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**Research Article**

# Evaluation of Epidemiological, Laboratory and Clinical Features of Scorpion Sting in Shaheed Beheshti and Imam Sajjad Hospitals (Yasuj) from the Beginning of 2005 to the End of the First Half of 2009

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## ABSTRACT

**Introduction and objectives:** Scorpion sting is one of the most important clinical and medical issues in tropical undeveloped countries in the world. There are about 1500 kinds of known scorpions in the world which near 30 of those kinds are dangerous for human. In spite of ratherly high prevalence of scorpion sting, there has not conducted any complete and comprehensive study in this province yet. So it is suggested to study of this topic in this province.

**Material and methods:** This study is kind of descriptive and retrospective which uses all inclusive sampling method and investigates about epidemiologic, clinical and laboratory characteristics of patients in two educational and therapeutic hospitals in Yasuj (i.e Shahid Beheshti and Emam Sajad) from 21 March,2006 till 22 September, 2010(from beginning of the year 2005 until first half of the year 2009). All the information after extracting from the patient cases was coded and then analyzed by using Epi data software.

**Findings:** From 72 scorpions sting cases in these study 39 cases (54.2%) were related to male persons and 33(48.5%) cases were related to females. Most of the investigated patients were between the ages of 20 to 29 years old in Boyer Ahmad town (77.8%). The most common signs respectively were swelling of sting site in 66 cases (91.5%) and then pain and redness of sting site. Cefazolin (61.1%) were the most prescribed antibiotic . The lower limb of body by 47% was the most stinged part and after that it was upper limb of body by 42%. All the people in this study were cured and there have not seen any death.

**Discussion and results:** Based on findings of this study, the ages between 20 to 29 years old, Boyer Ahmad town, lower limb of body and yellow scorpions had the most frequencies . So it is suggested to teach required educations to the families and also related centers.

## INTRODUCTION:

Order Scorpionida are animals of the class of Arachnida (1). The physical cordage of these arthropods is harsh. The poisonous device of the scorpions is located at the tail end and contains two toxic glands that are in the thick kitein's cover. This cover at the end is a sharp bite. Scorpio is fresh and colorless in its novelty and purity, and has a neutral to alkaline pH value

(2). The scorpion venom generally consists of mucus, oligo peptides, nucleotides, amino acids and various types of toxins. They target toxins, especially sodium-ion channels and voltage-dependent potassium in the membrane of the nerve cells (3 and 4). This action prolongs the potential for action or subsequent stimulation of neurons and the accumulation of calcium or sodium ions in the cell, the final result of which is the passive release of neurotransmitters (neurotransmitters) from the affected tissues (5). In the world there are about 1,500 scorpion species, which are divided into 18 families. About 30 species are dangerous to humans, which seems to be important in terms of the length of the Scorpions. As species that are more than 5 cm long, they must be important in terms of human injury (9). The Iranian scorpion reported in 18 genera, 29 species and 5 subspecies and three families of Buthidae, Scorpionidae and Liochelidae (10). Hemiscorpiuslepturus of Hemiscorpiidae is the most important species in Iran. The Androctonuscrassicauda (Fig. 1-1) is one of the most dangerous scorpions in the world. The scorpion is zoonotic and can involve most of the vital organs of the body and have a consequent effect (11). The most important outcomes of this scorpion bite in the form of pulmonary edema, paralysis, increased muscular movements (Twitching) irregular pulses are a paralysis of a pathway and some pathological changes (12). In the United States, the Centruroidesexilicauda is the most dangerous species found in Arizona and New Mexico (13). In the United States, 15 to 16,000 contact points are poisoned every year because of scorpion (15). In southern Europe (Portugal, Spain, the Mediterranean, France, Italy, and Greece), only small scorpions are found that their poison is not usually dangerous to humans (16). In Africa, in Morocco, an annual outbreak of about 50 bites per 100,000 populations is reported (17 and 18). The annual mortality rate was 0.27 per 100,000 populations (19). In Saudi Arabia, the most dangerous species are L.quinquestriatus, A. crassicauda and P. liosoma, which is particularly important for medical purposes especially for the species L. quinquestriatus (20). In Iran, the scorpion is more commonly used by Hemiscorpiuslepturus than the Androctonuscrassicauda scorpion. 140 per 100,000 populations are reported annually in Iran, which is particularly evident in the southern and southern tropical regions of the country. It is noteworthy that scorpion cases are estimated beyond this (21).

Patients over the age of 15 accounts for about 55% of the victims, with 10-15% of them admitted to the hospital and the mortality rate of these patients admitted despite receiving an antidote of 1% (22). In our country, the provinces of Khuzestan and Hormozgan are among the most important scorpions in the country, which annually contain thousands of reports and dozens of deaths from it (23). The number of scorpion bites in Kohgiluyeh and Boyer Ahmed provinces was more than 500 cases each year. Therefore, based on the results of this research, the number of scorpion scourge cannot be considered in the whole Kohgiluyeh and Boyer Ahmad is low. A look at the scorpion scores in Kohgiluyeh and Boyer Ahmed indicate that this is particularly high in Kohgiluyeh. In 2008, four cases and in the first six months of the year 79, we had two cases of scorpion deaths, all occurring in Kohgiluyeh. Patients with scorpion excrement may experience these symptoms: anxiety, restlessness, drowsiness, blurred vision or temporary blindness, eye disorders, excessive salivation, tearing, runny nose, inability to control discharge, excessive sweating, nausea and vomiting, shortness of breath, wheezing, dysphagia, urinary incontinence and muscle twitch feces, opioid and seizure-like vibrations may be confused with it.

Post-scorpion complications include tachycardia, arrhythmia, hypertension, body temperature, rhabdomyolysis, and acidosis. Symptoms have increased by about 5 hours and it decreases within one or two days, but pain and numbness can last up to a week. The deadly respiratory tract is common in young children and the elderly (25 and 14). Scorpion bite is one of the most common causes of pancreatitis in Brazil (13). Non-lethal sting needs only ice bags, dasgs and antihistamines (2). It has been shown that relaxing the patient and using

compressive and cold dressing in the wound site can reduce the amount of toxin absorption. Concomitant intravenous injection of midazolam may be useful in controlling restlessness and involuntary muscular mutation. Due to the possibility of respiratory arrest following the use of this drug or other analgesics or narcotics, the patient should be fully monitored. Blood pressure and pulmonary edema respond to nifedipine, nitroproside, hydralazine and prazosin, and bradyarrhythmia can be controlled by atropine (25).

Calcium gluconate can be used to treat muscle spasm. Narcotic drugs should not be used as they can worsen the neurotoxicity of scorpion venom (14). Children do not have enough insufficient immunity and nutrition due to the small size of the scrotal injectable poison and most importantly, the lack of recognition of the scourge's bites and their injuries is considered to be the greatest scourge victims and are more vulnerable than other age groups and are more at risk (6) which should be in the hospital and preferably in ICU and monitored and treated (26). Despite the relatively high prevalence of Scorpion bite, there is still a complete and comprehensive study on the need for prescribing anti-Scorpion serum. The lack of adequate anti-scorpion serum in all centers, as well as the obvious and unclear cases of prescription of anti-scorpion serum, have led to confusion on the part of health workers on the one hand and the insistence of sick fellows on the other (27). Therefore, it seems necessary to conduct a study in this province.

**Methodology:**

The study of this research in terms of research design is a cross-sectional descriptive, time-retrospective, review of epidemiological characteristics, laboratory and clinical practice of scorpion bite in Shahid Beheshti and Imam Sajjad hospitals (Yasuj) from the beginning of 2005 to the end of the first half of 2009 and the population studied in this study is all those who after scorpion bite from the beginning of 2005 to the end of September 2009 refer to one of two Shaheed Beheshti Hospitals or Imam Sajjad (AS) in Yasuj city and after the case was admitted and sampling method in this study was census sampling. This study was conducted in the summer of 2009 in Yasuj. After coordinating with the Research Deputy of Yasuj University of Medical Sciences and obtaining permission from the university's deputy, the coordination was carried out with Shahid Beheshti and Imam Sajjad hospitals in Yasuj. With the introduction of the letter to the archives of the two hospitals mentioned, they were granted access to the patients' files by the authorities. We determined the time interval according to the date of admission and the name and surname and card number. Then the records are delivered from the archives of the mentioned hospitals using the information inside the case, a questionnaire which was previously based on the variables desired to examine the epidemiological characteristics, laboratory and clinical design of scorpion cases were designed. To collect information, a questionnaire was designed for this purpose was used (attachment questionnaire form). The request is made up of four parts. The first part is related to the patient's profile, including first and last name, age, sex, date of scorpion bite, hospitalization date, stomach time and admission hours. In the second part we addressed epidemiologic factors including: the cause of hospitalization (if listed by the hospital doctor). Scorpion type based on color: yellow, brown, black listed by the patient and filed in the case and also a bite that can be headed, trunk, upper limb, genital, perineum or lower extremities.

The third part is devoted to clinical signs and symptoms of the patient, including laboratory tests, including the TAP test, or the presence of hematuria or hemoglobinuria. In the fourth part, the treatment is done for the patient, and at the end of the admission, determine the recovery or death as well as the cause of death in case of death of the patient in the questionnaire. There is also a section for adding supplementary information, including other medications or tests that have been done to the patient and probably not foreseen in the questionnaire. After collecting the necessary information, all information is precisely coded into the Epidata program, and then the data are based on the

parameters defined in the goals, using descriptive indicators such as prevalence, the mean and the meanings are analyzed and for the final report, descriptive charts and descriptors have been used. The study after obtaining permission from the research deputy, director of treatment and authorities of Shahid Beheshti Hospitals and Imam Sajjad Hospital (AS) private information contained in the patient file remained confidential.

The differences in the types of treatments were confidential and were not made available to unauthorized persons. Sources of suspicion and lack of credibility were not used. In the review, honesty and trustworthiness were observed.

**Findings:**

The present study was performed on 72 patients who visited and admitted to the teaching hospitals of Yasuj from 2005 to the end of September 2009 and obtained the following results: of all cases of scorpion bite in this study, 39 cases (54.2%) occurred in males and 33 cases (45.8%) were related to females. The highest number of patients with 29.2% frequency was in the age group of 20-29 and the lowest was 1.4% in the age group above 70 years. Among all the subjects, 44 (61%) were less than 30 years old and only 18% of scorpion bites (13 cases) were in the age group of more than 40 years. The youngest was the one-year-old child, and the oldest was a 74-year-old man.

The most frequent scorpions were in Boyer Ahmed (moderate climate) with 56 (77.8%), and Dena (cold and mountain climate) was also followed by 16 cases (22.2%). The study found that doctors had different reasons for hospitalization. The most common reason for hospitalization was ulcer pain, which was mentioned in 54 patients (75%) as one of the reasons for hospitalization, followed by topical edema at the site of the wound, with involvement of 35 patients (48.6%) as the second most common causes of hospitalization include: cellulite, ulcer site, redness of the wound site, tissue necrosis, wound blister, dizziness, wound infection, nausea and vomiting, headache, decreased consciousness, and eventually one person is also looking for edema around eye was admitted. In terms of symptoms and clinical symptoms, the most common symptom was bite pain, which involved 66 patients (91.5%), and 6 (8.5%) had no signs of edema. After edema, the most common clinical symptom of pain was bites on site, which involved 64 (88.9%) patients, and 8 (11%) patients did not complain of pain. Bleeding redness was in the third place of the outbreak, reported in 59 (82%) patients. These three signs, pain, edema, and redness of the bite were seen in most of the patients. Other symptoms were less common. Headache was reported in 15 patients (20.8%). 13 patients (18%) complained of nausea, while 10 (13.8%) of them also suffered from vomiting. 13 patients (18%) were febrile. 12 (16.6%) patients complained of paresthesia. Bites were blistered in 11 patients (15.3%). 10 (13.8%) patients suffered from dizziness. Skin rash was reported

| Sex / Age (year) | Male | | Female | | Total | |
|---|---|---|---|---|---|---|
| | Number | Percent | Number | Percent | Number | Percent |
| Under-10 age group | 6 | 15.4% | 2 | 6.1% | 8 | 11.1% |
| Age group 10-19 years | 6 | 15.4% | 9 | 27.3% | 15 | 20.8% |
| age group is 20-29 years old | 15 | 38.5% | 6 | 18.2% | 21 | 29.2% |
| age group is 30-39 years old | 7 | 17.9% | 8 | 24.2% | 15 | 20.8% |
| Age group 40-49 years | 1 | 2.6% | 7 | 21.2% | 8 | 11.1% |
| Age group 50-59 years | 1 | 2.6% | 1 | 3.0% | 2 | 2.8% |
| age group is 60-69 years old | 2 | 5.1% | 0 | 0% | 2 | 2.8% |
| Age group 70 years and older | 1 | 2.6% | 0 | 0% | 1 | 1.4 |

**Table 4-1:** Frequency distribution of scorpion bite in different age groups of patients admitted in Yasuj hospitals during 1995 to 2009 by age and sex

in 6 (8.3%) patients, and 5 (6.95%) also had scar tissue necrosis. Four people (5.5%) had blurred vision and one person (1.39%) was also suffering from shortness of breath. 3 (4.2%) of patients showed signs of decreased consciousness and eventually 2 (2.8%) of patients also had hypertension. In the case of clinical signs and symptoms, it should also be noted that none of the patients did not show arrhythmia, periopathy, urinary incontinence or stool, dysphagia, or increased saliva levels. In this study, different antibiotics were used in patients with antibiotics alone (61.1%) of cefazolin alone The most commonly reported cases were ceftriaxone (8.3%), caplin (2.7%), vancomycin and Ceftazidime (2.7%) and some antibiotics or antibiotic compounds were used only in one patient (1.39%), including ceftriaxone and gentamicin, the combination of ciprofloxacin and metronidazole, the combination of metronidazole and vancomycin, Combination of metronidazole and caplin, cefalexin. In 7 patients, the combination of two antibiotics was used, and in one patient, the combination of three antibiotics was used. It should be noted that nine patients (12.5%) did not use any antibiotics.

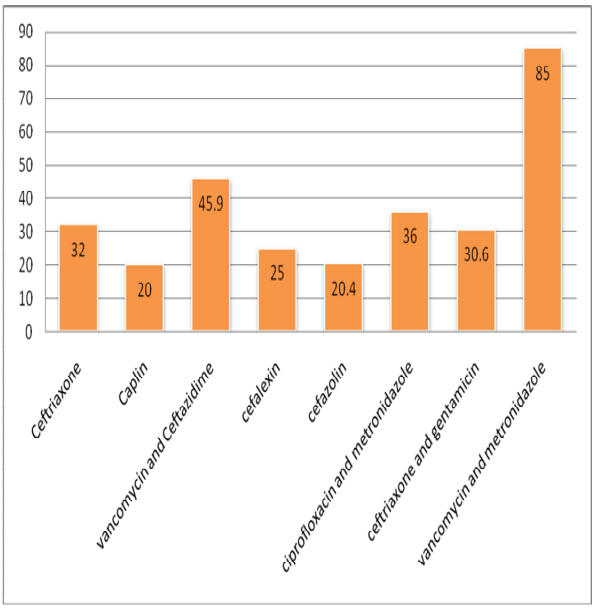


**Figure 3-4:** Frequency distribution of the use of different antibiotics in selected Scorpio patients hospitalized in Yasouj city during 1995 to 2009

In 67 patients (93%), hydrocortisone was used as IV. For treatment of 61 patients (84.7%), antihistamine was prescribed. Of the 55 patients (76.4%), they used anti-venom, and 17 (23.6%) had improved without anti-venom therapy. Because in none of the scorpion scenes, they could not bring the scorpions to the hospital themselves, scorpion type was not detectable and only by using the color mentioned by scorpion victims, we found that in 24 (33.33%) yellow scorpions, six cases (8.33%) were brown scorpions, two cases (2.78%) of black scorpions were causative agents, and 40 cases (55.56%) of the patients could not indicate the color of the scorpion.

**DISCUSSION AND CONCLUSION:**

Scorpion scores in this study were higher in men than in women, but this difference was not statistically significant. One of the reasons for this statistically significant discrepancy is the low sample size in this study. Of course, Padmagar Ali Chit-Nis, studying on 188 patients and Zohre Moshak, also examined 7930 cases of patients admitted to scorpion bite, in their studies, they have reached the same conclusion and did not find any meaningful difference in gender. In return, a bunch of other scholars report scorpion bites in men more than women, including Ahmad Talebian (2). Scorpion reported in men twice as much as women, also in a study by Pardal et al. (29) in Brazil; they performed 72 scorpions in 2003, showing that 83.3% of scorpion cases were related to male sex. This group of researchers attributed the greater frequency of scorpion in men to their out-of-home job activities. It has been argued that perhaps more scorpions in men are related to their out-of-home job activities. For example, men work in the countryside and on agricultural land, and are more likely to be at risk than women who are only at risk in a home environment are at risk in two environments (2). The highest number of patients with 27.75% frequency was in the age group of 20-29 years and the lowest number was 1.39% in the age group above 70 years. Among all the subjects, 43 (60%) were under 30 years of age, and only 18% of the scorpion bites (13 cases) were in the age group above 40 years. Most studies in the country over the years have been consistent with the results of this research on the prevalent age

of scorpion bite. For example, in the study of Padmagar Ali Chit-Nis in Khuzestan from 1979 to 1985, most of the subjects (81.8%) were under the age of 30 years and the lowest number was for the age group above 70 (28).

In the study of Zohreh Moshak in 1989 and 1988 in Ahwaz, 68.6% of the subjects were under the age of 30 years (6). In the study of Ahmad Talebian et al in Kashan during the years 1991-2002, the highest number of patients was in the age group of 0-9 years old and the smallest number was related to the age group above 70 (2).

In this research, the most cases of scorpion bites related to Boyer Ahmad city were 56 cases (77.8%) and the city of Dena was followed by 16 cases (22.2%), followed by the results of the only research. In Kohgiluyeh and Boyer Ahmad province, in order to determine the scorpions of residential areas and farms around the villages of the province which was carried out in 2000 by Kouroosh Azizi et al? In the mentioned research, Kohgiluyeh and Boyer Ahmad city was the most frequent species of scorpion caught and given the greater frequency of scorpion samples, it is natural that the most frequent scorpion scourge be reported in this city. This difference in the frequency of scorpion cases between Kohgiluyeh and Boyer Ahmad and Dena can be due to the climatic conditions of these two regions. Kohgiluyeh and Boyer Ahmad city has a warm and humid climate and, in contrast, the city of Dena has a cool and dry climate and is located in the mountainous region of the province.

According to the results of the study Zargan et al (8) the mortality rate of scorpion species in constant humidity is raising with increasing temperature and the relative humidity of 50-60% can provide the best conditions for the survival and growth of the scorpions, this condition is perfectly matched to Kohgiluyeh and Boyer Ahmad weather. Also, the biological study of scorpions in natural conditions shows that these organisms do not show any activity at temperatures below 4-10° C (8) which due to the cold and dry weather of the city of Dena, the fewer cases of scorpion are justifiable. Based on the findings of this study, for clinical signs and symptoms, none of the patients with arrhythmia, periapisis, urinary incontinence or stool, dysphagia or increased salivary levels did not give the most common clinical symptom of bite edema was involvement of 66 patients (91.5%), and 6 (8.5%) cases of edema were not seen. After edema, the most common clinical symptom of pain was bites, which involved 64 (88.9%) patients. Bleeding redness was in the third place of the outbreak, reported in 59 (82%) patients. These three signs are pain, edema and the redness of the bite was seen in most of the patients. Other symptoms were less common. In this study, the prevalence of clinical signs and symptoms of the patients was as follows:

Local edema, pain in the location of bites, redness, bites, headache, nausea and vomiting, fever, paresthesia, blisters, dizziness, skin rash, tissue necrosis of the wound site, blurred vision, decreased consciousness, increased blood pressure and shortness of breath.

Bentor et al (30), in a study in Israel, reported 225 cases of scorpion scarring, 13% of which were asymptomatic, 72% had mild symptoms and 15% had severe systemic symptoms. The most common manifestation was pain (97.2%), followed by cardiac symptoms (23.1%) and ECG changes (13.7%). Snaia et al (31) the most common clinical signs of scorpion bite have been reported: localized pain, redness, salivation, dysphagia, Tachycardia, Restlessness, Odinophagia and Paresthesia. Taliban and Dodgir Study in Kashan (2) also showed that 100% of the patients had inflammatory, burning and pain symptoms and symptoms of restlessness (15.5%), heart disease (14.9%), intravascular coagulation (0.5%) and seizure and pulmonary symptoms were 1% each. The results of this study are consistent with the clinical trials mentioned above. In the present study, 4 patients (5.56%) were diagnosed with hematuria in terms of laboratory characteristics. One person (1.39%) had acidosis, and two (2.78%) had hemoglobinuria in their tests.

In none of the cases, the TAP test was used. In the study of Padmagar Ali Chit-Nis et al (28) 34.8% of the subjects, hemoglobinuria and also 19.3% of those with blood urea (BUN) were abnormal, which is consistent with the results of

this study. In this study, different antibiotics were used in patients who had antibiotic cefazolin (61.1%) alone, most cases were the most commonly reported cases: ceftriaxone (8.3%), dabylin (2.7%), vancomycin and ceftazidime (2.7%). Regarding cases with different scorpion intensities and various local symptoms of ulcers, it seems natural to use different antibiotics at different intensities of involvement. Cefazolin antibiotics are also available due to the proper price and good coverage of Gram-positive bacteria and superficial skin bacteria. An appropriate antibiotic is in most cases an uncomplicated scorpion bite, which was also the most prevalent in this study. In this study, 55 patients (76.4%) used antivenomas, and 17 (23.6%) had improved without anti-venom therapy. In a study by Zohreh Meshkar at Ahvaz Abuzar Hospital, the percentage of people who used the anti-venom were determined by scorpion type: for Androctonuscrassicauda, Mesobuthuseupeus and Hemiscorpiuslepturus scorpions, 12%, 29% and 44% respectively, with an average of 28.2% anti-venom used which is consistent with the result of this study. Since no deaths were seen in this study, the effect of anti-venom injection on mortality was not determined. Osnaya et al (31) concluded in their study that anti-venom can reduce mortality as soon as possible, it can be useful in case of emergency, and in addition, there is no particular complication in using it.

Qaderi in his study on soldiers based in northern Khuzestan (32) during the years 81 and 82, all cases of scorpion scarring were treated without any prescription of anti-Scorpion serum (inevitably due to the absence of an antidote and the lack of dispatch) and recovered without any deaths. It should be noted that in his study, all scorpion bites were Androctonuscrassicauda scorpion. Finally, considering that all cases without anti-scorpion serum injections were observed, as well as due to the relatively high bite rate with this scorpion in Khuzestan province and the incidence of side effects of anti-scorpion serum injections, it is necessary to know that indications of anti-Scorpion serum prescribing agents in those who have been scorpion-type and are not of high severity and are in the age group of 18 to 45, it should be re-examined and reviewed. According to the findings of this study, the most common bony area was the lower extremity, which included 34 (47.22%) patients. Then, 30 cases (41.67%) of the upper limbs, 4 (5.56%) trunk, 3 patients (4.17%) of the head and neck, and 1 of them (1.39%) also suffered from genital ulcers. Talebian (2) in our study, the most common bite area was the lower extremity (27.8%) and then, the upper limb, trunk and head and neck respectively. In the Atomo (33) study, the lower extremities were the most common bite site with 66% and upper limb lateral with 29.4% bites. Zohreh Meshak (6) studied the scourge area with a scorpion-type distinction, and reported: "The Androctonuscrassicauda and Hemiscorpiuslepturus scorpions are more likely to bite people. While the most common bite has been on the Mesobuthuseupeus scorpion. "All three of these studies are consistent with the present study in terms of bite location in the body. Bite in the lower limbs can be related to the lack of proper use of shoes in the courtyard or farmland. On the other hand, when resting when people have not slept, the lower limbs are lower than the upper parts of the visual field and the lesser one notices that the Scorpion is approaching its feet. Because in none of the scorpion scenes, they could not bring the scorpions to the hospital themselves, scorpion type was not detectable and only by using the color mentioned by the scorpion-bruising sufferers we found that in 24 (33.33%) yellow scorpions, six cases (8.33%) were brown scorpions, two cases (2.78%) of black scorpions were causative agents, and 40 cases (55.56%) of the patients could not indicate the color of the scorpion.

Talebian in his study in Khuzestan showed that in color, 34.9% of cases of black scorpion and then yellow scorpion (19.6%) were biting agents. The incompatible cause of Talebian with this study can be due to the difference in the incidence of scorpion type in Khuzestan province with Kohgiluyeh and Boyer Ahmad province. According to Mahshid Chaychi (7), most of the scorpions in the Khuzestan region (more than 60%) are Androctonuscrassicauda

scorpions, one of the black scorpions of this region and even Hamid Ghaderi et al. (27) reported in their survey in northern Khuzestan that all scorpion bites collected during 2002 and 2003, they belonged the same way while according to the study of Koroush Azizi et al. (24) in Kohgiluyeh and Boyer Ahmed, Mesobuthuseupeus of the Buthidae family, which is a yellow scorpion, most of the time. The result of the present study, in terms of scorpion scoring, as a result of the study of Azizi et al in Kohgiluyeh and Boyer Ahmad province, all subjects studied in this study, improved and there was no death due to Scorpion bite.

In the study of Zohreh Meshak (6), in Ahwaz, all deaths (47 cases and 0.59%) were due to Androctonuscrassicauda and Hemiscorpiuslepturus scorpion bites and although the highest bite was caused by Mesobuthuseupeus scorpion but no deaths from bites were reported by this scorpion. In appearance, it seems that Mesobuthuseupeus, the most common scorpion species in Kohgiluyeh and Boyer Ahmed Province (24), is scarce.

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