


ANÁLISE CLÍNICA E EPIDEMIOLÓGICA DAS VÍTIMAS DE ACIDENTE OFÍDICO ATENDIDAS NO HOSPITAL DE DOENÇAS TROPICAIS ENTRE OS ANOS DE 2020-2023**CLINICAL AND EPIDEMIOLOGICAL ANALYSIS OF SNAKEBITE VICTIMS TREATED AT THE TROPICAL DISEASES HOSPITAL BETWEEN 2020-2023****ANÁLISIS CLÍNICO Y EPIDEMIOLÓGICO DE LAS VÍCTIMAS DE MORDEDURAS DE SERPIENTE ATENDIDAS EN EL HOSPITAL DE ENFERMEDADES TROPICALES ENTRE 2020 Y 2023** <https://doi.org/10.56238/sevened2025.028-004>**Ana Beatriz Gonçalves de Sousa Guedes¹, Jean Matheus Guedes Cardoso²,
Rejanne Lima Arruda³****RESUMO**

O acidente ofídico representa um importante problema de saúde pública no Brasil, especialmente em regiões tropicais como o Tocantins, onde há elevada incidência desses eventos. Este estudo teve como objetivo descrever o perfil clínico e epidemiológico das vítimas de acidentes ofídicos atendidas no Hospital de Doenças Tropicais (HDT), em Araguaína-TO, entre 2020 e 2023. Trata-se de um estudo retrospectivo, quantitativo, de natureza descritiva, baseado na análise de 457 prontuários. Os dados revelaram predominância de pacientes do sexo masculino (77,68%), jovens, especialmente entre 20 e 29 anos, e residentes de zonas rurais. A maioria dos acidentes ocorreu nos meses chuvosos, tendo como principal agente etiológico o gênero *Bothrops* (78%), seguido por *Crotalus* (20%). Os casos foram majoritariamente classificados como moderados (47,7%). O tempo entre o acidente e o atendimento variou, sendo que apenas 5,25% foram atendidos em até uma hora. As regiões mais afetadas foram os membros inferiores (90,59%). A maior parte das internações durou entre 2 e 7 dias, e intervenções como drenagem e desbridamento foram realizadas nos casos com complicações locais. O uso de antibióticos foi identificado em 22,1% dos casos, com destaque para a combinação ciprofloxacino e clindamicina. Os resultados reforçam a importância do atendimento precoce e de ações preventivas direcionadas às populações mais vulneráveis, além de subsidiar estratégias de capacitação profissional e planejamento de políticas públicas.

Palavras-chave: Acidentes por animais peçonhentos. Epidemiologia. Saúde pública.

ABSTRACT

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Snakebite accidents represent a major public health problem in Brazil, especially in tropical regions such as Tocantins, where there is a high incidence of these events. This study aimed to describe the clinical and epidemiological profile of snakebite victims treated at the Hospital de Doenças Tropicais (HDT), in Araguaína-TO, between 2020 and 2023. This is a retrospective, quantitative, descriptive study, based on the analysis of 457 medical records. The data revealed a predominance of male patients (77.68%), young patients, especially between 20 and 29 years old, and residents of rural areas. Most accidents occurred in the rainy months, with the main etiological agent being the genus *Bothrops* (78%), followed by *Crotalus* (20%). The cases were mostly classified as moderate (47.7%). The time between the accident and care varied, with only 5.25% being treated within one hour. The most affected areas were the lower limbs (90.59%). Most hospitalizations lasted between 2 and 7 days, and interventions such as drainage and debridement were performed in cases with local complications. The use of antibiotics was identified in 22.1% of cases, with emphasis on the combination of ciprofloxacin and clindamycin. The results reinforce the importance of early care and preventive actions aimed at the most vulnerable populations, in addition to supporting professional training strategies and public policy planning.

Keywords: Accidents caused by venomous animals. Epidemiology. Public health.

RESUMEN

Los accidentes por mordeduras de serpiente representan un importante problema de salud pública en Brasil, especialmente en regiones tropicales como Tocantins, donde hay una alta incidencia de estos eventos. Este estudio tuvo como objetivo describir el perfil clínico y epidemiológico de las víctimas de mordeduras de serpiente atendidas en el Hospital de Doenças Tropicais (HDT), en Araguaína-TO, entre 2020 y 2023. Se trata de un estudio retrospectivo, cuantitativo y descriptivo, basado en el análisis de 457 registros médicos. Los datos revelaron un predominio de pacientes varones (77,68%), pacientes jóvenes, especialmente entre 20 y 29 años, y residentes de zonas rurales. La mayoría de los accidentes ocurrieron en los meses de lluvia, siendo el principal agente etiológico el género *Bothrops* (78%), seguido de *Crotalus* (20%). Los casos se clasificaron mayoritariamente como moderados (47,7%). El tiempo transcurrido entre el accidente y la atención varió, y solo el 5,25% fue tratado en una hora. Las zonas más afectadas fueron las extremidades inferiores (90,59%). La mayoría de las hospitalizaciones duraron entre 2 y 7 días, y se realizaron intervenciones como drenaje y desbridamiento en los casos con complicaciones locales. Se identificó el uso de antibióticos en el 22,1% de los casos, con énfasis en la combinación de ciprofloxacino y clindamicina. Los resultados refuerzan la importancia de la atención temprana y las acciones preventivas dirigidas a las poblaciones más vulnerables, además de apoyar las estrategias de capacitación profesional y la planificación de políticas públicas.

Palabras clave: Accidentes causados por animales venenosos. Epidemiología. Salud pública.

INTRODUCTION

According to the Ministry of Health (2001), snakebite in Brazil has been seen as a disease of the public health system for several years, and was only considered a disease of mandatory notification in 1986. Worldwide there are about 3,000 species of snakes, and of these, only 10 to 14% are considered venomous (PINHO, F.M.O; OLIVEIRA, E.S; FALEIROS, F., 2004). According to the WHO, it is estimated that there are 2,500,000 accidents by venomous snakes per year, worldwide, with a mortality of 125,000 people. In tropical countries, such as Brazil, the number of snakebites per year is close to 27 thousand, most of which are caused by pit vipers (bothrops - 71.41%), rattlesnakes (crotalic - 7.03%), surucucu (lachetic - 3%) and true corals (elapidic - 0.78%) (STRAUCH, Marcelo Abrahão et al., 2018). The most affected Brazilian regions are the central-west and north regions, which can reach 30 accidents per 100,000 inhabitants in some cities (ROJAS, C. A.; GONÇALVES, M. R.; ALMEIDA-SANTOS, S. M., 2007).

The season with the highest incidence is in the hottest and rainiest months, and affects more young men in rural areas (DE PAULA, Ruth Cipriano Milhomem Fortaleza, 2010). The toxins present in snake venom can manifest from local to systemic symptoms, including acute renal failure, which is the main cause of mortality, mainly due to the genus *Crotalus* and *Bothrops* (RODRIGUES SGRIGNOLLI, Livia et al., 2011). Among the complications found, the bothrops accident can progress to necrosis with infection with abscess formation, resulting from the inoculation of bacteria present in the animal's mouth, and presents a mortality rate of only 0.3% in treated cases, but with high morbidity with a substantial degree of sequelae, such as loss of the limb or the affected segment (RIBEIRO, Lindioneza Adriano; GADIA, Rodolfo; JORGE, Miguel Tanús., 2008).

The diagnosis is based only on the clinical picture and epidemiological data, and proof of the circulating venom is not mandatory for diagnostic confirmation (FUNASA, 2001). The request for laboratory tests is necessary to monitor the complications and effect of serum therapy, and includes coagulation time, blood count and renal function (FUNASA, 2001). The management of snakebite depends, above all, on the identification of the causative animal, as it makes it possible to distinguish between venomous snakes through the characteristics of the group – loreal pit, presence of anterior hase, head detached from the body – and, thus, to institute specific treatment as early as possible (PINHO, F. M. O.; PEREIRA, I. D., 2001). The most effective treatment is serum therapy, which must be applied at the appropriate time, dose and route to achieve its maximum efficacy (DE PAULA, Ruth Cipriano Milhomem Fortaleza, 2010).

Therefore, even with the high incidence of snakebites in the country, it is still included in the group of neglected diseases. Therefore, the development of this study in the state of Tocantins, in the city of Araguaína, becomes substantial, since the Hospital for Tropical Diseases is the reference center for the care of accidents with venomous animals and for attending to many cases throughout the surrounding region, including cities in the states of Maranhão and Pará.

A descriptive study of the clinical and epidemiological evaluation of the victims would be beneficial, since the deficit of epidemiological data and the number of hospitalizations and associated complications have a high impact on morbidity and mortality. Therefore, based on these considerations, knowing the epidemiology and describing the clinical course and main associated complications justifies the present study.

METHODOLOGY

TYPE OF STUDY

This is an applied research, with a quantitative approach, of the retrospective descriptive type, based on a survey of data regarding snakebite accidents that occurred between the years 2020 and 2023.

POPULATION AND SAMPLE

The study was carried out based on a data survey at the Hospital for Tropical Diseases (HDT), located in the municipality of Araguaína – TO, a reference in care for cases related to venomous animals in the Tocantins region.

The sample consisted of all medical records of patients who suffered snakebites and were treated at the HDT in the specified period. All available medical records were included in the analysis, ensuring representativeness and comprehensiveness of the cases. The approach adopted was non-probabilistic sampling, considering all records within the time interval.

INCLUSION CRITERIA

The study included all available medical records of cases of snakebite accidents that occurred between January 2020 and December 2023, regardless of the severity of the envenomation or the clinical outcome, as long as the care was properly recorded during this period.

EXCLUSION CRITERIA

No exclusion criteria were applied. All records within the established time interval were considered for analysis, in order to ensure broad representativeness of the cases studied and not to exclude any documented patient.

RISKS

The patients were exposed to minimal risk, related only to the handling of confidential information contained in the medical records. To mitigate these risks, the researchers committed to safeguarding all information in accordance with the guidelines of Resolution No. 466, of December 12, 2012, which regulates research involving human beings.

BENEFITS

The study contributed with epidemiological data regarding snakebites recorded in the HDT of Araguaína, offering subsidies for future investigations aimed at the prevention, clinical and logistical management of snakes with the highest incidence in the region. In addition, it allowed the analysis of the number of hospitalizations, length of hospital stay, complications (such as secondary infections and the need for surgical approach) and possible sequelae.

This information enabled better training of the professionals involved in care and subsidizes the planning of public health actions, with the objective of reducing the damage to the victims. Thus, the results obtained can support public policies aimed at this patient profile, allow early recognition of complications, and serve as a model for other referral centers.

DATA COLLECTION INSTRUMENTS AND PROCEDURES

Initially, the medical records were organized into four groups, corresponding to the years 2020, 2021, 2022, and 2023. The information was collected weekly, through the analysis of each medical record, based on the data collection form (APPENDIX I), which served as a standardized guide for the collection of information.

DATA ANALYSIS PROCEDURES

After collection, the data extracted from the forms were entered into a Microsoft Excel spreadsheet and later transferred to the Statistical Package for the Social Sciences (SPSS) program, used for the preparation of the reports.

The information was organized according to each variable of the form, such as age group most affected, gender, city of origin, season of the year, gender of the snake, severity of envenomation, comorbidities, time to care, need for hospitalization, length of hospital stay, complications, antibiotics used, need for surgical approach, and number of deaths.

Categorical data were expressed as percentages, and continuous data were expressed as mean and standard deviation or median, minimum and maximum values. For variables with normal distribution, Student's t-test was applied; for asymmetric distributions, the Mann-Whitney test was used. The association between categorical variables was analyzed using Pearson's chi-square test, and Fisher's exact test was adopted when the expected frequencies were less than 5. The level of significance adopted was 5%, with a confidence interval of 95%.

ETHICAL ASPECTS

The study was conducted in accordance with Resolution No. 466/12 of the National Health Council, respecting the ethical and legal principles applicable to research with human beings. The researchers maintained complete confidentiality regarding the identity of the patients during and after the research was conducted. The information was treated confidentially, and no names, initials, registration numbers or any data that could identify the individuals were used.

RESULTS

In total, 457 medical records of patients who were victims of snakebite treated at the Hospital for Tropical Diseases (HDT) between 2020 and 2023 were analyzed. There was a clear predominance of males, representing 77.68% of the cases (355 patients), compared to 22.32% of females (102 patients). The distribution by age group showed a higher incidence among young adults, especially in the 20 to 29 age group (18.16%), followed by the 10 to 19 age group (17.07%) and 50 to 59 years old (13.57%). The complete data are shown in Table 1.

Table 1 – Distribution of patients by age group.

| Age Group | Number of Patients | Percentage (%) |
|--------------------|--------------------|----------------|
| 0 to 9 years | 42 | 9,19 |
| 10 to 19 years old | 78 | 17,07 |
| 20 to 29 years old | 83 | 18,16 |
| 30 to 39 years old | 61 | 13,35 |
| 40 to 49 years old | 52 | 11,38 |
| 50 to 59 years old | 62 | 13,57 |
| 60 to 69 years old | 54 | 11,82 |
| 70 years or older | 25 | 5,47 |

Image Source: Survey data, 2025.

Regarding the origin of the patients, Araguaína was the municipality with the highest number of cases (15.75%), followed by Campos Lindos (11.38%) and Babaculândia (5.91%). The monthly distribution of services showed concentration in the months of February (11.16%), May (10.94%), January (10.72%) and April (10.50%). March was the month with the lowest occurrence (5.91%).

The most common type of accident was bothropic, responsible for about 78% of cases, followed by crotalic accident, with 20%. Elapidic and lachetic accidents accounted for less than 1%. Regarding severity, moderate cases predominated (47.7%), followed by severe (26.7%) and mild (23%), as shown in Table 2.

Table 2 – Classification of the severity of snakebites.

| Classification | Number of Cases | Percentage (%) |
|-----------------------|------------------------|-----------------------|
| Lightweight | 105 | 23,0 |
| Moderate | 218 | 47,7 |
| Grave | 122 | 26,7 |

Image Source: Survey data, 2025.

The time elapsed between the accident and hospital care varied widely. Most patients were seen between 1:01 a.m. and 3 a.m. (35.56%) and 3:01 a.m. to 6 a.m. (32.70%). Only 5.25% of the patients were seen within 1 hour after the accident, and 3.58% received care after 24 hours.

Regarding the location of the bite, the lower limbs were the most affected (90.59%), followed by the upper limbs (8.75%). Only three cases were recorded in other parts of the body, such as the head, eye and back.

The length of hospital stay ranged from 1 to more than 15 days. Most remained hospitalized between 2 and 3 days (38.33%) or between 4 and 7 days (36.12%). Hospitalizations of up to 1 day represented 5.95%, while those lasting more than 14 days corresponded to 4.41%.

Regarding the surgical approach, the most performed procedure was drainage (13.57%), followed by debridement (8.10%). Fasciotomy was recorded in four patients (0.88%) and there were two mentions of necrosis (0.44%). No records of amputations were found.

Antibiotics were used in 22.1% of the cases (101 medical records), with the combination of ciprofloxacin and clindamycin being the most frequent (13.57%). Table 3 summarizes the data regarding the use of antibiotics.

Table 3 – Distribution of patients by age group.

| Antibiotic(s) | Number of Cases | Percentage (%) |
|-----------------------------|-----------------|----------------|
| Ciprofloxacin + Clindamycin | 62 | 13,57 |
| Ceftriaxone + Clindamycin | 19 | 4,16 |
| Cephalothin | 7 | 1,53 |
| Ciprofloxacin (isolate) | 5 | 1,09 |
| Clindamycin (isolate) | 4 | 0,88 |
| Amoxicillin + Clavulanate | 4 | 0,88 |

Image Source: Survey data, 2025.

These findings reinforce the epidemiological profile of snakebite accidents in the region served by the HDT, evidencing a predominance of moderate cases, a high frequency of bothrops accidents, and a greater involvement of young male adults living in rural areas.

DISCUSSION

The findings of this study reaffirm the epidemiological profile described in the literature on snakebite accidents in Brazil. The significant predominance of males among the victims (77.68%) corroborates what was observed by PINHO and PEREIRA (2001), who associate this data with greater occupational exposure of young men to rural environments, where there is a greater risk of contact with snakes. Likewise, DE PAULA (2010) also reports that snakebite accidents occur mostly among men living in rural areas, reinforcing the relationship between work activity in the field and vulnerability to accidents.

The age distribution observed in this study, with a higher concentration of cases in the 20 to 29 years (18.16%) and 10 to 19 years (17.07%) age groups, is compatible with the profile of young workers described by PINHO and OLIVEIRA (2004), who point to the predominance of victims of economically active age. This data highlights not only the importance of the accident from a clinical point of view, but also from a social and economic point of view, considering that the main victims are part of the active population (PINHO; PEREIRA, 2001).

The highest concentration of accidents in the months of January, February, April and May coincides with the rainy season in the northern region of Brazil, a period in which there is intensification of agricultural activities and greater activity of snakes. This seasonal pattern has already been described by DE PAULA (2010), who relates the increase in cases to environmental conditions favorable to snake mobility and human presence in the field.

Regarding the etiology of accidents, the genus *Bothrops* was responsible for approximately 78% of the cases, followed by *Crotalus* (20%). These data follow the national pattern described by STRAUCH et al. (2018), in which botroscopic accidents represent about 71% of cases. The predominance of botroscopic accidents is also associated with the aggressive behavior of these snakes and the wide geographical distribution of the species, as described by RIBEIRO, GADIA and JORGE (2008).

Most accidents were classified as of moderate severity (47.7%), followed by severe cases (26.7%). Such proportions are consistent with the description of PINHO, OLIVEIRA and FALEIROS (2004), who highlight that most venomous accidents present mild to moderate conditions, especially when care is performed early.

The time interval between the accident and the care was variable, but only 5.25% of the patients were seen within one hour. According to FUNASA (2001), early care — ideally in the first 6 hours — is decisive for prognosis, significantly reducing complications. RODRIGUES SGRIGNOLLI et al. (2011) also point out that delay in treatment can result in acute renal failure, especially in crotalic cases.

Regarding the location of the bite, it was observed that the lower limbs were affected in 90.59% of the cases. This data is consistent with PINHO and PEREIRA (2001), who state that about 80% of bites occur in the lower limbs, generally in workers who do not use adequate protection, such as boots or leggings.

The most frequent surgical interventions were drainage (13.57%) and debridement (8.10%), evidencing the presence of local complications such as infection and necrosis, commonly associated with bothrops accidents. Such manifestations are described by RIBEIRO, GADIA and JORGE (2008), who highlight necrosis and secondary infections as typical complications of Bothrops envenomation.

The use of antibiotics occurred in 22.1% of the cases, with the combination of ciprofloxacin and clindamycin being the most frequent (13.57%). According to FUNASA (2001), the use of antibiotics should be reserved for cases with clinical signs of infection, which is in accordance with the practice observed in this sample.

Thus, the results obtained in the present study are in line with the epidemiological and clinical data already established in the scientific literature, reinforcing the importance of early care, recognition of the regional pattern of accidents, and adequacy of clinical management based on the identification of the gender of the snake involved.

CONCLUSION

The present study allowed us to trace the clinical and epidemiological profile of snakebites treated at the Hospital for Tropical Diseases of Araguaína between 2020 and 2023. There was a predominance of male, young, and rural victims, which corroborates the data in the literature regarding the population group most vulnerable to this type of accident. Most cases were classified as moderate, with a predominance of botropic accidents and involvement of the lower limbs. These findings reinforce the need for preventive measures aimed at the most at-risk public, especially in the context of agricultural activities during the

rainy season. The importance of early care is also highlighted, since the time elapsed between the accident and the start of treatment directly influences the severity of complications, such as secondary infections and the need for surgical interventions. The judicious use of antibiotics and adequate clinical management proved to be fundamental for the reduction of associated morbidity and mortality.

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