

HOSPITALIZATION DUE TO CONTACT WITH SCORPIONS IN NORTHEAST BRAZIL

Vinicyus Eduardo Melo Amorim

Faculdade Pernambucana de Saúde. Recife,
Pernambuco, Brazil

ORCID: 0000-0003-4541- 690X

<http://lattes.cnpq.br/3530467921354204>

Calline Aguiar Cavalcanti

Faculdade Tiradentes. Jaboatão dos
Guararapes, Pernambuco, Brazil

ORCID: 0009-0007-6635-9410

<http://lattes.cnpq.br/8696624172194632>

Luiz Henrique Fernandes da Silva

Faculdade Tiradentes. Jaboatão dos
Guararapes, Pernambuco, Brazil

ORCID: 0009-0000-1803-2500

<https://lattes.cnpq.br/4420595426182426>

Maria Suziely Pereira

Faculdade Tiradentes. Jaboatão dos
Guararapes, Pernambuco, Brazil

ORCID: 0009-0003-0388-9992

<http://lattes.cnpq.br/3937321353464513>

Consuelo Maria Braga Pierre Branco

Faculdade Pernambucana de Saúde. Recife,
Pernambuco, Brazil

ORCID: 0000-0002-9258-3922

<http://lattes.cnpq.br/9121551496638338>

Lorena Carla de Lima Borba

Faculdade Tiradentes. Jaboatão dos
Guararapes, Pernambuco, Brazil

ORCID: 0009-0002-0655-3725

<http://lattes.cnpq.br/1255266317153241>

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Enzo Lima Maia Leite

Faculdade Pernambucana de Saúde. Recife,
Pernambuco, Brazil
ORCID: 0000-0003-4838-2485
<http://lattes.cnpq.br/4237264490317752>

Mônica Moura Ramos

Faculdade Pernambucana de Saúde. Recife,
Pernambuco, Brazil
ORCID: 0000-0003-4464-2294
<http://lattes.cnpq.br/1441227451681644>

Victor Rafael Barbosa Pereira

Universidade Católica de Pernambuco.
Recife, Pernambuco, Brazil
ORCID: 0000-0003-1814-8217
<http://lattes.cnpq.br/6324525515200077>

Mariana Cantarelli Freire

Centro Universitário Maurício de Nassau.
Recife, Pernambuco, Brazil
ORCID: 0000-0002-2309-0390
<http://lattes.cnpq.br/5236254714637795>

Luana Rabelo Moita

Faculdade Tiradentes. Jaboatão dos
Guararapes, Pernambuco, Brazil
ORCID: 0009-0002-7742-2474
<https://lattes.cnpq.br/3209396069458228>

Valéria Gardeney de Lacerda Lopes

Faculdade Pernambucana de Saúde. Recife,
Pernambuco, Brazil
ORCID: 0009-0009-1226-9641
<http://lattes.cnpq.br/6946122949044312>

Abstract: Introduction Scorpions have existed for more than 450 million years and although these animals inhabit humid forests and also deserts, they can live in cities and are increasingly close to men. Brazil is strongly inserted in the midst of these outbreaks of scorpionism and the Northeast represents a large percentage of these cases in the country. **Objective:** To describe the epidemiological profile of hospitalizations and notifications due to contact with scorpions in Northeast Brazil, as well as to understand the measures implemented to combat this situation. **Methodology:** This is a descriptive observational study, whose data were collected by the DataSUS platform. The collection started from the Hospital Information System (SIH), through hospital morbidity data through notifications and hospitalizations between January 2008 and December 2022, using the category of diseases: Contact with scorpion CID 10 - X22. **Results and discussion:** More than half a million people have been stung by scorpions in the Northeast of the country alone since 2007, and about 70% of reported cases occurred in just three of the nine states. Several studies in Brazil and in other countries have reported seasonality in the occurrence of scorpion stings. Furthermore, there was no statistically significant difference in the prevalence of bites between men and women. **Conclusion:** Knowledge about the treatment of venomous animal bites has evolved a lot in recent decades. However, every year people die in Brazil or are hospitalized due to this condition. Thus, prevention and combat measures must be implemented in a targeted manner, especially in high-risk regions, in order to mitigate cases of hospitalizations and deaths in the region.

INTRODUÇÃO

Scorpions have been around for over 450 million years and, due to evolution and natural selection, are extremely well adapted to the

wild. These arthropods are venomous animals that produce venom and, like all living beings, help in the ecological balance by serving both as predator and prey. According to the Zoonosis Control of the Municipal Health Secretariat of the City of São Paulo, there are around 2,200 species of scorpions in the world, however, only something around 30 of them are really worrying cause of serious and lethal damage to human beings. In Brazil, there are about 185 species of scorpions and about four are considered dangerous.¹ The main species existing in Brazil are: *Tityus serrulatus*, *Tityus stigmurus* e *Tityus bahiensis*.²

Accidents by venomous animals are considered by the World Health Organization (W.H.O.) as neglected tropical diseases.³ The *Tityus serrulatus* – yellow scorpion with a darker trunk –, for example, it is one of the most dangerous species in Brazil, with an average of four to five years of life in the wild. Another very dangerous species is the *Tityus stigmurus*: also yellow, this scorpion has a black stripe on the back and a dark triangle near the eyes. Envenomation by scorpion stings can range from respiratory syndrome to cardiogenic shock and multiple organ failure⁴

As much as these animals inhabit humid forests and also deserts, they can live in cities and are increasingly close to men, and can usually be found in cemeteries, vacant lots, amid construction materials and debris – especially in summer, when the number of accident cases increases.¹

Brazil is strongly inserted in the midst of these outbreaks of scorpionism. Since 1915, cases of scorpion stings have been reported in the country.⁵ And, despite this, thousands of cases and dozens of deaths are reported annually. The latest data available on the Ministry of Health platform showed that cases of scorpionism have increased significantly in recent years, rising from 52,509 cases in 2010 to 157,029 cases in 2020.

The Northeast was responsible for about 40% of all cases. In addition, within this region, the epidemiological distribution of cases is not homogeneous, with small states responsible for a greater number of occurrences when compared to others with larger territory and population.⁶

Thus, the objective of this work is to describe the epidemiological profile of hospitalizations and notifications due to contact with scorpions in Northeast Brazil, as well as to understand the measures implemented to combat this situation.

METHODOLOGY

This is a quantitative descriptive ecological observational study, whose objective is to understand the epidemiological distribution of admissions and notifications due to contact with scorpions CID 10 – X22 in Brazil. Data were collected by the DataSUS platform, through information obtained by the Notifiable Diseases Information System (SINAN). The collection started from the Hospital Information System (SIH), through hospital morbidity data by place of hospitalization between January 2008 and December 2022.

The study population is composed of patients who were admitted to any hospital in the northeastern territory, of both sexes and of all age groups. The information was characterized by Northeastern states according to hospitalizations per year of care. The indicators used were: gender, age, mortality rates, number of hospitalizations, number of notifications and average hospitalization rate. The study was carried out in line with the principles of Resolution 466/2012 of the National Health Council of Brazil.

Considering that 2020 and 2021 were unusual years due to the Coronavirus Disease 2019 (COVID-19) pandemic, we assumed it would be informative to access the preliminary

numbers of cases and deaths reported this year. Although SINAN is a very important resource for studying the epidemiology of scorpionism and other medical conditions in Brazil, inconsistencies in the available database on envenoming numbers were found.^{7,8} In addition, there is evident underreporting of cases of scorpionism. Even in urban centers, it is estimated that up to 10% of scorpion accidents may not be reported to the official surveillance system.⁹ In fact, Tanajura and collaborators detected that 4.35% of the cases of scorpionism that received medical attention in the state of Bahia were not notified to the national system.¹⁰ Therefore, the data presented in the results below must be critically analyzed, considering these restrictions.

RESULTS AND DISCUSSION

Between 2007 and 2022, 633,291 cases of scorpion stings were reported in Northeast Brazil **Table 1.0**. The most affected states were Bahia (28.7%), Pernambuco (23.2%) and Alagoas (16.5%). Only Bahia and Pernambuco were responsible for more than half of the cases. In Bahia, between 2010 and 2017, men were the most injured in rural areas, but, as in other studies, children had the most serious conditions. Anti-scorpion serum was administered in more than 20% of cases.¹¹

When analyzing the prevalence of reported cases according to age group, the most affected population is between 20 and 59 years old (approximately 56%), especially between 20 and 39 years old (approximately 31%). The prevalence of cases also differs by gender, affecting approximately 358,000 women from 2007 to 2021 and approximately 274,000 men. Fortunately, the mortality rate is low, affecting less than 0.1% of cases.

Furtado et al. carried out a survey of data in Ceará from 2007 to 2013 in which women between 20 and 29 years old were the most

victims, with most cases occurring in urban areas.¹² The cases were considered mild and the patients progressed to cure. In Sergipe, from 2004 to 2014, most accidents were caused by scorpions, also happening in urban areas, with the state capital being the most affected.¹³

Several studies in Brazil and in other countries have reported seasonality in the occurrence of scorpion stings.¹⁴⁻¹⁸ Accidents by scorpions show a constant variation, tending to be more frequent in the hottest and rainy seasons. This behavior of accentuated seasonal variation is well observed in the South, Midwest and Southeast regions, but is less pronounced in the Northeast and North regions, which may reflect the less evident seasons in these areas.

Analyzing the number of hospitalizations, cases considered more serious, 6,231 cases were notified **Table 2.0**. Bahia was responsible for 66% of all occurrences. The second region was Piauí with 20.6% of hospitalizations, despite being the 7th in number of notifications in the Northeast. There are some reports of poisoning by the sting of the species *Rhopalurus agamemnon* in the city of Teresina. It is characterized by its large size, reaching a total length of 110mm. There are records of its existence in Piracuruca, Castelo do Piauí, União, Teresina, José de Freitas and São Raimundo Nonato, in the State of Piauí.¹⁹

Prevalence of bites by sex was not very different between sexes; 3,513 men and 3,048 women. The ratio remained similar across states with the exception of Piauí, which had a 2:1 male/female ratio among the 1,383 patients, and the states of Pernambuco, Alagoas and Sergipe, which had 14, 4 and 6 cases hospitalization, respectively, not being statistically significant.

Mortality rates were scarce in the SINAN search in relation to hospitalizations between 2007 and 2021, being available only from Piauí and Bahia with a mortality rate of 1.37%

and 0.4%, respectively. Analyzing the deaths due to the reported injury (scorpion sting) in the same period, 620 deaths were reported. The region with the highest index was Bahia with 328 cases, followed by Pernambuco (84), Maranhão (46), Rio Grande do Norte (40), Piauí (35), Paraíba (32), Ceará (28), Alagoas (21) and Sergipe (6).

The preventive measures recommended by the Brazilian Ministry of Health involve keeping homes and surroundings clean, avoiding the accumulation of waste; prevent scorpions from entering houses, sealing doors, windows, drains and walls; inspect shoes and clothing before dressing; eliminating potential scorpion prey such as cockroaches; and featuring natural predators of scorpions such as nocturnal birds, lizards and frogs. As scorpions cannot climb smooth surfaces, using materials with this characteristic to cover walls and furniture can also help to avoid accidents.²⁰

CONCLUSION

Knowledge about the treatment of venomous animal bites has evolved a lot in recent decades. However, every year people die in Brazil or are hospitalized due to this condition. More than half a million people have been stung by scorpions in the Northeast of the country alone since 2007, and about 70% of reported cases occurred in just three of the nine states. Thus, prevention and combat measures must be implemented in a targeted manner, especially in high-risk regions, in order to mitigate cases of hospitalizations and deaths in the region.

CONFLICT OF INTERESTS

There is not any.

FINANCING

The own researchers.

Region/State of notification	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
TOTAL	19.490	19.056	23.519	25.084	30.212	30.002	38.519	42.858	38.303	39.585	56.764	69.716	73.746	63.450	62.987	633.291
Northeast Region	19.490	19.056	23.519	25.084	30.212	30.002	38.519	42.858	38.303	39.585	56.764	69.716	73.746	63.450	62.987	633.291
Maranhão	140	136	232	262	410	339	722	674	635	823	1.395	1.849	2.043	1.871	2.183	13.714
Piauí	274	386	583	516	692	857	1.860	1.614	1.385	1.836	2.473	2.852	2.733	2.300	2.819	23.180
Ceará	674	463	720	1.099	2.271	2.358	3.398	3.296	2.863	3.896	4.252	5.833	7.698	5.991	5.080	49.892
Rio Grande do Norte	1.261	1.421	2.188	2.324	2.830	3.010	3.301	3.727	3.866	3.766	4.337	4.605	5.588	4.257	3.503	49.984
Paraíba	1.065	1.151	1.113	1.477	2.105	2.454	2.869	3.460	3.046	1.358	4.355	4.908	6.210	5.782	5.896	47.249
Pernambuco	6.977	5.465	5.172	5.091	5.402	5.780	7.993	9.412	8.468	10.200	15.143	17.776	16.536	12.877	14.687	146.979
Alagoas	2.995	3.508	3.772	4.759	5.391	5.461	6.820	7.920	6.845	7.256	9.033	9.640	10.314	9.871	10.769	104.354
Sergipe	255	295	448	648	758	714	896	911	982	1.132	1.634	1.930	1.915	1.942	1.722	16.182
Bahia	5.849	6.231	9.291	8.908	10.353	9.029	10.660	11.844	10.213	9.318	14.142	20.323	20.709	18.559	16.328	181.757

Table 1.0 Number of notifications made by state in the Northeast of patients who suffered scorpion bites between 2007 and 2022.

Source: Ministry of Health - SUS Hospital Information System (SIH/SUS). 2023.

Region/Unit of Federation	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total
TOTAL	9	177	339	444	372	346	445	555	569	618	578	562	497	420	300	6.231
Northeast region	9	177	339	444	372	346	445	555	569	618	578	562	497	420	300	6.231
Maranhão	-	5	10	18	17	11	26	40	58	43	49	37	40	52	58	464
Piauí	4	32	61	67	70	85	132	139	116	88	85	88	104	123	88	1.282
Ceará	-	1	2	2	1	4	2	5	-	2	1	11	8	11	8	58
Rio Grande do Norte	-	-	-	-	1	2	2	-	-	-	-	-	3	2	2	12
Paraíba	-	4	1	13	2	2	-	11	15	34	39	43	38	40	37	279
Pernambuco	-	-	-	-	-	1	1	2	-	1	1	-	1	2	1	10
Alagoas	-	1	-	-	-	-	1	-	-	-	1	1	-	-	-	4
Sergipe	-	-	-	-	-	1	-	-	-	-	1	2	1	1	-	6
Bahia	5	134	265	344	281	240	281	358	380	450	401	380	302	189	106	4.116

Table 2.0 Number of hospitalizations per state in the Northeast of patients who suffered scorpion bites between 2007 and 2022.

Source: Ministry of Health – SUS Hospital Information System (SIH/SUS). 2023

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