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BOOKLET OF GUIDELINES ON CHAGAS DISEASE

3ª Edition

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INTRODUCTION

Chagas Disease (or American Trypanosomiasis) is caused by a worm (protozoan) named Trypanosoma cruzi. This disease can be transmitted to humans in several ways, but the main one is through the insect (vector), the kissing bug, which is contaminated with the worm.

Chagas disease is considered forgotten by the public authorities, as it mostly affects the least favored people. The state of Amapá stands out for the prevalence of confirmed cases during the years 2010 to 2020, especially the municipality of Macapá, with 191 new cases, which represents 68.2% of the total cases in the state.

In this sense, this e-book is justified by the concern about these data, being a product of a doctoral thesis in Public Health, with the aim of informing and guiding the general population in an accessible and didactic way. Recognizing and presenting the important aspects involving the population most susceptible to contamination, to avoid and prevent Chagas Disease.

Therefore, this booklet is for you and your family to learn about the kissing bug, the symptoms of the disease, the particularities of treatment and prevention, and the main forms of prevention during the production of açaí, one of the main foods of the northern region.

Read it, spread the word, and become a responsible agent in your community for this precaution, not forgetting to demand the necessary attention from the public authorities.

Have a good read!

SUMMARY

THE CHAGAS DISEASE

It is an infectious disease caused by a parasite and transmitted by the kissing bug.

The causative agent is a protozoan named Trypanosoma Cruzi.

WHAT ARE TRIATOMINES?

They are insects popularly known as kissing bug, chupão, procotó or bicudo. Their life cycle consists of egg, nymph (five nymph's stages) and adult stages. Nymphs and adults, both sexes, feed on blood and therefore, if infected, can transmit the Trypanosoma Cruzi.

WHERE THE KISSING BUGS INHABIT?

In man and animals. The kissing bugs inhabit in the peripheral blood muscle fibers, especially cardiac and digestive.

The kissing bugs inhabit in local close to their food source and can be found in the forest hiding in bird's nests, animal burrows, the bark of tree trunks, piles of firewood and under rocks.

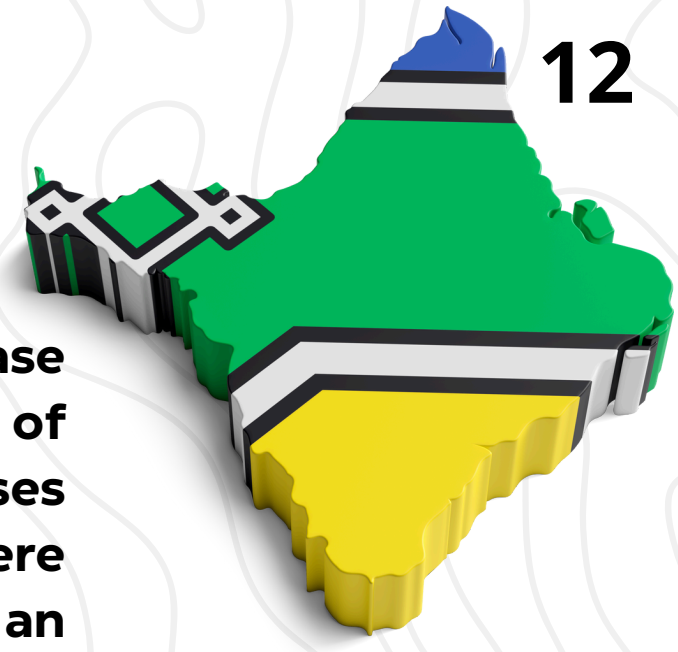
THE CHAGAS DISEASE IN THE *Amapá State*

The Amazon region presents an emergence of isolated cases and outbreaks in the form of family micro-epidemics, often in urban areas, resulting the region and endemic area. The increase in outbreaks by oral transmission in their region, it is possibly caused by agro-extractive products use without sanitary regulation, and the consumption of Açai pulp (Euterpe oleracea) identified as the main food in the transmission mechanism (Souza; Monteiro, 2013; Madeira, et al., 2021).

In Amapá, the disease has the second highest equivalent average rate on the country, 1,5 cases per 100.000 habitants, an average of 9,4 cases per year. It constitutes a significant public health problem among populations living in rural and forest areas, including traditional people and communities in northern regions: quilombolas and indigenous communities, people in situations of inequality, violence and violation of rights (Brasil, 2019a; Brasil, 2021).

IMPORTANT DATA

IMPORTANT DATA



2.870 cases of Chagas disease were reported in state of Amapá, of which 2280 cases were confirmed as severe disease, representing to an average annual incidence of 3,20 cases per 10.000 habitants.

Table 1 – Average of Chagas disease over 11 years

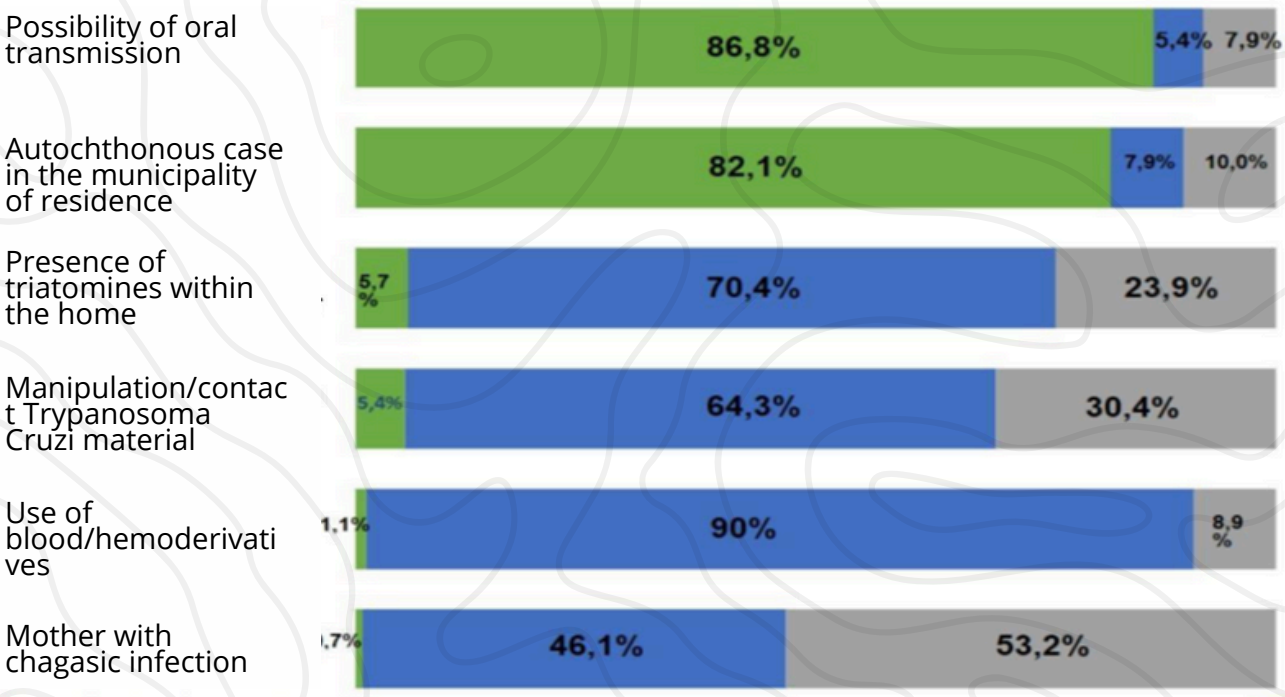
	Total 2010-2020	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Number of cases	280	8	16	23	11	19	12	33	38	65	48	7
Population		694261	711453	728015	744809	762156	779416	796419	813084	829494	845731	861773
Incidence (cases number/ 100.000 habitants)	3.20 (1)	1.15	2.25	3.16	1.48	2.49	1.54	4.14	4.67	7.84	5.68	0.81

Source: Rocha, et. al. (2023, p. 4)

The municipality of Macapá recorded the highest number of confirmed cases between 2010 and 2020 – 191 new cases, which represented 68,2% of the total number of cases, followed by the municipalities of Santana (82 cases – 29,3%), Mazagão (5 cases – 0,8%), Ananindeua (1 case – 0,4%) and Manaus (1 case – 0,4%). As for the municipality of residence, the municipalities of Macapá (170 cases – 60,7%), Santana (52 cases – 18,6%), Afuá (26 cases – 9,3%) and Breves (16 cases – 5,7%) stood out with the most cases.

IMPORTANT DATA

Graphic 1 - Epidemiological profile of confirmed cases of Chagas Disease in the State of Amapá



Source: Rocha, et. al., (2023, p. 7)

IMPORTANT DATA

In Amapá, the municipality of Macapá has the highest frequency, totaling 74,65% (159) of confirmed cases of Chagas disease in the acute stage, followed by Santana municipality with 20,14% (43) cases as shown in table 2. During 2020, there was a decrease in the notification od cases, which may be justifies due to the Covid-19 pandemic.

The prevalence rate in the state from 2016 to 2021 was 25,19%. This decrease confirms the analysis performed by Brasil (2021), where data indicate a reduction of 63% in confirmed cases in 2020 compared to 2019.

It is believed in the possibility of underreporting for other infectious diseases, especially when the onset of ACD symptoms is non-specific and can be silent.

Table 2 - Number of confirmed cases and prevalence rate for acute Chagas disease according to municipality of residence from 2016 to 2021.

Municipality of residence	2016	2017	2018	2019	2020	2021	Total for the period	Prevalence rate per 100.000 habitants
Macapá	28	29	29	26	5	42	**159**	31,59
Porto Grande	1	0	0	0	0	1	**2**	9,10
Pedra Branca do Amapari	0	0	0	0	0	1	**1**	6,06
Santana	3	2	16	13	1	8	**43**	35,43
Mazagão	0	1	1	2	0	0	**4**	18,49
Laranjal do Jari	0	0	1	0	0	0	**1**	1,98
Vitória do Jari	0	1	1	0	0	0	**2**	12,55
Tartarugalzinho	0	0	1	0	0	0	**1**	5,78
State	**32**	**33**	**49**	**41**	**6**	**52**	**213**	**25,19**

Fonte: Sistema de Informação de Agravos de Notificação SINAN/MS, apud Barrosso et. al., (2022, p. 4).

FORMS OF TRANSMISSION

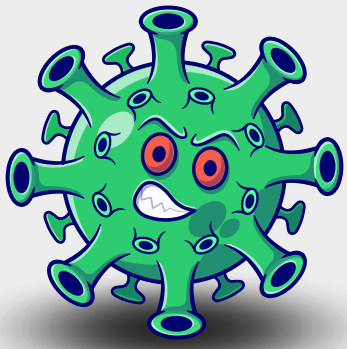
Vectorial: contact with feces of infected triatomines upon blood feeding. The ingestion of blood at the time, of the blood meal stimulates defection and, therefore, contact with the feces.

Oral: ingestion of food contaminated with parasites from infected triatomines or their excreta.

Vertical: occurs through the passage of parasites from women infected with Trypanosoma Cruzi to their babies during pregnancy or childbirth.

Blood transfusion or organ transplantation form infected donors to healthy recipients

Accidental: -through contact of injured skin or mucous membranes with contaminated material during laboratory manipulation or hunting manipulation.



INCUBATION PERIODS

The incubation period for the Chagas disease, in other words, the time when symptoms begin to appear after infection is divided by:

Vector transmission: 4 to 15 days.

Transfusion/transplant transmission: 30 to 40 days.

Oral transmission: 3 to 22 days.

Accidental transmission: up to, approximately, 20 days.

Vertical transmission: undetermined time.

Transmission can occur at any time during pregnancy or during childbirth.

SYMPTOMS

According to **Brazilian Healthy** Ministry Chagas disease can have different symptoms in its two stages, which are acute and chronic.

In the acute stage the main symptoms are:

-Prolonged fever (more than 7 days)
-Headache
-Intense weakness
-Swelling of the face and legs.

In the case of kissing bug bite, can appear a lesion such a furuncle in the area.

SYMPTOMS

Chronic stage

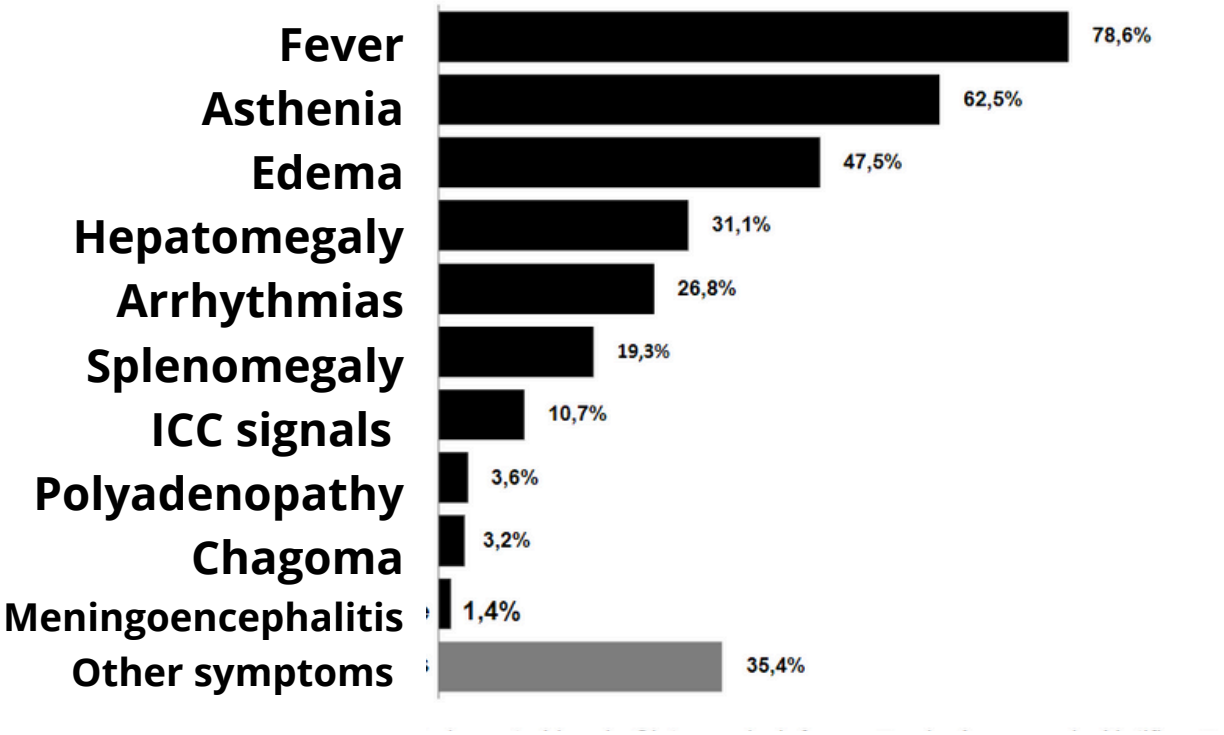
Upon the acute stage, it the person does not receive adequate treatment, they can develop the chronic stage of the disease initially without symptoms (indetermined form) and over the years can present complications such as:

-Heart problems, such as heart failure.

-Digestive problems such as megacolon and megaesophagus.

SYMPTOMS

Percentage of signs/symptoms of Chagas disease cases in the state of Amapá n:280 (2010 – 2020)



Source: Rocha, et. al. (2023)

TREATMENT

- Treatment to Chagas disease should be recommended by a doctor once the disease has been confirmed. The medicine named Benznidazole is provided free of charge by Ministry of Health, upon request from State Healthy Departments and should be used on people who have the acute disease as soon as it is diagnosed.

- For people in the chronic stage, the indication of his drugs depends on the clinical form and must be assessed on a case-by-case. In cases of intolerance or who do not respond to treatment with Benznidazole, the Ministry of Healthy offers the Nifurtimox as an alternative treatment, according to indications established in the Clinical Protocol and Therapeutic Guidelines.

- Regardless of treatment with Benznidazole or Nifurtimox people with the cardiac and/or digestive form should be monitored and given appropriate treatment for existing complications.

PREVENTION

- The prevention of Chagas disease is closely related to the form of transmission and once of the ways to control it is avoiding the kissing bug from forming colonies inside homes, using residual insecticides by qualified technical team.

- In areas where insects can fly into houses through openings or gaps, mosquito nets and metallic nets can be used. It is also recommended to use personal protective measures (repellents, long-sleeved clothing, etc.) when carrying out nocturnal activities (hunting, fishing or overnight stays) in forest areas.

HANDLING OF Acai

HANDLING OF AÇAÍ

Another significant issue is the detection of the contaminating triatomine crushed with açai fruit.
The way to prevent Chagas disease from consuming açai is to standardization the handling of the fruit for sale (Vasconcelos; Cartágenes; Silva, 2022).

In the specific case of açai, the Ministry of Agriculture, Livestock and Supply, through the Brazilian Corporation of Agricultural Research (EMBRAPA), elaborated the procedure for its processing, with stages from harvesting to freezing and stock aimed both traditional and industrial processing.

We will approach the main procedures for the adequate handling of açai to prevent Chagas disease.

Upon extracting the açai, receiving the fruit, selecting, pre-washing, softening, washing, pulping, and refining, there is traditional or semi-industrial processing.

This is the process that involves the açai producing families and here the traditional pulping machines or popularly known blenders. They are made of stainless steel, vertical format, which pulp batches of açai fruit with addition of water (EMBRAPA, 2018).

PACKAGING PROCEDURE

The primary packaging for açai, after heat treatment or not, is low-density polyethylene bags, usually those with a capacity of 100, 500 and 1000 gram (EMBRAPA, 2008, p. 103).

The packaged product is taken to a rapid freezing tunnel set at -40°C. This type of freezing provides better quality açai, as it reduces the possibility of chemical, biochemical and microbiological alterations. After freezing the açai should be stored in a cold room (fig. 49) with temperature between -18°C and 20°C (EMBRAPA, 2008, p. 103).

CONSERVATION PROCESSES

When not subject to conservation processes açai has a short shelf life of no more than 12 hours, even under refrigeration. It high perishability may be associated mainly with the high microbial quantity present in the fruit, caused by inadequate harvesting, packaging, transportation and processing conditions (EMBRAPA, 2008, p. 104).

Blanching is a heat treatment commonly applied after harvesting selection and washing the fruit with the aim of inactivating enzymes, fixing color, removing gases as well as reducing the microbial quantity (EMBRAPA, 2008, p. 105).

Pasteurization is a heat treatment aimed at destroying the vegetative cells of microorganisms present in food. This process is applied to food that cannot suffer rigorous treatments because they affect their organoleptic and nutritional properties as is the case with fruit. Pasteurization should be used combined with other preservation methods such as refrigeration and freezing (EMBRAPA, 2008, p. 105).

This is the method most used to conservation açai. This procedure inhibits microbial growth and slows down all metabolic processes. The lower the storage temperature the slower the enzymatic activity. Freezing açai at temperatures of -18°C to 20°C or lower significantly inhibits the activities of the enzyme's peroxidase and polyphenol oxidase (EMBRAPA, 2008, p. 106).

Dehydration is a method of preserving food that uses heat energy to remove some or almost all of the water. This way it possible to limit or prevent the growth of microorganisms or other chemical reactions. Removing the water also provide it easier to transport, store and handle the final product (EMBRAPA, 2008, p. 107).

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