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Epidemiological profile of scorpionism in children in the state of Pernambuco, 2015-2019

ABSTRACT | Objective: To analyze the epidemiological profile of scorpionism in children, in the State of Pernambuco, in the years 2015 to 2019. Methods: This is an ecological, exploratory study, whose data were extracted from the Notifiable Diseases Information System (data sheets). notification completed from 2015 to 2019). Data analysis was performed using the Statistical Package for the Social Sciences version 20.0. Results: Between 2015 and 2019 there were 17,825 accidents involving scorpions in children up to 14 years old in the State of Pernambuco. The most affected age group was 5 to 9 years old (32.70%). Children from 0 to 4 years of age were twice as likely to have a severe clinical condition ($p < 0.001$; OR: 2.353; 95% CI: 1.650 - 4.782). Conclusion: There was a high rate of injuries in the analyzed period, especially in children at the beginning of school life, giving rise to more effective prevention measures.

Keywords: Child; Epidemiology; Scorpion stings; Health information systems.

RESUMEN | Objetivo: Analizar el perfil epidemiológico del escorpionismo en niños, en el estado de Pernambuco, en los años 2015 a 2019. Métodos: Este es un estudio exploratorio ecológico, cuyos datos fueron extraídos del Sistema de Información de Enfermedades Notificables (fichas técnicas). notificación completada de 2015 a 2019). El análisis de los datos se realizó utilizando el Statistical Package for the Social Sciences versión 20.0. Resultados: Entre 2015 y 2019 se produjeron 17,825 accidentes con escorpiones en niños de hasta 14 años en el estado de Pernambuco. El grupo de edad más afectado fue el de 5 a 9 años (32,70%). Los niños de 0 a 4 años tenían el doble de probabilidades de tener una enfermedad clínica grave ($p < 0,001$; OR: 2,353; IC del 95%: 1,650 - 4,782). Conclusión: Hubo una alta tasa de lesiones en el período analizado, especialmente en niños al inicio de la vida escolar, dando lugar a medidas de prevención más efectivas.

Palabras claves: Niño; Epidemiología; Picaduras de Escorpión; Sistemas de Información en Salud.

RESUMO | Objetivo: Analisar o perfil epidemiológico do escorpionismo em crianças, no Estado de Pernambuco, nos anos de 2015 a 2019. Métodos: Trata-se de um estudo ecológico, de caráter exploratório, cujo dados foram extraídos do Sistema de Informação de Agravos de Notificação (fichas de notificação preenchidas no período de 2015 a 2019). A análise dos dados foi realizada por meio do Statistical Package for the Social Sciences versão 20.0. Resultados: Entre 2015 e 2019 foram registrados 17.825 acidentes com escorpiões em crianças de até 14 anos no Estado de Pernambuco. A faixa etária mais acometida foi a de 5 a 9 anos (32,70%). Crianças de 0 a 4 anos de idade apresentaram duas vezes mais chances de apresentar quadro clínico grave ($p < 0,001$; OR: 2,353; IC95%: 1,650 - 4,782). Conclusão: Houve uma elevada taxa de agravos no período analisado, especialmente em crianças em início de vida escolar, suscitando medidas de prevenção mais eficazes.

Palavras-chaves: Criança; Epidemiologia; Picadas de escorpião; Sistemas de informação em Saúde.

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INTRODUCTION

Poisoning or accidents involving scorpions (scorpionism) have been considered a public health problem in tropical and subtropical countries, especially in Brazil, due to the high incidence and the potential of the poison of some species to cause serious clinical situations, often fatal.⁽¹⁻⁴⁾

These accidents have been growing each year mainly due to the modification of the natural environment of the species, to the favorable places for their adaptation such as hydrographic networks, irregular occupations, green areas and the presence or absence of basic sanitation in addition to the scorpion species having their reproduction

by parthenogenesis, which contributes to the proliferation of these beings.⁽⁴⁾

It is estimated that approximately 1,5 million accidents per scorpion occur annually in the world, causing approximately 2.600 deaths, especially in tropical countries.⁽⁵⁾ At the Brazilian level, official data from the Ministry of Health indicate that about 50 thousand cases of accidents of this nature occur annually, mainly in the hottest periods, making the cases of scorpionism already surpass those of snakebites.^(6, 7)

Many of these accidents involve children and according to data from the Notifiable Diseases Information System (SINAN), between 2010 and 2014, 16.183 and 24.521 cases of intoxication among children and adolescents in Brazil were recorded. Referring specifically to the cases of scorpionism, this was responsible for 46,6% of the referred cases. In the State of Pernambuco, in the same period from 2010 to 2014, the Toxicological Assistance Center (CEATOX) recorded numbers that went from 2.316 to 4.585 notifications.⁽⁸⁾

In view of the growing number of reported and underreported accidents among children, it is opportune to carry out a retrospective analysis of data involving scorpionism, mainly due to the scarcity of studies related to the theme and aimed at regions in the Northeast of Brazil.

The research was conducted on the following guiding question: What is the epidemiological profile of children victims of scorpionism in the State of Pernambuco between the years 2015 and 2019? The answer to this question brought subsidies that can be useful in the formulation of prevention strategies and identification of risk factors for this public in question, since studies on scorpion accidents in this population are more rare.

Thus, this study aimed to trace the epidemiological profile of scorpionism in children from the State of Pernambuco, referring to the years 2015 to 2019.



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METHODS

In this study, the epidemiological profile was drawn up through an ecological, exploratory study. Data collection was carried out between the months of January to April 2020 through access to the data belonging to the notification forms deposited in the SINAN database, referring to the period from January 1st, 2015 to December 31st, 2019, related to the State of Pernambuco.

The State referring to this research has an estimated population of 9.557.071 inhabitants, approximately 2.256.769 children from 0 to 14 years old, with a total area of 98.068,021 km², characterized by two types of climate: humid tropical (predominant in the Coast); semi-arid (predominant in the interior).⁽⁹⁾

To identify the data found in SINAN, some eligibility criteria were taken. The proposed inclusion criterion was to analyze only the data referring to children from 0 to 14 years old. In turn, cases registered in the System were excluded from the analysis as ignored for any of the registered variables.

The variables selected for analysis in this study were based on two axes: 1) socio-demographic data: age group (children from 0 to 14 years old), sex (male or female), race and health region of residence; 2) data related to the accident: month of occurrence, notification micro-region (19 micro-regions of the State of Pernambuco), time elapsed between the bite and the service (0 to 1 hour, 1 to 3 hours, 3 to 6 hours, 6 to 12 hours, 12 to 24 hours, more than 24 hours), the final classification of the accident (mild, moderate or severe) and the evolution of the case (cure, death from scorpionism and deaths from various causes).

Statistical Package for the Social Sciences (SPSS) version 20.0 was used for statistical analysis of the data. The distribution of absolute and relative frequencies was determined, and a univariate analysis was performed on the

data collected using the chi-square test (X²), to compare proportions, adopting a significance level of $p < 0,05$. The risk estimates were calculated using Odds Ratios (OR) and the confidence interval

used was 95% (95% CI). The statistical analysis was performed excluding the absolute value of the ignored variables, in order to allow for greater precision of the data.

This research followed the guidelines set out in Resolution 196/96 of the National Council for Ethics in Research and because it is a study that uses secondary data, there were no ethical implications involved, requiring no analysis by the ethics and research committee.

RESULTS

In the analyzed period (2015-2019), according to the data made available by SINAN, 17.825 accidents with scorpions were registered in children up to 14 years of age in the State of Pernambuco, so that the year 2018 presented the highest frequency of cases, representing 26% of the total. The percentage distribution of scorpionism in this period is shown in Figure 1.

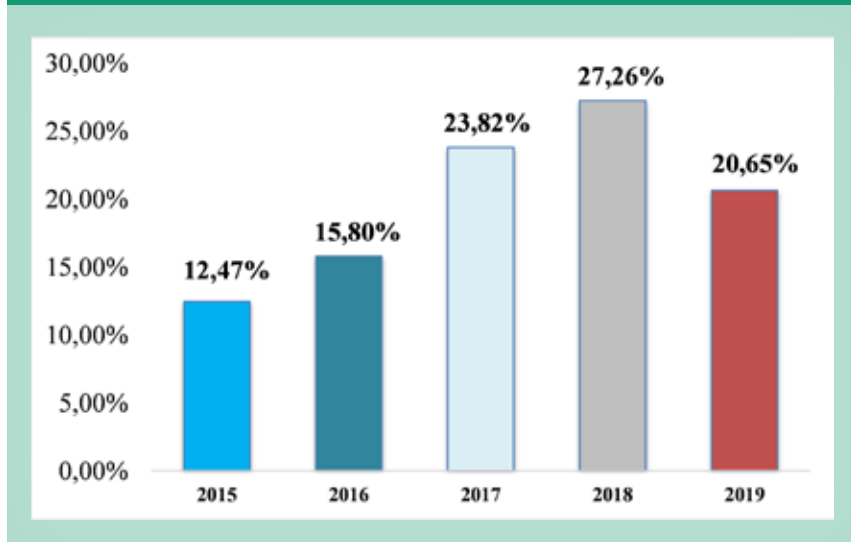
The age group with the highest incidence was 5 to 9 years (n: 6.036 - 32,70%) while most of these children were male (n: 8.949 - 50,20%) and of mixed race (n: 7.636 - 42,83%).

Regarding the month of occurrence of scorpionism in Pernambuco, those that registered the highest frequency of the accident were August (n: 1.815) and September (n: 1.787). The month with the lowest occurrence in the analyzed period was March (n: 1.242). Of the 19 microregions of notification of the State, the one with the highest incidence of cases was Recife (n: 8.773) followed by Vale do Ipojuca (n: 1.412). The lowest index was registered in Fernando de Noronha (n: 01).

Depending on Table 2, most children who were victims of scorpionism were treated within 06 hours (79,50%), mainly until 01 hours (45,78%). Of the total number of cases, 15.445 (86,64%) were recorded as mild, but even so, the number of cases classified as moderate and severe is not negligible.

About 16.102 cases (90,33%) evolved to cure. In the 5 years evaluated in this study, 07 deaths were registered in children from Pernambuco, five of which resulted from the direct effect of the scorpion's bite.

Figure 1: Percentage distribution of scorpion cases in children in the State of Pernambuco (Brazil), in the period 2015-2019.



Source: Data extracted from SINAN, 2020.

Table 1: Frequency measures of the sociodemographic characteristics of child victims of scorpionism, referring to the state of Pernambuco (Brazil), in the period 2015-2019.

| Variável* | Frequência absoluta | % |
|---------------------|---------------------|-------|
| Faixa etária | | |
| <1 Ano | 659 | 6,76 |
| 1-4 | 2.815 | 28,86 |
| 5-9 | 3.188 | 32,70 |
| 10-14 | 3.089 | 31,68 |
| Gênero | | |
| Masculino | 8.949 | 50,20 |
| Feminino | 8.876 | 49,80 |
| Raça | | |
| Amarela | 56 | 0,32 |
| Indígena | 148 | 0,83 |
| Preta | 281 | 1,57 |
| Branca | 1.364 | 7,65 |
| Parda | 7.636 | 42,83 |

Source: Data extracted from SINAN, 2020.

Note: * Ignored or blank variables were not computed.

The age group was considered as a possible exposure variable for the “severe case” event. Children from 0 to 4 years of age were twice as likely to have a severe clinical condition when compared to those from 5 to 14 years old (Chi-square test - comparing two dichotomous variables) (Table 3).

DISCUSSION

Based on data extracted from SINAN, a high prevalence of accidents involving scorpions and children was recorded in the period from 2015 to 2019, with a peak in the year 2018. This year there were above average rainfall rates in Pernambuco, compared to the other years of the sample, especially in the first quarter. (10) The peak can be justified by the fact that the strong precipitations are combined with a low humidity of the air, which causes shelter of scorpions in heated places of the residences, associated

with the fact that the children aim at these places in search of fun. (11)

Most accidents were recorded from August to September, with the exception of the peak in July, in 2018. A strong correlation between scorpion bites and seasonality has been described in studies from different regions of the world (12), including Southeast Brazil (13) and especially the Brazilian Northeast. (11, 14)

With regard to the region of occurrence, most accidents occurred in the state capital (Recife), including the entire metropolitan region. The higher incidence of child scorpionism in this region is justified, as high-density urban areas are places where there is a high risk of scorpion bites. (15) Similar data were found in studies carried out in the metropolitan region of Ceará between 2003 and 2004 (15), as well as in Pernambuco (2007-2010), where 53,3% of child victims were from Recife. (11)

In the light of the results, the most affected age group was 5 to 9 years old, the same pattern obtained in an equivalent survey conducted in the State of Bahia, concerning data from the period 2007 to 2010. (14) However, these results differ from a study referring also to the State of Pernambuco, but related to the period from 2006 to 2010, where the highest incidence of cases was concentrated in children under 5 years old (40,9%). (11)

It is noteworthy that the age group is closely related to the aggravation of cases. Children from 5 to 9 years old usually look for fun in more discreet places, away from their parents. This may have been a contributing factor to the occurrence of cases in this study. Although differences were found in the frequency of accidents by age group, when compared to other studies (11, 14), both are similar for the climatic characteristics of their places of observance and for the social aspects of their populations and even so, children of 0-9 years ago represented the biggest victims.

Referring to the initial care time of the victims, the period of greatest incidence was in the first six hours, especially within one hour, which is justified by the agility in helping the victims as well as by the quick access to referral hospitals.

The care protocol at both national and state level provides that victims of scorpion bites immediately seek a health unit such as an Emergency Care Unit (UPA - Unidade de Pronto Atendimento), and, depending on the severity of the case, must be referred to a hospital. of reference. (16)

Results pointed out by a study showed that children seen in more than three hours were almost twice as likely to progress to severe cases. (17) Another research evaluated that for each hour added until the initial care, there would be an increase of 9% in the chance of the child to die due to systemic complications resulting from it. (18)

Table 2: Frequency measures related to the time elapsed between the bite and the care and final classification of the victims, referring to the State of Pernambuco (Brazil), in the period 2015-2019.

| Variável* | Frequência absoluta | % |
|---|---------------------|-------|
| Tempo entre picada e atendimento | | |
| 0-6h | 14.172 | 79,50 |
| 6-12h | 350 | 1,96 |
| Mais de 12h | 408 | 2,28 |
| Classificação final | | |
| Leve | 15.445 | 86,64 |
| Moderado | 538 | 3,01 |
| Grave | 160 | 0,89 |

Source: Data extracted from SINAN, 2020.

Note: * Ignored or blank variables were not computed.

Table 3: Serious cases according to age group, referring to the State of Pernambuco (Brazil), in the period 2015-2019.

| \ | Casos grave | | Total | p* | OR** | |
|-----------|-------------|------------|--------|--------|-------|---------------|
| | Não | Sim (%) | | | | |
| Idade | | | | | | |
| 0-4 anos | 5.910 | 100 (1,66) | 6.010 | <0,001 | 2,353 | 1,650 – 4,782 |
| 5-14 anos | 10.802 | 60 (0,55) | 10.862 | - | - | - |

Source: Research data.

Note: *p calculated by the Chi-square test; ** Odds Ratio; + 95% Confidence Interval

Regarding the severity of the cases according to age group, the statistical analysis showed that children up to 4 years old are twice as likely to evolve to the most severe forms compared to those aged 5 to 14 years old. Studies suggest that children up to 4 or 5 years old are more susceptible to severe forms of poisoning from scorpions compared to older children. ^(19, 20)

This association is due to the vulnerability of the immune system and the relationship between the dose of the poison and the patient's body weight, which are generally lower in this age group. ⁽²¹⁾ Studies show that children, especially those of a younger age, because they have smaller body areas, generally have higher levels of poison in the body, as well as greater absorption of the poison by the heart and other essential organs. ⁽²²⁾

Thus, so that these patients do not progress to more serious cases, disease prevention programs need to be improved and new strategies need to be designed as a way of coping that results in lower accident rates as well as more effective control of this disease.

CONCLUSION

It was found that in the period between 2015 to 2019, the State of Pernambuco recorded a high prevalence of scorpionism in children, especially in the age group of 5 to 9 years. Most of the cases were mild and treated within six hours, progressing to cure, with only seven deaths recorded in the period.

It was found that children up to 4 years of age are more likely to evolve to more serious complications resulting

from the scorpion's bite, thus requiring public prevention policies aimed at this population to be more effective and constant.

With regard to the limitations of this research, since it refers only to data from a State of the Federation of Brazil, it is not possible to generalize them to all regions. In the notification forms analyzed, there are no records of the identification of the species of scorpions causing the event, apart from the lack of information from health professionals regarding all variables.

The content documented in this study can be significant for health managers and assistants to implement accident prevention programs involving scorpions in children. Public policies in this area need to be reinforced and implemented in order to reduce the incidence of this problem in this risk group. 🐍

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