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CHAGAS DISEASE IN THE STATE OF PIAUI: INTEGRATIVE REVIEW

DOENÇA DE CHAGAS NO ESTADO DO PIAUÍ: REVISÃO INTEGRATIVA

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ABSTRACT: Objective: to examine publications on Chagas disease in the State of Piauí, in order to provide a comprehensive and scientifically based view on this topic with the purpose of identifying the incidence and prevalence rates of the disease in the state. **Method**: this study was developed through a systematic review, which included original articles from primary studies in English, Spanish, e Portuguese and published in the last five years. **Results:** of the 12 articles analyzed, 6 studies were selected that met the eligibility criteria. **Conclusion:** Chagas Disease has high prevalence rates in the state of Piauí and there are few publications and epidemiological surveys that address the topic. There is a perceived need for more studies and dissemination of data to support the health system and the population in preventing and reducing the number of cases of the disease.

KEYWORDS: Chagas disease. Trypanosoma cruzi. Prevalence. Incidence.

RESUMO: Objetivo: examinar as publicações sobre a doença de Chagas no Estado do Piauí, a fim de fornecer uma visão abrangente e embasada cientificamente sobre esse tema com o propósito de identificar a quais taxas de incidência e prevalência da doença no estado. **Método:** este estudo foi desenvolvido através de revisão sistemática, através da qual incluiu-se artigos originais de estudos primários em inglês, espanhol e português e publicados nos últimos cinco anos. **Resultados:** dos 12 artigos analisados, foram selecionados 6 estudos que atenderam os critérios de elegibilidade. **Conclusão**: A Doença de Chagas tem altos índices de prevalência no estado do Piauí e que há poucas publicações e inquéritos epidemiológicos que abordem a temática. Percebe-se a necessidade de mais estudos e divulgação de dados para apoiarem o sistema de saúde e a população na prevenção e redução no número de casos da doença.

PALAVRAS-CHAVE: Doença de Chagas. *Trypanosoma cruzi*. Prevalência. Incidência.

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INTRODUCTION

Chagas disease (CD) is caused by a protozoan called Trypanosoma cruzi. It is an anthropozoonosis known as American trypanosomiasis, which is extremely common and has significant morbidity and mortality. It presents a clinical course that is divided into two phases. An acute phase, which can be observed clinically, and a chronic phase, which can be of an undetermined nature, cardiac, digestive or cardiodigestive. [1]

It is considered an important endemic disease in the Americas, mainly affecting populations in situations of greater social vulnerability. According to the World Health Organization (WHO), this disease belongs to the list of Neglected Tropical Diseases, affecting people who are directly affected by the lack of public policies aimed at preventing vectorial transmission of T. cruzi, which is the most important source of infection in humans. [2, 3, 4, 5]

Social determinants include poverty, food, housing, and education, among others. Biological determinants include the virulence of the parasite and the susceptibility of affected individuals. Poor social, financial, educational, and housing conditions, in addition to the destruction of the natural environment and uncontrolled migrations, contribute significantly to the increase in the number of cases diagnosed with Chagas disease due to the domiciliation of insect vectors. Deforestation can reduce the natural food supply, forcing both the animals and potential reservoirs of T. cruzi to change their behavior to seek food and shelter in artificial environments. [3, 6]

CD is a disease that has been monitored by the Brazilian Ministry of Health and was recently included in the National List of Compulsory Notification, through Ordinance No. 264 of February 17, 2020. [7]

The World Health Organization (WHO) states that CD is part of the list of neglected tropical diseases (NTDs) that affect people in conditions of poverty, vulnerability and are also related to social problems, including stigma. [8]

Current data indicate that there are 16 to 18 million infected people worldwide, with approximately 2.5 million infected in Brazil. It is one of the most neglected tropical diseases in the world, with approximately 30 thousand new cases, with an average of 200 cases in Brazil, and 10 thousand deaths reported in Latin America each year. [3, 4, 5]

The change in the epidemiological framework of Chagas disease in Brazil, as a result of vector control and transfusion actions since the 1970s, led to changes in surveillance actions and strategies. Even so, the risk of vector transmission of CD persists due to the existence of indigenous triatomine species with high colonization potential, the presence of reservoirs of Trypanosoma cruzi and the increasingly frequent proximity of human populations to these environments, in addition to the persistence of residual foci of Triatoma infestans. [1, 9]

In Brazil, from 2018 to 2022, 1,685 acute cases of the disease were reported. During this period, 5 cases were reported in Piauí. It is known that underreporting of cases is something important to be observed, since there is still a lack of studies and dissemination of information. [10]

It is known that greater knowledge about Chagas disease will lead to important progress in the fight against the disease and its vectors, leading the inhabitants of endemic areas to a better understanding of their reality and to the acquisition of habits that allow them to be the protagonists of their own well-being.

In view of these data and the negative impact of Chagas disease, it is crucial to invest in research that explores the effectiveness and benefits of dissemination and studies on this topic. Therefore, the objective of this article is to conduct a systematic review to examine publications on Chagas disease in

the state of Piauí in order to provide a comprehensive and scientifically based view on this topic with the purpose of identifying the incidence and prevalence rates of the disease in the state.

METHODOLOGY

The study was developed through a systematic review, following the precepts of an exploratory study. It is clarified that the process of selecting studies eligible for the study objectives and in accordance with the established inclusion and exclusion criteria was divided into four phases following the criteria of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA): the first phase (identification) resulted in the search for studies published in the databases using the defined descriptors; in the second phase (selection), the pre-established filters were applied; in the third phase (eligibility), studies that did not address the theme were removed; in the fourth and final phase (inclusion) the final sample of the study was found.

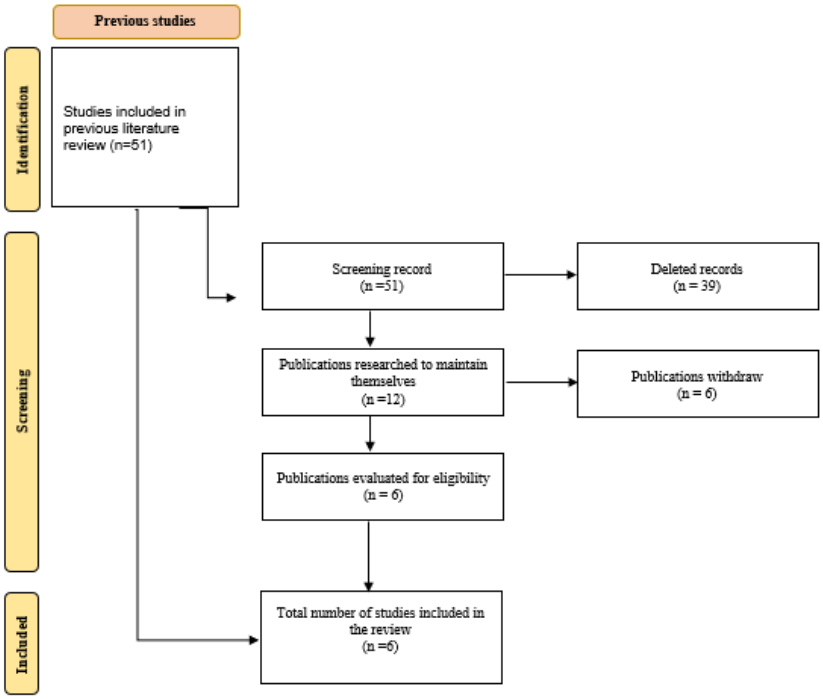
The search was performed in the Medline (PubMed) and SciELO databases using the descriptors Chagas Disease; Piaui; e Epidemiology, combined with the Boolean operator AND.

Original articles of primary studies in English/Spanish/Portuguese were included; published in the last five years, and using different methodologies. Thus, the exclusion criteria were all incomplete studies, dissertations, theses, monographs, Papers, as well as those that did not address the topic and that did not belong to the period between 2019 and 2024.

Initially, a total of 51 studies were obtained for analysis. When the information was extracted from them, according to the pre-established exclusion criteria, 6 studies were eligible. Thus, the studies were systematized, organizing them according to author, year, journal, type of study and objectives. Sequentially, the information was extracted from the selected studies, thus allowing the qualitative data to be treated through content analysis, then the results were interpreted and the review was presented, thus allowing a synthesis of knowledge.

Therefore, the data obtained were presented in tables, analyzed and interpreted according to the idealized objective. Figure 01 shows the study selection flowchart.

Figure 01: Flowchart of selection and inclusion of studies in the review.



Source: Authors, 2024.

RESULTS AND DISCUSSION

The consolidated results of the selected articles are organized in tables 1 and 2 below.

Table 1: Characterization of articles according to title, authorship, year, journal and type of study

N°	TITLE	AUTHORSHIP	YEAR	MAGAZINE	TYPE OF STUDY
1	Mortality from neglected tropical diseases in Piaui, Northeastern Brazil: temporal trends and spatial patterns, 2001-2018	Brito [11]	2022	Epidemiology and Health Services	Mixed ecological study
2	Epidemiological aspects of Chagas disease in the state of Piauí (Northeast Brazil) in the period 2010–2019	Santana et al. [10]	2021	Tropical Medicine and International Health	Analytical cross-sectional study
3	Seroprevalence of Chagas disease in rural communities at Campinas do Piauí city, Brazil	Santana [12]	2021	Tropical Medicine and International Health	Epidemiological study
4	Triatomine bugs (Hemiptera, Reduviidae, Triatominae) in the Domiciles of the Guaribas Valley Territory, in Northeastern Brazil	Mendes-Sousa et al. [13]	2020	Journal of the Brazilian Society of Tropical Medicine	Epidemiological study
5	Spatiotemporal trends of Chagas disease-related mortality in the Northeast of Brazil, 2007–2017	Sousa et al. [14]	2020	Parasitology	Ecological study
6	Spatial distribution of synanthropic triatomines in Piauí State, Northeastern Brazil	Santos [15]	2020	Journal of the Institute of Tropical Medicine of São Paulo	Ecological study

Source: Authors, 2024.

Table 2: Categorization of studies according to objective and main findings.

N°	OBJECTIVES	MAIN FINDINGS
1	To analyze temporal trends and spatial patterns of mortality from neglected tropical diseases (NTDs) in Piauí, Brazil, 2001-2018	Mortality from NTDs in Piauí remains high, particularly from Chagas disease, among the most vulnerable groups, with the highest rates concentrated in the southwest of the Semiarid macroregion, northeast and south of the Cerrados.
2	To evaluate epidemiological aspects of ChD in the state of Piauí, located in northeastern Brazil.	Vector transmission of ChD in the state of Piauí remains active.
3	To assess the seroprevalence of Chagas disease in the population of rural communities in the city of Campinas do Piaui, State of Piauí Brazil.	The results indicate that Chagas disease remains actively transmitted in the municipality of Campinas do Piauí, as reported by the occurrence of a case in a resident under 10 years of age. The region is endemic for Chagas disease, as observed by the high prevalence of positive cases.
4	To analyze the geographic distribution of triatomines and their natural T. cruzi infection in the territory of the Guaribas Valley, a region with endemic CD, in northeastern Brazil.	This is the first report of T. b. macromelasoma and T. juazeirensis in the Guaribas Valley territory. The persistence of triatomine species in households in an area endemic for Chagas disease emphasizes the relevance of entomological assessment, surveillance measures and vector control in the studied area.
5	To identify the spatiotemporal trends in mortality from CD in Northeast Brazil.	The study identified the spatial pattern of mortality due to CD mainly in Bahia and Piauí, highlighting priority areas in the planning and control strategies of health services.
6	To describe the spatial distribution and evaluate entomological indicators of synanthropic triatomines in the State of Piauí Northeastern Brazil.	The rates of triatomine dispersion were much lower in the North, when compared to the Southwest, Southeast and North-Central macro-regions. The infestation rates were higher in the Southwest and Southeast and the rates of intra-household infestation varied during the study period, reaching high values in all regions. The highest rates of positivity for trypanosomatids of T. brasiliensis and Panstrongylus spp. were in the Southeast region. A significant proportion of the municipalities of the State of Piauí present parameters that indicate a risk of Chagas disease by vector transmission.

Source: Authors, 2024.

Published studies demonstrate the prevalence and incidence patterns of CD in Piauí. It can be observed that the state has a high distribution pattern in several regions of the state.

Brito [11] studied, through a mixed ecological study, the temporal trend and spatial patterns of mortality from neglected tropical diseases in Piauí, Brazil, from 2001 to 2018. Of the 2,609 deaths from NTDs in Brazil during the period (4.60/100,000 inhabitants), 55.2% were due to CD. There was a higher risk of death in males, age ≥60 years, municipalities with medium social vulnerability, smaller population size, and the Piaui cerrado macroregion. The authors found an increasing trend in mortality rates from 2001 to 2008 and a reduction in 2009 to 2018, and concluded that mortality from NTDs in Piauí remains high, particularly from CD.

Santana [12] assessed the seroprevalence of Chagas disease in the population of rural communities in the municipality of Campinas do Piauí, in the state of Piauí, through a cross-sectional study. The authors analyzed 763 blood samples from 161 residences in 18 rural communities collected from residents aged between 2 and 92 years, and verified through the indirect immunofluorescence reaction

technique that 44 (5.8%) of the results were positive, with 40 (5.2%) confirmed by the enzymatic immunosorbent assay technique. Among the communities studied, reactive cases were observed in 15 of them, and these cases were distributed according to age group as follows: 1 case from 0 to 10 years; 13 cases from 11 to 60 years; and 30 cases over 61 years. The authors concluded that CD remains with active transmission in the municipality of Campinas do Piauí, therefore being considered an endemic region for CD, as observed by the high prevalence of positive cases.

Santana [10] aimed to evaluate the epidemiological aspects of CD in the state of Piauí through a cross-sectional study carried out based on data collection from the Notifiable Diseases Information System (SINAN) of suspected and confirmed cases of acute CD in the state, from 2010 to 2019. According to this survey, 517 suspected cases of acute CD were reported in Piauí, with 70 cases (13.5%) confirmed. In 88.5% of the confirmed cases, confirmation occurred by laboratory diagnosis. Most of the confirmed cases occurred in municipalities located in the semiarid region, with the municipality of São João do Piauí having the highest number of cases. Regarding sociodemographic data, females represented 55.7% of the cases, people over 50 years old (55.7%), with three cases in people up to 18 years old and less than 8 years of education (67.1%). 77.9% of confirmed cases were likely transmitted by vector. The authors conclude their final considerations by confirming that vector transmission of CD in the state of Piauí remains active, and emphasize the need for housing improvement programs and more effective epidemiological surveillance to control disease transmission in the state.

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Sousa [14] outlined an ecological study carried out through the Mortality Information System (SIM). The authors found that the North and Northeast regions of Brazil have a higher mortality rate due to CD, especially in Bahia, with 611 deaths in 2019. Although the state of Piauí has a low mortality rate compared to other states, with 53 deaths in 2019 and 46 deaths in 2022, according to data from the SIM of the State Secretariat of Health of Piauí (SESAPI), it stands out for being an endemic region and, therefore, requires strategies for planning and controlling health services.

Santos [15] proposed to describe the spatial distribution and evaluate entomological indicators of synanthropic triatomines in the state of Piauí through surveillance data on the detection, identification and evaluation of natural infection by trypanosomatids of triatomines in the state from 2014 to 2017. The authors found that a significant proportion of the municipalities in Piauí present entomological parameters that indicate a risk of Chagas disease by vector transmission, mainly in the semiarid and caatinga regions, due to the characteristics of these regions that are extremely favorable to the presence of triatomine species typical of the territory and the peculiar interaction between humans and the environment in the semiarid region favors human contact with transmitting insects. The rates of intra-household infestation varied during the study period, reaching high values in all regions, and therefore

a significant proportion of the municipalities in the state of Piauí present entomological parameters that indicate a risk of Chagas disease by vector transmission.

Even though cases are reported in the official systems of the Ministry of Health, the prevalence and incidence of cases is still high, which requires a closer look at public social and health policies, since this is a disease that causes numerous negative impacts on the lives of the population and that this disease is directly linked to situations of social vulnerability of the population.

Based on the studies analyzed, it was noted that the scientific collection on the subject in the state of Piauí is quite low, despite this being an area considered endemic by the competent bodies. Thus, it is reflected on the need to develop more studies, especially those aimed at understanding the epidemiological aspects as a way of subsidizing actions aimed mainly at preventing the disease, assisting in the implementation and/or improvement of public policies.

CONCLUSION

Based on the data presented, it can be concluded that CD is endemic in the state of Piauí, even though there has been a significant decrease in mortality from CD over time in this state.

It was also noted that the scientific collection on the subject is not very extensive. Thus, there is a need for more studies and dissemination of data to support the health system and the population in preventing and reducing the number of cases of the disease in this region, thus contributing to the improvement of intersectoral and integrated public policies and practices in health care, surveillance, prevention and control of neglected tropical diseases in the state of Piauí.

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