

BRIEF COMMUNICATION

PREVALENCE OF CHAGAS DISEASE IN A RURAL AREA IN THE STATE OF CEARA, BRAZIL

Erlane Chaves FREITAS(1), Maria de Fátima OLIVEIRA(2), Mônica Coelho ANDRADE(2), Arduina Sofia Ortet de Barros VASCONCELOS(2), José Damião da SILVA FILHO(2), Darlan da Silva CÂNDIDO(2), Laíse dos Santos PEREIRA(2), João Paulo Ramalho CORREIA(2), José Napoleão Monte da CRUZ(3) & Luciano Pamplona de Góes CAVALCANTI(1,4)

SUMMARY

Chagas disease is caused by *Trypanosoma cruzi* and affects about two to three million people in Brazil, still figuring as an important public health problem. A study was conducted in a rural area of the municipality of Limoeiro do Norte - CE, northeastern Brazil, aiming to determine the prevalence of *T. cruzi* infection. Of the inhabitants, 52% were examined, among whom 2.6% (4/154) were seropositive in at least two serological tests. All seropositive individuals were older than 50 years, farmers, with a low education and a family income of less than three minimum wages. Active surveillance may be an alternative for early detection of this disease.

KEYWORDS: Chagas disease; Epidemiology; Health survey.

In Brazil, there are about two to three million people infected with *Trypanosoma cruzi*, generating a high social, pension and healthcare impact, and also the need for continuous surveillance^{7,15}.

The prevalence of Chagas disease in the state of Ceara (CE), Brazil, according to the National serological survey that was conducted between 1975 and 1980, was 0.84%. However, the results for Ceara presented limitations, such as the long-term storage of samples, a fact that may have affected the validity of this finding⁴. The municipality of Limoeiro do Norte - CE stood out by its high prevalence of Chagas disease, mainly between last century's 50s and 70s. Serological studies performed in humans until 1967 in Ceara brought up an infection prevalence of 14.8%, for the whole state. In the same period, the prevalence in Limoeiro do Norte was 16.7%. In the next decade, from 1970 to 1974, the prevalence of human *T. cruzi* infection was 4.6%¹. In addition to the high levels of human infection, entomological studies showed triatomine infection rates of 14% in 1955-1976¹ and 5% in the period 2009-2011¹⁸.

Epidemiological studies are important to spread information about the disease among populations in risk areas¹². Therefore, this study aimed to investigate the seroepidemiological situation of CD in a rural location in Limoeiro do Norte, Ceara, Brazil, in order to provide early diagnosis and evaluate the profile of this population.

This cross-sectional study was conducted between February and September, 2011, in a rural area in the municipality of Limoeiro do Norte, which is 162 km away from the Capital, Fortaleza, in a

straight line. The municipality is located in the Jaguaribe river valley, northeastern Brazil (5° 08 '44' and 38° 05 '53 "')¹¹. The locality of Sape was chosen randomly among those that had a greater number of insects captured between the years of 2006-2009 in the city of Limoeiro do Norte¹⁷. The census type sample was possible due to the reduced number of inhabitants of the locality, in addition to the fact that it meets the goal of providing early diagnosis to individuals in the region. This location was chosen due to the presence of infected triatomines, captured in routine surveillance activities of the municipality and because Limoeiro do Norte is located between the areas of highest disease prevalence, according to other studies^{1,17,18}. Then, all 115 residences and its 296 inhabitants were visited, informed about the objectives of the project and invited to participate. Socioeconomic data were collected using a structured questionnaire and 154 people who agreed to participate had blood samples taken.

The Enzyme-Linked Immunosorbent Assay (ELISA) method was used, according to the Wama Diagnostica® kit for Chagas Disease (Brussels, Belgium) in the Laboratory for Research in Chagas disease (LPDC) of the Federal University of Ceara, in Fortaleza. Serum samples that resulted reagent, or inconclusive in serology for anti-*T. cruzi* antibodies by ELISA were forwarded to the Public Health Central Laboratory of Ceara (LACEN-CE) to be analyzed by three methods: indirect immunofluorescence (IIF), indirect hemagglutination (HAI) and ELISA. According to the Brazilian Consensus on Chagas disease, serum reagent individuals in at least two serological tests with different methodological principles were considered positive¹⁴.

(1) Universidade Federal do Ceará, Departamento de Patologia e Medicina Legal, Fortaleza, CE, Brasil.

(2) Universidade Federal do Ceará, Faculdade de Farmácia, Departamento de Análises Clínicas e Toxicológicas, Fortaleza, CE, Brasil.

(3) Laboratório Central de Saúde Pública do Ceará, Fortaleza, CE, Brasil.

(4) Universidade Federal do Ceará, Faculdade de Medicina, Departamento de Saúde Comunitária, Fortaleza, CE, Brasil.

Correspondence to: Luciano Pamplona de Góes Cavalcanti, Departamento de Saúde Comunitária, Universidade Federal do Ceará, Faculdade de Medicina. R. Prof. Costa Mendes 1608, 5º andar, 60430-140 Fortaleza, CE, Brasil. Tel.: +55 85 99878969; Fax +55 85 33668050. E-mail: pamplona.luciano@gmail.com

Table 1

Seropositivity for anti-*Trypanosoma cruzi* antibodies by age group and sex among residents of a rural area in the municipality of Limoeiro do Norte – CE, 2011

Age Group (years)	Women			Men			Total		
	Exa	Pos	% Pos	Exa	Pos	% Pos	Exa	Pos	% Pos
0 - 9	4	0	-	4	0	-	8	0	-
10 - 19	11	0	-	13	0	-	24	0	-
20 - 29	16	0	-	10	0	-	26	0	-
30 - 39	20	0	-	9	0	-	29	0	-
40 - 49	10	0	-	8	0	-	18	0	-
50 - 59	16	3	18.8	7	0	-	23	3	13.0
60 - 69	11	0	-	7	0	-	18	0	-
≥ 70	4	0	-	4	1	25.0	8	1	12.5
Total	92	3	3.3	62	1	1.6	154	4	2.6

Exa: examined, Pos: positive.

The study was approved by the Research Ethics Committee of the Federal University of Ceara (UFC COMEPE) with number 255/11.

The index of Chagasic infection obtained, 2.6% (4/154) (Table 1), was considered high, even though, it is about two times lower than that estimated for the whole municipality in the late 1970s¹.

In the present study, all positive participants were farmers, living in brick masonry houses, had a family income of up to three minimum wages and primary education, thus consistent with the profile described in the literature^{6,8}.

Vectorial transmission must probably have been the route of transmission responsible for the diagnosed cases, since positive individuals for serum IgG anti-*Trypanosoma cruzi* did not mention having a mother with CD or having donated or received blood prior to the study.

All positive individuals were older than 50 years, which shows the aging of the CD population also found in other studies^{3,9}. Moreover, only two infected children were detected in the recent national survey that evaluated more than 9,000 children up to the age of five in the state of Ceara¹⁶. Both results may indicate the effectiveness of vectorial control and improvement of housing conditions in these areas^{3,9}. However, a recent entomological survey showed persistence of favorable conditions for the maintenance of Chagasic endemy in Limoeiro do Norte – CE^{17,18}.

Even with the clear reduction of vectorial transmission in Brazil, there is still evidence of isolated cases¹⁶ and the prevalence of infection of some vector species is considered high in the area under study^{17,18}. In addition, the decentralization of monitoring and control may have weakened the actions over other priorities such as dengue.

The active case surveillance (the search for chronic cases in endemic and high risk transmission areas) may be an alternative for early detection, since the control actions prioritize combating transmission and not the investigation of existing disease cases.

Given the underreporting of individuals in the chronic phase of CD (FSMs) and the lack of studies that portray the current epidemiology of the disease, it is necessary to conduct further investigations in order to scale the disease status in endemic areas aiming to guide the maintenance of actions for disease control and to provide diagnosis and adequate treatment, when still benefic^{2,5,10}.

During the period 2006-2009, approximately 40% of the insects captured in Limoeiro do Norte were in the intradomicile area. Also, a noteworthy fact is that most of the captured specimens were nymphs, pointing to the domiciliation of the vector¹⁷. Furthermore, in the southeastern region of Ceara, Limoeiro do Norte showed the highest rate of natural infection among triatomines captured in the period from 2009 to 2011¹⁸. Besides, despite the reduction in mortality due to Chagas disease in Brazil, in the period 1999-2007, the Northeast region stood out as the only one to experience an increase in mortality, calling attention to the need for strengthening of control measures and improvement of care services to patients currently infected¹³.

With the decentralization of the endemic diseases control in the municipalities in 1999, and the competition with other endemic diseases such as dengue, the disintegration of some programs for the control of Chagas disease occurred. Thus, it is important to conduct sample surveys to characterize the potential of transmission and to implement relevant and timely control measures in areas such as Limoeiro do Norte, where there is no current active entomological surveillance but have evidence of the presence of vectors.

RESUMO

Prevalência da doença de Chagas em área rural no estado do Ceará, Brasil

A doença de Chagas é causada pelo *Trypanosoma cruzi* e atinge cerca de dois a três milhões de pessoas no Brasil, permanecendo como importante problema de saúde pública. Foi realizado um estudo em área rural do município de Limoeiro do Norte - CE, nordeste do

Brasil, com o objetivo de conhecer a prevalência da infecção chagásica. Foram examinados 52% dos habitantes, dentre os quais 2,6% (4/154) apresentaram sorologia reagente em pelo menos dois testes sorológicos. Todos os positivos tinham idade superior a 50 anos, eram agricultores, com baixa escolaridade e renda familiar inferior a três salários mínimos. A busca ativa pode ser uma alternativa para o diagnóstico precoce dessa doença.

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Av. Dr. Enéas Carvalho de Aguiar, 470 - CEP 05403-000 - São Paulo - Brasil
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