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Case Report

Cases caused by spider bite in Tripoli, Libya

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Abstract:

Spiders Arachnida has a significant impact on the insect population due to their position as predators and their effect on the ecology. Although spiders contain venom glands, the majority of them do not bite humans or cause harm, with the exception of a few situations, and usually only when they are trapped, injured, or annoyed. Spider bites resulted in serious injuries. This recent study includes a review of verified instances of spider bites in two large dermatological facilities in Tripoli, Libya (Tripoli Central Hospital and Bair al-UstaMilad Hospital). Data from all patients with verified spider bites during the years 2014 and 2019 were gathered. The total cases were 251, with 152 female patients (60.6%) and 99 male patients (39.4%) in total. Age groups (20-29 years) are the most commonly affected by spider bites, followed by age groups (0-9 years). The affected patient's body portion was the lower part (thighs and legs) (n = 189, 75.3%), while one patient (0.4%) had a spider bite on the backside. Furthermore, this study depicts the geographical distribution of documented instances. The majority of patients (53%) were from Tripoli. However, the need for medical counsel and treatment compelled some patients from other places to go to the capital city. In general, western Tripoli has the lowest patient percentage incidence (5.5%). This research reveals that the incidence of spider bites is quite low in comparison to the Libyan population, which may be related to the country's very low registration of cases.

Keywords: spider bite, venom spiders, Loxoscelism, dermatology, Tripoli, Libya.

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Introduction:

Spiders belong to the class Arachnida and are similar to all arachnids with eight legs, no wings or antennae, and have only two body parts, the cephalothorax hard part, and an abdomen the soft part (Dharmaraj et al.,2017). Spiders have a huge impact on the insect population due to their role as predators (Koneri&Nangoy, 2017), they affect the ecosystem where they live, therefore spiders are considered one of the most abundant predators in many agricultural areas (Carter and Rypstra, 1995), and feeds on other arthropods which transmit diseases to human (Diaz, 2004).

Until August 2022, about 50260 species of spider were described (World Spider Catalog, 2022), and more than 5000 species were noticed in the Mediterranean area alone (Fusto et al., 2020). However, about 200 species of 20 genera of spiders globally can cause serious envenoming to humans (Diaz, 2004).Although most of spiders contain venom glands and secrete venom into their venom sacs, with the exception of a few, the majority of spiders do not bite people or cause injury (Nentwig et al., 2022). Spiders typically exhibit violent behaviour only when they are imprisoned, injured, or agitated, with the exception of one aggressive spider in Australia that attacks humans without provocation. (Rahmani et al., 2014). In fact, spider venom is a cocktail of highly potent components, (Nentwig, et al., 2022), including proteins, free acids, peptides, polyamines, glucose, bio amines, free amino acids, inorganic ions (Francielle et al., 2015; Arshah, 2021). Swelling and pain at the site of a spider bite are symptoms that may be developed and followed by; hypertension, pyrexia, necrosis, respiratory distress, kidney dysfunction, and death (Rahmani et al., 2014). However, Spider bites caused three significant syndromes latrodectism, loxoscelism, and funnel-web spider syndrome (Rahmani et al., 2014; Arshah, 2021), and the venom of the spiders are distinguished into two main types: neurotoxic (hit the nervous system), secreted by Latrodectus species and Atrax species, and necrotic (destroy the tissue) released by Loxosceles species (Braitberg& Segal 2009).

In Libya, some research was carried out to identify spiders in specific areas (Elmareme, 2016&Bourass et al., 2014); 35 families were identified, some of which included venom species and their clinical effects, such as Theridiidae (Latrodectusspp), (Steatodaspp),

and Sicaridae (Loxoscelesrufescens) (1). 2016 (Elmareme). There are few studies that focus on spider bites and their medical importance. In this study, we review the confirmed spider bite cases in two main dermatology hospitals in Tripoli, Libya.

Material and Methods:

Data were acquired from daily reported instances of suspected spider bites at Tripoli Central Hospital and Bair Al-UstaMilad dermatological hospital for the years of 2014 - 2019. All verified spider bite cases ranged in age, gender, and location. Data was acquired from patient files.

Data were statistically analyzed using the statistical package for the social sciences program (SPSS) version 20.0 software, and the map was created using ArcGIS software by Esri (http://www.esri.com).

Results:

The number of recorded patients in both Tripoli Central Hospital and Bair al-UstaMilad Hospital were (157) and (94) respectively, and the total number was (251). The majority of the patient were females (n= 152, 60.6%) while the male patient was (n = 99, 39.4%) figure (2).

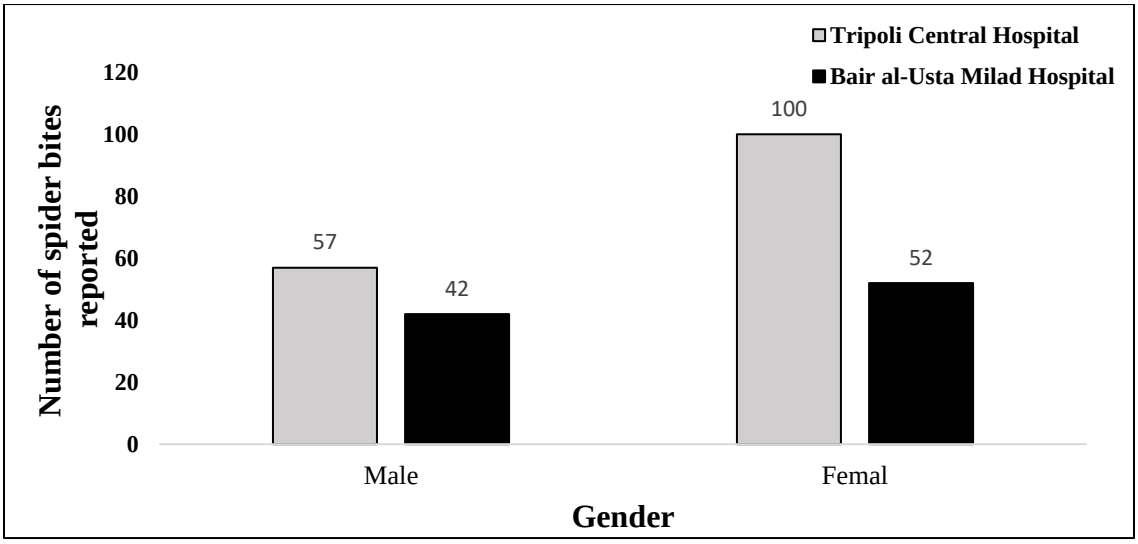

Figure 2: Gender demographics of patients with a spider bite.

Most recorded Patients were aged 20-29 years, with a smaller number of patients aged 0-9 years Figure (3).

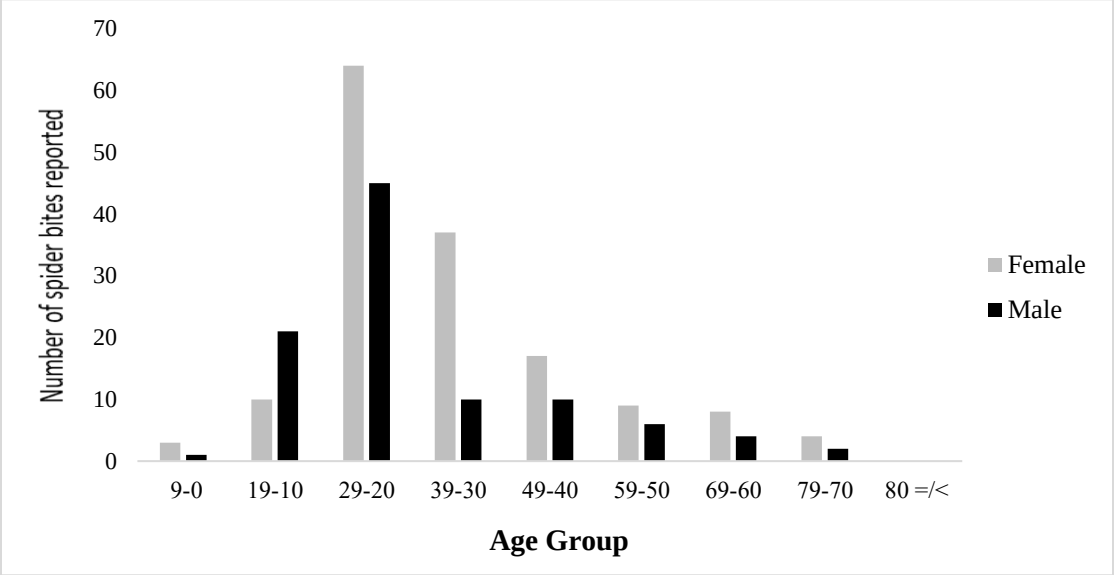

Figure 3: Age demographics of patients with a spider bite

The site of a spider bite widely differed between patients. Themost body parts affected by spider bite were the lower parts (thighs and legs) (n = 189, 75.3%), and one patient has a spider bite in the backside (0.4%), Figure (4).

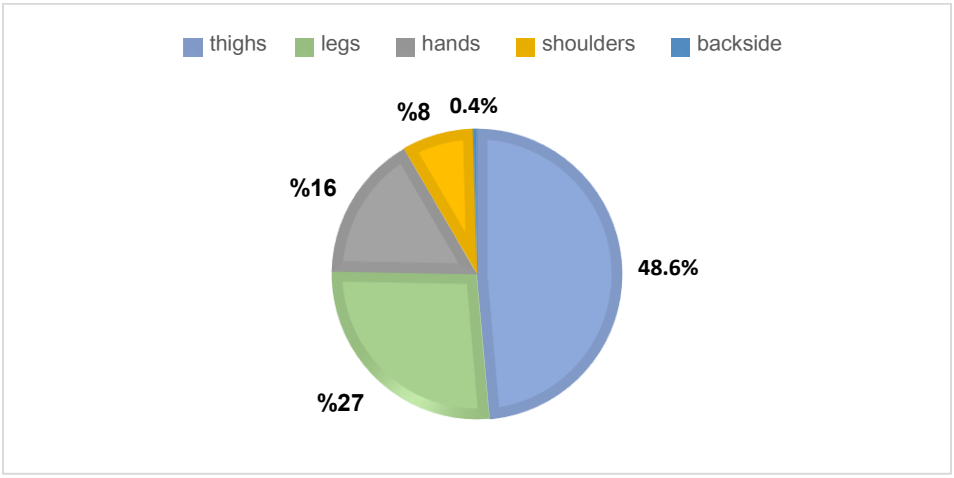

Figure 4: Spider bite site on patient's body

The number of patients varied by area, with Tripoli region having the highest representation with 132 individuals (53%), accounting for over half of all cases. The regions east of Tripoli and south of Tripoli had similar results, with 55 instances (22%) and 51 cases (20%), respectively. The region of western Tripoli had the fewest patients (13 cases, or 5%). (Fig. 5).

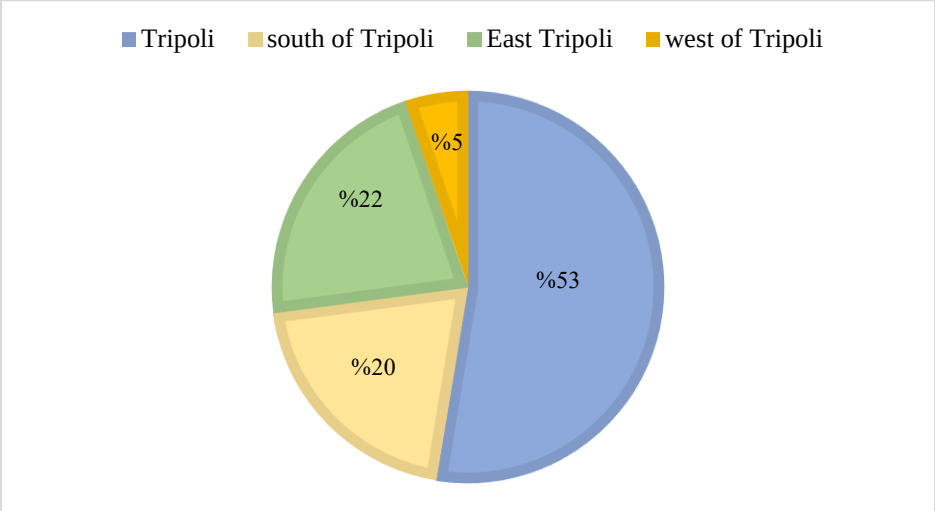

Figure 5: The parentage of spider bites by place of residence.

According to statistics gathered from the Dermatology Departments of Tripoli Central Hospital and Bir al-UstaMilad Hospital, the proportion of a total number of spider bite patients hospitalized is 5.5% of the total number of patients (4552) accommodated in the two hospitals' dermatological departments (Table 7).

Table 1.The percentage of hospitalized patients with spider bites among total patient numbers every year.

year	The number of patients accommodated in the dermatology department	The number of patients with spider bites	(%)percentage
2014	990	17	**% 2**
2015	860	42	**% 5**
2016	602	34	**% 6**
2017	880	77	**% 9**
2018	800	55	**% 7**
2019	420	26	**% 6**
	4552	251	**%5.5**

Discussion:

Spider bites are considered one of the most significant toxins-related problems (Hawdon & Winkel, 1998). All spiders are predators with venom glands, and spiders use teeth-like hooks to inject poison into their victims (Gopalakrishnakone1990).Spiders venomous have varying medicinal significance depending on their genus and the victim. Many spiders' venoms do not instantly kill humans (Nentwig& Kuhn-Nentwig2013).The majority of spiders do not bite humans and except for a few cases, they are not harmful to human beings or other mammals (Diaz & Leblanc2007).Spider bites are common, andthe majority of species cause minimal manifestations. (Braitberg& Segal2009), However, children, the elderly, as well as and the sick, especially those who have immune system problems, are more susceptible to the effects of spider venom(James et al. 2006).

Spiders typically inject two different forms of venom: neuro and necrotic. Neuro venom works to disable neuromuscular activity, disrupting important processes like breathing and circulation that depend on the movement of muscles (George, 2009). Necrotic venom operates on tissue analysis (Vetter, 2000). The majority of spider venom is a type of neurotoxin (Langenegger et al 2019).However, necrotic venom makes up a significant portion of the venom in some spider species that are thought to be deadly to humans (Escoubas& Rash, 2004). The Sicariidae family includes the majority of spiders that generate necrotic venom; these spiders create venom that contains sphingomyelinase D, which damages the skin and spider bite tissues and causes necrosis (Binford et al, 2009).Necrotic venom is not unpleasant after a bite; thus, it may not induce symptoms that require a trip to the doctor (Lüddecke et al 2022). However, if the bite contained venom from dangerous species, it could result in patient death in some cases due to a reaction of the human body caused by those species' venom components, such as kidney failure in patients with weakened immunity (Shames et al., 2014), particularly if the bitten person had a disease that had already compromised their immune system (Lüddecke et al 2022).The majority of the patients, 60.6% of whom were female, had comparable findings to those of the studies (Elmareme, 2016., Elmareme, 2016and Arshah., 2021); This conclusion may be explained by the fact that females in Libyan society are initially in charge of housekeeping, which puts them in conflict with spiders. It has been demonstrated that certain species of the Theridiidae and Sicariidae

families may necrotisingarachnidism (Duggal et al 2022). They are frequently discovered indoors in dark areas behind pictures or boxes, beneath windowsills or outdoor furniture, and in clothes or shoes (Elmareme, 2016; Coetzee, et al.,2017).The findings of this study are consistent with those of a recent study done in Turkey, which concluded that the majority of patients are under the age of 30 (Cesaretl&Ozkan, 2011). Comparatively, the findings of a different study carried out in Libya revealed that people between the ages of ≤ 20 and 40were more commonly affected by spider cases (Elmareme, 2016).This is most likely due to the fact that this age group is more active than others. The location of a spider bite varies greatly from patient to patient. The lower areas of the patient's body were the most afflicted by spider bites (thighs and legs). Only one known patient has had a spider bite on the backside. These areas of the body may be more vulnerable to spider bites than other areas covered by clothes, as in the instance of a spider bite in the posterior. These findings are comparable to those of (Sulaj et al., 2015) and (Elmareme, 2016). which demonstrates how the majority of spider bites occur in the distal part of the extremities. Patients usually recover within 24 hours of treatment or 3 to 5 days without supportive care, according to Timms and Gibbons' 1986 studies and Edwards' 2002 study. Although there were no significant impacts on pregnancy, black widow spider bites have the potential to cause considerable maternal morbidity and death. If adequate therapy is directed toward the mother, acute hazards to the fetus appear to be minor in the near term. For severe systemic symptoms, therapeutic approaches such as antivenom should be investigated (Ramirez-Cruz et al., 2022).The high population density in the city may be the cause of the disparity in patient numbers between the areas, where Tripoli has the greatest percentage (53%), which is equal to over half of the cases.While there were relatively few cases of spider bites in Tripoli's east and south (22% and 20%, respectively), there were the fewest cases in the western cities (5%) and this might be attributed to the lack of registration in the affected area.Despite the fact that the hospitals under study are in Tripoli's capital city, some of the study's patients came from other cities, which suggests that patients from other cities may receive less comprehensive medical advice and treatment than those in Tripoli, in addition to insufficient medical staff and a lack of diagnosis expertise.

There is no epidemiological research on spider bites in Libya that can be used to determine how often they are. This study concludes that, unless

the patient's recording is really poor, the occurrence of spider bites is quite low relative to the population of Libya. Therefore, in order to better comprehend the status of patients who have been bitten by spiders across Libya, epidemiological and clinical research should be carried out. The best When a patient is suspected of having been bitten by a spider, it is crucial to collect the suspected insect or spider—or to gather its body parts after it has been killed—and bring it to the hospital. From there, it may be sent to be identified by a medical entomologist for better investigations.

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Conflict of interest

The authors have declared no conflict of interest.

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