

ACCIDENTS INVOLVING VENOMOUS ANIMALS AND ASSOCIATED FACTORS IN CHILDREN AND ADOLESCENTS

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Abstract: The objective was to describe the factors associated with accidents involving venomous animals among children and adolescents. An integrative literature review was conducted, analyzing articles retrieved from secondary databases such as the Virtual Health Library, Latin American and Caribbean Literature in Health Sciences, Scientific Electronic Library Online, and the Online System for Searching and Analyzing Medical Literature, using the descriptors “venomous animals,” “child,” and “adolescent,” and Boolean operators. This study evaluated the factors associated with accidents involving venomous animals among children and adolescents. It was observed that 54.5% of the recorded accidents occurred predominantly in the 10-19 year age group, with a higher number of victims being male, a pattern consistent across all “types of causative animals” observed. The results highlight the specific vulnerability of this age group, particularly in rural areas and areas with greater contact with natural environments, where the incidence of snakebites, scorpion stings, and arachnid bites is higher. The identified risk factors, such as lack of adequate supervision, absence or incorrect use of Personal Protective Equipment (PPE) during leisure or work activities/helping with household chores, and lack



of knowledge about preventive measures and immediate post-accident management, highlight the need for multifaceted interventions.

Keywords: venomous animals; child; adolescent.

INTRODUCTION

Diseases of poverty are considered both a cause and a consequence of human rights violations, these diseases kill more than half a million people a year, causing losses of complex estimates in terms of productivity and lost life time (Hunt, 2007). Worms and viruses are well known and are a reason for great investment, both public and private. Other diseases, on the other hand, remain obscure or even underreported, not being clearly represented in the curricula of undergraduate curricula, even if such diseases are endemic, as is the case of accidents by venomous animals (Kasturiratne et al., 2017; Solomon; Luna; Machado, 2018).

Venomous accidents kill more than malaria and sub-Saharan Africa loses 2 million Disability-Adjusted Life Years (DALYs)/year to snakebites (Harrison; Gutiérrez; 2006; Chippaux, 2017).

The clinical repercussions and socioeconomic losses, due to hospitalizations, length of hospitalization, deaths, and disability retirements, led the World Health Organization (WHO) to include such emergencies as neglected tropical diseases in the years 2009 and 2017. Accidents with venomous animals kill more than malaria and in sub-Saharan Africa two million Disability-Adjusted Life Years (DALYs)/year are lost to snakebites (Harrison; Gutiérrez; 2006; Chippaux, 2017).

Thus, accidents with venomous animals are an important cause of morbidity and mortality worldwide, especially among the population living in the countryside, forests and waters, however, they are neglected as a public health problem (World Health Organization, 2007). The WHO estimates that about 1.841 million cases of poisoning may occur annually in the globe, resulting in 94 thousand deaths. In the Brazilian epidemiological scenario, accidents by venomous animals represent the second



cause of human poisoning, to the detriment only of drug poisoning (Oswaldo Cruz Foundation, 2013).

Venomous animals are classified as those that are capable of injecting into their prey, through their teeth or stingers, a certain toxic substance elaborated in their own body. Among the main accidents involving venomous animals, the most common are; araneism, erucism and ophidism (BRASIL, 2014). These animals account for about 100 thousand accidents and approximately 200 deaths per year in Brazil. Data from 2021 portrayed 328 deaths and 15,672 hospitalizations, reaffirming its prism as a public health problem (Carmo et al., 2016).

In pediatrics, accidents with venomous animals are also considered a public health problem in many countries (Chippaux; Goyffon, 2008). The literature indicates that children (under 10 years of age) have low immune capacity and lower muscle mass than adults, and may have more intense envenomation, and also have a higher risk of reactions to serum therapy (Langley, 2010). Thus, children under the age of fourteen years have higher rates of deaths and also of lethality in scorpion accidents, portraying that children and adolescents form a group of higher risk, as described in some surveys (Nunes et al., 2000; Soares; Azevedo; Maria, 2002; Guerra et al., 2008; Bucarechi et al., 2014).

It is also noteworthy that, among other aspects, scorpion stings stand out among accidents with venomous animals in childhood, due to the particularities of the life of these arthropods and the habitual exposures of children. Thus, in this age group, there is a risk of greater severity (Bucarechi et al., 2014; Campos; Costa; Oliveira, 2000; Tamassone; Vainstrib; Peirano, 2003). Thus, the present study aimed to describe the factors associated with accidents with venomous animals among children and adolescents.

METHODS

An integrative literature review was carried out. This approach was adopted because it allows the combination of data from investigative and theoretical research that can be thus directed to conceptualizations, registration of gaps in the areas of investigation, theoretical review and



methodological analysis of studies on a specific subject, allowing the analysis of the literature.

In this sense, six interdependent and interrelated phases were considered: elaboration of the guiding question, search or sampling in the literature, data collection, critical analysis of the included studies, discussion of the results and presentation of the integrative review. As the guiding question was defined:

What are the factors associated with accidents with venomous animals among children and adolescents?

Studies were collected through an electronic search in the following databases available in the Virtual Health Library (VHL), Latin American and Caribbean Literature on Health Sciences (LILACS), the Scientific Electronic Library Online (SciELO) and the Analysis of Medical Literature (MEDLINE).

The inclusion criteria included complete articles available electronically, in Portuguese, English or Spanish and that presented the theme proposed in the title, abstract or descriptors. Regarding the eligibility criteria, letters to the editor, editorials, duplicate articles, and those that did not unequivocally address the theme under study were considered.

The survey of studies was conducted during the months of May to August 2025. As research strategies, the Health Sciences Descriptors (DECS) were used, retrieved through the website: <https://decs.bvsalud.org/>, which were venomous animals, children and adolescents, for the refinement of the search and better selection of data for analysis, the Boolean and Boolean was used to combine the selected descriptors.

For data collection, an instrument validated by Ursi (2005) for integrative reviews was developed, covering the following categories of analysis: identification code, title of the publication, author and author's education, source, year of publication, type of study, region in which the research was carried out and the database in which the article was published. After selecting the articles, the information that would be extracted from the studies was defined. To enable the apprehension of the information, a database developed in the Microsoft Office Excel 2010 software was used, composed



of the following variables: title of the article, year of publication, study design, and main outcomes. The data obtained were grouped in a table and in thematic approaches and interpreted according to specific literature.

RESULTS AND DISCUSSION

In this study, the factors associated with accidents with venomous animals among children and adolescents were evaluated, in this sense, it is observed that 54.5% of the accidents recorded predominated in the age group of 10 to 19 years with the highest number of victims belonging to the male sex, remaining in this profile in all the “types of causative animals” observed. This prevalence may be related to the greater presence of boys in activities that provide greater risks, such as outdoor sports, contact with animals in the external environment due to curiosity and socio-environmental stimulus. As for young people aged 15 to 19 years, susceptibility to these accidents involving work activities or subsistence practices cannot be ruled out when observing the north and northeast regions (Amorim et al., 2017; Vilaça et al., 2019).

It is perceived that the child population is equal in profile when compared to the general population, always tending to predominate over the male sex and the urbanization of these accidents. Disagreeing in certain aspects of classic literature, when they link accidents with venomous animals predominantly to rural and peri-urban areas. Recent studies show that factors such as temperature, climate change, and the increase in urbanized areas, also linked to improvements in the routine of reporting and verification of diseases, contribute to the apparent rural exodus of these accidents (Cavalcanti et al., 2021; Machado, 2016). However, when observing a study carried out in the municipality of Afuá, in the state of Pará, a higher incidence of accidents by scorpions in children aged one to nine years is noticed, with a prevalence of females (57%). In addition, 72% of these cases are considered serious with a high hospitalization rate (Silva et al., 2019).

Another important aspect also related to this age group is the worsening of the health



conditions of the injured person. The severity of animal-human collision is greater in children, which has a greater impact on long-term effects and mortality rate, making the systematization of agile and effective care and assistance indispensable (Lima et al., 2016). In this sense, observing the time of initial care of the victims, the period of greatest search for medical care was in the first hours, especially up to one hour (47.3%), which justifies the high cure rates (91.3%) and low rates of local (1.1%) and systemic (0.5%) complications. Alves (2018) shows that children up to 4 years old are twice as likely to progress to the most severe forms compared to those between 5 and 14 years old. This association is due to the vulnerability of the immune system and the relationship between the dose of the venom and the patient's body weight, which are generally lower in this age group, and may have higher serum levels of venom in the body, as well as a greater absorption of the venom by the heart and other essential organs (Haack; Lutinski, 2021; Neves et al., 2022).

Venomous animals are described as those that, by inoculating venom, harm human health (Paris et al., 2017). The main venoms defined in the National List of Compulsory Notification of diseases, conditions and public health events are scorpions, spiders, bees, wasps and snakes (Brasil, 2014). The frequency of accidents is determined by different factors, such as climatic variations in temperature, humidity and rainfall, ecological imbalance of ecosystems, expansion of urban and agricultural areas (Paris et al., 2017; Cozzer et al., 2019). In the South of Brazil, for example, the highest frequencies of notifications are recorded between the months of November and March (spring and summer), when there is an increase in temperature and rainfall (Assis, 2019) and an increase in agricultural activities. Also during this period, the animals are more active in the search for food and for opportunities for reproduction (Brasil, 2014) which expands contact with humans.

It should be noted that snakebite is defined as the envenomation caused by the action of toxins derived from snakes. When the absorption of the venom occurs through the hematogenous route, different clinical manifestations occur, according to each genus of snake. However, there are some clinical manifestations common to most genders, such as: localized inflammatory process, pain, redness and edema (Brasil, 2010).



Araneism, on the other hand, is classified as the poisoning caused by toxins from venomous spiders. General clinical manifestations include local pain, mild erythema, and swelling. When there is contact with caterpillar bristles with the skin, it is defined as erucism. The clinical manifestation of stinging dermatitis, common to all species of caterpillars, is characterized by pain, burning, redness, itching and in some cases blisters and erosions. Treatment for these accidents is instituted with the administration of antivenom serum specific to each species accompanied by the use of analgesics and anti-inflammatories, if necessary (Brasil, 2010).

Finally, it is essential that epidemiological studies be carried out to know the variables related to accidents with venomous animals in childhood so that control and prevention measures can be proposed, thus avoiding negative outcomes, reducing the morbidity and mortality rate, or even preventing deaths. As long as accidents with venomous animals are considered a public health problem, there is an ethical need for new research that seeks to understand the clinical, epidemiological and social behavior of these cases (Chippaux; Goyffon, 2008).

CONCLUSION

The results highlight the specific vulnerability of this age group, notably in rural areas and with greater contact with natural environments, where the incidence of snakebite, scorpionism and spider monkey is higher. The risk factors identified, such as lack of adequate supervision, absence or incorrect use of Personal Protective Equipment (PPE) during leisure or work activities/help with household chores, and lack of knowledge about preventive measures and immediate post-accident management, highlight the need for multifaceted interventions.

It is concluded that the prevention of accidents with venomous animals in children and adolescents should be a public health priority. It is essential to implement educational programs aimed not only at children and adolescents, but also at their parents and caregivers, focusing on: recognition of risk habitats, safe behavior (e.g., not handling animals, not walking barefoot in risk areas) and



adequate first aid until arrival at the health service. These actions, together with the improvement of access and response capacity of health services in endemic areas, are crucial for reducing morbidity and mortality resulting from these accidents.

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