Epidemiological characteristics of scorpionism victims in Bahia

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ABSTRACT

Objective: Investigate the epidemiological profile of scorpionism cases in Bahia. Methods: This research consists of an integrative literature review using the MEDLINE and LILACS databases, through the Virtual Health Library Portal (VHL) and PubMed. The analysis period comprised the years 2013 to 2023. 10 studies were chosen, distributed as follows: 40% retrospective research, 30% descriptive observational studies, 10% clinical-epidemiological studies, 10% cross-sectional studies and 10% ecological studies. Discussion: There is a direct and proportional association between the incidence of scorpionism in Brazil and territories with sanitary weaknesses. Final considerations: Most of the studies carried out agree that the female sex is the most affected by scorpion accidents. The age range of involvement varied between the studies, however, victims aged between 20 and 59 years predominated. The records occur in the home environment, in older self-declared pardos.

Keywords: Epidemiological profile, Bahia, Scorpion accidents.

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INTRODUCTION

Scorpion accidents represent an important cause of admission to emergency services worldwide. According to Chippaux and Goyffon (2008), although it may be an underestimated figure, more than 1,200,000 scorpion stings occur annually in the world, with the number of deaths exceeding 3,250 per year, also demonstrating that the number grows proportionally to the development of peripheral areas.

According to the Information System for StatisticalRecords (SINAN), Bahia had approximately 199 thousand cases of scorpionism reported between 2010 and 2020 by its 417 municipalities, with the city of Vitória da Conquista responsible for 2,583 cases in these 10 years of data collection. Still from a dynamic perspective, "scorpions have been, since the 2000s, the etiological agents that cause accidents with the greatest intensity and speed of growth in Brazil" (SOUZA and BOCHNER, 2019).

According to the Ministry of Health (MS), the scorpions of medical importance in Brazil belong to the genus *Tityus*, with 4 main species: *T. serrulatus* (yellow scorpion), *T. bahiensis* (brown scorpion), *T. stigmurus* (yellow scorpion of the Northeast) and *T. obscurus* (Amazonian black scorpion). Such arachnids predominate in urban regions (hidden in closets, shoes, rubble), have nocturnal habits and can be found in dry climates or humid biota. *T. serrulatus* stands out for its high toxicity and abundance in urban environments (ALMEIDA et al., 2021).

In addition to knowing how to recognize the etiological profile of cases of scorpionism in Brazil, the definition of the severity of the accident is very important for the indication of antivenom therapy and for the prognosis of the patient treated by the health service. According to the Annual Diagnosisand Treatment of Accidents by Venomous Animals (Ministry of Health), the diagnosis of scorpion accidents is eminently clinical and the degree of the case is defined by the signs and symptoms presented by the victim.

Patients with only local pain and paresthesia are classified as mild cases, requiring only symptomatic cases, sparing the patient from the use of anti-scorpion serum (SAEsc). Severe local pain associated with one or more of the following manifestations (nausea, vomiting, sweating, drooling, agitation, tachypnea, and tachycardia) make the case moderate, requiring the use of two to three ampoules of SAEsc. However, patients with moderate signs associated with profuse vomiting, convulsions, coma, bradycardia, heart failure, acute pulmonary edema, or shock are considered severe cases and require the use of four to six ampoules of SAEsc. It is also important to emphasize that in children under ten years of age, it is imperative to use antivenom serum, regardless of the severity of the condition.

Souza and Bochner (2019) state that scorpionism is a neglected tropical disease that continues to plague the Brazilian population, both due to the prevalence of cases and the lack of knowledge of

the medical team in managing a case of scorpion accident. To this end, this study aims to describe the epidemiological profile of cases of scorpionism in Bahia.

METHODS

The integrative review is a method that allows the synthesis of knowledge and provides the incorporation of the applicability of significant results in practice, allowing the approach of experimental and non-experimental studies, data from the theoretical and empirical literature for a complete understanding of the analyzed phenomenon.

The six phases of the development of the integrative review were constructed according to Souza *et al* (2010). The first phase refers to the elaboration of the guiding question of the research, taking into account the aspects of definition of the participants, the interventions that will be evaluated and the expected results. In this sense, the question elaborated was "what is the epidemiological profile of patients who are victims of scorpionism in Bahia?".

The second stage is based on the definition of the databases, the ones used in this work being the MEDLINE and LILACS databases, via the Virtual Health Library Portal (VHL) and PubMed, delimiting the articles within the period from 2013 to 2023.

The bibliographic search was guided by the following descriptors, found in the DeCS (Descriptors in Health Sciences): "epidemiology", "epidemiological profile", "scorpionism", "Bahia" and "scorpion accidents", in different combinations.
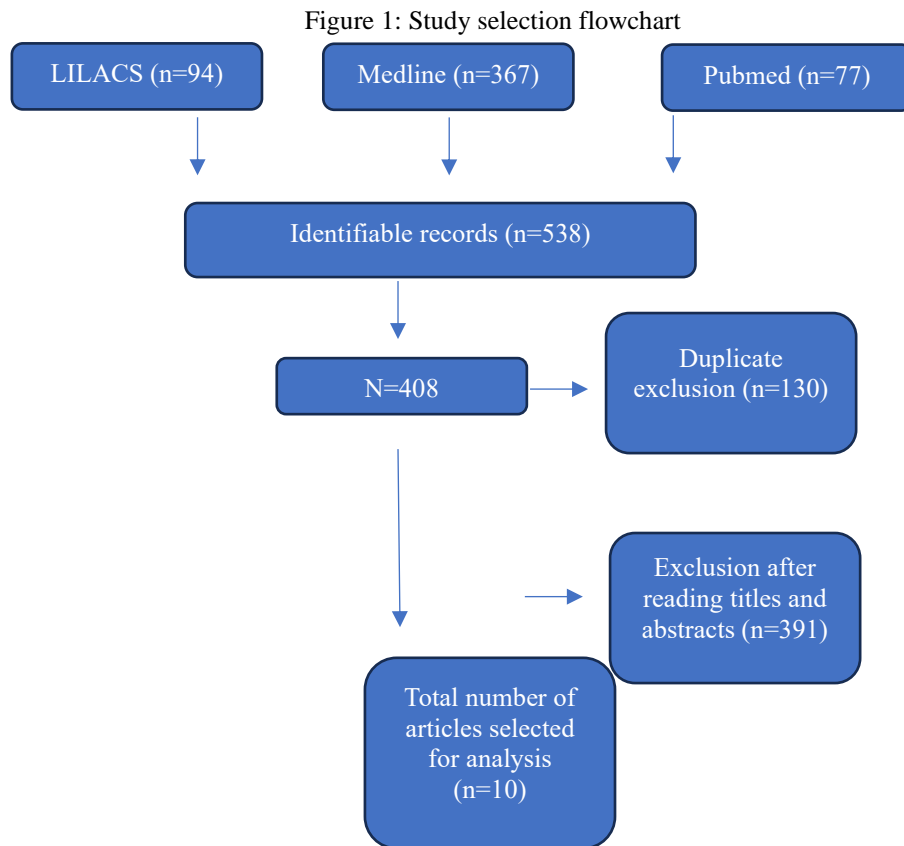
The inclusion criteria were based on publications whose expressions (described above) were found in the title or keyword, or that had explicit in the abstract that the publication was related to accidents due to scorpionism in Brazil. On the other hand, articles that did not meet the established inclusion criteria, that presented duplicates in the chosen database, that did not have the article released for reading in full, and that were not related to the state of Bahia were excluded. The searches were performed with the descriptors in Portuguese and English.

In the third phase of the research, the data were extracted, ensuring a relevant totality, in addition to the accuracy in checking the information, to avoid and exclude possible biases. Thus, a total of 538 articles were found in the selected databases, and their subsequent analysis and selection were performed (Figure 1).

In the fourth phase, a critical analysis of the included studies was carried out, aiming to weigh the rigor and characteristics of each study through the observation of the hierarchy of evidence and the design of the research. To this end, the *Rayyan virtual database was used* to screen articles with shielded analysis and with more than one researcher.

During the fifth stage of the research, the results were discussed, and the data were interpreted and synthesized in a rigorous manner. Finally, in the sixth phase, the integrative review

was presented in a clear and complete way, in order to provide the reader with a critical evaluation of the results.

Figure 1: Study selection flowchart

Cast iron: Magalhães et al. (2023).

RESULTS

Table 1 represents the synthesis of the studies selected to be discussed in this integrative review. A total of 10 studies were selected, one published in 2022, two published in 2021, two published in 2020, one in 2019, one in 2017, two in 2016 and the oldest in 2014.

Regarding methodological aspects, 40% of the studies correspond to retrospective studies, 30% to descriptive observational studies, 10% to clinical-epidemiologicalstudies, 10% to cross-sectional studies and 10% to ecological studies.

Table 1: Studies considered suitable for discussion in the review.

Year	Authorship	Objective	Methods	Main results
2022	Mata et al.	To analyze the records of scorpionism in a municipality in the recôncavo region of Bahia.	Retrospective analysis	The most affected age group was between 20 and 39 years old, with a predominance of females.
2021	Bonfim et al.	OBJECTIVE: To describe the epidemiological aspects of accidents with venomous animals in Bahia.	Descriptive observational study	About 122492 scorpion accidents were recorded in Bahia, with an average incidence of 68 cases per 100,000 inhabitants/year. The reported population corresponded to 10.6% white, 60.51% brown, 10.22% self-declared black, 0.8% yellow and 0.55% indigenous.
2021	Almeida et al.	OBJECTIVE: To analyze the ecological association between socioeconomic, occupational, and infrastructure/sanitation characteristics with scorpionism in Brazil.	Ecological study	Scorpion accidents were most frequently reported in the home and peridomiciliary environments. In addition, the highest notification rates occurred among females.
2020	Santana et al.	OBJECTIVE: To characterize the epidemiological profile of victims of scorpion accidents in a municipality in the state of Bahia.	Cross-sectional study	Of the total cases, 80.9% were caused by scorpions, most of them males aged between 20 and 59 years.
2020	Lisboa et al.	OBJECTIVE: To describe the epidemiological profile of scorpionism and to investigate factors associated with the severity of cases in the extreme south of Bahia, Brazil	Descriptive study	The recorded cases predominated in rural areas, in males, aged between 20 and 49 years, and in black people.
2019	Carmo et al.	OBJECTIVE: To describe the sociodemographic, clinical, and epidemiological profile of scorpionism in Jequié, Bahia, Brazil.	Retrospective epidemiological study	Of the total of 3,565 cases registered, most were female, brown and had not completed elementary school.
2017	Silva and Pereira	OBJECTIVE: To describe the epidemiological profile of	Quantitative study with a clinical-	The highest number of

		scorpionism in a municipality in the state of Bahia.	epidemiological approach	scorpion accidents occurred between 20 and 49 years of age, with males being the most frequently affected.
2016	Carmo et al.	OBJECTIVE: To describe the characteristics of hospitalizations involving contact with animals in a hospital in the interior of Bahia.	Descriptive study.	Of the total of 246 hospitalizations, 6.5% were caused by scorpion accidents, with a predominance of male victims, aged between 20 and 59 years and living in rural areas.
2016	Carvalho and Franco-Assis.	OBJECTIVE: To analyze secondary data on scorpion accidents that occurred in Barreiras, Bahia.	Retrospective epidemiological study	Most of the incidents occurred among females aged 20 to 49 years, especially in urban areas.
2014	Barros et al.	OBJECTIVE: To analyze the clinical and epidemiological aspects of scorpion stings in the northeastern region of Brazil	Retrospective descriptive study	Most of the victims are females between the ages of 20 and 29. The highest incidence of accidents occurred in urban areas.

Cast iron: Magalhães et al. (2023).

DISCUSSION

There is a direct and proportional association between the incidence of scorpionism cases in Brazil and territories with health fragility. The state of Bahia represents about 30% of the notifications in the Northeast region and has the highest mortality rates associated with scorpion accidents. From 2010 to 2019, about 122,492 scorpion accidents were recorded in Bahia, with an average incidence of 68 cases per 100,000 inhabitants/year (BONFIM et al., 2021; CARMO et al., 2019).

The analysis of the period from 2007 to 2015 showed about 3,565 cases of scorpion accidents in the municipality of Jequié, located in Bahia. Carmo et al. (2019) conducted a retrospective epidemiological study to understand the profile of patients affected by scorpions and recorded that 54.9% were females aged between 20 and 59 years. In addition, most cases occurred among brown individuals (63.5%) and those with incomplete primary education (48.6%) (CARMO et al., 2019).

About 84.5% of scorpion accidents occurred in residential environments, with the upper limbs being the most affected sites. Hospital care occurred in 66.4% of cases within one hour after

the bite episode, with 10.2% presenting systemic symptoms, 84.1% mild severity, and 17.3% requiring serum therapy (CARMO et al., 2019).

In a descriptive study, when describing the characteristics of hospitalizations due to external causes with venomous animals in Jequié, Bahia, Carmo et al. (2016) observed 246 hospitalizations in a hospital for this cause between 2009 and 2011. Of the total number of cases, 6.5% occurred due to scorpion accidents, with a predominance of male victims aged between 20 and 59 years and living in rural areas (CARMO et al., 2016).

The studies by Almeida et al. (2021) corroborate that accidents with scorpions occur more frequently in the home environment, especially among females. The authors argue that this epidemiological accentuation related to gender refers to historical and social influences associated with women and domestic activities in Brazil, a fact reiterated in the studies by Lira-da-Silva et al. (2009) (ALMEIDA et al., 2021; LIRA-DA-SILVA, 2009).

In a descriptive study, Lisboa et al. (2020) described the epidemiological profile of patients affected by scorpions in the extreme southern region of Bahia. A total of 3,055 cases of scorpionism were recorded, 62.5% of which occurred in rural areas, with males (70.1%) aged between 20 and 49 years (51%). It was also observed that the highest records occurred among black populations (84%) (LISBOA et al., 2020).

The analysis of data from the Department of Epidemiological Surveillance of a municipality in the interior of Bahia in the period between 2012 and 2014 showed 304 scorpion accidents. Of the total, 53.28% occurred among female populations aged between 20 and 49 years. Differently from what was presented by other studies, in this retrospective epidemiological analysis, cases of notification were more frequent in urban areas (72.3%), without a characteristic pattern of seasonality (CARVALHO and FRANCO-ASSIS, 2016).

The studies by Barros et al. (2014) agree that the highest incidence of scorpion accident cases occurs in urban areas and among females. In a descriptive and retrospective study, the authors analyzed 2,283 medical records and showed that the recorded cases occurred mainly among populations aged between 20 and 29 years. The most recorded bites occurred in the foot and hand region (BARROS et al., 2016).

Menezes et al. (2022) discussed that the state of Bahia has the highest rate of accidents caused by scorpions when compared to otherstates inthe Northeast, and is considered a serious public health problem (MENEZES et al., 2022). During the years 2010 to 2019 alone, 1513 notifications of scorpion accidents were registered in a municipality in the Recôncavo region of Bahia, with an average incidence rate of around 24.9 cases/10,000 inhabitants/year. No differences associated with seasonality are observed, as also described by other studies.

The most affected age group was 20 to 39 years of age, with individuals under 1 year of age and over 80 years of age being the least affected by scorpions. Women were the most affected, representing about 53.27% of the sample, and self-declared brown individuals stood out as the racial profile with the greatest involvement. It was also discussed that social determinants of health are important risk factors associated with socioeconomic variables, especially with regard to infrastructure, supply and occupational activities in the municipality. In the municipality analyzed, less than half of the households have sanitary sewage in conditions considered adequate. In addition, garbage collection is irregular and 33% of the population lives in poverty (MATA et al., 2022).

FINAL THOUGHTS

Scorpion accidents are considered a serious environmental problem in Bahia, directly and indirectly affecting the health of the population. Most of the studies analyzed agree that females are the most affected by scorpion accidents. The age range of the cases varied among the studies, however, there was a predominance of victims aged between 20 and 59 years. The highest records occurred in the home environment, in self-declared brown populations. The epidemiological records regarding the area of residence varied among the studies, with half reporting a predominance of accidents in urban areas and the other half in rural areas.

It was observed that records of scorpion accidents in rural areas occur more frequently in male populations, while in urban areas, women are more affected.

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