

A Study of the Frequency and Incidence of Scorpion Stings and Snakebites in Riyadh City

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Abstract. Five hundred and eight scorpion stings and 131 snakebites were recorded during the period 1986–1988 with a mortality rate of 0.17% and 2.3% respectively. Scorpion stings were predominant in June to September with the highest frequency in June and least in January. Snakebites showed the highest frequency in August with few cases in November to March and no recorded cases in December to February. Male-female ratio of victims due to scorpion stings was ~ 2:1 while that of snakebites cases was ~ 4:1. Both stings and bites were maximal in the age group of 21-30 years. *Leiurus quinquestriatus*, *Androctonus crassicauda* and *Apistobuthus pterygocercus* were incriminated in scorpion stings while *Cerastes cerastes*, *Echis coloratus* and *Atractaspis microlepidota engaddensis* were the main species involved in snakebites.

Introduction

Scorpion stings and snake bites are a real threat in the tropical and subtropical and most of the temperate zones of the world. Considerable epidemiological studies on scorpion and snake envenomation have been undertaken in different parts of the world such as India [1], Finland [2], Palestine [3;4], Algeria [5], Mexico [6, pp. 119-131], South-East Asia [7], and Tunisia [8]. Fifty one species of snakes can be recognized in Saudi Arabia. Nine of these are venomous sea snakes and the remaining 42 species are terrestrial, of which 9 are venomous [9;10]. According to Vachon, fourteen species of scorpions have been recorded in Saudi Arabia [11]. The Kingdom of Saudi Arabia is one of the least investigated countries concerning envenoming by scorpions and snakes where informations are sparse and fragmentary [12-15]. There are no reliable statistical studies on this problem.

The present study was an attempt to quantify scorpion and snake envenoming in the Kingdom of Saudi Arabia. It is hoped that this effort will stimulate further intensive work of medical and social value.

Material and Methods

The incidence and frequency of scorpion stings and snakebites in Riyadh city were reviewed for a period of three years (1986-1988). Medical data were obtained from the records of the following hospitals: King Khalid University Hospital; King Fahad Hospital (National Guard), Riyadh National Hospital, Riyadh Central Hospital, Prince Salman Hospital, Al-Ali General Hospital, Al-Mobarak Hospital, Al-Quwayiyah Hospital and Riyadh Military Hospital. The data were analyzed on the basis of: patient name, file number, age, sex, nationality, time of sting or bite, site of sting or bite, single or multiple sting or bite, outcome of treatment and the type of animal. A considerable number of data were missing from some hospitals records.

Results

Scorpion stings

Analysis of the data collected from the medical records of the above mentioned hospitals showed that 580 victims of scorpion stings were hospitalized during a period of three years (1986 through 1988). A death case was reported resulting in a mortality rate of 0.172%. The patient that died had developed paraplegia, hydrocephaly, unconsciousness and cardiac arrest.

Scorpion stings were predominant in the summer months with the highest (18.4%) frequency in June (Fig. 1). However, 10% of stings were recorded between November through to March with the least (0.86%) frequency of cases in January. Sting sites were reported mainly on body extremities (63%). The results showed that a considerable number of stings were on the thumb (44%) with the least frequency on the little finger (Table 1). Other sting sites were also recorded such as thigh, ear and testis.

Male-female sting percentage was 67.1% and 32.9% respectively the age range of the patients was 9 months to 88 years. Figure 2 shows that 59.7% of the patients were below 30 years while 19.7% cases were among children below 10 years.

The scorpions brought to the hospitals by the patients and their relatives were identified as *Leiurus quinquestriatus*, *Androctonus crassicauda* and *Apistobuthus Pterygocercus*. Most of the medical records of the stung patients described the scorpions as black or yellow.

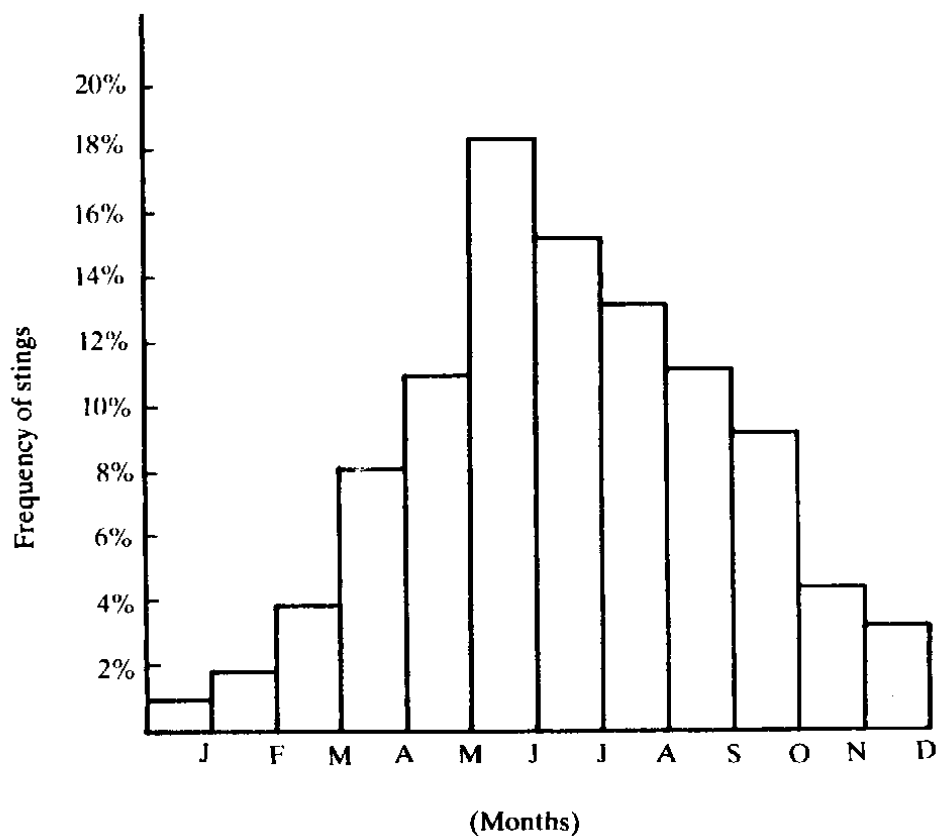


Fig. 1. Distribution of scorpion stings through the year.

Table 1. Distribution of scorpion sting and snakebite on body extremities

	Scorpion sting	Snakebite
Upper extremities	(37%)	(44.7%)
Right arm	55%	58.1%
Left arm	45%	41.9%
Thumb	44%	16.6%
Index finger	12%	41.6%
Middle finger	16%	25 %
Ring finger	20%	0.0%
Little finger	8%	16.6%
Lower extremities	(63%)	(55.3%)
Left foot	53%	50 %
Right foot	47%	50 %

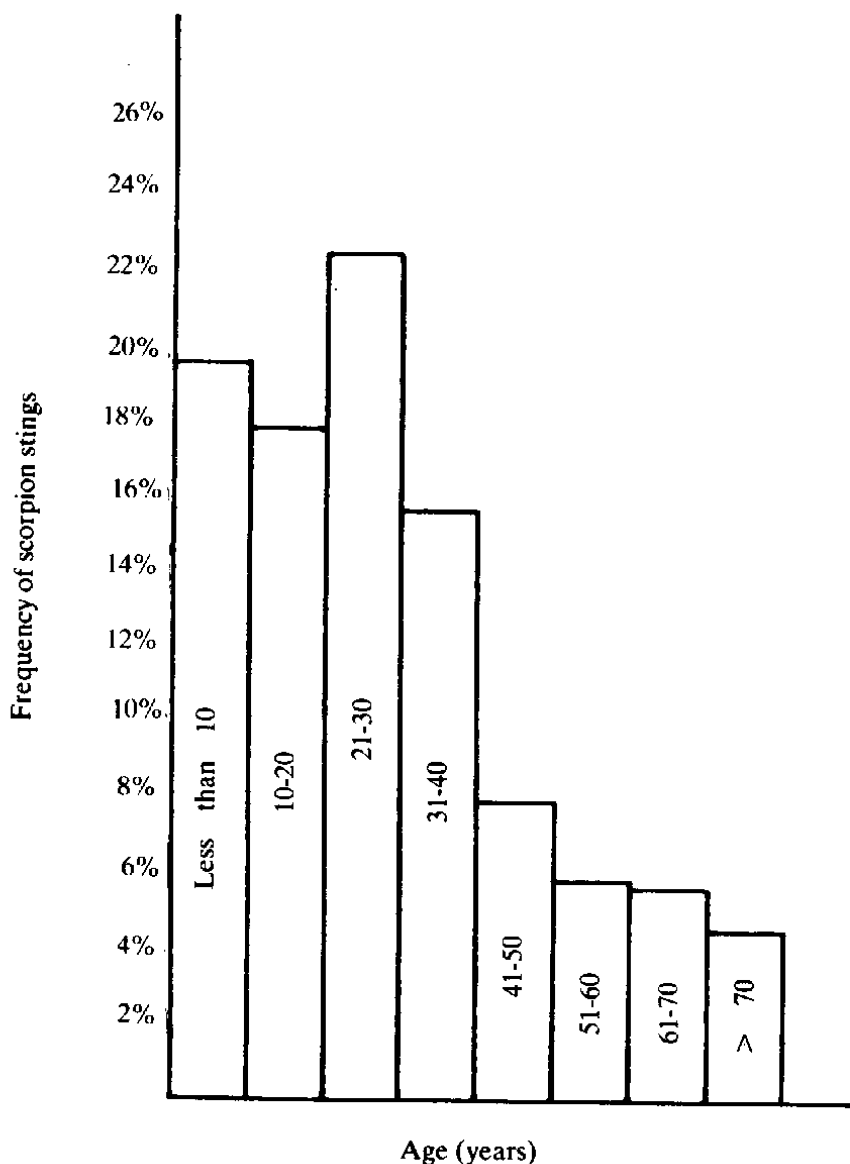


Fig. 2. Distribution of scorpion stings according to age.

Snakebites

The reviewed medical records showed that 131 patients were hospitalized due to snakebite with a mortality rate of 2.3%. The patients that died had developed right-sided hemiplegia, left-sided infarction, renal failure, chest infarction and cardio-respiratory failure. Most of the snakebite cases were reported in the summer months (June to September), with the highest (27.9%) frequency in August. Few cases were reported in November to March while no cases were reported in the winter months December to February (Fig. 3). As shown in Table 1, bites were mainly in the extremities with the highest (55.3%) frequency at the lower extremities. The right and the left feet were almost equally affected with (62.5%) frequency of bites on the

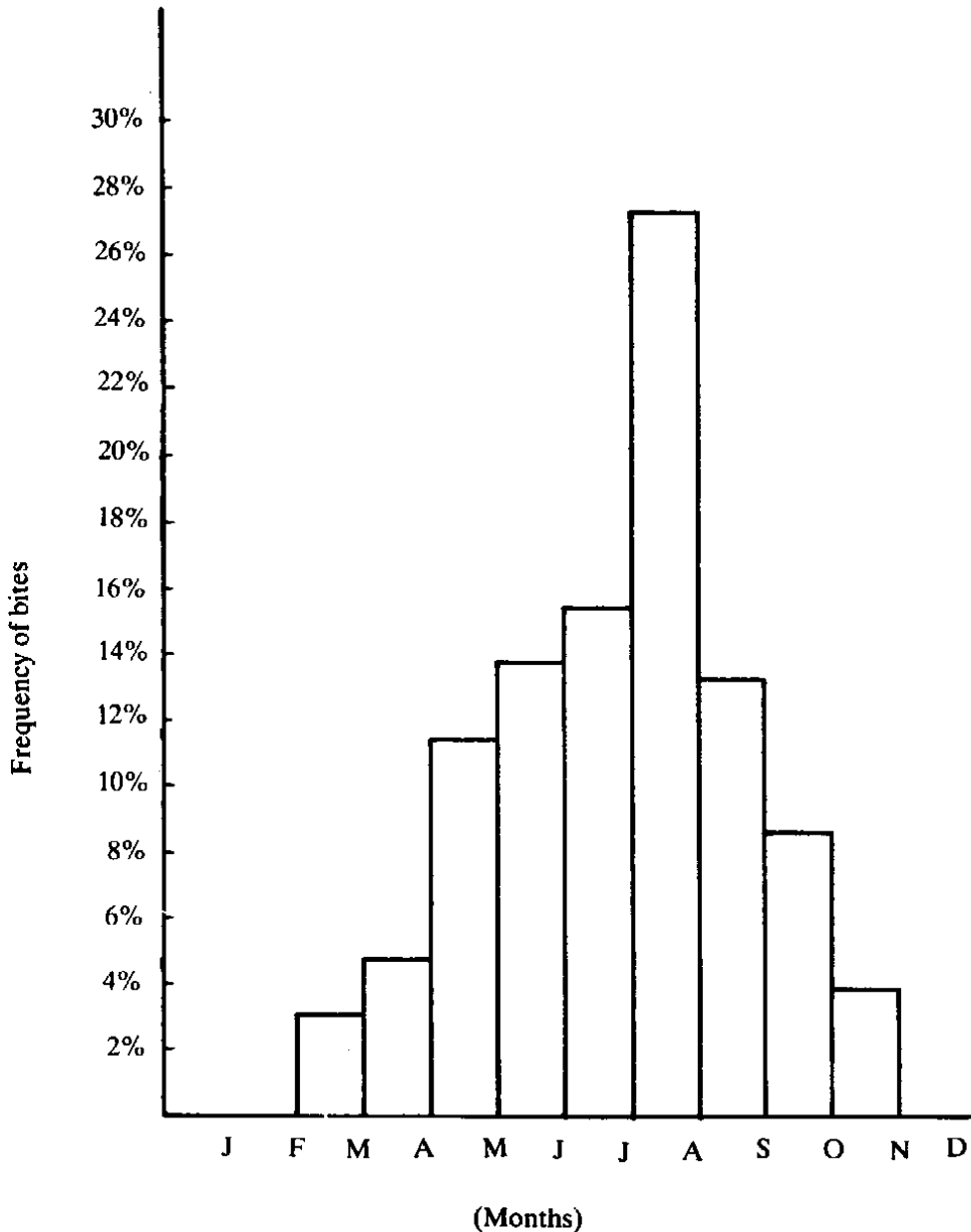


Fig. 3. Distribution of snake bites through the year.

big toe. Bites of the right arm were more (58.1%) than those of the left one (41.9%). The records showed that most of the bite cases were on the index finger (45.5%), while the thumb, middle finger and the little one were almost equally affected but no bites were recorded on the ring finger. Bites were also recorded in the thigh, heel, chest and ankle.

Distribution of bite cases according to sex showed that almost 4/5 of the cases (81.4%) were among males. The bitten patients were 1 to 90 years old. This study showed that 61% of the cases were below 30 years, while 10% of the cases were children below 10 years (Fig. 4).

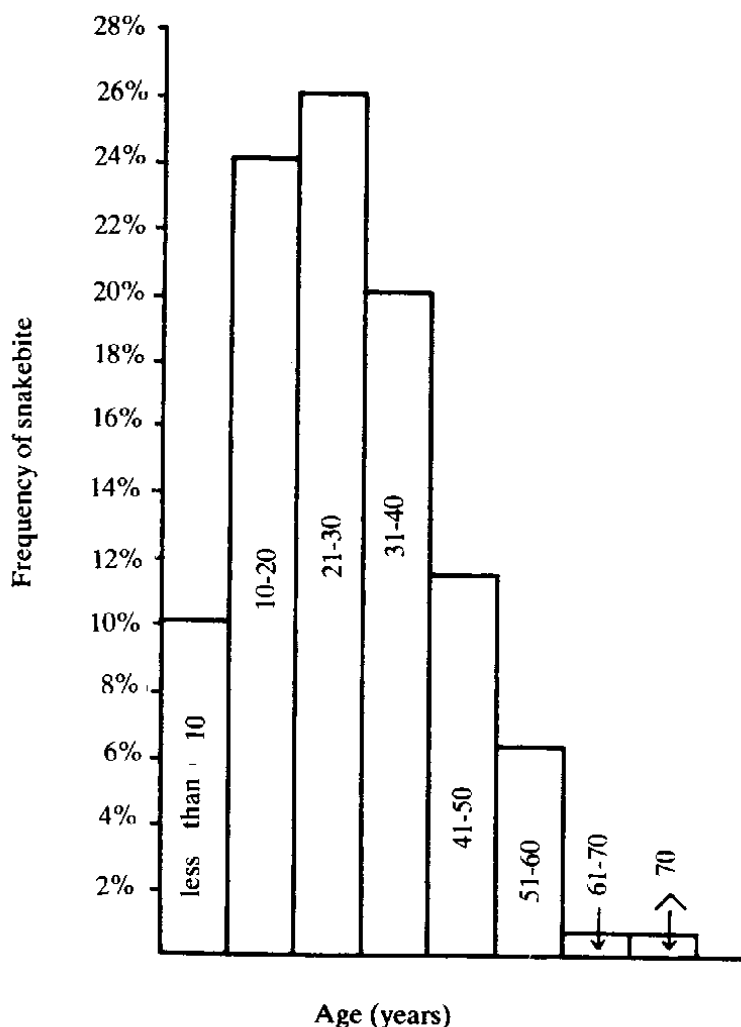


Fig. 4. Distribution of snake bites according to age.

The snakes brought to hospitals by patients were identified as *Cerastes cerastes*, *Echis coloratus* and *Atractaspis microlepidota engaddensis*. In most of the cases, proper description of the inflicting snakes was helpful in identifying the species.

Discussion

Bites by venomous animals is a medical problem in some countries. According to the estimation of the World Health Organization, there is an average of 1.7 million snakebites that occur annually in the world. The present study shows that there is a number of snake bite cases occurring annually in Riyadh city with a mortality rate of 2.3%. The mortality for snake bites has been reported as 8.5% in Philippines, 5.1% in Taiwan, 2% in South Africa, 0.33% in Malaysia, 1.3% in Thailand and 5.6% in Palestine [3; 7; 16, pp. 467-476]. The mortality rate due to scorpion stings found in the present study was 0.17%. Neale found no death cases among 205 stung patients for

the five-year period (1983 through 1987) in Eastern Riyadh [14] while Brennan *et al.* reported two death cases among 86 stung patients in Al-Baha in the southwest region of the Kingdom of Saudi Arabia [17]. The mortality rate due to scorpion stings was reported in some countries to be as follows: Tunisia (0.35%), Mexico (1.71%), Algeria (1.9%) [5; 6; 8]. The mortality rate among 1573 study cases treated by Arizona physicians was 4.1% while the rate was 19.9% of the admitted cases to the Negev hospital in Palestine during 1960 through 1968 [4; 18].

The current study revealed that scorpion stings were frequent in the summer months May-September with the maximum frequency in June. The periods with predominant cases of scorpion stings were reported in different places as follows: Mexico (April-July), Tunisia (July-September) with maximum frequency of cases during August (Tunisia) and December (Brazil) [6; 8]. These differences could have been due to variation in environmental conditions especially rainy or dry summer times together with the habits of these animals as being ectotherm. The difference in the social and recreational habits of the local people in each country may be another factor.

This study shows that 2/3 of the victims of scorpion stings and 4/5 of snakebites are males. Our results are in agreement with those of Neale [14] while Goyffon *et al.* reported that males and females were equally affected in Tunisia [8]. This difference may reflect the fact that women in Saudi Arabia, in contrary to men, spent most of their time indoors with their families.

Most scorpion stings and snakebites were among victims below 30 years of age with the bites occurring mainly in the right arm especially in the index finger. This may be explained on the basis that most stings and bites occurred during work. The similar incidence of scorpion stings as compared to snake bites among children might indicate that house gardens in Riyadh (where children play) are good habitats for scorpions.

Although few scorpion stings were reported in the winter months (December through February), no snakebites were reported in the same period. This may be due to the fact that snakes hibernate and become totally inactive in the winter months while scorpions do not hibernate but become less active and can sting during the same season.

The present study indentified *Cerastes cerastes*, *Echis coloratus* and *Atractaspis microlepidota* as the cause of the snakebite. Fatal cases of snakebite due to *Echis carinatus* and a bite by Burton's carpet viper, *E. coloratus* were recorded [12; 13]. Death rates due to snakebite in Saudi Arabia have been less in the late decades than before despite a four to five-fold increase in the population. This may be due to the excellent medical facilities that developed in the recent years especially in terms of

intensive care units. Antivenins for the dangerous local species of snakes and scorpions are either lacking or of low efficacy in Saudi Arabia. Treatment of bite and sting cases consists of symptomatic treatment and administration of non-specific polyvalent antivenins. This would call for an effort to produce potent antivenins against snakebites and scorpion stings by the local species. Further investigation is needed to recover the frequency and incidence of scorpion stings and snakebites in all districts of Saudi Arabia.

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دراسة ميدانية للدغات العقارب وعضات الثعابين في مدينة الرياض

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(سُلّم في ١ محرم ١٤١٤هـ، وقُبِل للنشر في ١٦ جمادي الثانية ١٤١٤هـ)

ملخص البحث. تم في هذه الدراسة رصد ٥٨٠ حالة من لدغات العقارب و ١٣١ حالة من عضات الثعابين في مستشفيات مدينة الرياض خلال الفترة ١٩٨٦-١٩٨٨م وكان معدّل الوفيات ١٧,٠% و ٣,٢% على التوالي.

كانت أغلبية حالات لدغ العقارب في الفترة من حزيران إلى أيلول من كل عام. بينما كانت أعلى نسبة في حزيران وأقلها في كانون الثاني أما بالنسبة لعضات الثعابين فكان أعلى معدّل لها في آب بينما سُجّل عدد قليل من هذه العضات خلال الفترة من تشرين الثاني وحتى آذار بينما لم تسجل حالات منها خلال الفترة من كانون الأول حتى شباط.

لقد كانت حالات لدغ العقارب بين الذكور والإناث الملدوغين بنسبة ٢ : ١ بينما كانت هذه النسبة لحالات عض الثعابين ٤ : ١ وأكثر حالات اللدغ بين ضحايا تراوحت أعمارهم ما بين ٢١-٣٠ سنة. دلت نتائج هذه الدراسة على أن أكثر أنواع العقارب المسئولة عن حالات اللدغ في منطقة مدينة الرياض هي عقرب فلسطين الصفرء *Leiurus quinquestratus* والعقرب السوداء *Androctonus crassicauda* والعقرب *Apistobuthus pterygocercus* بينما كانت معظم حالات عض الثعابين من قبل الأنواع التالية: الأفعى المقرنة *Cerastes cerastes* وأفعى السجاد الشرقي *Echis coloratus* والثعبان الأسود *Atractaspis microlepidota engaddensis*.

تمّ في هذه الدراسة تحديد أجزاء الجسم التي كانت أكثر عرضة للدغات العقارب وعضات الثعابين حيث دلت النتائج على أن اللدغات في الأيدي كانت أكثر منها في الأرجل وقد فاقت اللدغات في اليد اليمنى عنها في اليد اليسرى بينما زادت نسبة اللدغ في القدم اليسرى عنها في القدم اليمنى. دلت النتائج

أيضاً على أنه للإبهام النصيب الأكبر من لدغات العقارب بينما كانت عضات الثعابين للإصبع الأوسط أكثر منها لأصابع اليد الأخرى.
قارنت الدراسة معدلات حالات لدغ العقارب وعضات الثعابين التي أبرزتها هذه الدراسة مع نتائج دراسات أخرى في مناطق مختلفة من العالم.