

Health education and chagas disease: Reality of a region in Brazilian central

Educação em saúde e a doença de chagas: Realidade de uma região no centro Brasileiro

Educación en salud y enfermedad de chagas: Realidad de una región del Brasil central

RESUMO

Objetivo: verificar o conhecimento da população de Águas Claras acerca da doença de Chagas, promovendo educação em saúde relacionada a essa patologia. Métodos: Estudo transversal descritivo, realizadas entrevistas sobre a doença em março e abril de 2019. Elaborada cartilha explicativa para educação em saúde. Os dados foram analisados quanto à sua frequência seguido de teste qui-quadrado em nível de significância de 5%. Resultados: Dos 387 participantes, 78% eram mulheres, a idade variou de 18 a 85 anos, 82,9% dos participantes reconheceram o vetor. Variáveis como alimentação e habitat do vetor, apenas 31,5% e 19,1%, respectivamente, dos participantes acertaram a resposta. Perguntas como transmissão e sintomas da doença, apenas 3,9% e 22,1%, respectivamente, dos participantes acertaram a resposta, 96,1% e 77,7% não sabiam responder. Conclusão: A fragilidade de conhecimento da população indica a negligência do Estado em promover educação em saúde. O uso da cartilha disponibilizou as informações de forma de fácil acesso.

DESCRIPTORIOS: Doença de Chagas; Trypanosoma cruzi; Controle de vetores; Triatomíneos; Educação em saúde.

ABSTRACT

Objective: to verify the knowledge of the population of Águas Claras about Chagas disease, promoting health education related to this pathology. Methods: Descriptive cross-sectional study carried, semi-structured interviews about the disease were carried out in March and April 2019. Elaborated for health education. Data were analyzed for frequency followed by the chi-square test at a significance level of 5%. Results: Of the 387 participants, 78% were women, ages ranged from 18 to 85 years. 82.9% of the participants recognized the vector. Variables such as food and vector habitat, only 31.5% and 19.1%, respectively, of the participants got the answer right. Questions such as transmission and symptoms of the disease, only 3.9% and 22.1%, respectively, of the participants got the right answer, 96.1% and 77.7% did not know answer. Conclusion: The population's fragility of knowledge indicates the State's negligence in promoting health education. The use of the booklet made the information available in an easily accessible form.

DESCRIPTORS: Chagas Disease; Trypanosoma cruzi; Vector control; Triatominae; Health education.

RESUMEN

Objetivo: verificar el conocimiento de la población de Águas Claras sobre la enfermedad de Chagas, promoviendo la educación en salud relacionada con esta patología. Métodos: Estudio transversal descriptivo. Se realizaron entrevistas sobre la enfermedad en marzo y abril de 2019. Se elaboró un cuadernillo para la educación sanitaria. Los datos se analizaron en términos de frecuencia y chi-cuadrado con significancia del 5%. Resultados: De los 387 participantes, el 78% eran mujeres, la edad osciló entre 18 y 85 años, el 82,9% de los participantes reconoció el vector. Variables como alimentación y hábitat del vector, solo el 31,5% y el 19,1%, respectivamente, de los participantes acertaron. Preguntas como transmisión y síntomas de la enfermedad, solo el 3,9% y el 22,1%, respectivamente, de los participantes respondieron correctamente, el 96,1% y el 77,7% no supieron responder. Conclusión: La fragilidad del conocimiento de la población indica la negligencia del Estado en la promoción de la educación en salud.

DESCRIPTORES: Enfermedad de Chagas; Trypanosoma cruzi; Control de vectores; Triatominae; Educación en salud

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INTRODUCTION

Chagas disease (CD) is an important public health problem caused by *Trypanosoma cruzi* (TC).¹ It has a high degree of morbidity and lethality.² There are about 7 million infected in the world, mainly in Latin America. In Brazil, according to the World Health Organization (WHO), there are about 1.1 million sick people.³

In endemic areas, TC is transmitted by several species of triatomines (barbeiros). They are hematophagous, found predominantly in areas of South and Central America. Miles et al⁴ showed that the number of triatomine species in the Amazon has increased to 11. Other transmission routes are important, such as congenital, oral through ingestion of contaminated food, blood transfusion, organ transplantation and laboratory accidents.⁵

The acute phase of CD is characterized by high parasitemia and is usually asymptomatic, but there are cases in which the Romaña sign or inoculation chagoma can be observed, indicating vector transmission. The chronic phase, defined by the very low number of parasites in the peripheral blood, may show no symptoms for

several years.⁶ About 30% to 40% of those infected will develop heart and/or gastrointestinal problems years after the initial infection. There is no vaccine available to prevent TC infection.⁷ CD is included in the group of neglected diseases, which is a category of preventable diseases, however stigmatized, disabling, debilitating and fatal, compromising a large part of the poor and vulnerable populations in developing countries, contributing to the maintenance of social inequality.⁸

Entomological surveillance in the Federal District is systematized through 65 information posts on triatomines, where triatomines captured by the population in domestic or rural areas can be left for analysis. Between 2012 and 2014, 894 triatomines were delivered to these stations. The Administrative Regions (AR) with the highest occurrence of triatomines were: Vicente Pires, Park Way and Paranoá. The species *P. megistus* appeared more frequently, corresponding to 92.6% of the findings, including the home environment. The second most found species was *T. pseudomaculata* with 51 specimens collected, one of which was recorded in the peridomestic environment. Of the 894 triatomines found, 13 were positive

for flagellated forms, being similar to TC, four were found in an indoor environment.⁹

Between 2016 and 2017, a study carried out at the Brasília Zoo identified triatomines with a high frequency of TC infection among wild mammals in the area. A colony of 19 *P. megistus* was found, of which five were infected.¹⁰ Although there is no record of autochthonous transmission of CD in the DF, the result found characterizes a risk of human infection.

According to Parente et al¹¹, triatomines are of great epidemiological relevance, due to their high susceptibility to TC infection and their ability to invade and colonize human homes, increasing the risk of CD transmission. The accelerated growth of ARs in the DF, the precarious infrastructure in some areas and the fact that many homes are located close to forests, collaborate with the dispersion by flight of adult insects and their home invasion stimulated by environmental changes.¹²

The AR of Águas Claras has a high degree of urbanization, with only 0.03% of the domiciles being improvised, 23.06% of which are houses and 76.46% are apartments.¹³ Even so, one of the TC-infected triatomines, collected between 2012 and

2014 in the DF, was captured in an apartment located on the 12th floor of this AR. 10 Another triatomine captured in 2017, also infected with TC, was found on the 9th floor of another building in the city.¹⁴ The insect may have flown from the remaining forests of Park Way and Arnuqueiras to the residence or have been accidentally taken by a resident. Observing the presence of triatomines in a place that differs from the common environments in which the insect usually appears, since there is a choice for more rural and arboreal environments, motivated the execution of the present work. The objective was to verify the knowledge of the population of Águas Claras about CD, promoting health education related to this pathology.

METHOD

This is a descriptive cross-sectional study carried out in the field in AR Águas Claras-DF, Brazil in March and April 2019.

After sample calculation, considering a confidence interval (CI) of 95% and a sampling error of 5%, 385 participants would be needed for a significant sample. The sample consisted of 387 participants. Participants were at least 18 years old and resided and/or studied and/or worked in AR. Participants were approached on the streets and the researchers identified themselves and explained the research objectives and procedures for data collection, the Free and Informed Consent Form (FICF) was signed, which was prepared in accordance with the Resolution of the National Health Council 510/2016.

Regarding health education, an explanatory booklet was prepared with images and a synthesis of information based on material available by the federal government, as well as relevant articles on Chagas disease and its transmitting agent.

A semi-structured questionnaire adapted from Maeda and Gurgel-Gonçalves (2012)¹² was used, with 23 questions about CD and its vector in order to verify the degree of knowledge of the population interviewed about the disease, its transmission and prevention process. To recognize

the insect by the participants, a triatomine image was used.¹⁵ Then, the participants were informed about the correct answers and the doubts they had about CD were clarified through the use of the explanatory booklet that was made available to the participants after the interview was concluded. The study was approved by the Research Ethics Committee of the Fundação de Ensino e Pesquisa em Ciências da Saúde/FEPECS/SES/DF under protocol number 2,852,710.

All statistical analyzes were performed using SAS® software (v9.4, Cary, North Carolina). Data were analyzed in terms of frequency by applying the PROC FREQ procedure followed by a chi-square test at a 5% significance level. The answers to the questionnaire were evaluated considering

gender, education, time of study, place of residence, type of building in which they reside and whether or not there are cracks in the place where the interviewed population lives.

RESULTS

Of the participants, 78% (302) were women, age ranged from 18 to 85 years, with a mean of 33.48 ± 13.9 years. 22% (85) were men, age ranged from 20 to 80 years, with a mean of 43.14 ± 15.47 years. Schooling varied among those who studied up to complete elementary school 21.2% (82), completed high school 30.7% (119) and high school to higher education 46.6% (181). Table 1 presents the sample characterization data in detail.

Table 1. Characterization of the sample population according to data presented by the research participants.

| Characteristics of the population | N | % |
|-----------------------------------|-----|------|
| Sex | | |
| Female | 302 | 78 |
| Male | 85 | 22 |
| Age | | |
| Between 18 and 25 years old | 36 | 9,3 |
| Between 26 and 35 years old | 83 | 21,4 |
| Between 36 and 45 years old | 116 | 30 |
| Between 46 and 55 years old | 79 | 20,4 |
| Between 56 and 85 years old | 73 | 18,9 |
| Education | | |
| Up to complete elementary | 82 | 21,2 |
| High school | 119 | 30,7 |
| Above high school | 181 | 46,6 |
| Uninformed | 5 | 1,5 |
| Type of housing or work | | |
| Apartment | 344 | 88,9 |
| House | 38 | 9,8 |
| Store | 5 | 1,3 |
| House has cracks | | |
| Yes | 62 | 16 |
| No | 325 | 84 |

Source: the authors, 2019

Among the participants, 16% (62) gave a positive answer for the presence of cracks in the residences, most cited spaces in the door portal, even though the questionnaire did not specify this question.

82.9% (321) of the participants were able to identify the triatomine from the figure presented. Regarding the source of knowledge, 27.1% (105) said it was through education and 16.5% (64) through the media. As for the eating habits of the triatomine, 31.5% (122) answered blood. As for the place where the triatomine lives, the most prevalent answer was “other places” with 44.5% (172) of the answers, being mud houses with only 15% (58).

85% (329) were able to indicate CD as the disease caused by triatomine bugs and more than half reported knowing someone who has the disease. The most common answer to the question “What would you do if you found the insect?” was would kill in 81.1% (314), while only 8.3% (32) said they would pick it up and deliver it to a health agency. The most prevalent answer on how to avoid CD was through cleaning 32.9% (127) (Table 2). Most 81.7% (316) of the participants believe that the disease is treatable, however it has no cure 66.9% (259).

12.7% (49) reported that CD causes cardiomegaly, swelling and growth in the heart, equivalent to 40.1% (155) and death to 13.7% (53), as shown in Table 3.

When looking for the relationship between schooling and the level of knowledge about CD through statistical analysis, interesting data were found. Of all the questions asked, only those about feeding the vector and where it lives, transmission, disease symptoms, symptoms and prophylaxis showed a statistically significant difference ($p < 0.05$) between participants with higher and lower levels of education.

DISCUSSION

The results demonstrate that the population of Águas Claras-DF has knowledge about CD, but only superficially.

Still on the question “where did you meet the insect?”, education corresponds to

Table 2. Knowledge about triatomine bugs and Chagas disease

| Questions | N | % |
|--|-----|------|
| Did they know the insect | | |
| Yes | 321 | 82,9 |
| No | 66 | 17,1 |
| How did they meet the insect? | | |
| Education | 105 | 27,1 |
| Medias | 64 | 16,5 |
| Others | 218 | 56,4 |
| What does the insect eat | | |
| Blood | 122 | 31,5 |
| Others | 31 | 8 |
| Doesn't know | 234 | 60,5 |
| Where does the insect live | | |
| Cracks / Gaps | 16 | 4,1 |
| Wooden houses / Rammed earth | 58 | 15 |
| Other places | 172 | 44,5 |
| Do not know | 141 | 36,4 |
| Does the insect cause any disease? | | |
| Yes | 371 | 95,9 |
| No | 13 | 3,4 |
| Do not know | 3 | 0,7 |
| What disease does it cause | | |
| Chagas disease | 329 | 85,0 |
| Do not know | 58 | 15 |
| Knew someone with Chagas disease | | |
| Yes | 198 | 51,2 |
| No | 189 | 48,8 |
| Who did they know that had the disease | | |
| 1st degree relatives | 66 | 33,3 |
| Acquaintances/Distant relatives | 132 | 66,7 |
| What is the mode of transmission of the disease? | | |
| Barber | 4 | 1 |
| Feces/ Urine | 15 | 3,9 |
| Others | 268 | 69,3 |
| Do not know | 100 | 25,8 |

27.1% (105) of the answers. Health units and other responses appeared and were allocated in the “others” category, accounting for 56.4% (218) of the responses. Demonstrating that the participants' knowledge was not acquired through health education. Of interest, primary health care (PHC) and all professionals who work in it are responsible for carrying out health education actions for the AR population.¹⁵ A study carried out by Carneiro et al.¹⁶ evaluated the quality of educational practices for health promotion, showing that actions in primary care are still guided by the outdated model of imposing knowledge characterized by vertical interventions and little concern with the development of subjects' autonomy. This corroborates the data of the present study that few people acquired information through education, thus reinforcing vertical and distant relationships between professionals and service users.

According to Schmunis¹⁷, CD has been outside the curricula of health universities and is not usually an object of interest to physicians in training, which further contributes to the abandonment of studies on the pathology. Thus, if education about Chagas disease has been neglected in the training process of health professionals, it may be a factor that contributed to the little knowledge of the population on the subject, since the professionals who promote health education have weak technical knowledge about this pathology as well.

As described in the results, few data showed a statistically significant difference ($p < 0.05$) between participants with higher and lower levels of education. In other words, the hypothesis that health education on CD has been neglected is quite acceptable, since even those who have more access to information due to their education profile still demonstrated little knowledge about this topic.

The National Policy on Continuing Education for Workers in the Unified Health System¹⁸ emphasizes the need to train professionals according to the realities, raised from the daily routine of the services. According to Schmunis¹⁷, In order to provide a more effective approach to health

| What would they do if they found the insect? | | |
|---|-----|------|
| Would kill it | 314 | 81,1 |
| I would keep it in a pot and/or deliver it to a health or surveillance agency | 32 | 8,3 |
| Others | 29 | 7,5 |
| Do not know | 12 | 3,1 |

Source: the authors, 2019

Table 3. Knowledge about symptoms, prevention, treatment and cure of Chagas disease/doença de Chagas

| Question | N | % |
|---------------------------------|-----|------|
| Chagas disease causes symptoms | | |
| Yes | 268 | 69,3 |
| No | 70 | 18,1 |
| Do not know | 49 | 12,6 |
| What symptoms does it cause | | |
| Cardiomegaly | 49 | 12,7 |
| Fever | 37 | 9,6 |
| Others | 54 | 13,9 |
| Do not know | 247 | 63,8 |
| Complications | | |
| Heart swelling/enlargement | 155 | 40,1 |
| Swelling/growth of other organs | 3 | 0,8 |
| Death | 53 | 13,7 |
| Heart problems/ stroke | 25 | 6,3 |
| Others | 13 | 3,4 |
| Do not know | 138 | 35,7 |
| How to avoid Chagas disease | | |
| Renovation+cleaning | 127 | 32,9 |
| Avoid food or places | 47 | 12,1 |
| Others | 66 | 17 |
| Do not know | 147 | 38 |
| Chagas disease is treatable | | |
| Yes | 316 | 81,7 |
| No | 63 | 16,3 |

education involving CD, the public health system's performance through quality PHC and timely interventions is essential.

Of the participants who claimed to know someone with the disease, 33.3% (66) reported being a first-degree relative and the remaining 66.7% (132) a distant or known relative. Most of these distant or known relatives resided in other states. One of the most cited was Bahia, whose annual average of deaths between 2008 and 2017 due to CD was 624, being historically significant in the state, with the fourth highest rate among the federated units, behind only Goiás, Distrito Federal and Minas Gerais.¹⁹

Knowledge about the epidemiological distribution of CD represents a central point to establish more constant and consistent management, surveillance and health care actions. In the period from 2012 to 2016, the average annual incidence of CD in Brazil was 0.1 cases/100,000 inhabitants. With a case fatality rate of 1.5%, the Midwest (2.8%) of the 105 acute cases recorded. The highest average incidences occurred in the states of Pará and Amapá, with 2.9 and 1.5 cases/100 thousand inhabitants, respectively.²⁰

Only 31.5% (122) knew that the triatomine feeds on blood, strengthening the need to constantly promote health education. According to Villela et al²¹, the evaluation of knowledge and practices by the population can serve as a tool to minimize information limits and promote health, being essential to include or use it in public policies, as well as technical consistency to generate transformative and driving actions. In relation to CD, it is important that educational activities are included in the training of the control program teams, so that they can offer the population the necessary information to understand the importance of the work of capturing triatomines.²¹

Some participants stated that the insect shown in the figure (triatomine) caused dengue, which suggests that although dengue is more widespread than CD, the health education process is also deficient in relation to other pathologies.

According to Sales²², health education

| | | |
|----------------------------|-----|------|
| Do not know | 8 | 2 |
| Is Chagas disease curable? | | |
| Yes | 98 | 25,3 |
| No | 259 | 66,9 |
| Do not know | 30 | 7,8 |

Source: the authors, 2019

activities are evidenced in the 1988 Constitution, stating the need for its implementation and/or implementation. According to Mendes²³ what can be observed is a health practice emphasizing interventions restricted to curative actions, focused on pathology and distant from prevention and health promotion. One of the biggest challenges for the construction of knowledge between professionals and the population lies in the language that can make it difficult/prevent an authentic interaction.²⁴ Therefore, contact with the population of Águas Claras, both through the booklet and verbal explanations, immediately after the interview clarified most of the doubts.

36.4% (141) of the participants could not indicate where the triatomines live. According to Crocco et al²⁵ there are risk factors that are associated with the presence of triatomines, such as roofs and walls of homes. Regarding the characteristics of the dwellings of the participants, there is little favoring to house the triatomine.

According to Passos et al²⁶, açai was the food related to the highest number of cases of acute Chagas disease (ACD) that occurred in the northern region of Brazil in recent years. Recent cases of ACD reported in Brazil are correlated with the consumption of açai juice, considered an essential food in the diet of the population of Northern Brazil and much appreciated in other states and countries.²⁷

Less than 4% of participants stated that transmission is through contaminated feces and food. Even though the vector and oral route is quite common to transmit TC²⁸. The disease presents regional outbreaks by oral transmission. The main suspects of contaminated food sources are açai and sugarcane juice, widely consumed as a drink

in Brazil.^{29,30}

The study carried out by Maeda and Gurgel-Rodrigues³¹ demonstrated that the population's knowledge about CD transmission is restricted to contact with the barber, since the average percentage was 83.5% with responses related only to contact with the vector, excluding other forms of contamination. Although there is no record of autochthonous transmission of CD in the Federal District, knowing the forms of transmission is essential to minimize the chances of exposure.

As for the clinical manifestations of the disease, fever, corresponding to 9.6% (37) of the participants' responses, is the most characteristic symptom of the acute phase of the disease, sometimes elevated and often in the afternoon and lasting up to two weeks.³² Other non-specific symptoms include prostration, diarrhea, vomiting, loss of appetite, headache, myalgias³³ which were not recognized by the population as a symptom of CD.

The acute phase of CD can present nonspecific clinical manifestations and is easily confused with viral infections. Most patients present asymptotically or with systemic infectious symptoms and changes in laboratory tests.³⁴

In the chronic phase, some patients present with myocarditis and the appearance of signs and symptoms similar to myocarditis from causes other than CD, in addition to dyspnea, fatigue, and heart failure.³⁴ 40.1% (155) of the participants stated that growth or swelling in the heart is a complication of CD, demonstrating that some people understand the severity of this disease, as myocarditis can be fatal.

Clinical manifestations can be variable, severe heart failure and cardiogenic shock

are likely to occur.³⁵ Parallel to this data, 6.3% (25) of the participants reported heart problems as one of the complications and about 13.7% (53) understood the severity of CD, as they listed death as one of the answers.

Sudden death is estimated to be the main cause of mortality throughout the stages of chronic CD cardiomyopathy, corresponding to up to 65% of deaths. Sudden death is most often triggered by exertion and can be caused by either tachycardia and ventricular fibrillation, or by asystole or complete atrioventricular block, the latter being less frequent.³⁴

Among the participants, 38% (147) declared not knowing what can be done to avoid contamination by the triatomine bug, 32.9% (127) reported renovating or cleaning cities and houses, 12.1% (47) responded that they avoid places or foods that have the vector, referring to the consumption of açai and sugarcane juice and the presence in sugarcane fields.

The prevention of CD is attributed to the form of transmission, highlighting, as a form of control, the application of insecticides; health education and use of protective screens on doors and windows to prevent the insect from forming colonies inside homes. Still, preventive measures for CD are: housing improvements, such as plastering and filling cracks and crevices; avoid debris inside or around the residence and remove bird nests from the eaves of houses and maintain periodic cleaning in the houses.³³

The need to have qualified human resources is highlighted, and it is recommended to implement and strengthen programs aimed at the continuous training of human resources from different segments of society.³⁶

Regarding what to do with the insect, 81.1% (314) responded that they would kill it, while only 8.3% (32) would store the triatomine in a pot and/or deliver it to a specialized location. It is recommended that the population, during capture, does not crush, squeeze or damage the insect and, if necessary, touch it, that gloves or plastic bags are used, and that the insect is subsequently placed in plastic containers,

with screw cap, preferably alive and even if the recipient is identified with the date of collection, name of the person in charge, place of capture and address.³³ Information on the care to be taken when encountering the insect provided an alternative for participants to collaborate with entomological

Knowledge about the epidemiological distribution of CD represents a central point to establish more constant and consistent management, surveillance and health care actions. In the period from 2012 to 2016, the average annual incidence of CD in Brazil was 0.1 cases/100,000 inhabitants.

surveillance. Currently, vector transmission is residual, occurring through native species with potential for domiciliation.³¹

Community participation in triatomine notification is of fundamental importance for the maintenance of home vector con-

trol.^{21,27,37} The research participants were instructed on the necessary care with the barber and on the Triatomine Information Post (PIT - Posto de Informação de Triatomíneo) closest to the city, physical, electronic and telephone addresses.³⁸

As for treatment and cure, 81.7% (316) of the participants believed that CD is treatable and 25.3% (98) that it is also cured. Currently, the treatment is free, upon requests from the State Health Departments to the Public Ministry, and offers relevant benefits in the acute phase, with a suppression of parasitemia with the use of current antiparasitic therapy.^{33,39}

According to Alves et al.⁴⁰, in the acute phase of CD, the infection may be symptomatic or asymptomatic, and may progress to the chronic phase if not treated early with a specific medication. Treatment is based on antiparasitic drugs that control the signs and symptoms of infection, in addition to eliminating the parasite.³³

Pharmacotherapy should be started as early as possible with benznidazole and requires follow-up under a standardized research protocol for an average period of 5 to 6 years. Specific antiparasitic treatment contributes to a better evolution of the disease, and survival of about 80% among those who undergo treatment for at least 30 days.³⁹

CONCLUSION

A good part of the interviewed population has some knowledge about CD, but in need of deepening, in view of this, the need arises to expand actions related to the promotion of health education, providing coherent information on CD even in urbanized regions with a good level of education. Deficits in the population's knowledge about the pathology were evidenced. Most know people with the disease and know how to identify that it causes cardiac complications, however they fail to describe the symptoms of the acute phase and, mainly, the prevention actions.

The fragility of the population's knowledge about CD prevention measures indicates the State's negligence in spreading

effective health education on this pathology. The population should be oriented on the biological cycle of the etiological agent, prevention, forms of transmission, clinical profile and methods of detection and control, as community participation in the process of reducing the spread of the disease is essential.

The elaboration and use of the explanatory

booklet on CD made it possible to disseminate information more effectively, taking into account the need to use simple language for easy understanding by anyone in the population. Images help people detect or remember the insect. In this way, with the set of resources used, such as booklet, images and discussion of the answers, the participants' learning was

facilitated.

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