

STUDY OF THE PREVALENCE OF *Capillaria hepatica* IN HUMANS AND RODENTS IN AN URBAN AREA OF THE CITY OF PORTO VELHO, RONDÔNIA, BRAZIL

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SUMMARY

Introduction: Hepatic capillariasis, caused by *Capillaria hepatica* (*Calodium hepaticum*) (Bancroft, 1893), Travassos, 1915 (Nematoda, Trichinelloidea, Capillariidae), is a common zoonosis in rodents but is rare in humans. Seventy-two cases in humans have been reported worldwide since the first case was described by MACARTHUR in 1924^{17,27}. This study aimed to determine the prevalence of *Capillaria hepatica* in humans and rodents in an urban area of Porto Velho, the capital of Rondônia, in Brazil. **Methods:** After conducting a census of the area, 490 residents were randomly selected, and, after signing a term of consent, provided blood samples that were screened for anti-*Capillaria hepatica* antibodies. Simultaneously, rats were captured to assess the prevalence of this parasite in rodents by histopathological examination in liver sections. **Results:** A prevalence of 1.8% was found among residents who had specific antibodies at a dilution of 1:150, indicating exposure to parasite eggs; 0.8% of the subjects also had positive titers at a dilution of 1:400, indicating true infection. The prevalence in rats was 2%. **Conclusions:** The prevalence of infection with this parasite among humans and rats was low. While the prevalence encountered among humans was within the limits reported in the literature, the prevalence among rodents was much lower.

KEYWORDS: Capillariasis; *Capillaria hepatica*; Rondônia; Amazônia.

INTRODUCTION

Capillaria hepatica has a wide geographic distribution and is able to colonize a diverse array of environments and mammals, including wild and domestic rodents.

Certain authors reported finding *Capillaria* sp. eggs in canine coprolites from 6,500 BC in Patagonia¹⁸, and certain studies reported evidence of human infections in France in the Neolithic and Paleolithic periods³ and in the region that is now Belgium in the 16th century and the Middle Ages^{13,35}. This parasite has been detected from the icy regions of Canada, where studies have shown that eggs can withstand the six winter months¹⁶, to Africa, Asia and South America, passing through the US and Europe¹⁷.

This nematode has a unique esophageal structure consisting of specialized cells known as stichocytes (characteristic of the superfamily

Trichinelloidea). The adult forms of this parasite are very slender, small and morphologically similar to parasites of the genus *Trichuris* that live in the hepatic parenchyma. The male is 30 to 50 mm long⁴² and the eggs are bi-operculate with a tray-like shape³⁶. The completion of the life cycle of the worm does not depend on an intermediary host as embryonated eggs are ingested directly from the soil or animal carcasses. L1 larvae hatch in the cecum, penetrate the mucosa, travel to the portal system and establish themselves in the hepatic parenchyma, where they develop from L2 to L4 larvae and finally into the adult form. Fertilized eggs are released in groups around the female, and the female perishes after an average period of 30 days. The viable, but still immature eggs remain for up to 120 days. For embryogenesis to occur, the egg must be outside the host, which can occur: a) when the host dies and its carcass disintegrates and/or b) when the viscera of the host are ingested by predators; in the latter case, the non-embryonated eggs are eliminated in the feces and thus returned to the environment and embryonate^{12,25}. There is also evidence that arthropods (flies and beetles) can spread eggs from the soil^{29,30,32}.

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Seventy-two cases of hepatic capillariasis have been reported in humans in the literature¹⁷ since the first case was described by MACARTHUR in 1924²⁷. Infections have been documented on all continents, and five were reported in Brazil^{33,34,39}. In addition, *C. hepatica* eggs have reportedly been found in the feces of Suruí Indians⁹, ethnicities of the Guaporé-Mamoré valley³⁸ and a riverine population in Rondônia, Brazil⁴. As a rule, the infection produces the classical triad of fever, hepatomegaly and eosinophilia and can progress to death if left untreated^{34,39}.

Some sero-epidemiological surveys of hepatic capillariasis have been performed: JUNCKER-VOSS *et al.*²⁵ surveyed employees of the Vienna zoo and encountered a total prevalence of 1.8%, and GALVÃO²¹ documented a prevalence of approximately 1.6% in Salvador, Bahia. CAMARGO *et al.*, documented a *C. hepatica* seroprevalence of 0.8% in the local riverine population of Rio Preto at the intersection of the Machado and Madeira Rivers in the state of Rondônia in the Amazonian Region of Brazil (300 km away from Porto Velho, the capital city of Rondônia)⁴.

The logical follow-up to the study of CAMARGO *et al.* (2010)⁴ would be to assess the seroprevalence of this parasitic disease in the urban area of Porto Velho, a city that suffers from many urban problems, such as unhygienic living conditions that force many of its inhabitants to coexist with a large population of domestic rats (an important reservoir for the disease in urban areas)¹⁹. This study aimed to verify the findings of CAMARGO *et al.*⁴ and propose specific intervention measures.

Because adult worms and their eggs remain confined to the liver, they are not normally eliminated with feces. Eggs are sometimes found in the stool of "spurious carriers" (i.e., those that swallowed immature eggs in the viscera of other animals) that are not necessarily sick. This makes the diagnosis of capillariasis somewhat more complex. However, available serological techniques (Enzyme-Linked Immunosorbent Assay - ELISA and indirect immunofluorescence - IFI) with different antigens^{1,24} can identify "spurious carriers" of *C. hepatica* or diseased individuals while ruling out cross-reactions with other similar helminths^{22,24}.

Because this disease is seldom suspected, it is thought that less severe cases are rarely detected^{2,24}. Furthermore, clinical manifestations of mild cases are likely to produce signs and symptoms common to other pathologies. Therefore, the detection of these cases will heavily depend on the degree to which *C. hepatica* infection is suspected.

No consensus exists on the treatment of this disease. CHEETHAM & MARKUS⁶ used mebendazole and albendazole in an experimental rat model and showed that these drugs prevented oviposition in the hepatic parenchyma. EL GEBALY *et al.* and EL NASSERY *et al.*^{10,11} successfully used ivermectin and mebendazole in an experimental model to stop larvae from developing into adult form and thus prevent oviposition. SAWAMURA *et al.*³⁹ successfully treated three infected patients with mebendazole and albendazole.

GENERAL AIM

The objective of this work was to study the prevalence of *C. hepatica* infection in humans and rodents in the urban area of Porto Velho, the capital of the Northern Brazilian state of Rondônia.

METHODS

Ethical parameters: All procedures described and performed in this study were approved by the *Ethics Committee on Research with Human Beings* of the Biomedical Sciences Institute of the University of São Paulo through process 1051/ICB and by the *Ethics Committee on Animal Use (Comissão de Ética no uso de Animais - CEUA)* of the same institute, according to the protocol registered under number 149 on page 136 of book 02.

Study site: The study took place in the urban area of the Tucumanzal district of the municipality of Porto Velho, Rondônia, Brazil. To improve the distribution of samples and participants in this study, the area was divided into five subareas: AO, A1, A2, A3 and A4 (Table 1). The region chosen for the study has an epidemiological profile that is compatible with the transmission of *C. hepatica*¹⁹⁻²¹: it is an old district of slums populated by low/medium income residents and has irregular garbage collection and inadequate sanitation.

Table 1

Sample stratified random sub-areas, the total area of study. Tucumanzal district, city of Porto Velho, Rondônia, 2011

Subarea	No. Inhabitants	Sample	% (sample)
AO	323	66	13.5
A1	546	117	23.9
A2	442	90	18.4
A3	301	66	13.5
A4	737	151	30.7
Total	2,349	490	100

A UBS (Unidade Básica de Saúde - Basic Health Unit), a college and a variety of commercial establishments are found in the area.

Census: A census of the population residing in the study area (Tucumanzal District, city of Porto Velho (8°46'44.9"S 63°53'43.8"W - Google Maps accessed on 03/04/2014), was conducted during the months of February and March 2011. A total of 2,349 inhabitants were catalogued, and the following information was gathered from each inhabitant: name, monthly family income, address, age, gender, information about the sanitation conditions of households, ingestion of game meat and time residing in the area.

A sample size calculation was performed using the appropriate statistical analysis in the Open Epi software (Open Source Epidemiologic for Public Health) version 2.3.1 (www.openepi.com accessed on 10/01/2011). From a total of 2,349 registered inhabitants, given an estimated prevalence of 2% and a confidence limit of 5%, a sample size (N) of 383 individuals was obtained. This sample size was inflated by 30% to compensate for potential drop-out or refusal to participate, thus raising the total to 498 inhabitants. The sample was randomized using the Random Number Generator program (www.random.org accessed on 10/01/2011). Blood samples were collected from 490 of 498 randomly selected individuals (Table 1).

The population was willing to provide blood samples, most likely because health care in the region is lacking. To avoid concentrating the

sampling within a single region of the district, the sample was randomly drawn from five subareas in proportion to the population of each subarea. This process resulted in a stratified random sample.

Human blood collection: The blood of the 490 volunteers was collected according to the following methodology. First, information on the study and the parasite was provided to the residents; in addition, participants received an informational leaflet. Next, pre-registered residents - who had been randomly selected and agreed to take part in the study - signed an Informed Term of Consent. Residents then underwent a general clinical examination, and blood was collected from the cubital fossa after the collection site was disinfected with 70% alcohol and a tourniquet was placed on the proximal arm region using a latex strap. The collected blood was allowed to stand to coagulate and then centrifuged at 5,000 RPM for 10 minutes, and the serum was aliquoted into PVC tubes and stored at -20 °C until the time of analysis.

Serological technique: The technique previously proposed by ASSIS *et al.*¹ was used: serum samples were diluted in 50% phosphate buffered saline (PBS) solution up to a concentration of 1:150 and tested using histological sections of rat livers containing *C. hepatica* worms and eggs embedded in paraffin supplied by the LAPEX-FIOCRUZ Brazilian government laboratory. Seropositive samples at a dilution of 1:150 were classified as either weakly positive (PI), moderately positive (PII) or strongly positive (PIII) according to the intensity of fluorescence assessed by two different examiners. Serum samples considered either moderately or strongly positive at a dilution of 1:150 were tested again at a dilution of 1:400, i.e., at the highest dilution used as a cut-off point for the elimination of false positives (spurious infections).

System for capturing rodents: Rodents were captured using 20 “Tomahawk” live traps (20 x 20 x 40 cm) with banana, bread and peanuts as bait. All traps were mounted and remained active from 6:00 pm on Wednesday to 6:00 pm on Friday. Traps were checked and bait was replaced every 12 hours. If rodents were found in the traps at inspection times, they were sedated until death. These capture activities took place over a period of nine months. The traps were placed along a line of 10 points with approximately two traps per point; traps were laid on the

ground and in bushes or trees up to 2 m high 20 to 40 m apart, depending on the irregularity of the terrain.

Sedation of the rodents: After rodents were captured, the animals were sedated using ketamine (10 mg/kg) and xylazine (1 mg/kg) using lethal doses of the same sedatives¹⁶. Liver samples were then collected and immediately stored in numbered tubes containing 10% buffered formaldehyde.

Slides were prepared by fixing the sample material to preserve tissue morphology, dehydrating the tissue in increasing concentrations of ethyl alcohol, cleaning the tissues in xylol, impregnating them with melted paraffin and embedding them. Afterwards, the tissues were cut with a microtome, stained and mounted. Slides were prepared using histological sections from liver samples of 50 rats (*Rattus rattus* and *Rattus norvegicus*).

Disposal of material: Sharp/cutting material was discarded in rigid containers while gloves and cotton were disposed of in 10-micrometer-thick opaque white plastic garbage bags according to the the Brazilian Health Surveillance Agency for disposal.

RESULTS

Socio-economic conditions of the population: From an economic point of view, the large majority of the residents are workers with little or no specialization who perform manual labor in commerce, the public service, private companies or informally. Table 2 gives an overview of the population characteristics of the studied area. As can be seen, the sample is composed of people of low socioeconomic status, with an average monthly income of around US\$ 400 (up to twice the minimum wage). As a result, residents belong to classes D and E of the classification of the Brazilian Institute of Geography and Statistics i.e., they have low incomes (Table 2).

Table 2 shows the urban conditions in which they live. They have poor sanitation and these areas that are liable to flooding favor the proliferation of rats. An aggravating factor for the risk of spurious infections is the frequent ingestion of game meat and viscera by residents.

Table 2
Socio-economic, cultural and urban characteristics of the study area. Tucumanzal District, Porto Velho, Rondônia, 2012

Subareas	A0	A1	A2	A3	A4
Total inhabitants	323	546	442	301	737
Per capita income (MW)	Up to 1.5	< 1.0	< 1.0	Up to 1.0	Up to 1.0
Wastewater discharged to the stream	No	Yes	Yes	No	Yes
Igarapé (tributary river)	No	Yes	Yes ²	No	Yes
Households with river water catchment and/or sewage (%)	75	60	20	90	95
Households with running water (CAERD) (%)	95	85	60	95	90
Paved roads (%)	95	90	75	100	100
Weekly garbage collection ¹	3 times	3 to 4 times	3 times ³	3 times	3 to 5 times
Game meat consumption among residents (%)	35	35	41.1	27.2	34.4

¹ - Selective garbage collection was not mentioned. ² - Refers to inundation during rainfall. ³ Garbage collection is not performed on some streets. MW: minimum wages.

Material collected from rodents: Table 3 summarizes the results of anatomopathological studies of the livers of the 50 captured rats; the data are categorized by subareas.

Table 3
Anatomopathological analysis of the rat livers. Tucumanzal District, Porto Velho, Rondônia, 2012

Subareas	Total/Subarea	Necrosis	Septal Fibrosis	Parasites and/or eggs
A0	07	Zero	Zero	Zero
A1	11	03 (27.3%)	02 (18.8%)	Zero
A2	05	Zero	Zero	Zero
A3	15	04 (26.6%)	Zero	Zero
A4	12	04 (33.3%)	02 (16.6%)	01 (8.3%)
Total	50	11 (22%)	04 (8%)	01 (2%)

In addition to being inspected for eggs and worms (which would confirm the infection beyond any doubt), tissue samples were also inspected for the presence of septal fibrosis (probable infection), focal fibrosis, necrosis and inflammation (suspected infection).

Several anatomopathological studies of the livers of rats infected by *C. hepatica* have shown that while the observed presence of parasite eggs and/or worms definitively confirms the infection, the presence of hepatic septal fibrosis is also an important characteristic that appears after the death and degeneration of worms in the presence of eggs^{14,37}. Such a finding, though non-conclusive, would strongly suggest infection by *C. hepatica*.

Material collected from humans: Serology (IIF) of blood samples from the 490 residents of the selected area of Porto Velho was performed to quantify the prevalence of *C. hepatica* infection.

As observed in Table 4, nine of the 490 human blood samples were positive by IIF for *C. hepatica* at the 1:150 dilution (1.8%); four of these also reacted positively at the 1:400 dilution (0.8%) (two in subarea A1 and two in subarea A3).

An equal number of men and women tested positive by IIF at the 1:400 dilution; these individuals were aged 10-19 (one case), 20-29 (two cases) and above 50 (one case).

Table 4
Serology (IIF) results by subarea, gender and serum dilution. Tucumanzal District, Porto Velho, 2012

Subarea	Number of Individuals	Positive at 1:150 dilution	Positive at 1:400 dilution
Zero	66	1	Zero
A1	117	4	2
A2	90	Zero	Zero
A3	66	4	2
A4	151	Zero	Zero
Total	490 (100%)	9 (1.8%)	4 (0.8%)

The following laboratory tests were further performed on the individuals with positive serology at the 1:400 dilution: complete blood count and measurement of levels of aspartate aminotransferase (ATS), alanine aminotransferase (ALT), bilirubin total and fractions. As observed in Table 5, only one of the four residents with positive serology at the 1:400 dilution displayed altered laboratory parameters, namely, a mild to moderate increase in her total and indirect bilirubin levels. All of these individuals underwent a liver ultrasound, but none of them displayed any abnormalities.

DISCUSSION

Although previously published studies show that the prevalence of *C. hepatica* in certain rodent species, tends to be high (between 56.5 and 89.3%)^{5,7,20,31}, the prevalence of *C. hepatica* infection appears to be low among residents of the studied area and among rodents that live close to their dwellings.

To ascertain whether a rodent is infected with *C. hepatica*, eggs or worms must be found in its liver. In the present study, eggs and worms were detected in the liver of only one of the animals captured in subarea A4, which corresponds to a prevalence of 2%. This animal also presented with septal fibrosis. Studies have shown that septal fibrosis occurs in practically all rats infected with *C. hepatica*^{5,14,22,37}. FERREIRA & ANDRADE¹⁴ stated that experimental *C. hepatica* infection in rats represents a good model for the study of liver septal fibrosis because all rats in their experiments developed septal fibrosis after the 40th day of parasite infection. A similar result was found by SANTOS *et al.*³⁷.

In the study, three other animals had septal fibrosis, which could raise the prevalence among rodents to 8%; however, 8% is still lower than the values encountered in other studies⁷. Seventeen animals in the present study also had non-specific inflammation, and eleven animals had marked necrotic areas that can be associated with infection by the parasite, although not a specific manifestation.

The low prevalence of infection in rodents in the study area (Table 4) is consistent with the low prevalence encountered among humans. As observed by SPRATT & SINGLETON⁴¹, most *C. hepatica* infections in non-rodent mammals occur when these animals live near infected *R. norvegicus* populations⁵.

It is likely that the reduced size of the rat sample did not allow the present study to demonstrate the association between the presence of infected rodents and a high prevalence of parasite infection. It is important to try to understand why the prevalence of *C. hepatica* in rats in the urban region of Porto Velho was so low. Infection with this parasite occurs after the infected animal dies and its liver decays in the environment, thus releasing the eggs that become infective after a certain period of time. Once ingested by other animals, these eggs cause infection in a wide variety of species, including humans. The ingestion of eggs, even directly from the livers of infected animals, does not necessarily lead to infection, as the eggs must travel undamaged through the digestive tract, be released in the feces and reach the soil, where their maturation cycle is completed. The city of Porto Velho is located in a very rainy region with long daily episodes of high-volume rainfall. The site where the present study was conducted has streams that usually overflow, thus "washing out" the site and carrying much of the accumulated garbage to

Table 5
Results of *C. hepatica* positive serology (IIF) residents (1:400). Tucumanzal District, Porto Velho, Rondônia, 2012

Laboratory test	Resident				Reference Values
	1	2	3	4	
Red blood cells 10 ⁶ /mm ³	4.85	4.81	5.24	5.18	4.1 - 6.0
Hemoglobin g/dL	13.9	14.3	13.6	15.6	12 - 18
Hematocrit %	41.7	43.8	42.3	45.8	37 - 54
Leukocytes 10 ³ /mm ³	5.320	6.75	9.09	6.44	4 - 10
Band cells %	2	2	2	1	0 - 4
Segmented neutrophils %	46	65	63	50	45 - 70
Eosinophil's %	5	1	1	2	1 - 5
Basophils %	0	0	0	0	0 - 2
Typical lymphocytes %	38	29	29	37	20 - 40
Atypical lymphocytes %	0	0	0	0	0 - 2
Monocytes %	9	5	5	10	2 - 10
Platelets 10 ³ /mm ³	235	197	323	336	150 - 450
ATS U/L	13	10	21	17	10 - 39
ALT U/L	12	11	23	13	10 - 37
Total bilirubin mg/dL	1	1.1	0.9	1.5	1.2
Direct bilirubin mg/dL	0.2	0.2	0.2	0.2	0.4
Indirect bilirubin mg/dL	0.8	0.9	0.7	1.3	0.8

the Madeira River channel. Therefore, animal carcasses do not remain in the environment; as a result, the spread of eggs and their ability to mature in an adequate environment is limited. It is possible that the study area represents a region where the disease has only recently been introduced instead of an endemic region where a high prevalence in rats was detected.

When the results obtained in the present study are compared with those of CAMARGO *et al.*⁴ in riverine populations of the state of Rondônia, it becomes clear that the riverine population experiences much higher rates of contamination than the urban population, but only with regard to the spurious infections. When the spurious infection rates (1:150 dilution) of both populations are compared ($\chi^2=153.6$ and $p < 0.0000001$), it appears likely that the riverine population experiences much higher rates of spurious contamination (34.1%) than the urban population (1.8%), perhaps due to the ingestion of wild animal viscera. However, when the seroprevalence is analyzed at higher dilutions that are indicative of true infection (1:500 in the study of CAMARGO *et al.* and 1:400 in the present study), similar rates of approximately 0.8% are found in both populations ($\chi^2 = 0.2289$ and $p = 0.2161$).

In reality, the data presented in this study corroborate the results of CAMARGO *et al.*⁴. Because the riverine population is characterized by low socio-economic conditions, people from this area tend to frequently eat game meat and use the viscera to prepare 'farofa,' a dish made of manioc flour mixed with giblets. The consumption of viscera greatly increases the likelihood of ingesting non-embryonated *C. hepatica* eggs, which may not cause infection but does result in enough antigen stimulation to trigger seropositivity at a 1:150 dilution. As reported in

the present study (Table 2), the consumption of game meat is much less common in the urban population than in the riverine population. According to CAMARGO *et al.*⁴, 91.7% of the riverine population had ingested viscera in the 15 days prior to the survey. In contrast, 27.2 to 41.1% of the urban population had ingested game meat in the 15 days preceding the study. This is the most likely explanation for the different rates of spurious infection (positive serology up to 1:150) between the riverine and urban populations.

Hepatic capillariasis is a disease with potentially high rates of contamination, low infectivity and low pathogenicity⁴. The low prevalence among humans can be explained not only by the low prevalence among rodents but also by the presence of running water and septic tanks in most dwellings, which prevent the exposure of humans to embryonated eggs.

The physical examination of the four residents with positive serology (IIF) for *C. hepatica* at the 1:400 dilution found no significant physiological alterations, such as jaundice, pain or visceromegaly. None of these four individuals had any abnormal laboratory findings (Table 5); similarly, results of their liver and bile duct ultrasound exams appeared to be within normal limits.

Abdominal pain and jaundice associated with hepatitis are clinical signs typically observed in humans infected with *C. hepatica*. CHOE *et al.*⁸ reported the case of a female 14-month-old child who presented with the triad of persistent fever, hepatomegaly and leukocytosis with eosinophilia. SAWAMURA *et al.*³⁹ reported three cases of children aged between 18 and 36 months infected with the parasite; their disease

progressed to include symptoms of pain, choluria, jaundice, weight loss, fever and night sweats that only disappeared after antiparasitic treatments were administered. For these reasons, a *C. hepatica* infection must be considered as a differential diagnosis in cases of suspected hepatitis A, B or C and leptospirosis, which are frequent in the studied region.

Future studies in other districts or older cities in the state may help answer these questions and better understand this zoonosis.

CONCLUSIONS

- Anatomopathological analyses of the livers of 50 rats captured in the periphery of dwellings in the study area and serological tests of 490 individuals in the same area using IIF were performed. A lower prevalence of *C. hepatica* infection was found in rodents in this study than in other studies in the literature. However infection of humans lies close to that found in other studies.
- Spurious infections characterized by positive serology (IIF) at a low serum dilution (i.e., 1:150) were detected among the residents. This finding suggests that humans have contact with *C. hepatica* eggs. This prevalence is much lower than the prevalence reported in the riverine population ($\chi^2 = 154.6, p < 0.0000001$), most likely because the riverine population habitually consumes wild game viscera infected with *C. hepatica*, while consumption in the studied urban population is much lower.
- A low prevalence (approximately 1%) of true infections was encountered. Infection with *C. hepatica* should be included in differential diagnosis lists along with viral hepatitis and leptospirosis. Importantly, the immediate treatment of capillariasis reduces its lethality^{8,39}.
- Even though the prevalence of *C. hepatica* is low, the municipality should improve its urban areas to diminish the rat population.
- To better understand the situation encountered in this study (namely, the low prevalence of *C. hepatica* infection in an urban area of Porto Velho, the authors propose to 1) expand the study area, performing new assessments in other districts of the city or in Guarajá-Mirim, a nearby city as old as Porto Velho, and 2) increase the sample size by capturing and analyzing more rats.

COMPETING INTERESTS

All the authors declare no conflict of interest.

AUTHORS' CONTRIBUTIONS

EJGdR coordinated the research and wrote the article. LMAC: supervised the research and made the statistical analysis. SAB participated in the assessments and medical follow-ups of the residents during the data collection stage. MMdS participated in the supervision of the serological tests for the blood samples of residents. ERH performed the serological tests (IIF) for the serum blood samples of residents. MBdC performed the anatomopathological tests of the rat livers. EMC prepared the slides with the liver sections from rats experimentally infected by *Capillaria*

hepatica in the laboratory for the IIF tests. JCDeS participated in field work, data collection and analysis. LPB participated in field work, data collection and analysis. ESR participated in field work, rat capture and preparation of the specimens (liver) in paraffin blocks. All authors read and approved the final manuscript.

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LIST OF ABBREVIATIONS USED

C. hepatica - *Capillaria hepatica*; ELISA - Enzyme-Linked Immunosorbent Assay; IBGE - Brazilian Institute of Geography and Statistics; IIF - Indirect immunofluorescence; N - sample size; PBS - Phosphate Buffered Saline; PVC - Polyvinyl chloride; *R. norvegicus* - *Rattus norvegicus*; *R. rattus* - *Rattus rattus*; RPM - rotations per minute.

RESUMO

Estudo da prevalência da *Capillaria hepatica* em humanos e roedores em área urbana da cidade de Porto Velho, Rondônia, Brasil

Introdução: Capilaríase hepática é causada pela *Capillaria hepatica* (syn. *Calodium hepaticum*) (Bancroft, 1893), Travassos, 1915 (Nematoda, Trichinelloidea, Capillariidae), sendo uma zoonose comum entre roedores, porém rara em humanos. Setenta e dois casos humanos foram relatados na literatura mundial desde o primeiro caso descrito por MACARTHUR em 1924^{17,27}. O objetivo desse estudo é determinar a prevalência da *Capillaria hepatica* em humanos e roedores de área urbana da cidade de Porto Velho, capital de Rondônia, Brasil. **Método:** Após realizar um censo da área, 490 moradores foram aleatoriamente selecionados e assinaram termo de consentimento, foram colhidas amostras de sangue para testar anticorpos anti-*Capillaria hepatica*. Simultaneamente, ratos foram capturados para determinação da prevalência deste parasita através do exame histopatológico em cortes de fígado. **Resultados:** Foi encontrada entre humanos prevalência de

1,8% de positividade para anticorpos específicos em diluição de 1:150, indicando exposição aos ovos do parasito; 0,8% desses também deram testes positivos quando seus soros sofreram diluição de 1:400, indicando infecção verdadeira. Nos ratos, a prevalência foi de 2%. **Conclusão:** A prevalência encontrada para o parasito entre homens e roedores foi baixa. Enquanto a prevalência encontrada entre humanos esteve dentro dos limites encontrados na literatura, a prevalência entre roedores foi bem menor.

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