

Cases of Chronic Chagas Disease in the State of Piauí according to the Public reference Laboratory in Health in the Period of 2013-2017

Jossuely Rocha Mendes¹, Jurecir da Silva^{2,*}, Tacyana Pires de Carvalho Costa³, Roberto Coelho de Farias⁴, Fabiano Vieira da Silva⁵, Francisco Sylvestre Miranda Melo⁶, Rômulo Oliveira Barros⁷, Marcelo Cardoso da Silva Ventura⁸, Jacenir Reis dos Santos Mallet⁹, Gabriane Nascimento Porcino¹⁰

¹Specialist in public health and teaching in higher education. Faeme College. Graduated in biomedicine from the University Maurício de Nassau, PI, Brazil.

²Master in Tropical Medicine at Oswaldo Cruz Institute – IOC- FIOCRUZ, PI. Professor at the Federal Institute of Education, Science and Technology of Piauí, Brazil.

³PhD student in Biomedical Engineering at Brazil University. Professor at the Maurício de Nassau University, PI, Brazil.

⁴Master student in Tropical Medicine at Oswaldo Cruz Institute – IOC- FIOCRUZ, PI. Pharmaceutical-Biochemist at Central Public Health Laboratory Dr. Costa Alvarenga - LACEN, PI, Brazil.

⁵PhD student in Tropical Medicine at Institute Oswaldo Cruz – IOC- FIOCRUZ, RJ. Biomedic at Central Public Health Laboratory Dr. Costa Alvarenga - LACEN, PI, Brazil.

⁶Veterinary medicine student at the Federal University of Piauí. Sanitary inspection agent of the Municipality of Teresina, PI, Brazil.

⁷Specialist in Business Management from the Higher Education Center of Vale do Parnaíba, PI. Administration Assistant at the Federal Institute of Education, Science and Technology of Piauí, Brazil.

⁸Master in Biological Sciences from the State University of Maranhão. Professor at the Federal Institute of Education, Science and Technology of Piauí, Brazil.

⁹PhD in Parasitic Biology by the Oswaldo Cruz Foundation – FIOCRUZ, RJ. Coordinator of Fiocruz Regional Office, PI. Professor at the UNIG- University Iguaçú, RJ, Brazil.

¹⁰PhD student in Immunology at Ribeirão Preto Medical School, University of São Paulo. PhD in Biological Sciences from the Federal University of Juiz de Fora, MG, Brazil.

*Correspondent Author

Abstract— Chagas Disease (CD) or American trypanosomiasis is a serious infectious disease that presents acute and chronic phases. In Brazil, acute cases of CD are compulsory notification to epidemiological surveillance. Between the years 2013 and 2017, in Piauí state, 350 cases were confirmed in chronic phase, which represent 26.8% of the acute cases registered in Brazil (1304 cases). Therefore, screening of Chagas disease in the chronic phase is of paramount importance for controlling the pathology.

Keywords— Cases Notification, Chagas Disease, Public Health.

I. INTRODUCTION

Chagas disease (CD) is serious infection caused mainly by the flagellate protozoan *Trypanosoma cruzi*, transmitted mostly by Triatomine bugs. Oral contact, organ transplantation, blood transfusion, work accidents and vertical transmission may be other ways to contract the disease¹⁻².

The acute and chronic phases manifest asymptotically or symptomatically³⁻⁴. Acute phase takes around 4 to 12 weeks, when the parasite might be found in the blood. The parasite multiply inside macrophages in spleen, liver, lymph node, myocardium and tissues, and may cause inflammatory reactions⁵. Chronic phase emerges after acute phase with decrease of IgM and increase of IgG antibody levels. In that moment the body

already suffers great damage and treatment is compromised, what means less chance of cure ⁶.

The World Health Organization⁷, estimates between 6 and 7 million people with CD worldwide, highlighting 21 countries in Latin-America, mainly Argentina and Brazil. In the latter, epidemiological surveillance acts through the compulsory notification of cases of acute CD, however researchers have brought discussions on improvements in the reporting process, with the inclusion of chronic cases⁸⁻⁹. In regard to the vector, the natural infections rate of triatomines by flagellates morphologically like *Trypanossoma cruzi* was around 183 out of the 22,896 triatomines in captured inside houses in Piauí state in 2008¹⁰. A research about main transmissible infectious diseases in serological screening at Blood Centers from Piauí in 2012, showed that out of 49,829 donations, 1,818 were blocked after serological tests and 177 had positive results to CD ¹¹.

According to the described above, it is important to keep control of CD in the state. This study aims to report cases of chronic CD in Piauí state among the years 2013 to 2017, which do not require reporting, based on positive cases detected in a reference laboratory of public health.

II. MATERIAL AND METHODS

For this retrospective study, with a qualitative-quantitative approach, secondary data on the chronic form of CD from the reference laboratory in Public Health of Piauí, Brazil, dating from the years of 2013 to 2017, were used. The data were grouped by year and by the city where

the patients were living. To define the distribution of people infected by CD per city in Piauí state, the software ArcGis was used.

The data were obtained through the records of the laboratory system, after careful analysis and proper authorization.

The ethical and legal aspects related to the phases of the research were respected according to the National Health Council under resolution 466/2012 and its complementary rules with Ethics Presentation Certificate number 2.962.707.

III. RESULTS

Over the years 2013 to 2017 there were 4029 suspected cases of CD in the reference laboratory of Public Health of Piauí, Brazil, and 350 of those were tested positive to the disease. The laboratory received and processed suspected samples of chronic CD, which were analyzed, and the diagnosis was confirmed by methods including ELISA, IFI and Chemiluminescence. The age range that showed the highest frequency of positive cases for both females (40.76%) and males (32.80%) was between 41 and 61 years old. However, among males the frequency was higher between 25-41 years old (25.40%) and above 61 years old (28.57%) compared to female (Table 1). In this study, it was not possible to identify gender and age of 4 patients (data not shown in the table).

Table 1- Frequency of chronic CD according to age and sex in population from Piauí state, Brazil

Age Range	Female	Relative frequency (%)	Male	Relative frequency (%)	Female + Male frequency/(%)
00 --- 11	4	44.4	5	55.6	9/ (100)
11 --- 18	14	82.3	3	17.7	17/ (100)
18 --- 25	14	45.2	17	54.8	31/ (100)
25 --- 41	28	36.8	48	63.2	76/ (100)
41 --- 61	64	50.8	62	49.2	126/100)
61 --- 98	33	37.9	54	62.1	87/(100)
95% CI	3.8 to 48.5		3.9 to 59		
Σ	157	-	189	-	346

Source: produced by the authors

There are 224 cities in Piauí state, in which 49 (21.87%) had positive cases in this study (Fig 1 B).

The Figure 1 (A and B) shows the distribution of CD cases in all state of Piauí with highlight to the cities of

Teresina (n= 186; 53.14%) and Riacho Frio (n= 53; 15.14%) with the most of positive tests.

In the Figure 1C it is possible to see the number of cases per year decreasing over time, with the following

occurrences: 2013 with 37.71% of cases (132 to 350), 17.71% in 2014 (62 to 350), 14.57% in 2015 (51 to 350), and 2016 10.86% (38 to 350). However, there was a short increase in 2017 with 19.14% of cases (67 to 350).

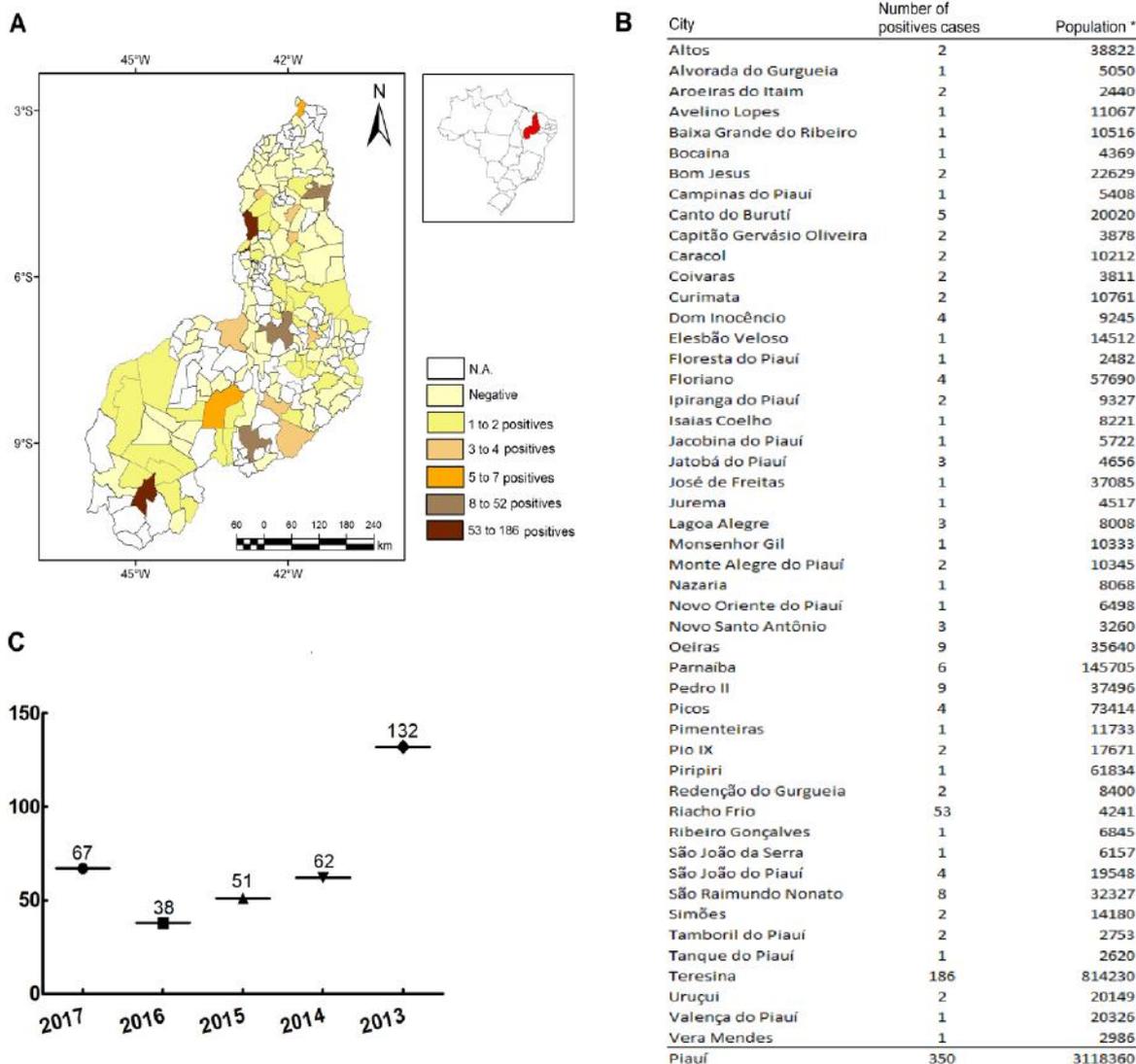


Fig.1: Distribution of CD cases in Piauí state

Source: produced by the authors

IV. DISCUSSION

According to SINAN (Information System of Injury Notification)¹², in the period of this study, 1304 cases of acute DC were notified in Brazil, whereas in Piauí no case was reported. Despite this, the present work shows 350 positive chronic CD cases in 49 cities in Piauí state with the major frequency between 41 and 61 years old, and no significant difference in frequency between female and male. In addition, it is possible to observe that 2.6% of

positive cases are of children among 0 and 11 years old. The maternal anti-*T. cruzi* of the IgG fraction can cross the placenta and so all newborns of chronic CD mothers are seropositive until approximately the sixth month of life¹³.

It has been reported that chronic patients (average age of 54 years old; 34% female and 31% male) arising from different geographical regions from Brazil, assisted between 2011 to 2014 at the Chagas disease ambulatory from the Evandro Chagas Infectology National Institute

(INI—Fundação Oswaldo Cruz, Rio de Janeiro, Brazil), are mainly immigrants from the northeast region, where Piauí is located¹⁴.

The socioeconomic inequities and the access to the healthcare systems provided to Brazilian population are characteristics that define the differences of mortality rates from CD. In regard to age, the mortality rates increased in patients over 30 years old, with higher occurrence among individuals between 50 and 64 years old; in addition, men died five years younger than women⁶. CD cases have been reported in various regions of Brazil with a high prevalence of comorbidities. However, there is a tendency to increase the mortality rate in the northern and northeastern regions of Brazil¹⁵⁻¹⁶.

Due to the short duration of the acute phase, chronic cases of CD are more sensitive to epidemiological research. Additionally, reference laboratories apply immunological tests to find only IgG, an antibody characteristically reactive in chronic phase of this disease. There is no specific kit to define the acute phase⁷ in the standards determined by the ANVISA (Brazilian National Health Surveillance Agency).

The acute phase of CD presents high parasite count, Romanã sign or inoculation chagoma in the skin are main clinical manifestations. However, is possible to see systemic symptoms as moderate fever, headache, malaise, anorexia and diarrhea. The diagnostic methods used are direct parasitological study via microscopic examination of fresh anti coagulated blood, thin and thick blood smears, or preferably through the identification of motile trypomastigotes in samples following Strout concentration technique. Also a feasible diagnostic method as Polymerase chain reaction (PCR) with host's peripheral blood or cerebrospinal fluid (CSF) samples. However, is possible to find high incidence of false positives because this method is not fully standardized¹⁷⁻¹⁸.

Generally, chronic CD presents low parasitic load and the patients can manifest digestive form of the disease resulting in the formation of mega viscera, which involves mainly esophagus and colon¹⁹⁻¹⁸. The standards for diagnosis are serological tests, and the strategy recommended by WHO⁷ is to combine epidemiologic information with two different serologic assays since commercial ELISA based tests present heterogenic sensitivity and specificity¹⁸⁻²⁰.

If there is disagreement between the tests, it is recommended to repeat the testing and, persisting the disagreement, a third test with PCR or western blot is recommended¹⁸⁻²¹. Since CD has been a largely neglected disease it is important to report both acute and chronic

manifestations. The diagnosis to chronic CD is complex due to low parasitic load, but notifications of the cases are required to monitor disease incidence throughout the country²².

V. CONCLUSION

In this work, we show high frequency of DC in Piauí, mostly in the cities of Teresina and Riacho Frio, in the period of 2013 to 2017, with a short increase in the latter. The screening of Chagas disease in the chronic phase is of paramount importance for the control of the pathology and the case reports help to keep attention on health education of the population.

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