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EPIDEMIOLOGICAL ASPECTS OF ACCIDENTS BY POISONY ANIMALS IN NORTHEAST BRAZIL

Aspectos epidemiológicos dos acidentes por animais peçonhentos no Nordeste brasileiro

Aspectos epidemiológicos de accidentes por animales venenosos en el Noreste de Brasil

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ABSTRACT

Objective: to analyze the epidemiological aspects of accidents by venomous animals in Northeastern Brazil. **Method:** descriptive, retrospective study, constructed from secondary data available on the website of the Department of Informatics of the Brazilian Unified Health System regarding cases of accidents with venomous animals in the period from 2015 to 2019. **Results:** it was noticed that between 2015 and 2019 there was an average percentage increase of 74.25% in cases, with approximately 4 thousand accidents involving venomous animals per month. As for the sociodemographic aspects, there was a predominance of females (51.35%), browns (62.51%), aged 20-59 years (57.5%). In addition, in the clinical aspects of accidents, there is a higher occurrence of accidents with scorpions (72.70%). **Conclusion:** we see the importance of analyzing epidemiological aspects in order to support health promotion, protection and management actions.

DESCRIPTORS: Emergencies; Animals poisonous; Epidemiologic studies.

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RESUMO

Objetivo: Descrever os aspectos epidemiológicos dos acidentes por animais peçonhentos no Nordeste do Brasil. **Método:** estudo descritivo, retrospectivo, construído a partir de dados secundários disponíveis no portal do Departamento de Informática do Sistema Único de Saúde do Brasil referente aos casos de acidentes com animais peçonhentos no período de 2015 a 2019. **Resultados:** percebeu-se que entre 2015 e 2019 houve um crescimento percentual médio de 74,25% nos casos, sendo registrados cerca de 4 mil acidentes com animais peçonhentos por mês. Quanto aos aspectos sociodemográficos, predominou o sexo feminino (51,35%), pardos (62,51%), com faixa etária de 20-59 anos (57,5%). Além disso, nos aspectos clínicos dos acidentes, nota-se a maior ocorrência de acidentes com escorpiões (72,70%). **Conclusão:** vê-se a importância em analisar aspectos epidemiológicos a fim de subsidiar ações de promoção, proteção e gestão em saúde.

DESCRITORES: Emergências; Animais venenosos; Estudos epidemiológicos.

RESUMEN

Objetivo: analizar los aspectos epidemiológicos de los accidentes por animales venenosos en el noreste de Brasil. **Método:** estudio descriptivo, retrospectivo, construido a partir de datos secundarios disponibles en el sitio web del Departamento de Informática del Sistema Único de Salud de Brasil sobre los casos de accidentes con animales venenosos en el período de 2015 a 2019. **Resultados:** se notó que entre 2015 y 2019 fue un aumento porcentual promedio de 74,25% en los casos, con aproximadamente 4 mil accidentes con animales venenosos por mes. En cuanto a los aspectos sociodemográficos, hubo predominio del sexo femenino (51,35%), marrones (62,51%), de 20 a 59 años (57,5%). Además, en los aspectos clínicos de los accidentes, hay una mayor ocurrencia de accidentes con escorpiones (72,70%). **Conclusión:** vemos la importancia de analizar los aspectos epidemiológicos para apoyar las acciones de promoción, protección y gestión de la salud.

DESCRIPTORES: Urgencias médicas; Animales venenosos; Estudios epidemiológicos.

INTRODUCTION

Venomous animals are considered to be those that have glands that produce venoms or toxic substances packaged and/or ejected by one or more specialized devices.[1-2] Thus, when injected into humans, the accidents caused are considered a frequent clinical emergency, especially in tropical countries of Latin America, Africa, Asia, and Oceania. In this context, accidents with snakes, scorpions, spiders, and bees are the main venomous animals of epidemiological importance in Brazil and worldwide.[3]

Since 2009, the World Health Organization (WHO) has recognized snakebite accidents in the list of neglected tropical diseases, because although the incidence and morbidity and mortality rates reach significant rates worldwide, these diseases do not arouse the interest of health authorities, pharmaceutical companies, or research funding agencies.[3-5]

In Brazil, it is estimated that about 20,000 cases of accidents with snakes occur annually.[5] However, the accuracy of these data tends to be questioned, due to underreporting and cases not reported for logistical and geographical reasons or due to professional unpreparedness regarding the accurate identification of the grievance.[6]

Knowing that accidents caused by venomous animals represent a public health problem still neglected by most health authorities, it is understood that they have, unlike other diseases, specific and effective treatment to solve the victim's clinical condition. However, the delay in seeking health care, the barriers to access to health care in certain locations, the shortage of antivenom serum, and the deficit in the training of health professionals to develop quality care are the main factors that hinder the adoption of care strategies that can minimize the impacts generated by this public health problem.[5]

Knowing the little attention directed to accidents with venomous animals and the low investment in the availability of forms of treatment, especially regarding the production of antivenom serum, it is expected that epidemiological information about this grievance may be essential to support the rational distribution of inputs and direct the proposals of educational campaigns aimed at accident prevention, also contributing to improve the care of patients admitted to health units and emergency services. From this perspective, the present study aims to describe the epidemiological aspects of venomous animal accidents in the Northeast of Brazil.

METHODS

This is an ecological, descriptive, retrospective study, built from secondary data available on the portal of the Department of Informatics of the Unified Health System of Brazil (DATASUS), which has the compulsory notifications integrated with the Information System for Disease Control and Notification (SINAN) regarding the cases of accidents with venomous animals in the Northeast region of the country in the period from 2015 to 2019, since according to the literature, this is the minimum period to support an epidemiological analysis.[7]

The study scenario has an estimated population of 46,995,094 and an annual population growth rate of 1.1%, distributed in its nine Federative Units (UF): Alagoas (AL), Bahia (BH), Ceará (CE), Maranhão (MA), Paraíba (PB), Pernambuco (PE), Piauí (PI), Rio Grande do Norte (RN), Sergipe (SE). Each Federal

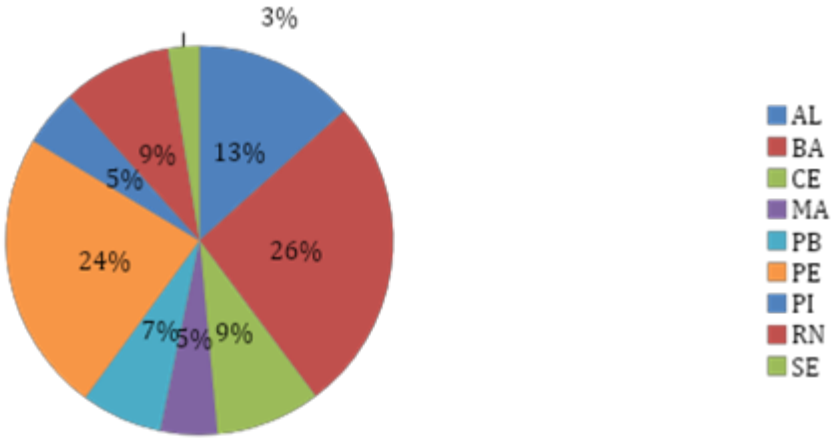
State has a specific and distinct population size, as well as a wide territorial extension.[8]

The data were extracted from the notifications in SINAN, through the menu of access to information – health information (TABNET) and the link "Epidemiological and morbidities". The variables collected refer to the year of notification, month, region of the country, UF of the area being approached, age group, race, gender, education, type of accident, time between the bite and care, classification and clinical evolution of accidents by venomous animals, where the epidemiological variables followed the standards of classification addressed by the Ministry of Health.[9]

In data analysis, the percentiles were observed from the tabulation of data in the Excel software of Microsoft Office 2013 to enable its insertion in the Statistical Package for the Social Sciences (SPSS) software version 20.0. The comparison of the percentiles related to the five major regions of the country was performed through absolute frequency. Furthermore, in the annual analysis, we used the comparison of average percentage growth. Also in this context, it should be noted that due to the use of secondary data, approval by the Research Ethics Committee was not necessary.

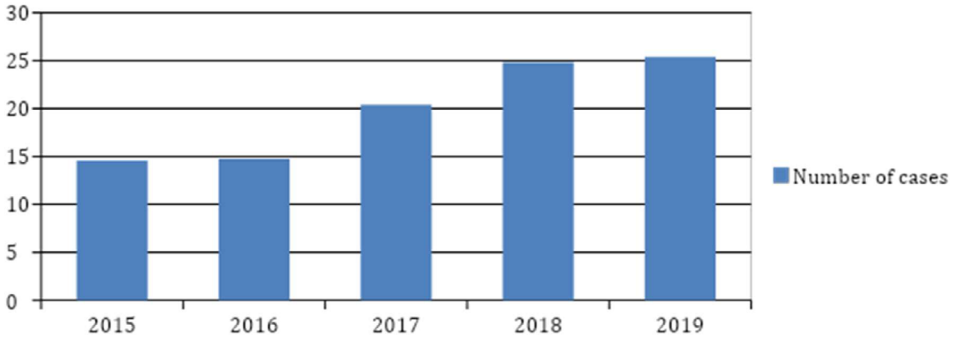
RESULTS

In Brazil, between the years 2015 and 2019, about 1,101,483 cases of accidents by venomous animals were notified. The notifications are distributed among the five major regions of the country, being the Southeast (38.08%), Northeast (33.83%) and South (14.55%) regions with the highest percentiles, while North (8.12%) and Midwest (5.42%) Thus, it was noticed that the Northeastern states concentrate a quantity of cases distributed as follows (Graph 1):



Graph 1 – Percentage distribution of accidents with venomous animals notified in the Northeastern Brazilian states from 2015 to 2019 (N = 372,673). Northeast region, Brazil, 2021.
Source: DATASUS, 2020.

According to Graph 1, it can be seen that the states of Bahia (26.37%), Pernambuco (23.53%), and Alagoas (13.38%), when added together, account for more than half of all cases (63.28%). Considering the study period, the data are based on the total number of notifications of accidents with venomous animals provided by the Brazilian Ministry of Health through DATASUS, as shown in Graph 2.



Graph 2 – Percentile of reported cases of accidents with venomous animals in Northeastern Brazil by year (N= 372,673). Northeastern region, Brazil, 2021.
Source: DATASUS, 2020.

According to Graph 2, the last two years (2018, 2019) stand out for having the highest percentiles with 24.80% and 25.38%, respectively. It is also seen that from 2015 to 2016 there was an average percentage growth of 1.19% in the number of cases, and from 2016 to 2017 the growth in the number of cases was 38.31%. A similar phenomenon is observed from 2017 to 2018 with a 21.62% growth in accidents. An average percentage growth of 2.35% in the cases occurring between 2018 and 2019 was also perceived. Furthermore, it is recorded that the Northeast reported at least 4,000 accidents with venomous animals per month among the last five years. It is emphasized that there was an average percentage growth of 74.25% between the years 2015 and 2019.

In order to describe the percentage distribution as to sex, race, age group, and education related to accidents with venomous animals in Brazil (2015-2019), Table 1 was constructed.

Table 1 – Percentage distribution according to sociodemographic characteristics of cases of accidents with venomous animals in Northeast Brazil, 2015-2019 (N= 372,673). Northeast region, Brazil, 2021.

Variables	Frequency	%
Gender		
Male	181.221	48,62
Female	191.373	51,35
Ignored	79	0,02
Race		
Brown	232.993	62,51
Yellow	2.334	0,62
Black	18.418	4,94
White	36.051	9,67
Indigenous	1.911	0,51
Ignored	80.966	21,72
Age Group		
< 1 year old	6.470	1,73
1 to 4 years old	21.893	5,87
5 to 9 years old	25.658	6,88
10 to 14 years old	25.712	6,89
15 to 19 years old	31.151	8,35
20 to 39 years old	122.652	32,91
40 to 59 years old	91.146	24,59
60 to 69 years old	27.644	7,41
≥ 70 years old	20.262	5,43
Ignored	85	0,02
Education		
Illiterate	9.097	2,44
1st to 4th grade	41.738	11,19
5th to 8th grade	46.787	12,55
Incomplete high school	16.336	4,38
High school complete	34.048	9,13
Incomplete higher education	3.639	0,97
Higher education complete	6.798	1,82
Ignored/Not applicable	214.230	57,48

Source: DATASUS, 2020.

In addressing the sociodemographic data described in Table 1, there was a balance between genders, with females slightly higher than males, 51.35% and 48.62%, respectively. Among the victims there was a predominance of the brown race (62.51%) with ages ranging from 20 to 39 years (32.91%), followed by 40 to 59 years (24.59%). Moreover, it was noticed considerable percentages regarding education, since more than half did not fill out this data (57.48%) and 23.74% had the 1st to 8th grade of elementary school. Moreover, we describe the percentage distribution of the cases considering the type of accident, clinical classification, evolution and time between the accident and the treatment in Table 2.

Table 2 – Percentage distribution according to the clinical characteristics of accidents with venomous animals in Northeast Brazil, 2015-2019 (N= 372,673). Northeastern Region, Brazil, 2021.

Variables	Frequency	%
Type of accident		
Snake	37.409	10,03
Spider	10.117	2,71
Scorpio	270.958	72,70
Caterpillar	2.981	0,79
Bee	29.013	7,78
Other	13.869	3,72
Ignored	8.326	2,23
Clinical Classification		
Light	314.532	84,39
Moderate	30.130	8,08
Severe	3.832	1,02
Ignored/White	24.179	6,48
Clinical Evolution		
Healing	332.807	89,30
Death by grievance	568	0,15
Death from another cause	43	0,01
Ignored	39.255	10,53
Time between accident and service		
0 to 1h	160.389	43,03
1 to 3h	92.642	24,85
3 to 6h	28.680	7,69
6 to 12h	13.543	3,63
12 to 24h	11.632	3,12
≥ 24h	12.246	3,28
Ignored	53.541	14,36

Source: DATASUS, 2020.

According to the clinical characteristics shown in Table 2, there is a higher occurrence of accidents with scorpions (72.70%), snakes (10.03%) and bees (7.78%).

Thus, in general, accidents with venomous animals were mostly clinically classified as mild (84.39) and generally evolving to healing (89.30%). However, it is worth mentioning that about 9.1% of the accidents were clinically moderate or severe. Moreover, it was observed that most of the cases were attended within three hours (67.88%) after the accident with a venomous animal.

To characterize the accidents with venomous animals through the type of accident, considering the main groups of snakes and spiders, we built Table 3.

Table 3 – Percentage distribution according to the characterization of accidents with snakes and venomous spiders in Northeast Brazil. 2015-2019 (N= 47,526). Northeast region, Brazil, 2021.

Variables	Frequency	%
Type of accidents due to snake bites (N= 37.409)		
Botropic	20.584	55,02
Laquetic	161	0,43
Crotalic	4.623	12,35
Elapidic	703	1,87
Non-poisonous	3.889	10,39
Ignored	7.449	19,91
Type of spiderbite accidents (N= 10.117)		
Loxoscelism	1.219	12,04
Phoneutrism	467	4,61
Latrodectism	256	2,53
Other species	2.056	20,32
Ignored	6.119	60,48

Source: DATASUS, 2020.

After the presentation of the types of accidents with venomous animals, it was decided to subdivide some classes according to the type of bite between snakes and spiders. Among the accidents with snakes, the Botropic (55.02%) and Crotalic (12.35%) genera stood out, while among the spiders the prevalence of loxoceles (12.04%) was noticed. Furthermore, it is noteworthy that at least 19.91% of snakes and 60.48% of spiders were not identified.

DISCUSSION

Considering the frequency of occurrence of accidents with venomous animals presented in this study, the inclusion of ophidian accidents in the list of neglected tropical diseases by the World Health Organization is of great importance to public health because of the morbidity and mortality caused.[4]

This is due to the accelerated and disorganized growth of cities, ecological imbalance, and poor urban infrastructure. These aspects, when added together, cause venomous animals to increasingly inhabit urban and peri-urban environments, sharing space with humans and increasing the risk of occurrence of this public health hazard. [10-11]

In this context, a study that analyzed accidents with venomous animals in southeastern Brazil showed in the results an average percentage increase of 65.9% in the occurrence of this grievance between the years 2005 and 2015.[11] Thus, it is observed that the grievance is increasingly common, since this study detected an average percentage growth of 74.25% between the years 2015 and 2019. One sees a greater increase in the last 5 years than in the 10 years preceding the period under study.

As for the profile of the victims, associations with low education and self-reported brown color are frequent,[1,5,12-13] which converges with the results presented. Moreover, several studies point out the incidence of cases with people in the adult phase of life, because even when cases from other countries are approached, especially Asian and African countries, the age bracket from 20 to 59 years old remains the most cited[1], [5, 12, 14-16].

As for the sociodemographic characteristics, we have a high number of ignored/white data, which can be justified by the urgency in the management of the cases; however, it can influence the analysis and interpretation of the results[11]. In this context, it is believed that the low level of education corroborates the lack of knowledge regarding the protective measures for accidents with venomous animals, when associated with active adulthood, which makes the grievance even more common in this public, being suggestive of a relationship between accidents by venomous animal bites, the victims' profile, living conditions, and even socioeconomic level.[10]

Still regarding the profile of the victims in relation to gender, the present study shows the female gender with a discrete incidence when compared to the male gender, corroborating the findings in the literature.[5,14] However, this is in opposition to other epidemiological studies carried out in the country.[1,12-13, 17] Thus, a better delineation is needed regarding this aspect, since the analysis of the cases allows us to identify and propose ways to implement a strategic planning with preventive actions, focusing especially on the most affected populations, in order to mitigate the ophidian accidents.[18]

Regarding the clinical aspects of venomous animal accidents, a study conducted in Vitória da Conquista – BA, stated that scorpion stings caused about 80.9% of reported cases from 2016 to 2017,15 i.e., data that corroborate the results presented in this study. Also in this context, it was noticed that scorpions have

a strong incidence, as highlighted in a South African study.[19] However, contrary data was found when considering a study conducted in Rio de Janeiro – RJ between the years 2007 and 2015, in which the incidence of accidents caused by snakes and spiders is reported.[13]

The consistency of the classification of accidents considers the type of accident, local manifestations (necrosis), systemic manifestations (hemorrhagic, renal, neuro-paralytic, vagal) as well as altered tomography. Such information can determine the treatment and care for victims of venomous animal accidents, which is offered free of charge by the Unified Health System (SUS), in which serotherapy is indicated as early as possible to neutralize the venom inoculated after a venomous animal accident.[20]

This study showed cases clinically classified as mild (84.3%9), whose evolution is mostly cure (89.30%) and it was observed that the care occurred from 0 to 3 hours after the accident, the period in which the first damage in the body tissue, after the venom inoculation, It is suggested that the quality of care is in the association between the time of the accident by a venomous animal and the time of care; moreover, in ophidian accidents, there may be accident/bite without poisoning, where the accident is classified as mild and does not require serotherapy [5, 9-10, 15].

In this sense, it is worth mentioning that "venomous animals, especially snakes and scorpions investigated in this study, can lead to severe accidents, sequelae, many of them disabling, and even evolve to death. [11] Considering that, despite the availability of serum therapy in the healthcare network, the access of victims to care is difficult, trained professionals are few, and the cost of the vial to the government is high and represents five times the amount invested in health education strategies for the prevention of accidents with venomous animals, especially in regions with higher occurrence – poor countries.[12,21]

Even if accidents caused by scorpions are more frequent, as discussed in this study, the changes made in DATASUS in 2006 made it impossible to identify the main species of scorpions in the reported accidents, thus "the lack of broad access to these data prevents important parameters to be considered in epidemiological studies".[21-22]

However, the identification data of ophidic accidents remain in the system, with snake bites being the second most prevalent type of accident with venomous animals in the northeastern region. Thus, it is seen that attacks by jararaca, jararacuçu, caissara, boca de sapo, which belong to the Bothrops genus are considered the most common in the North and Northeast regions.[6]

Among the limitations of the study, we highlight the use of secondary data, which in its completeness does not allow the unique identification of data, and the underreporting of cases, which is a frequent characteristic in Brazilian health services. The existence of incomplete data compromises the assessment of the lethality of cases and the quality of care, as there is no information about the serotherapy offered to the patient or treatment of complications. Moreover, the clinical characterization was superficial due to incomplete information, which reflects the deficit in the management of data provided to DATASUS [12-13;22].

CONCLUSION

Accidents with venomous animals are becoming more frequent in the Northeast of the country and may be related to the geographic issue, since many areas where this type of accident occurs have difficult access and limited transportation, besides the low incentive to preventive activities for this grievance in health facilities. Therefore, it is believed that the aspects analyzed can subsidize the management of health resources and alert the authorities about this historically neglected grievance.

For health management, epidemiological information is crucial to understand what is happening in a given region. Thus, by identifying the main venomous animals that cause accidents in the Northeast, it subsidizes actions of prevention, promotion and protection in health, together with the timely notification of cases, since the distribution of serum is performed according to the regional characteristics of the occurrence of accidents reported in SINAN, justifying the importance of its registration.

We suggest the development of local studies that can offer specific and in-depth data to support the management of resources and investments in public health, in an attempt to meet the health demand imposed by accidents with venomous animals and, through prevention and health promotion, without affecting the quality of care in health services, reduce the amount spent by the public authorities in urgent and emergency care.

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