Health-disease process of acute chagas disease according to the single one health

Abstract *The One Health approach emerges as an innovative perspective to understand the health-disease process of Acute Chagas Disease (ACD). The objective of this study was to identify scientific evidence on the health-disease process of ACD through the one-health approach. An integrative literature review study, which had as its guiding question "What is the current scientific evidence on the health-disease process of acute Chagas disease according to the single health approach?". A greater number of publications can be seen from 2021. The following categories were defined from the 13 studies found: single health approach to Chagas disease, spatial epidemiology of Chagas disease, control and transmission factors of Chagas disease, health indicators in Chagas disease and educational technology in Chagas disease. The results of this literature review, while showing greater proportions of studies involving control and transmission of CD, also demonstrate fields of study that are still little explored by national and international scientific literature, such as in the field of technologies for CD, reflecting a large gap to be filled with future research on DC. This study contributed to expanding the debate on the importance of an integrative approach in health research and encouraging the search for more comprehensive solutions for CD.*

Key words*Chagas disease, One Health, Health-Disease Process*

Introduction

Acute Chagas Disease (ACD) is an infectious disease caused by the protozoan *Trypanosoma cruzi*, transmitted mainly by the insect vector Triatominae, also known as "kissing bug". This endemic disease persists as one of the most neglected tropical diseases that affects 6 to 7 million people in the world, especially in the different regions of Latin America, representing a serious public health problem (Heukelbach *et al*., 2021; Pereira – Silva *et al*., 2021).

The single health approach, also called an integrative approach, emerges as an innovative perspective for understanding the health-disease process in this disease, promoting a broader and more holistic view of the individual and their relationship with the environment (Sinclair Jr., 2019). One Health, developed based on the understanding of the relationship between human diseases and animal diseases, leads to the prevention and control of zoonoses (Fei *et al*., 2022).

Therefore, understanding the health-disease process of ACD from this perspective can provide new perspectives for the diagnosis, treatment and prevention of the disease, as well as for managing its consequences (Quaresma *et al*., 2023).

The relevance of this research lies in the fact that, although ACD has been known for decades, its approach has been predominantly segmented into isolated studies of each component of the health-disease process. The single health perspective opens new horizons for a more comprehensive understanding, allowing the identification of gaps in current knowledge and the formulation of more effective proposals to combat this condition (López-García; and Gilabert, 2023).

Through the integration of different disciplines and perspectives, the aim is to improve disease control strategies, as well as contribute to the well-being of affected populations. Therefore, this study aims to identify scientific evidence on the health-disease process of ACD through a single health approach, seeking to understand how biological, socioeconomic, cultural and environmental factors interact and influence the course of this disease.

Methods

Study of the Integrative Literature Review (RIL) type whose research method aims to investigate a certain subject already discussed in the literature following specific protocols, search strategies, careful selection of the sample for analysis of the results. It seeks to understand and analyze existing studies with the aim of correlating studies with each other, bringing new views and interpretations in order to contribute scientifically to the identification of gaps and flaws in studies, as well as proposing and promoting discussions about the topic studied (Galvão and Ricarte, 2019).

This review follows what was exposed by Sousa *et al.* (2017), being organized into six distinct phases: definition of the research question; establishment of the data source and

inclusion and exclusion criteria; definition of the information to be extracted from the selected studies (categorization of studies); evaluation and critical analysis of findings, identifying differences and conflicts; interpretation of results and synthesis of evidence found.

To conduct the research, a guiding question was developed based on the PICo strategy, an acronym for P: population; I: interest; Co: context. For this study, P was assigned: health-disease process; I: acute Chagas disease; Co: One Health. Therefore, the following guiding question was used: "What is the current scientific evidence on the health-disease process of acute Chagas disease according to the one health approach?

A search was carried out in the following databases: PubMed, SciELO, SCOPUS and Virtual Health Library (VHL). The descriptors validated in DeCS/MeSH in Portuguese and English were used: "health-disease process" or "Health-Disease Process"; "Chagas disease" or "Chagas Disease"; and "São Paulo" or "One Health", using the Boolean operators AND or OR.

As inclusion criteria, complete, free articles were considered, which covered the objective and research questions, published between January 2013 and August 2023, in Portuguese, English and Spanish. The exclusion criteria were articles that were repeated in the search, incomplete publications, other types of documents and studies that did not answer the research questions.

For textual analysis, the Content Analysis research technique proposed by Laurence Bardin (2011) was used, which occurs through the process of categorizing scientific articles, classified and grouped by themes and elements that constitute each one.

The text organization and selection process was defined following the PRISMA Flow Diagram 2020 instrument. The content extracted from the texts was organized in a table containing the most relevant information extracted from the studies according to authorship,

year of publication, periodical, methodological characteristic of the study, objectives and main search results.

Finally, the identified evidence was gathered, organized and synthesized according to the categories defined in this study, as well as the researchers' conclusions and critical-reflective analysis based on the research findings.

Figure 1 presents the flowchart of the organization and selection of articles based on the PRISMA flow diagram 2020 instrument.

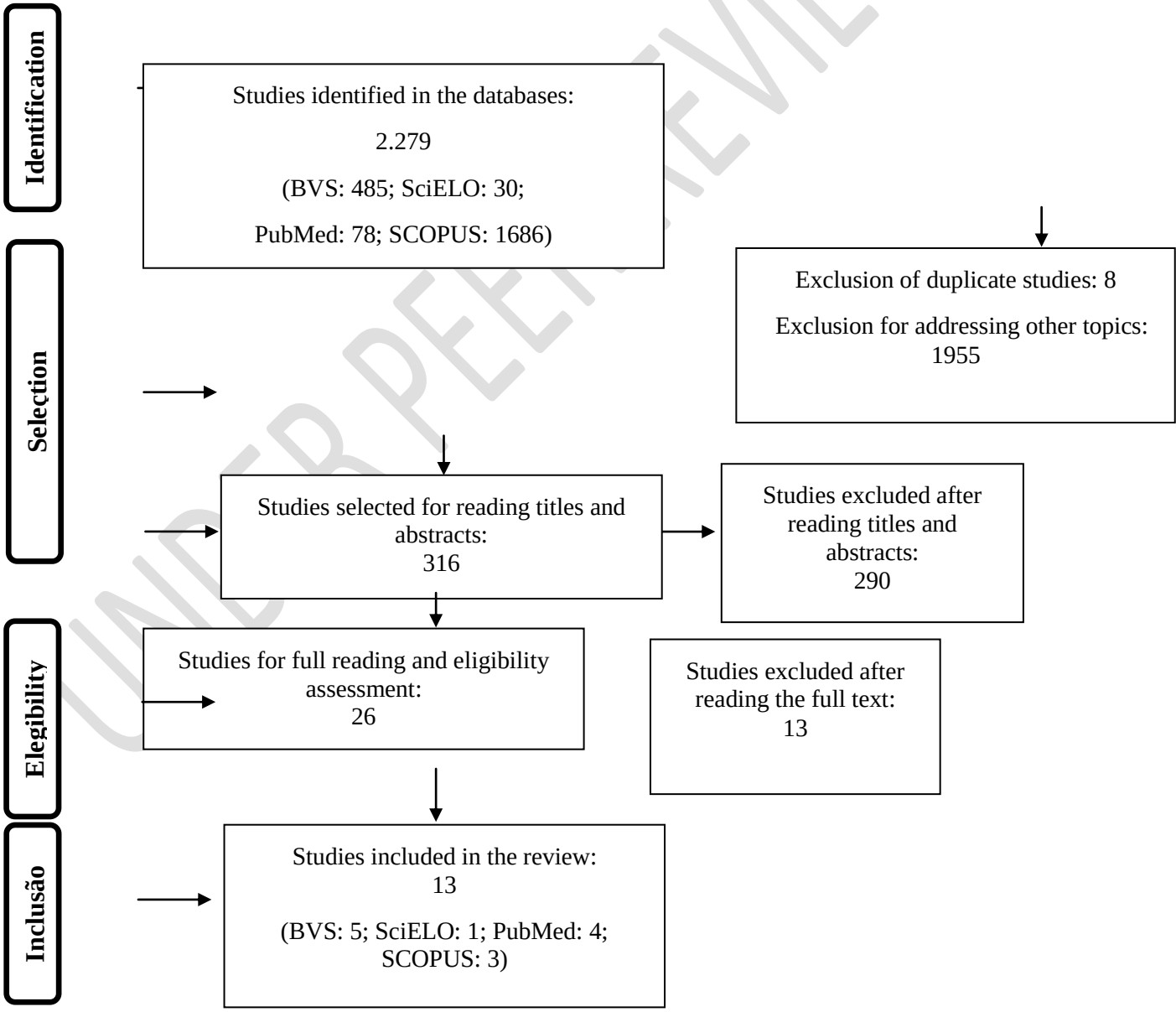

Figure 1: Article selection flowchart.

Source: Own authorship (2024).

Results and discussion

After searching the scientific databases, using the search filters according to the established inclusion and exclusion criteria and reading the titles, abstracts and full text in full, the final sample consisted of 13 articles. Such studies are distributed in the following VHL databases: 5; SciELO: 1; PubMed: 4; SCOPUS: 3.

These selected articles are presented below in table 1, so that their characteristics and respective information for each publication can be observed: author, year, periodical, methods, objectives and main results.

Table 1 - Characteristics of the selected studies.

Author, year and periodic	**Methods**	**Objectives**	**Main results**
Alejandra Lopez-García; Juan A. Gilabert, Trop Med Int Health, 2023.	Systematic review of studies in which clinical cases of oral transmission were confirmed by parasitological and/or serological tests that included epidemiological investigation of sources of infection, vectors and reservoirs	To analyze acute outbreaks of Chagas disease (CDC) through a qualitative systematic review and discuss the determinants for their prevention and control.	Thirty-two outbreaks (1965–2022) were analyzed. The main foods involved in oral transmission outbreaks are homemade fruit juices. Different species of vectors have been identified. The reservoirs were mainly dogs, rodents and large American opossums (didelphids). Conclusion: Under the One Health approach, environmental changes are one of the factors responsible for the increase in oral transmission of CD. Entomological surveillance of vectors and control of changes in wild and domestic reservoirs and

			reinforcement of hygiene measures around food in domestic and commercial settings are required.
Rachel E. Busselman and Sarah A. Hamer. Annual Review of Animal Biosciences, 2022.	Ecological, quantitative study.	This review focuses on triatomine distributions and animal infections in the southern United States.	A quantitative synthesis of available US data from triatomine bloodmeal analysis studies shows that dogs, humans, and rodents are key triatomine feeding taxa. Imperfect and unvalidated diagnostic tools for wildlife complicate the study of animal T. cruzi infections, and integrated vector management approaches are needed to reduce transmission in the wild. The diversity of animal species involved in Chagas disease ecology underscores the importance of a One Health approach to disease research and management.
Emma Taylor et al., International Health, 2022.	The nine countries that make up the Amazon basin were considered (Bolivia, Brazil, Colombia, Ecuador, French Guiana, Guyana, Peru, Suriname and Venezuela) in the formation of a new network.	Report the work of the Amazonian Tropical Bites Research Initiative (ATBRI) Project with the aim of creating transdisciplinary solutions to the problem of animal bites that lead to	ATBRI seeks to unify the currently disjointed approach to controlling neglected zoonoses across Latin America.

		diseases in Amazonian communities.	
Javier Martín-Escolano, et al. ACS Infectious Diseases, 2022.	Literature review	Provide a comprehensive update on our understanding of the current life cycle, new morphological forms, and genetic diversity of T. cruzi, as well as identify intervention points in the life cycle where new drugs and treatments could achieve a parasite cure.	The study described the life cycle of *Trypanosoma cruzi* and the main challenges for developing effective treatments for Chagas disease. In recent years, technical advances in several areas, combined with changes in research practice and a more favorable financing scenario, have contributed to a better understanding of the biology and life cycle of this parasite, which has made it possible to profile the ideal of both drugs and therapeutic options for the treatment of CD.
B. K. M. Case et al., a. PLoS Negl Trop Dis., 2022.	Epidemiological study of spatial, quantitative analysis. The method fits Bayesian geostatistical models to make spatially informed predictions while	Describe spatial epidemiology and adaptive targeted sampling for management of the Chagas disease vector Triatoma dimidiata.	A key feature of the method is the use of a single exploration parameter, α, to control the transition rate between these two design targets. In a simulation study using empirical data from five villages in southeastern Guatemala, we test our method using a range of values for α, and find that it can consistently select fewer houses than random sampling

	gradually transitioning from prioritizing homes based on forecast uncertainty to targeting high-risk homes of infestation		while reducing the rate of village infestation below a certain threshold. We further found that when additional socioeconomic information is available, much greater savings are possible, but achieving the infestation rate target is less consistent, especially among less exploratory strategies. Our results suggest new options for implementing long-term control of T. dimi diata.
Melissa N. Garcia et al., PLoS Negl Trop Dis., 2016.	Ecological, quantitative study.	One Health Interactions of Chagas disease vectors, canine hosts, and human residents along the Texas-Mexico border.	To determine the prevalence of infection, we tested sera from coyotes, stray domestic dogs housed in public shelters, and residents participating in related research and found 8%, 3.8%, and 0.36% positive for T. cruzi, respectively. PCR was used to determine the prevalence of T. cruzi DNA in vectors collected from peridomestic sites in the region, with 56.5% testing positive for the parasite, further confirming the risk of transmission in the region.
Tania C. Araujo-Jorge et al. Plos Neglected Tropical Diseases, 2021.	Case study	Our research group has developed and tested under field conditions such as innovative social	CE21 was shown at local educational institutions (schools, universities) in four cities, involving 2,117 people who evaluated the 41 activities carried out. Citizens and healthcare

		technology: an interdisciplinary itinerant education scenario called "Chagas Expresso XXI" (CE21).	professionals enjoyed acquiring information related to blood, parasites, vectors, reservoirs, environmental changes and social determinants of CD. In addition, local legacies of 600 participants are volunteers in health promotion groups and DC associations, local empowerment groups fighting for better health conditions and 05 mural paintings. We observed that 81% of participants ignored the possibility of treating CD while 52% of participants requested a blood test for CD showing seropositivity in 20% of them.
Adriana Gisela Martínez-Parra, Maria Yaneth Pinilla-Alfonso, César Ernesto Abadía-Barrero. Social Science & Medicine, 2018.	Data for our ethnographic study was collected in 2013 and included participants observation in two main endemic areas in Colombia. Furthermore, 81 people belonging to four groups (patients and families; health professionals;	Identify and characterize the sociocultural dynamics that influence CD health care in Colombia.	Data analysis resulted in the identification of three main sociocultural dynamics. Local understandings: Patients reported confusion surrounding disease transmission, treatment efficacy, and development of future complications. Knowledge and training of providers: Gaps in the knowledge and training of professionals mainly affect the primary level of care in rural areas. Professionals undergo minimal training during medical school and do not have access to continuing

	researchers; and officials) They were recruited using the snowball sampling technique and participated in informal and semi-structured interviews. People from the first two groups also participated in social activities cartography exercises		education. In contrast, physicians working in tertiary university hospitals or the DC unit of the Colombian National Institute of Health (NIH) demonstrated great knowledge and competence. Health system barriers: Colombia's market-based health system reform has increased access barriers, which has had a major impact on CD care. We identified geographic and bureaucratic itineraries that depended on the type of insurance plan, insurance contracts with service-providing institutions and service levels.
Velázquez-Ramírez DD, Pérez de Léon AA and Ochoa-Díaz-López H. Front. Public Health, 2022.	Bibliographic study	Review of American trypanosomiasis in southern Mexico highlights Surveillance opportunity Research to advance control Through the One Health approach.	Adapting the One Health approach to AT research is an opportunity to advance surveillance and control efforts for this neglected disease that disproportionately burdens rural and semi-rural populations in southern Mexico. This can be a challenge in the states of Chiapas and Oaxaca where it has been argued that the situation has reached a crisis point and where other vector-borne diseases affecting urban populations divert attention from AT (71, 72). However, the official action plan to

			prevent and control AT provides a path forward for transdisciplinary collaboration involving human and animal health professionals (31), which may facilitate the implementation of One Health research to prevent AT in rural areas and communities. semi-rural.
JM Schurer et al., One Health, 2016.	Systematic review of gray and peer-reviewed literature databases in English and Chinese.	Identify zoonotic endoparasite research using an HO approach in community settings.	Our review identified 32 articles where samples collected simultaneously from all three domains of HO (people, animals, and environment) were evaluated for endoparasite infection or exposure. Study sites spanned 23 countries and research teams brought together an average of seven authors from two countries. Surveillance for bloodborne and gastrointestinal protozoa was reported most frequently (19 of 32; 59%), followed by trematodes, nematodes, and cestodes. Laboratory techniques varied greatly between studies, and only 16 identified parasites using Polymerase Chain Reaction (PCR) in all three OH domains. Our review identified important gaps in parasitology research that operates under an OH framework. We

			recommend that researchers working in the domain of zoonotic diseases strive to assess all three domains of HO, integrating modern molecular tools as well as techniques provided by economists and social scientists.
Little, S.E. Veterinary Parasitology, 2013.	Literature review	Analyze key aspects of vector-borne disease maintenance cycles that present challenges to health in the Americas, including the emergence of vector-borne disease agents, the impact of habitat changes on vector-borne disease transmission, and the complexities faced in developing effective control programs.	New strategies will be needed to effectively combat these infections in the future if we are to succeed in the goal of promoting an environment that supports healthy animals and healthy people.
Sheena Francis et al., One Health, 2021.	Comprehensive literature review on reports regarding insect-borne NTDs in the Caribbean and Latin America was conducted.	The aim of the article is to raise awareness of insect-borne NTDs important to humans and to assess the factors affecting this control in the English-speaking	Potential risk factors for arthropod-borne NTDs in the English-speaking Caribbean are summarized. The mosquito appears to be the main insect vector of human importance in the region in question. Arthropod vectors of diseases of veterinary importance are also relevant because

		Caribbean.	they affect the livelihoods of farmers in economies heavily based on agriculture. Other NTDs may also be in circulation, assessed by the presence of antibodies in Caribbean individuals. However, routine diagnostic tests for specific diseases are expensive and tests may not be performed when diseases are not prevalent in the population. It appears that only a few English-speaking Caribbean countries have examined secondary pathogen reservoirs or evaluated the effectiveness of their insect control methods. As such, the disease risk assessment appears incomplete. While ongoing control is financially demanding, an integrated, multi-sectoral approach can help divert costs. These interventions are now being promoted by health agencies in the region and several countries are creating and exploring the use of new tools to be incorporated into their insect vector control programs.
Fernanda Cardoso Lanza et al. Journal of the Brazilian Society of	A mixed ecological and descriptive study was carried out with secondary	Evaluate CD indicators (prevalence and mortality) in MRS.	São Francisco do Conde was one of the municipalities with the highest mortality rates from CD. Seroprevalence rates varied by year

Tropical Medicine, 2023.	data. We analyzed data from 2008 to 2015: deaths from CD, self-reported cases of CD and blood donors not negative for T. cruzi infection.		and municipality; those with the highest values were 2008: Vera Cruz, 2009: Mata de São João, 2010: Dias D'Ávila, 2011 and 2015: São Francisco do Conde, 2012: São Sebastião do Passé, and 2013 and 2014: Pojuca. Spatial correlations between municipalities were not detected.

Source: Own authorship (2024).

Regarding the language found in the selected articles, around 100.00% of them (13) were published in English. Regarding the year of publication, of these 13 articles, a frequency of publications in different time periods was observed, with one (1) study in 2013, 2 (two) in 2016, one (1) study in 2018, two (2) in 2021, five (5) in 2022 and two (2) in 2023. Thus, a greater number of publications can be seen from the year 2021 onwards, with greater emphasis on the year 2022.

After reading and analyzing the sample content, the following categories were defined to facilitate the understanding of the subject and the synthesis of the evidence found: 1) Single health approach to Chagas disease; 2) Spatial epidemiology of Chagas disease; 3) Control and transmission factors for Chagas disease; 4) Health indicators in Chagas disease and 5) Educational technology in Chagas disease. Such categories, as shown, were calculated from the 13 different studies found in this review and can be viewed below, in alphabetical order.

Category 1 – One Health Approach to Chagas Disease

In this category, around 5 articles addressed the theme of One Health, each in a specific context. The term “One Health” refers to a concept that encapsulates and highlights the inherent interrelationship of the health of people, animals and the environment. Vector-

borne infections are central links in this concept applied to health studies. OH, or one health approach in Portuguese, provides an integrated framework for observing and improving health issues associated with human, animal and environmental factors, and has been applied in particular to zoonotic disease problems (Little, 2013; Case *et al.*, 2022).

As stated by Schurer *et al.* (2016) and other collaborators, it is known that OH serves to illustrate how the life cycles of zoonotic parasites are complex and require the most diverse approaches and multifaceted strategies, in studies and health measures, considering that parasites such as of DC presume interactions between people, animals and the environment, which amplifies the urgency of approaching DC through the OH line.

For Velázquez-Ramírez *et al.* (2022) OH is an approach in which multiple sectors communicate and work together to achieve better public health outcomes, recognizing the complexity surrounding the control of neglected tropical diseases and supporting the need for a shift away from disease-specific interventions with such feature. Therefore, it becomes increasingly important to use existing tools to combat CD in a harmonious and complementary relationship with OH structures, so that the predominant transmission routes of trypanosomiasis pathogens can be identified and mitigated.

In a first analysis, as an initial example of the clear need for OH in CD, we can comment on the study by Garcia *et al.* (2016), whose research addresses the triad of person, animal and environment in a very exemplary way.

It is known that CD is transmitted to mammals via vectorial, oral, congenital and/or transfusion/transplantation and that its triatomine vector, known as “kissing bug”, serves as the predominant mode of transmission, particularly in wild populations and/or domestic. Canines, in particular, are important components in peridomestic transmission, resulting in a bridge between wild and domestic transmission cycles. Thus, humans can become infected

when vectors establish nests in or near homes, and vectors feed on both humans and domesticated animals (Garcia *et al*., 2016).

In the study by Garcia *et al.* (2016), the authors evaluate, in an unprecedented way, the panorama and scenario of vector infection and the seroprevalence of CD among populations of mammals and humans, all of which live in the same geographic region, in the south of the state of Texas, in the States United. Evidence from other recent studies confirms the establishment of vector transmission cycles, particularly in south Texas, where there are aggravating factors that may contribute to this area being a high-risk region for transmission.

As results of the original study by Garcia *et al.* (2016), seroprevalence was highest among the wild adult coyote reservoir (8%), moderate among peridomestic juvenile dogs in community shelters (3.8%), and lowest among local residents (0.36%). In addition to finding evidence of infection in canines and humans, the authors found a high and relevant percentage (56.5%) of vectors carrying the parasite, which solidified and further highlighted the risk of transmission of Chagas disease in the region studied.

Another study for example, in a second analysis, is that of Velázquez-Ramírez et al. (2022), in which the OH approach is used to investigate and understand the complexities of cases of American trypanosomiasis in Mexico, whose territory offers at least two thirds of ecological conditions that are conducive to the transmission of triatomine vectors and was evident in the study , a neglected disease that disproportionately affects rural and semi-rural populations in southern Mexico.

Category 2 – Spatial epidemiology of Chagas disease

In this second category, around 2 articles addressed the topic of Chagas disease based on an epidemiological analysis. Spatial epidemiology can work and develop better adaptive strategies regarding the control of Chagas disease. An example is geostatistics, a field that

studies the spatial autocorrelation of data to make inferences and predictions, and which, making use of what the single health approach advocates, can be used in the context of controlling the Chagas disease vector in infested housing and, consequently, with a high risk of infection in regions concentrated in dense forest. It is noteworthy that the use of such a statistical approach in this sampling of residences is efficiently validated, meeting targets for reducing transmission by the disease vector (Case *et al*., 2022).

Epidemiology can still, as in the study by Busselman and Hamer (2022), highlight behavioral differences in CD in certain regions, when compared. According to the authors mentioned at the beginning of the paragraph, CD has, in Latin America, species such as Triatoma infestans, which commonly colonize human homes and, therefore, have access to humans, which contrasts with the scenario seen in the United States. United States, where triatomines are mainly wild and are associated with wildlife in natural habitats, with occasional dispersal into domestic environments and around homes.

Category 3 – Control and transmission factors for Chagas disease

In this third category, around 7 articles addressed topics that address control and transmission factors for Chagas disease. It is known that many infectious and emerging diseases arise from several factors, which are complex, and are also in constant evolution with the environment, depending on their respective condition, given that, for example, cases of deforestation precede climate change and so on, to the point where the etiological agents of infectious diseases are more susceptible to using the human species as a host, a fact that is clearly observable in the translocation of wildlife (Schurer *et al*., 2021).

Furthermore, other factors, such as urbanization, food acquisition, living with animals in general, socioeconomic factors (poverty and global trade) are links that can influence the resurgence or the emergence of diseases. It is important to mention that, even with the mass

administration of medicines and parasite eradication campaigns, parasitic zoonoses continue to cause significant morbidity and mortality throughout the world and, therefore, still persist as serious public health problems (Schurer *et al.*, 2021).

It is concluded that control measures for diseases such as CD are affected in several countries and regions due to the high cost associated with complex transmission factors. Therefore, an integrated and multisectoral approach to health may be one of the best solutions to offset the size of such costs of CD, of which recent global public health data shows around 6 to 8 million people affected (Francis *et al*., 2021; Martín-Escolano et al., 2022).

CD control and transmission factors are also attracted by the interrelationship of the health of people and animals. Investigations show that the sociocultural dynamics of certain communities affect the geographic dissemination of arthropod vectors due to the fact that, in these places, people have difficulties in understanding the specific etiological, clinical and therapeutic aspects of CD (Little, 2013; Martínez-Parra, Pinilla- Alfonso, Abadía-Barreiro, 2018).

Unfortunately, even though CD is very difficult to eradicate, the disease still receives little attention from public bodies, as well as the private sector. There is therefore an urgent need to acquire regional information on neglected tropical diseases, which will not only promote progress in research but is also imperative. This will direct health decision-making and policy development for countries and communities in all regions of the Amazon, focusing on prevention and control, as well as coordinated collaborative and multidisciplinary strategies for a One Health approach to diseases such as to CD (López-Garcia and Gilabert, 2023; Taylor *et al*., 2022).

Category 4 – Health indicators in Chagas disease

In this category, among the 13 studies selected, only 1 focused on addressing health indicators of Chagas disease.

Indicators such as seroprevalence and mortality rates are data that vary according to seasons and regions in Brazil and, given the importance of these and other metrics in public health, it is a fact that their analysis, as well as constant surveillance, allow for better control of the parasite and its vector. That being said, it confirms the importance of strengthening surveillance programs at the municipal level, even in regions classified as low risk for transmission of the *T. cruzi* vector (Lanza *et al*., 2023).

Category 5 – Use of educational technology in Chagas disease

In this last category, there was also only 1 article exploring the field of technologies associated with Chagas disease.

Technologies in tropical diseases are potentially useful, both for health and science education, and for an active search for asymptomatic chronic cases of Chagas disease. Furthermore, technologies for this purpose can be adapted so that we can understand and cooperate in various potentially epidemic situations, especially those related to tropical diseases considered neglected (Araújo-Jorge *et al*., 2021).

Therefore, regarding the appropriate discussions in this review, the studies found vary and have different metrics, depending on each specific topic, with studies on the control and transmission of ACD being more frequent. On the other hand, there is a low number of articles that specifically deal with the association of technologies or mapping with DCA, and even more in-depth work in the field of the single health approach, reinforcing a perennial need for studies to cover other areas of Chagas disease.

Despite their great relevance, contemporaneity and impact factor on Brazilian public health, unconventional ways of approaching Chagas disease are still incipient and,

furthermore, little explored by researchers, which is proven by the aforementioned scarcity of scientific work in the country about this zoonosis, even with the important descriptors used in this review.

From the visualization and variations of the studies, it is also clear that urgent dedication is also needed on the part of public health bodies, since the reality of ACD is still alarming, as it is endemic in all Latin American countries, mainly in locations where socioeconomic factors are decisive.

As Araújo-Jorge *et al.* (2021), in their study, the fact is that it is urgently necessary to take effective measures to control CD in more socioeconomically fragile and neglected locations, where there is an affected population, through articulation and integration of CD prevention factors, through vector surveillance and community education, with health promotion strategies through a dialogical organization in primary health units. Factually, actions like this depend directly on political decisions and social pressure to confront and reprimand such negligence in relation to CD (Araújo-Jorge *et al*., 2021).

Still according to Araújo-Jorge *et al.* (2021), in endemic areas, especially important for CD, relevant data suggest that, in association with poor regions, information about CD is very precarious and that it is therefore necessary for there to be more activities, with the aim of to reduce this misinformation about a disease of such public significance.

In less developed regions, populations generally fall short of basic information about a given disease, with CD being no different, in the most diverse regions where the disease is present. The population does not know, for example, that there are treatments available, nor is it aware of the ways the disease is transmitted and infected. Therefore, even though the field of microbiology has already made rapid advances in recent decades, it can be concluded that, often, primary and basic health attitudes are still dispersed in communities, especially those with a lower level of education, given that this it is a strong determinant of vulnerability,

which creates a huge need for new policies aimed at everyone's information (Araújo-Jorge *et al*., 2021).

In addition to a public eager for information of this magnitude, it is also visible that health professionals, specifically community and endemic health agents, need access to training courses to reduce lack of knowledge about biological and epidemiological concepts related to CD, focusing on OH, as this aspect is best suited for providing types of multifaceted parasite control strategies (Araújo-Jorge *et al*., 2021). That said, and according to the aforementioned paragraphs, despite OH already receiving a certain frequency of discussion in the literature relating to zoonoses, the present work demonstrates that, in general, parasites such as CD are not explored in a scope that addresses the three domains present. in the OH triad simultaneously, which can be explained, in part, by the logistical challenges adjacent to the interdisciplinary collaboration of this concept, especially at the level required for OH research (Araújo-Jorge *et al.*, 2021; Case *et al.*, 2022).

Potential issues with this include communication barriers across languages and disciplines, synchronizing research priorities, budget allocations, and ensuring that team members remain engaged throughout the study period. In addition to methods that require collaboration and coordination, not only at an intersection between health sectors, but also between organizations at regional, national and international levels, given that this is a principle in the definitions of OH (Case *et al*., 2022; Velázquez -Ramírez et al., 2022).

Conclusion :

It is concluded that this literature review, while highlighting greater proportions of studies involving control and transmission of CD, also demonstrates fields of study that are still little explored by national and international scientific literature, reflecting a large gap to

be filled with future research on this neglected tropical disease, which is highly relevant in the field of tropical diseases, even more so because it is considered neglected.

Still in this context, a greater frequency of studies exploring other areas would, consequently, mean more control strategies, interruption of cycles and health education for CD, so that the results of studies of such size could be translated into government policies or programs focused on crucial points regarding the elimination of the vector, seeking and acquiring the involvement of health actors, especially the figure of the public manager of collective health in tropical regions, which would shape and improve the scenario of vector surveillance, community education with strategies for health promotion.

It is also demonstrated that many research works focus on municipal and regional realities in certain locations in some states of the federation, with an insufficient and unequal number of works per region when looking at the production of studies at a national level.

That being said, it was intended, through this literature review and the analysis of epidemiological and social data, to draw a complete overview of ACD, considering the complex interactions between the various factors involved.

Thus, this study contributed to expanding the debate on the importance of an integrative approach in health research on this disease, which is the most serious parasitic disease in the Latin American region, with an estimated disease burden around 5 to 10 times greater than than malaria.

Furthermore, such an expansion of the debate can, and should, encourage the search for more comprehensive, precise and humanized solutions in tackling endemic and globally relevant diseases such as ACD, so that this threat so present in people on the line can be extinguished once and for all. of poverty.

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