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Abstract

Background: Scorpionism (scorpion sting envenoming) is an endemic public health concern in many Arab Middle Eastern countries. However, our knowledge of the epidemiology of scorpion stings in the West Bank is limited.

Aim: To investigate the epidemiology of scorpion stings in 4 districts of the West Bank over a specified period.

Methods: We obtained scorpion sting records from the main hospitals in 4 districts of the West Bank for 2012 and 2014–2020. A total of 2175 cases were analyzed retrospectively using SPSS version 17.

Results: The average age and standard deviation (±SD) for both sexes was 24.7±17.5 years (22.7±16.5 and 27.1±18.4 years for males and females, respectively). The median age was 20 years and 47.2% were children under 18 years. Most cases were reported during the summer months, between June and October, with a peak in July–August. By anatomic site, the right hand was the most commonly stung in both sexes, followed by the right foot. The chest, buttocks and scrotum were the least affected body parts. Clinical data were available for 405 cases, in which pain, vomiting and sweating were the most common symptoms. The overall incidence of stings was 26.32 per 100 000 inhabitants per year over the study period of 8 years

(59.21–171.67, 95% CI).

Conclusion: Scorpion stings are commonly encountered by adults and children in the West Bank. There is a need for awareness among the West Bank populations on how to avoid being stung, to train medical staff to better manage sting cases, and to evaluate the antivenom currently being used by physicians for scorpion stings.

Keywords: scorpion, scorpionism, sting, venom, antivenom, Palestine, West Bank, Middle East

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Introduction

Scorpionism (scorpion sting envenoming) is an endemic public health concern in many Arab Middle Eastern countries (1). Our knowledge of scorpion stings in the State of Palestine is very limited.

Wahbeh (2) reported scorpion stings among children in Ramallah area with a total of 5 fatalities. Dudin et al. (3) described the clinical symptoms associated with scorpion stings among children in the Jerusalem area. Sawalha et al. (4) recorded 154 scorpion stings from Nablus Governorate without clinical or epidemiological data. The annual report for 2020 issued by the Palestine Ministry of Health reported 500 scorpion stings with 34.2% of the cases from Jericho and the Jordan Valley (5). Adawi et al. (6) studied the epidemiology of scorpion stings in the Salfit District in 2014–2015.

At least 10 species of scorpion belonging to 3 families were reported from the West Bank. The family Buthidae is represented by 7 species (Androctonus crassicauda, Androctonus bicolor, Birulatus israelensis, Compsobuthus werneri, Hottentotta judaicus, Leiurus hebraeus and Orthochirus scrobiculosus); family Diplocentridae by 1 species (Nebo hierichonticus); and family Scorpionidae by 2 species (Scorpio fuscus and Scorpio palmatus) (1,7). Hottentotta judaicus is a strictly Mediterranean species known in wooded areas, while A. crassicauda has been found in arid areas, especially in the Jordan Valley. Leiurus hebraeus is confined to arid Mediterranean areas and to parts of the Jordan Valley (7). Representative taxa are shown in Figure 1
.

This study aimed to investigate the epidemiology of scorpion stings encountered in 4 districts in the State of Palestine in 2012 and 2014–2020 and to evaluate the public health significance of a neglected cause of distress, especially among children.

Methods

IRB approval was granted by the Office of the Dean of Research, responsible for Research Ethics Committee (Institutional Review Board) at Bethlehem University. Records were obtained and retrospectively analysed for 2012 and 2014–2020 from the main hospitals in 4 districts of the State of Palestine: Bethlehem: Al-Hussein Governmental Hospital; Hebron: Princess Alia Governmental Hospital; Jericho: Jericho Governmental Hospital; and Salfit: Salfit Governmental Hospital (see Table 1).

No data were available for 2013 because the data gathering system was not functioning in the ministry’s hospitals and clinics in that year. Gender, age and date of admission were available for all patients, but the site of the sting and clinical symptoms were recorded in only 723 and 405 cases, respectively. Hospitals included in this study serve all major towns, villages and refugee camps within the vicinity of each district.

Data were analysed using SPSS version 17 (SPSS, Chicago). A chi-squared test was used for comparison of qualitative data, and a t-test was used for qualitative analysis.

Results

A total of 2175 cases of scorpion stings were reported from 4 districts in the State of Palestine in 2012 and 2014–2020. The highest number of cases was reported from Hebron District, and the lowest from Salfit District (see Table 1). Male to female ratio was 1.26:1 and was statistically significant (P 0.004, 0.54–0.58, 95% CI). The median age was 20 years and the average age and standard deviation (±SD) for both sexes was 24.7±17.5 years (22.7±16.5 and 27.1±18.4 years for males and females, respectively).

Most stings occurred among people aged 1–20 years (P 0.001, 0.91–0.93, 95% CI), constituting 51.3% of total cases; 47.2% of all studied cases were under the age of 18 (i.e. children, as defined by WHO); and 19.1% occurred among people 40 years or older (see Figure 2). Among males, most stings occurred among people aged 1–20 (P 0.001, 0.07–0.03, 95% CI). Among those aged 20 years and older, there was no statistical difference between males and females.

Most of the cases were reported during the summer months (32.6%), between June and October, with a peak in July–August (P 0.01, 0.17–0.20, 95% CI), while the lowest numbers of recorded cases were in January and December, 1.2% and 1.8%, respectively (see Figure 3). Seasonal differences affected males and females similarly (P 0.135, 0.12–0.15, 95% CI).

Table 2 and Figure 4 show the frequency of stings according to the affected body part in 723 cases. By site, the right hand was stung most commonly among both sexes (P 0.001, 0.43–0.54, 95% CI) followed by the right foot, whereas the chest, buttocks and scrotum were the least affected sites.

The duration of hospital stay varied from less than 6 hours to 3 days. There were no fatalities. Administration of scorpion antivenom (1–7 ampoules) was documented in 344 cases. The only available antivenom in hospitals was Scorpion Venom Antiserum IHS (VINS BIO Products, India).

Clinical data were obtained for 405 cases from all hospitals included in the study (see Table 3). Unfortunately, since neither the species nor any other distinguishing feature, such as colour or size, of the scorpion involved was mentioned, symptoms or severity of envenoming could not be attributed to a particular species. Pain, vomiting and sweating were the most commonly observed symptoms.

Table 4 shows the incidence per 100 000 inhabitants by governorate. Jericho Governorate had the highest incidence of scorpion sting encounters, followed by Bethlehem Governorate. The lowest incidence was reported from Salfit Governorate and highest from Hebron area. The overall incidence was 26.32 per 100 000 inhabitants over the study period of 8 years (P 0.0067, 59.21–171.67, 95% CI).

Discussion

Our data reveal a high incidence of scorpion stings in the districts served by the 4 participating hospitals, with an average of 26.32 cases per 100 000 inhabitants per year over an 8-year period (see Table 4). However, incidence varied considerably. Jericho had an incidence 10 times higher than districts like Hebron and Salfit. The reason is probably that Jericho District is situated in the Jordan Valley below sea level, with a warmer, semi-tropical climate, and is predominantly rural where most people are engaged in agriculture. This biogeographical zone harbours two highly venomous species: A. crassicauda and L. hebraeus but fewer less-dangerous Mediterranean wooded-area species like Scorpio (7). On the other hand, Hebron District has the highest population (696 599) and largest area (997 km2) in the West Bank.

Scorpion stings appear to be a common problem in the State of Palestine. The terrain of these districts provides a suitable habitat for scorpions, and many people are engaged in agriculture in this rural landscape and therefore are exposed to scorpion stings. The seasonal pattern for scorpion stings is similar to that reported from Salfit District (6) and neighbouring countries such as Saudi Arabia (8) and Jordan (9). Males were more likely to be stung than females (6,8,10). This is due to their greater exposure while working in the fields as adults or playing in open areas as children.

Stings on the hands (36.7%) were the most common. This is probably the result of inadvertent handling of scorpions while picking vegetables or other objects. In Saudi Arabia, the lower extremities and especially the feet (10, 11), fingers and hands (12), and feet (45%) and hands (24%) (11) were variously reported to be most affected. In Jordan, fingers and toes were stung most often (10).

Associated clinical symptoms are similar to those described by several authors in Jordan, the State of Palestine and Saudi Arabia (6,10,11,13,15). Dudin et al. (3) gave a comprehensive account of clinical symptoms associated with scorpion stings, West Bank among children in the Jerusalem area.

Although substantial numbers of scorpion stings were recorded during the study, the symptoms recorded were mostly consistent with a Class II classification: minor manifestations (non-life-threatening), according to Khattabi et al. (14), namely, vomiting, sweating, nausea, priapism, salivation and tachycardia. Only 8 patients had dyspnoea, suggesting a Class III classification: severe manifestations (life-threatening), and no fatalities were reported. Dudin et al. (3) reported 2 fatal cases among children in the Jerusalem area who had not received antivenom intravenously.

In the State of Palestine, the only antivenom available was Scorpion Venom Antiserum IHS manufactured in India by VINS BIO Products. The antivenom is specific for L. quinquestriatus and A. amoreuxi, neither of which species occurs in the Palestinian Territories. Paraspecificity is claimed by the manufacturer against Androctonus crassicauda, A. aeneas, A. australis, Scorpio marus [sic] palmatus and Buthus occitanus. In our study, 344 (15.8% of the total cases) patients, most of them children, received this antivenom, but there was no information about effectiveness or adverse events.

Although few severe cases and no fatalities were identified in this study, the most common management problem faced by medical staff was the lack of effective analgesia, especially for children. The official management recommendations for scorpion stings and their application by health personnel in the State of Palestine follow global recommendations, including using drugs like Prazosin in severe cases. However, there seems to be a lack of awareness among health providers about proper treatment, and ignorance of which species of scorpions are of medical importance. This can and should be addressed through training of medical staff. The drugs currently available should be reevaluated for local efficacy since other sources of specific antivenoms for the local species are available, for example in Saudi Arabia.

Conclusions

Scorpion stings are a problem faced frequently by medical staff in the State of Palestine, especially in areas like Jericho District. They affect both sexes and particularly children. Most of the cases were reported during the summer months (with a peak in July–August). The right hand was most commonly stung in both sexes. Management guidelines for scorpion sting cases, especially for child victims, and prospective protocols for data collection should be developed and published.

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Competing interests: None declared.

Épidémiologie des piqûres de scorpions en Cisjordanie

Résumé

Contexte : Le scorpionisme (envenimation par piqûre de scorpion) est un problème de santé publique endémique dans de nombreux pays arabes du Moyen-Orient. Toutefois, nos connaissances en matière d'épidémiologie des piqûres de scorpion en Cisjordanie sont limitées.

Objectif : Étudier l'épidémiologie des piqûres de scorpion dans quatre districts de Cisjordanie au cours d'une période spécifique.

Méthodes : Nous avons obtenu les dossiers relatifs aux piqûres de scorpion provenant des principaux hôpitaux de quatre districts de Cisjordanie pour l'année 2012 et pour les années comprises entre 2014 et 2020. Au total, 2175 cas ont été analysés rétrospectivement à l'aide du logiciel SPSS version 17.

Résultats : L'âge moyen et l'écart type (±ET) pour les deux sexes étaient de 24,7 ans (±17,5) (22,7 ans [±16,5] et 27,1 ans [±18,4] pour les hommes et les femmes, respectivement). L'âge médian était de 20 ans et 47,2 % des sujets étaient des enfants de moins de 18 ans. La plupart des cas ont été signalés pendant les mois d'été, entre juin et octobre, avec un pic au cours des mois de juillet et d'août. Pour les deux sexes, les sites anatomiques les plus souvent piqués étaient la main droite, suivie par le pied droit. La poitrine, les fesses et le scrotum étaient les parties du corps les moins touchées. Les données cliniques étaient disponibles pour 405 cas, pour lesquels les symptômes les plus courants étaient la douleur, les vomissements et la transpiration. L'incidence globale des piqûres était de 26,32 pour 100 000 habitants par an sur les huit années de l'étude (59,21-171,67 ; IC à 95 %).

Conclusion : Les piqûres de scorpion sont fréquentes chez les adultes et les enfants en Cisjordanie. Il est nécessaire de sensibiliser les populations locales sur la manière d'éviter les piqûres, de former le personnel médical à une meilleure prise en charge des cas et d'évaluer le sérum antivenimeux actuellement utilisé par les médecins pour les traiter.

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