

Chronic Chagas cardiomyopathy: characterization of cases and possibilities of action in primary healthcare

Cardiomiopatia chagásica crônica: caracterização de casos e possibilidades para ação na atenção primária à saúde

Miocardopatía chagásica crónica: caracterización de los casos y posibilidades de actuación de la atención primaria de salud

Tiago Augusto Fernandes Peres ¹
Stefan Vilges de Oliveira ¹
Denner Custódio Gomes ¹
Isabella Guzmán Núñez del Prado ¹
Gabryella Londina Ribeiro Lima ¹
Layanne Cintra Soares ¹
Jean Ezequiel Limongi ¹

doi: 10.1590/0102-311XEN290321

Abstract

Despite the drastic decrease in the incidence of Chagas disease in Brazil, past cases still greatly impact health services in the country. Thus, this study aimed to characterize Chagas disease cases regarding their cardiac staging and death prognosis and, based on that, to propose primary healthcare (PHC) case follow-ups. This is a cross-sectional study based on secondary data from the medical records of patients with chronic Chagas cardiomyopathy (CCC). A logistic regression was applied to estimate crude and adjusted odds ratios (OR). A total of 433 medical records were evaluated. More severe CCC cases were associated with a greater number of hospitalizations (OR = 3.41; 95%CI: 1.59-7.30) and longer hospitalization (OR = 3.15; 95%CI: 1.79-5.53). Cases with a higher risk of death were associated with a higher number of hospitalizations (OR = 1.92; 95%CI: 1.09-3.37), longer hospital stays (OR = 2.04; 95%CI: 1.30-3.18), and visits to the outpatient clinic (OR = 2.18; 95%CI: 1.39-3.41) and the emergency department of the assessed hospital (OR = 3.12; 95%CI: 1.27-7.66). Analyzing the medical records at two moments, 72.9% of the cases remained in the stages in which they were initially evaluated. Overall, 44.4% of cases were classified as mild to moderate risk of death and 68.3% as low ones. The cases classified in the most severe stages of CCC and with high or intermediate risk of death were associated with greater hospital dependence. However, most cases were classified as milder forms of the disease, with a low risk of death and clinical stability. These findings aim to promote the role of PHC as a protagonist in the longitudinal follow-up of CCC cases in Brazil.

Chagas Cardiomyopathy; Chagas Disease; Heart Failure; Primary Health Care

Correspondence

J. E. Limongi
Universidade Federal de Uberlândia,
Av. João Naves de Ávila 2121, Uberlândia, MG
38401-240, Brasil.
jeanlimongi@gmail.com

¹ Universidade Federal de Uberlândia, Uberlândia, Brasil.



Chagas disease or American trypanosomiasis is a neglected tropical disease with expressive morbidity and mortality and high prevalence, especially among adults and older adults ¹. Previous estimates show that there are 6 to 7 million people infected with *Trypanosoma cruzi* worldwide and about 70 million people in vulnerable conditions to new infections in endemic areas. About 10,000 to 12,000 deaths per year are attributable to the disease. Latin America, in which the wild cycle of this anthro-zoonosis occurs, concentrates 90% of the infected world population ^{1,2,3}.

With a biphasic course, the acute phase of Chagas disease shows an oligosymptomatic clinical picture (usually fever) related to the large number of circulating parasites. It is possible that serious situations of acute Chagas disease lead to cardiac or neurological impairment, though observed in less than 1% of affected individuals ^{4,5,6}. Remarkably, acute myocarditis is a common complication in cases of oral transmission, occurring in Brazil as a result of the consumption of contaminated foods, such as *açaí* juice. In these cases, acute manifestations are more frequent, probably due to the greater number of parasites in the initial inoculum ⁷.

Patients in the chronic phase can develop different clinical forms. Initially, there is the indeterminate form, which is asymptomatic and do not compromise the patients' health. Posteriorly, after 10 to 30 years, about 10% to 30% of patients evolve to cardiac, digestive, or cardiodigestive forms of the disease, which greatly affect patients' quality of life ^{4,5}.

Patients' low quality of life, medical expenses, and the impact on social security generated by work incapacities in an economically active population cause great social and economic burden ⁶. In Latin America, estimates suggest that Chagas disease generates approximately USD 1.2 billion a year in expenses ⁸. Chronic Chagas cardiomyopathy (CCC), more severe and prevalent, is the major responsible for the greatest individual, social, and economic repercussions ⁶.

In Brazil, approximately 1 million people are estimated to be infected ³. Nevertheless, a systematic review and meta-analysis published in 2014 showed that these numbers may be underestimated and that there are approximately 4.6 million Brazilians infected ⁹. According to the Brazilian Health Informatics Department (DATASUS), from 2000 to 2019, 94,788 deaths from Chagas disease were registered in the country ¹⁰.

Recently, the role of primary healthcare (PHC) has been highlighted as imperative to care and monitor chronic Chagas disease patients in Brazil ^{6,11,12,13,14}. PHC is closer to the community and thus individuals' first access to care networks. Notably, it assumes a pivotal role in health education, along with functions and attributes such as communication, accountability, and resolvability.

Chagas disease is within the scope of essential actions which PHC must perform, with the role of diagnosing, screening, controlling, preventing, educating, treating, referring, and monitoring clinical cases, hence reducing expenses arising from the disease and improving affected individuals' biopsychosocial conditions ^{11,12}. For this purpose, articulated actions for the proper management of Chagas disease must be conducted by principles guiding PHC, including territorialization, multi-professional interventions, humanized care, person-centered care, and resoluteness ⁶.

Thus, this study aimed to characterize Chagas disease cases regarding CCC staging and death prognosis and, based on that, to propose the longitudinal follow-up of cases by PHC.

Materials and methods

This is a cross-sectional study based on secondary data from the medical records of the Hospital of Clinics of the Federal University of Uberlândia (HC-UFU), a reference service in the region for medium- and high-complexity health care. This study included medical records of patients with CCC in the cardiac or cardiodigestive clinical forms of the disease who showed information about the clinical, epidemiological, and laboratory diagnosis of Chagas disease, resided in the municipality of Uberlândia, Minas Gerais State, Brazil, and sought care related to the disease from March 2018 to February 2020. Patients' medical records with incomplete information which made it impossible to identify the disease or those who died were excluded from this study.

Gender, age, presence of comorbidities, number of hospitalizations, length of hospitalization, number of visits to outpatient clinics, number of visits to the emergency department, cardiac staging, and death prognosis were the evaluated variables.

For CCC staging, the classification proposed by Dias et al. ⁶ was used. In this classification, five stages are distinguished (A, B1, B2, C, and D), considering electrocardiogram, echocardiogram, and degree of heart failure analysis, according to the New York Heart Association (NYHA; United States) (Box 1).

Death prognosis followed the score created by Rassi Jr. et al. ¹⁵, in which heart failure III or IV (according to the NYHA), cardiomegaly (according to chest radiography or echocardiogram exams), segmental or global abnormality (on echocardiograms), non-sustained ventricular tachycardia (according to Holter), low voltage of the QRS complex (on electrocardiograms), and male patients are considered. In this score, each risk factor is assigned a score and individuals are classified as at low, intermediate, and high risk of death. The expected mortality rates in these groups, in periods of 5 and 10 years, are as follows: low risk (2% and 10%), intermediate risk (18% and 44%), and high risk (63% and 84%), respectively ¹⁵.

The clinical evolution of patients over time was also investigated by the analysis of their medical records. Therefore, the initial cardiac staging was established based on the first clinical information about Chagas disease registered in the medical records of patients, regardless of the date (clinical condition I). Clinical condition II refers to recent observations in the medical records up to this study deadline. For statistical analysis of demographic factors and health service use, information from the most recent clinical condition was used.

A specific database in the Epi Info 7.2.2 computer software (<https://www.cdc.gov/epiinfo/index.html>) was constructed for data entry and analysis. The distribution of frequencies of all studied variables and data consistency were performed. A logistic regression was applied to estimate variable association. For each dependent variable, four models were created: first, simple logistic regression models were used to study the relations between the independent variables and cardiac staging (dependent variable 1) or prognosis of death (dependent variable 2). Models 2, 3, and 4 were adjusted for the variables age, presence of comorbidity, and age + presence of comorbidity, respectively. The dependent variable cardiac staging was defined as 1 = cardiac stage C/D; 0 = cardiac stage A/B1/B2. The dependent variable prognosis of death was defined as 1 = intermediate/high risk, 0 = low risk. The independent variables were gender, number of hospitalizations, days in the hospital, number of visits to outpatient clinics, and number of visits to the emergency unit. For the models related to prognosis of death, the variable gender was not used as it is one of the variables included in Rassi Jr. et al.'s risk score ¹⁵. Logistic regression results were shown with odds ratios (OR) and 95% confidence intervals (95%CI).

This study was approved by the Human Research Ethics Committee of the UFU (registration n. 3,655,664/2019). Informed consent forms were not signed because this is a study with secondary data. Data confidentiality and volunteers' anonymity were guaranteed.

Box 1

Staging of myocardial involvement in chronic Chagas cardiomyopathy.

STAGE	ELECTROCARDIOGRAM	ECHOCARDIOGRAM	HEART FAILURE
A	Altered	Normal	Absent
B1	Altered	Altered, LVEF \geq 45%	Absent
B2	Altered	Altered, LVEF < 45%	Absent
C	Altered	Altered	Compensable
D	Altered	Altered	Refractory

LVEF: left ventricular ejection fraction.

Source: adapted from Dias et al. ⁶.

Results

A total of 433 medical records of patients with CCC were evaluated, 334 (77.1%) with the cardiac form and 99 (22.9%) with the cardiodigestive ones. These individuals received treatment at the institution outpatient clinic, ward, and emergency department. We found a greater predominance of female patients (236; 54.5%), aged from 24 to 99 years, with a mean age of 68.47 ± 11.02 . Most patients came from the state of Minas Gerais (363; 83.8%), mainly from the Triângulo Mineiro and Alto Paranaíba mesoregion (277; 64%), followed by the state of Goiás (39; 9%). Overall, 283 (65.4%) and 144 (33.3%) medical records registered the use of outpatient and emergency services, respectively. We also found hospitalizations, in the ward or intensive care unit of the hospital, in 323 (74.6%) medical records.

We could classify CCC staging in 252 medical records. Patients in the C/D stages of CCC were associated with a higher number of hospitalizations and a greater number of days in the hospital. Patients in these stages were 3.41 more likely to be hospitalized for more than three times and 3.15 times more likely to remain hospitalized for more than 10 days (Table 1).

By assessing the most recent medical records, we could classify 44.4% of the patients as showing mild to moderate forms of CCC (A, B1, and B2) and 55.6%, more advanced forms (C and D).

Regarding death prognosis, patients classified at intermediate and high risk of death were more associated with a greater number of hospitalizations (OR = 1.92; 95%CI: 1.09-3.37), days in the hospital (OR = 2.04; 95%CI: 1.30-3.18), and visits to the emergency department (OR = 3.12; 95%CI: 1.27-7.66) and the outpatient clinic (OR = 2.18; 95%CI: 1.39-3.41) (Table 2).

Overall, out of 410 records which enabled us to estimate death scores, we classified 68.3% of patients as low risk for it.

Regarding the evolution of their clinical condition, among the nine patients initially classified as stage A, 66.7% remained in this classification over time; 11.1% and 22.2% progressed, with worsened cardiac function, to stages B1 and C, respectively. In total, 83 patients who were classified as B1 in the initial stage (89.2%) remained in this classification; 1.2%, 8.4%, and 1.2% progressed to stages B2, C, and D, respectively. The nine patients initially classified as stage B2 (22.2%) improved to stage B1, whereas 22.2% remained at stage B2 and 55.6% progressed to stage C. Initially, 63 patients were in stage C, 93.7% remained in this classification and 6.3% progressed to stage D. Finally, among 35 patients classified in stage D, only 11.4% remained in this classification, whereas 88.6% regressed to stage C (Table 3). Overall, 72.9% of the cases remained in the stages in which they were initially evaluated, 16.6% showed improvement, and 10.5%, worsening.

Table 1

Crude and adjusted odds ratios (OR) for age and presence of comorbidity in predicting the stages of chronic Chagas cardiomyopathy (A/B1/B2 x C/D).

Characteristics	Crude OR (95%CI)	Age-adjusted OR (95%CI)	Comorbidity-adjusted OR (95%CI)	OR adjusted for age and comorbidity (95%CI)
Sex (n = 252): male	1.26 (0.76-2.09)	1.28 (0.77-2.11)	1.24 (0.74-2.05)	1.25 (0.75-2.07)
Number of hospitalizations (n = 251): more than 3	3.43 (1.62-7.29) *	3.32 (1.56-7.08) *	3.52 (1.65-7.51) *	3.41 (1.59-7.30) *
Number of days hospitalized (n = 251): more than 10	3.22 (1.83-5.64) *	3.16 (1.80-5.55) *	3.21 (1.83-5.63) *	3.15 (1.79-5.53) *
Number of visits to the emergency department (n = 250): more than 5	1.03 (0.37-2.85)	1.02 (0.37-2.83)	1.03 (0.37-2.88)	1.03 (0.37-2.87)
Number of visits to the outpatient clinics (n = 251): more than 10	0.96 (0.57-1.60)	0.94 (0.56-1.58)	0.96 (0.57-1.61)	0.94 (0.56-1.59)

95%CI: 95% confidence interval.

* p < 0.01.

Table 2

Crude and adjusted odds ratios (OR) for age and presence of comorbidity in predicting the prognosis of death in chronic Chagas cardiomyopathy (low risk x intermediate/high risk).

Characteristics	Crude OR (95%CI)	Age-adjusted OR (95%CI)	Comorbidity-adjusted OR (95%CI)	OR adjusted for age and comorbidity (95%CI)
Number of hospitalizations (n = 406): more than 3	2.02 (1.16-3.51) *	1.92 (1.11-3.36) *	2.02 (1.16-3.52) *	1.92 (1.09-3.37) *
Number of days hospitalized (n = 406): more than 10	2.06 (1.32-3.21) **	2.04 (1.30-3.19) **	2.06 (1.32-3.21) **	2.04 (1.30-3.18) **
Number of visits to the emergency department (n = 405): more than 5	3.04 (1.24-7.41) *	3.12 (1.27-7.66) *	3.04 (1.24-7.48) *	3.12 (1.27-7.66) *
Number of visits to the outpatient clinics (n = 408): more than 10	2.23 (1.43-3.48) **	2.17 (1.39-3.40) **	2.23 (1.43-3.49) **	2.18 (1.39-3.41) **

95%CI: 95% confidence interval.

* p < 0.05;

** p < 0.01.

Table 3

Staging of myocardial compromise in chronic Chagas cardiomyopathy evaluated in two moments.

Stage (clinical condition I)	Stage (clinical condition II)					Total (%)
	A (%)	B1 (%)	B2 (%)	C (%)	D (%)	
A	6 (66.7)	1 (11.1)	-	2 (22.2)	-	9 (100.0)
B1	-	74 (89.2)	1 (1.2)	7 (8.4)	1 (1.2)	83 (100.0)
B2	-	2 (22.2)	2 (22.2)	5 (55.6)	-	9 (100.0)
C	-	-	-	59 (93.7)	4 (6.3)	63 (100.0)
D	-	-	-	31 (88.6)	4 (11.4)	35 (100.0)

Discussion

This study shows that cases of CCC in advanced stages of Chagas disease and at high or intermediate risk of death cause a major impact on more complex health services, with patients in stages C and D showing high hospital dependence. There is a direct relation of these individuals with the need for a greater number of hospitalizations throughout their lives and for longer periods. In this scenario, a justification for this finding is that patients classified in these stages have heart failure and, therefore, high rates of hospitalization and rehospitalization ¹⁶. Furthermore, hospitalized individuals with this condition require complex management to restore hemodynamic stability, especially in decompensated patients, and treatment requires several medications which can impair renal function ¹⁷. This complexity of heart failure management explains the more numerous and longer hospitalizations, when compared to groups A/B1/B2.

Patients with high and intermediate risk of death were associated with the highest number of hospitalizations, number of days in the hospital, and number of visits to the outpatient clinic and to the emergency department. Affected individuals' low quality of life is also noteworthy, especially those with the most advanced forms of CCC, as is the important influence of the biopsychosocial context of these individuals ¹⁸. A previous literature review examined studies on health-related quality of life (HRQoL) and Chagas cardiomyopathy. It identified three main findings: (1) cardiac complications are

associated with a poor HRQoL; (2) HRQoL is associated with the functional capacity of patients; and (3) simple and inexpensive therapeutic interventions are effective to improve HRQoL ¹⁹.

Thus, PHC plays a fundamental role in managing and monitoring patients to avoid the worsening of cases and to monitor the disease evolution. The provision of adequate assistance to its most serious forms, together with specialized services, should also be recommended ¹¹.

Referrals to specialized care should be carried out by PHC teams, following referral flows and encouraging counter-referral in cases of severe acute Chagas disease, severe CCC, patients with advanced digestive forms which would indicate invasive procedures, pregnant women with severe acute Chagas disease or CCC, individuals with decompensated immunosuppressive conditions, and chronic Chagas disease patients with nifurtimox indications ¹².

Thus, the National Commission for Technology Incorporation (CONITEC) at the Brazilian Unified National Health System (SUS) of the Brazilian Ministry of Health created the *Clinical Protocol and Therapeutic Guidelines for Chagas Disease* in 2018. It targets healthcare providers involved in the care of people with Chagas disease, especially family and community physicians, internists, cardiologists, obstetricians, infectious diseases specialists, gastroenterologists, and nurses working in PHC ¹². The protocol mentions that most cases in Brazil show a non-serious clinical condition and should be mostly followed up within PHC, with the possibility of treating patients with benznidazole. A recent retrospective cohort observational study showed that benznidazole treatment was associated with a decreased risk of Chagas disease progression from the indeterminate to the cardiac form and a decreased risk of cardiovascular events, recommending its implementation into clinical practice ²⁰. Patients with non-severe acute diseases, indeterminate chronic phases, chronic cardiac, digestive, or cardiodigestive phases, with stable and non-severe diseases, and pregnant women with Chagas disease in the chronic phase without comorbidities are likely to be monitored by PHC ¹².

Of the 410 medical records in which we could evaluate death prognosis, 68.3% were classified as low risk. Of the 252 medical records of patients in which we could analyze Chagas disease staging, 44.4% were classified as mild to moderate forms of CCC (A, B1, and B2). Individuals in these classifications would find technical and infrastructure conditions to be adequately assisted in basic health units after teams were trained in the management of this disease ^{13,14,21}.

Importantly, PHC teams must keep patients and families informed about the actions to be taken so CCC patients receive suitable treatment and monitoring, reducing the overload of highly complex services and the economic and biopsychosocial impacts of individuals and their families ^{12,18}. For indeterminate Chagas disease, the most prevalent clinical form, medical evaluation, and conventional ECG are recommended once a year. In case of disease evolution, patients should be referred to specialized services but with integrated management to PHC (referral and counter-referral) ^{6,22}.

The role of PHC in intervention projects is imperative to receive and monitor men with CCC in their territories, improving adherence to monitoring programs, as this population tends to develop more severe forms of the disease ²³.

In total, 65.4% of the records reported the use of an outpatient service. These are sectors responsible for the therapeutic plan and monitoring of patients with CCC. They monitor these individuals, establish complication prevention practices, and educate patients about their diagnosis and the care inherent to their disease, hence improving the quality of life of these people. However, many of these actions could be conducted within the scope of PHC without the need to overload the infrastructure, human resources, and inputs of highly complex services, which could be directed to other groups with more urgent, highly complex needs ^{12,18}.

The greater participation of PHC provides easier access for monitoring people affected by CCC, benefiting them with reduced costs related to transport, as well as reduced waiting time for assistance. In this study, the cases classified as having a low risk of death proved to be prevalent and are distributed throughout Brazil. Likewise, the PHC network in the municipality of Uberlândia is well divided and needs to ensure access and longitudinality in the care of these patients.

This study evinced that 72.9% of patients diagnosed with CCC tended to show a stabilized disease. These findings show the slow and gradual evolution of the disease over time and, thus, the possibility of continued PHC practice involvement ²⁴. Furthermore, 16.6% of the cases improved, showing stage regression, and 10.5% progressed to more severe stages. There was a high percentage of regression from stage D to stage C. Stage D is a condition of severe clinical instability (i.e., refractory heart fail-

ure) a situation in which medical teams must take striking interventions to stabilize the condition, evolving the patient to a compensable heart failure (stage C). It is very common for patients in severe stage D to be unsuccessful and progress to death. Costa et al.²⁵ investigated 60 patients with severe heart failure of originated from Chagas disease for 90 months. Most (88.3%) died during the follow-up period. Indeed, Chagas disease is a predictor of poor prognosis in patients with chronic heart failure²⁶. This study only considered active medical records (of patients still alive), and this may have influenced the percentage of stage regression.

Despite the relevant information about the classification of Chagas disease cases and their associated factors, we should mention data reliability uncertainty, inherent to any cross-sectional study using secondary data as a limitation of this work. Additionally, the absence of complete data in the medical records made it impossible to classify some patients' cardiac staging and death prognosis.

In conclusion, cases of CCC classified in the most severe stages and with high or intermediate risk of death were associated with greater hospital dependence. Nevertheless, most cases were classified as milder forms of the disease, with low risk of death and clinical stability. These findings aim to promote the role of PHC as a protagonist in the longitudinal follow-up of CCC cases in Brazil.

Contributors

All the authors contributed in the study conception, data analysis and interpretation, and writing; and approved the final version of the manuscript.

Additional informations

ORCID: Tiago Augusto Fernandes Peres (0000-0002-2866-8585); Stefan Vilges de Oliveira (0000-0002-5493-2765); Denner Custódio Gomes (0000-0001-8234-4322); Isabella Guzmán Núñez del Prado (0000-0002-2067-6951); Gabryella Londina Ribeiro Lima (0000-0001-9009-0238); Layanne Cintra Soares (0000-0003-0994-1854); Jean Ezequiel Limongi (0000-0003-2649-9842).

References

1. Pan American Health Organization. Chagas disease. <https://www.paho.org/en/topics/chagas-disease> (accessed on 10/Dec/2020).
2. World Health Organization. Chagas disease (also known as American trypanosomiasis). [https://www.who.int/news-room/fact-sheets/detail/chagas-disease-\(american-trypanosomiasis\)](https://www.who.int/news-room/fact-sheets/detail/chagas-disease-(american-trypanosomiasis)) (accessed on 11/Dec/2020).
3. Secretaria de Vigilância em Saúde, Ministério da Saúde. Boletim Epidemiológico Doenças de Chagas 2021; (número especial). https://www.gov.br/saude/pt-br/centrais-de-contudo/publicacoes/boletins/boletins-epidemiologicos/especiais/2021/boletim_especial_chagas_14abr21_b.pdf.
4. Acquatella H. Echocardiography in Chagas heart disease. *Circulation* 2007; 115:1124-31.
5. Bern C. Chagas' disease. *N Engl J Med* 2015; 373:456-66.
6. Dias JCP, Ramos Jr. AN, Gontijo ED, Luqueti A, Shikanai-Yasuda MA, Coura JR, et al. II Consenso Brasileiro em Doença de Chagas, 2015. *Epidemiol Serv Saúde* 2016; 25:7-86.
7. Pinto AYN, Valente SA, Valente VC, Ferreira Junior AG, Coura JR. Fase aguda da doença de Chagas na Amazônia brasileira: estudo de 233 casos do Pará, Amapá e Maranhão observados entre 1988 e 2005. *Rev Soc Bras Med Trop* 2008; 41:602-14.
8. Lee BY, Bacon KM, Connor DL, Willig AM, Bailey RR. The potential economic value of a *Trypanosoma cruzi* (Chagas disease) vaccine in Latin America. *PLoS Negl Trop Dis* 2010; 14:e916.

9. Martins-Melo FR, Ramos AN, Alencar CH, Heukelbach J. Prevalence of Chagas disease in Brazil: a systematic review and meta-analysis. *Acta Trop* 2014; 130:167-74.
10. Departamento de Informática do SUS. Mortalidade. Doença de Chagas. <http://tabnet.datasus.gov.br/cgi/deftohtm.exe?sim/cnv/obt10br.def> (accessed on 08/Jun/2021).
11. Melo HNS, Oliveira AC, Lima IGM, Fonsêca DV, Silva AL. Análise da importância da atenção primária à saúde na prevenção e controle da doença de Chagas. In: Sousa IC, editor. *Ciências da saúde no Brasil: impasses e desafios 2*. Ponta Grossa: Atena; 2020. p. 160-71.
12. Ministério da Saúde. Portaria nº 57, de 30 de outubro de 2018. Torna pública a decisão de aprovar o Protocolo Clínico e Diretrizes Terapêuticas da doença de Chagas no âmbito do Sistema Único de Saúde – SUS. *Diário Oficial da União* 2018; 31 oct.
13. Carvalho NB, Atala MM, Leite RM, Yasuda MAS. Manual de atendimento a pacientes com doença de Chagas: atenção básica 2014/2015. São Paulo: Faculdade de Medicina, Universidade de São Paulo; 2015.
14. Rodrigues FCS, Souza ICA, Araujo AP, Souza JMB, Diotaiuti LG, Ferreira RA. Agentes comunitários de saúde: percepção sobre os serviços de saúde relacionados à doença de Chagas. *Cad Saúde Colet (Rio J.)* 2020; 28:130-9.
15. Rassi Jr. A, Rassi A, Little WC, Xavier SS, Rassi SG, Rassi AG, et al. Development and validation of a risk score for predicting death in Chagas' heart disease. *N Engl J Med* 2006; 355:799-808.
16. Mesquita ET, Jorge AJL, Rabelo LM, Souza-Jr CV. Entendendo a hospitalização em pacientes com insuficiência cardíaca. *Int J Cardiovasc Sci* 2017; 30:81-90.
17. Vilas-Boas F, Follath F. Tratamento atual da insuficiência cardíaca descompensada. *Arq Bras Cardiol* 2006; 87:369-77.
18. Mendes EV. A construção social da atenção primária à saúde. Brasília: Conselho Nacional de Secretários de Saúde; 2015.
19. Sousa GR, Costa HS, Souza AC, Nunes MCP, Lima MMO, Rocha MOC. Health-related quality of life in patients with Chagas disease: a review of the evidence. *Rev Soc Bras Med Trop* 2015; 48:121-8.
20. Hasslocher-Moreno AM, Saraiva RM, Sangenis LHC, Xavier SS, Sousa AS, Costa AR, et al. Benznidazole decreases the risk of chronic Chagas disease progression and cardiovascular events: a long-term follow up study. *EClinicalMedicine* 2021; 31:100694.
21. Ferreira AM, Sabino EC, Moreira HF, Cardoso CS, Oliveira CDIL, Riberiro ALP, et al. Avaliação do conhecimento acerca do manejo clínico de portadores da doença de Chagas em região endêmica no Brasil. *Rev APS* 2018; 21:345-54.
22. Dias JCP, Siqueira IOC, Dias RB. Doença de Chagas: diagnóstico e manejo na atenção primária à saúde. In: Gusso G, Lopes JMC, editors. *Tratado de medicina de família e comunidade*. v. 2: princípios, formação e prática. Porto Alegre: Artmed; 2012. p. 2067-80.
23. Elias BK, Gervásio VL, Dell'Acqua MAQ, Lima MAJ, Silva NMMG. Avaliação do acesso e acolhimento de homens na atenção básica: revisão de literatura. *Brazilian Journal of Development* 2021; 7:22582-90.
24. Lidani KCF, Sandri TL, Castilho-Neira R, Andrade FA, Guimarães CM, Marques EN, et al. Clinical and epidemiological aspects of chronic Chagas disease from Southern Brazil. *Rev Soc Bras Med Trop* 2020; 53:e20200225.
25. Costa AA, Rassi S, Freitas EMM, Gutierrez NS, Boaventura FM, Sampaio LPC, et al. Prognostic factors in severe chagasic heart failure. *Arq Bras Cardiol* 2017; 108:246-54.
26. Silva CP, Del Carlo CH, Oliveira Junior MT, Scipioni A, Strunz-Cassaró C, Ramirez JAF, et al. Why do patients with chagasic cardiomyopathy have worse outcomes than those with non-chagasic cardiomyopathy? *Arq Bras Cardiol* 2008; 91:389-94.

Resumo

Apesar da diminuição importante na incidência da doença de Chagas no Brasil, as infecções ocorridas no passado ainda têm um impacto grande sobre os serviços de saúde no país. Portanto, o estudo buscou caracterizar os casos de doença de Chagas quanto ao estadiamento cardíaco e prognóstico de morte, e com base nisso, propor o seguimento dos casos na atenção primária à saúde (APS). O estudo transversal usou dados secundários dos prontuários de pacientes com cardiomiopatia chagásica crônica (CCC). Foi aplicada a regressão logística para estimar os odds ratios (OR) brutos e ajustados. Foram avaliados 433 prontuários médicos. Casos mais graves de CCC estavam associados com número maior de hospitalizações (OR = 3,41; IC95%: 1,59-7,30) e tempo de internação (OR = 3,15; IC95%: 1,79-5,53). Os casos com risco maior de morte estavam associados com número maior de hospitalizações (OR = 1,92; IC95%: 1,09-3,37), tempo de internação (OR = 2,04; IC95%: 1,30-3,18) e visitas aos ambulatórios (OR = 2,18; IC95%: 1,39-3,41) e serviços de emergência (OR = 3,12; IC95%: 1,27-7,66). Ao analisar os prontuários em dois momentos, 72,9% dos casos permaneceram nos estágios inicialmente avaliados. No total, 44,4% dos casos foram classificados como formas leves a moderadas e 68,3% como risco baixo de morte. Os casos classificados nos estágios mais graves de CCC e com risco de morte alto ou intermediário estavam associados com maior dependência hospitalar. Entretanto, a maioria dos casos foram classificados como formas mais leves da doença, clinicamente estáveis e com baixo risco de morte. Os achados apoiam a promoção do papel da APS como protagonista no seguimento longitudinal dos casos de CCC no Brasil.

Cardiomiopatia Chagásica; Doença de Chagas; Insuficiência Cardíaca; Atenção Primária à Saúde

Resumen

A pesar de la drástica disminución de la incidencia de la enfermedad de Chagas en Brasil, los casos infectados en el pasado siguen teniendo un gran impacto en los servicios de salud del país. Por lo tanto, este estudio tuvo como objetivo caracterizar los casos de enfermedad de Chagas en lo que se refiere al estadio cardíaco y al pronóstico de muerte y, con base en eso, proponer el seguimiento de los casos por parte de la atención primaria de salud (APS). Se trata de un estudio transversal basado en datos secundarios de las historias clínicas de los pacientes con miocardiopatía chagásica crónica (MCC). Se aplicó la regresión logística para estimar las odds ratio (OR) crudas y ajustadas. Se evaluaron 433 historias clínicas. Los casos de MCC más graves se asociaron a un mayor número de hospitalizaciones (OR = 3,41; IC95%: 1,59-7,30) y días de hospitalización (OR = 3,15; IC95%: 1,79-5,53). Los casos con mayor riesgo de muerte se asociaron a un mayor número de hospitalizaciones (OR = 1,92; IC95%: 1,09-3,37), días de hospitalización (OR = 2,04; IC95%: 1,30-3,18), y las visitas a los ambulatorios (OR = 2,18; IC95%: 1,39-3,41) y al servicio de urgencias (OR = 3,12; IC95%: 1,27-7,66). Analizando las historias clínicas en dos momentos, el 72,9% de los casos permanecieron en los estadios en los que fueron evaluados inicialmente. En general, el 44,4% de los casos fueron clasificados como formas leves o moderadas y el 68,3% como de bajo riesgo de muerte. Los casos clasificados en los estadios más graves de la MCC y con riesgo de muerte alto o intermedio se asociaron a una mayor dependencia hospitalaria. Sin embargo, la mayoría de los casos fueron clasificados como formas más leves de la enfermedad, con bajo riesgo de muerte y clinicamente estables. Estos resultados pretenden promover el papel de la APS como protagonista en el seguimiento longitudinal de los casos de MCC en Brasil.

Cardiomiopatia Chagásica; Enfermedad de Chagas; Insuficiencia Cardíaca; Atención Primaria de Salud

Submitted on 14/Dec/2021

Final version resubmitted on 18/Feb/2022

Approved on 18/Mar/2022