeh and Samie 2006, Vazirianzadeh *et al* 2008). However, the remarkable species difference in Lordegan County from Kashan, central of Iran is related to the existence of *H. lepturus* in Lordegan County as one of the most dangerous species of scorpion in the world. *H. lepturus* is only scorpion with related cutaneous findings in Iran (Radmanesh 1990). Presence of *Compsobuthus* sp. in Lordegan County is another good reason for important of scorpionism problem in this area, because this species cause similar medical problem in human (Farzanpey 1987, Deghani 2009). Totally 160 cases out of 177 scorpion stung persons were received antivenin of scorpions. This antivenin is a 5 ml polyvalent ampoule against 6 species including **H. lepturus**, *A. crassicauda*, *Mesobuthus eupeus*, *Odonthobuthus doriae*, *Hottentotta saulcyi* and *Hottentotta schach*. This is made in Razi Research Vaccine and Serum Institute,

Iran. No case terminated to death and in all cases recovery was recorded in the current study. This is almost accordance to the results of Gajre and Dammas who 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 (Gajre & Dammas 1990).

According to the results of the current study it is concluded that the scorpion stings in Lordegan county are epidemiologically similar to the other area of south west of Iran regarding: distribution rate of ages, sex and site of stings and not similar from point of season frequency. The results of this study show that the preventing ways of scorpion stings should be educated among the residents of Lordegan County. From point of epidemically, results of this study suggest, injecting the antivenin in the persons is a useful way to reduce the mortality after scorpion stings.

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