

## INTESTINAL PARASITISM AMONG TOBA QOM ETHNIC CHILDREN OF THE SAN FRANCISCO DE ASIS VILLAGE, CITY OF BENJAMÍN ACEVAL, PARAGUAY

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### ABSTRACT

**Background:** Enteroparasitoses are caused by species of helminths and protozoa which affect the gastrointestinal tract causing infections that, depending on the severity of pathogenicity, can be fatal to the infected host. This research has the objective of investigate the identity and prevalence of enteroparasites among children of the Toba Qom ethnic people established at the San Francisco de Asis Community, city of Benjamín Aceval, Paraguay. **Methods:** Ninety faeces aliquots from children were stored in 10% formaldehyde solution and the laboratory tests were performed by the techniques of Hoffman, Pons and Janer, Willis and Kinyoun at the Laboratory of Research on Parasitic Diseases of the UNIABEU University Center, Rio de Janeiro, Brazil. **Results:** Among the 90 examined samples, 58 were positive (64.44%), and 32 (35.56%) were negative. The following parasitic species were found: nematode helminths of the species *Ascaris lumbricoides* (1.11%) and *Strongyloides stercoralis* (4.44%); cestodes of the species *Hymenolepis nana* (11.11%) and *Taenia* spp. (1,1%); Protozoa of the species *Endolimax nana* (8.89%), *Iodamoeba butschlii* (6,67%), *Giardia lamblia* (7,78%) and *Entamoeba coli* (25,55%), *Entamoeba histolytica/díspar* (10%) and the Chromista *Blastocystis* spp (7.78%). **Conclusions:** The parasitological profile of the Toba Qom population of the San Francisco de Asis community presents quite different characteristics when compared to the other indigenous groups reported in the scientific literature. This fact suggests that socio-cultural characteristics, environmental aspects, health and hygiene habits peculiar to each population group influence in a determinant way the prevalence and variety of parasitic species that affect the diverse population groups. The results of this research were the basis for the treatment of parasitoses and the plan of preventive actions regarding the transmission of these diseases.

**KEYWORDS:** Enteroparasitoses, Indigenous people, Toba Qom, Paraguay.

### INTRODUCTION

The frequency of enteroparasites and the consequences of their aggressions to the human organism represent a serious public health problem worldwide. Prevalence rates are directly associated to environmental, social, economic, cultural and educational conditions of the infected populations. High prevalence degrees of parasitism are often related to pollution of water, soil and consumed food.<sup>[1,2]</sup>

Intestinal parasites are considered as low-priority diseases by public health agents in a large number of

countries, being often disregarded by government health programs, resulting in a poor attention in prevention and treatment of such diseases.<sup>[3,4]</sup> The greater frequency of enteroparasitoses is registered in the rural areas due to the living conditions of the inhabitants. The continuous contact with the contaminated environment eases infection by a great variety of parasites since approximately 300 species of helminths and about 70 species of protozoa are found in the environment as sources of contamination. Among these parasites, humans can acquire about 90 species and some of these can cause the world's most important diseases.<sup>[5,6]</sup> Intestinal parasites are one of the main debilitating

factors to the population, often associated with chronic diarrhea and malnutrition, which compromise the physical and intellectual development of the younger population. Parasitic diseases affect children and young adults more frequently and, depending on the parasite, can interfere in the nutritional status and the growth of the infected ones, causing decrease in intellectual activity, leading to low academic performance.<sup>[7,8]</sup> Enteroparasites can cause asymptomatic diseases or induce several clinical manifestations with characteristic symptoms, being worrisome the parasitic diseases in the immunocompromised patients.<sup>[9]</sup> Enteroparasites when infecting alone generally are not lethal, but some particular parasites or associated parasitism can affect nutritional balance, induce intestinal bleeding and promote nutrient malabsorption, compete for micronutrient absorption, reduce food intake, cause surgical complications such as rectal prolapse, obstruction or intestinal abscess, acting through several mechanisms, among them the spoiler and allergen actions. As a result of the spoilage action, iron deficiency anaemia may occur, which in adults may lead to a decrease in reproductive potential.<sup>[10,11]</sup>

The World Health Organization considers that over 200 million people in the world are hosts of enteroparasites. The most parasitized people are those living in the poorest countries, and between 20% and 30% of these are in Latin America, where the incidence of enteroparasitoses can reach indexes of 50% to 95% in indigenous ethnic people communities.<sup>[12]</sup> The etiological agents of intestinal parasitoses are acquired by the indigenous population mainly through the contact with non-indigenous society and thus disseminated to the community itself. Several researchers commented on the poor sanitation conditions in indigenous communities, associated with sedentary lifestyle, inadequate cultural, food consumption and personal hygiene habits, as the main factors responsible for the high prevalence of intestinal parasitoses in these groups.<sup>[13,14,15]</sup>

After the contact with the indigenous people of the Toba Qom ethnic group established in the San Francisco de Asis, located in the rural area of the city of Benjamín Aceval, Paraguayan Chaco region, and verifying with the risk conditions related to parasitic diseases, this research was developed with the objective to estimate the diversity and prevalence of intestinal parasitoses among the indigenous population of that community.

## MATERIAL AND METHODS

The research was performed with indigenous children of the Toba Qom ethnic group living in the San Francisco de Asis community, in the rural area of the city of Benjamín Aceval, Paraguay. The community has approximately 800 inhabitants. The research has a cross-sectional, descriptive and observational design, with a representative sample of the community. The inclusion criteria to the research universe were: belong to the ethnic group Toba Qom, be resident in the community

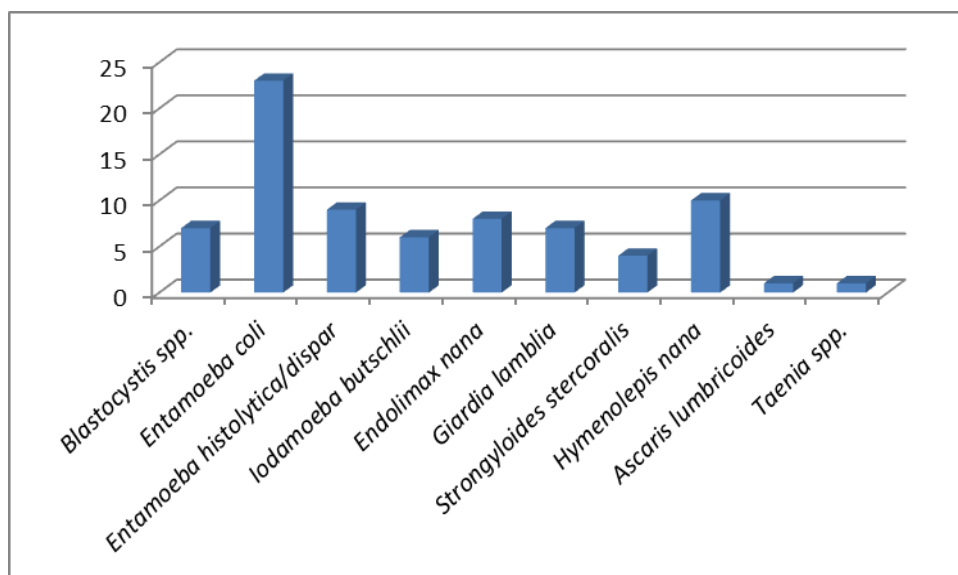
and not have been treated with antiparasitics in the last 3 months. The group was formed by 90 children aged up to 15 years and the material was collected in September 2017. Parents, after informed all procedures and importance of the research, were asked to allow and perform the children faeces sample. All research procedures were guided by ethical norms, cultural respect, preservation of the health and integrity of the patients, as well as the maintenance of anonymity, based on the precepts of the Declaration of Helsinki, the XVII World Medical Assembly and the Convention 169 about Indigenous and Tribal Peoples of the International Labor Organization (ILO). All research procedures and objectives were explained to community leaders and children parents, and the results were delivered to all participants by individual medical cards and, in the case of parasitism, the appropriated antiparasitic drug with the indications of the dosage. The faeces aliquots were stored in 10% formalin solution and sent to the Research Laboratory on Parasitic Diseases of the UNIABEU University Center, in the city of Belford Roxo, Rio de Janeiro, Brazil. The exams were performed by the methods of Hoffman, Pons, Janer; Willis and Kinyoun. Results are represented by descriptive and analytical statistical values.

## RESULTS

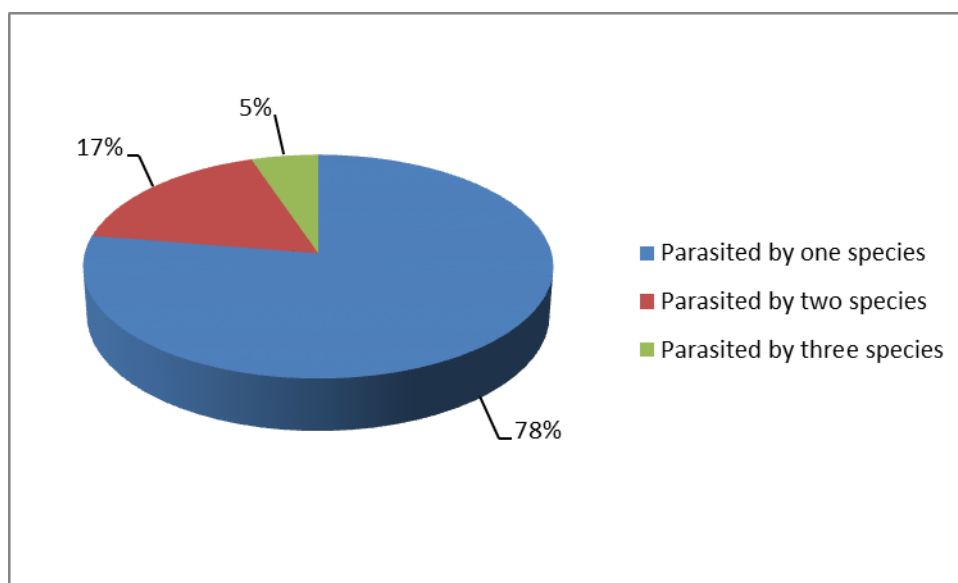
Among the Toba Qom children, it was identified infections by nematode helminths of the species *Ascaris lumbricoides* (1,11%) and *Strongyloides stercoralis* (4,44%), cestodes of the species *Hymenolepis nana* (11,11%) and *Taenia* spp. (1,1%), protozoan of the species *Entamoeba coli* (25,55%), *Entamoeba histolytica/dispar* (10%), *Endolimax nana* (8,89%), *Iodamoeba butschlii* (6,67%), *Giardia lamblia* (7,78%) and the Chromista *Blastocystis* spp (7,78%). Of the 90 examined samples, 58 were positive (64.44%), and 32 (35.56%) were negative. The research universe was composed by 46 boys and 44 girls (Table 1).

**Table 1: Distribution of parasitism by species, age group and gender among Toba Qom children of the community of San Francisco de Asis, city of Benjamín Aceval, Paraguay.**

Parasites	Age class						Total
	0-5		6-10		11-15		
	Male	Female	Male	Female	Male	Female	
<i>Blastocystis</i> spp.	1	0	0	1	2	3	7
<i>Entamoeba coli</i>	5	4	5	3	4	2	23
<i>Entamoeba histolytica/dispar</i>	0	2	4	1	1	1	9
<i>Iodamoeba butschlii</i>	2	2	1	1	0	0	6
<i>Endolimax nana</i>	0	2	1	3	1	1	8
<i>Giardia lamblia</i>	1	3	2	1	0	0	7
<i>Strongyloides stercoralis</i>	1	3	0	0	0	0	4
<i>Hymenolepis nana</i>	2	2	2	3	1	0	10
<i>Ascaris lumbricoides</i>	0	0	0	0	1	0	1
<i>Taenia</i> spp.	0	0	0	0	1	0	1
Negative samples	12	5	3	6	2	4	32



**Figure 1: Cases of parasitism by species among children of the Toba Qom ethnic group of the San Francisco de Asis Community, city of Benjamín Aceval, Paraguay.**



**Figure 2: Distribution of cases by one or more species of enteroparasites.**

## DISCUSSION

Intestinal parasites continue to be a health problem with worrisome incidence depending on geographic area and environmental conditions. According to Echagüe *et al.*<sup>[16]</sup> there are few studies on parasites in children under five years old in rural areas of Paraguay; there are also no publications on parasitological surveys in children of indigenous and non-indigenous in rural communities of this country. In a parasitological study carried out by these authors in the Department of Caazapá, Paraguay, 69 (56.1%) of a total of 123 indigenous children were parasitized, with *Giardia lamblia* (18,8%), *Blastocystis hominis* (18,8%), *Entamoeba coli* (11,5%), *Hymenolepis nana* (7,2%), *Ascaris lumbricoides* (2,9%) and *Taenia* spp. (1,5%). Despite differences in parasite prevalence and diversity, we highlight the fact that *Ascaris lumbricoides* and *Taenia* spp were also the less prevalent among helminths in our study among Toba Qom children, with a prevalence of 1,11% for each one of these species. The researchers commented on the poor health conditions of children in indigenous communities, linking parasitic diseases in children to living in houses with soil floor, community wells and latrines, lack of access to safe drinking water and poor hygiene habits as no washing hands before touching food or after contact with soil. These factors ease the transmission of infectious and parasitic disease agents. We also observed similar conditions as mentioned by Echagüe *et al.* (2015) among the Toba Qom community, facts that justify the high prevalence of parasitic infections in that community.

Hellman and Arbo<sup>[17]</sup> conducted a cross-sectional study on enteroparasitoses with children under 15 years old of the Ache ethnic group from the community of Naranjal, Province of Alto Paraná, Paraguay. The prevalence of intestinal parasitoses was 85%, with no differences between genders and age groups. The species represented were *Giardia lamblia* (39,39%), *Blastocystis hominis* (28,03%), *Entamoeba coli* (18,18%), *Cryptosporidium parvum* (5,3%), *Ascaris lumbricoides* (36,36%), *Trichuris trichiura* (26,51%) and *Strongyloides stercoralis* (21,97%). The authors report that the high prevalence of parasites is linked to economic, health and environmental conditions. The most prevalent protozoan among the children was *Giardia lamblia*, with 39,39%, while among the Toba Qom it was the second more prevalent, with 25.56%, an incidence higher than that found among Ache's children, which registered 18.8% of prevalence. Among the helminths, *Ascaris lumbricoides* the more prevalent species among the Ache, was the least prevalent among the Toba Qom, with only one case (1,11%); *Trichuris trichiura*, with a prevalence index of 26,51% among the Ache community was not even found among the Toba Qom children and *Strongyloides stercoralis*, which shows 21,97% of prevalence among the Ache's children, represented only 4,44% of the parasite children among the Toba Qom.

Cardozo and Samudio<sup>[18]</sup> studied the predisposing factors and the consequences of intestinal parasitoses among children of an educational institution in the city of Mínga-Guazu, Paraguay. A group of 184 children of both genders, with ages from 6 to 14 years old, were examined. For the coproscopies, the used techniques were the direct smear fecal exam, spontaneous sedimentation and flotation method in saturated sodium chloride solution. The total prevalence of parasitosis was determined in 53%. The authors identified only three species of parasites: *Giardia lamblia* (35.3%), *Blastocystis hominis* (33.7%) and *Hymenolepis nana* (6%), the only helminth species found. The prevalence of enteroparasites found by these authors differs from the results found in our research among the Toba Qom Ethnic children, who were parasite with a large number of parasite species.

According to O'Loracin and Holland<sup>[19]</sup>, studies performed by several researchers reveal that *Ascaris lumbricoides* is the most incident helminth in the world population, but in our research among the Toba Qom Ethnic group, the parasite with the highest incidence was the cestoda *Hymenolepis nana*. The incidence of *A. lumbricoides* among Toba Qom children registered only one case (1.11%). *Ascaris lumbricoides* is probably not part of the parasitological profile of this population, being an isolated case and with possible acquisition outside of the community. *Hymenolepis nana* had a prevalence of 24.4%, and was the most prevalent helminth, is a parasite with fecal-oral transmission and associated with poor hygiene conditions, being the only cestode that does not require intermediate hosts, easily transmitted by ingestion of infective eggs eliminated through the faeces of the hosts. It is the only cestoda that is transmitted person-to-person directly, a fact that occurs among the inhabitants of the community San Francisco de Asis.

According to Kozubsky<sup>[20]</sup>, records from the Paediatric Hospital of La Plata, Argentina, revealed that enteroparasitoses represent one of most worrisome public health problems in this country. Since a long time, the problem remained constant; In the years of 1999, 2002 and 2005 the protozoan infection rates were 70,05%, 66,75% e 71,93% respectively, and the helminth infections registered 18,5%, 20,7% e 24,2% indexes of prevalence. Among children from 1 to 3 years old, the incidence of *Giardia lamblia* infection was 33%, a rate higher than found in other age groups. The author considered that the main intestinal parasites in infant populations are *Giardia lamblia*, *Cryptosporidium* spp., *Entamoeba histolytica*, *Enterobius vermicularis*, *Hymenolepis nana*, *Trichuris trichiura*, *Taenia* spp., *Strongyloides stercoralis* and hookworms. Most of these parasites were found among children of the Toba Qom ethnic group of the San Francisco de Asis community.

Borges *et al.*<sup>[21]</sup> investigated the occurrence of intestinal parasitoses among indigenous people of the Mapuera

village, in the city of Oriximiná, province of Pará, Brazil. The coproscopies of 83 people were positive for 9 protozoan species: *Entamoeba coli* 49 (59%), *Blastocystis hominis* 48 (56,8%), *Endolimax nana* 40 (38,2%), *Entamoeba histolytica/dispar* 36 (43,4%), *Iodamoeba butschilii* 27 (32,5%), *Chilomastix mesnili* 22 (26,5%), *Cyclospora cayetanensis* 9 (10,8%) and *Cryptosporidium* spp. 3 (3,6%), and three species of helminths: *Hymenolepis nana* 17 (20,5%), *Ascaris lumbricoides* 6 (7,2%) and *Enterobius vermicularis* 1 (1,2%). The results of our research with Toba Qom Ethnic people also revealed that the highest rate among helminths was also the species *Hymenolepis nana* (24,4%). Among the protozoa, the highest rate among Toba Qom was *Entamoeba coli*, with a prevalence of 33,3%, also of the highest prevalence among people of the Mapuera village (59%).

Among the Parakanã Ethnic group, in the province of Pará, Brazil, the researchers Miranda *et al.*<sup>[22]</sup> found a prevalence of enteroparasitoses of 82,2%. The species of helminths that parasited this population were: Ancylostomatidae (33,3%), *Ascaris lumbricoides* (42,8%), *Trichuris trichiura* (0,8%) and *Strongyloides stercoralis* (5,6%). Among the protozoa, they found *Entamoeba histolytica* (65%) and *Giardia lamblia* (46,8%). The results show how different are the parasitic profiles between the Parakanã and Toba Qom groups. *Ascaris lumbricoides* and Ancylostomatidae helminths appears in a prominent position among the highest prevalences in Parakanã, while among the Toba Qom, only one case (1,11%) of *Ascaris lumbricoides* was found, and there were no cases of Ancylostomatidae infecting the population of this ethnic group of Paraguay.

Andrade *et al.*<sup>[23]</sup> investigated the prevalence of intestinal parasites among people of the Ethnic group of Kayapó in the Province of Pará, Brazil. The examined material set was formed by 28 faecal samples. The laboratory exams were performed at the Laboratory of Research on Parasitic Diseases of the Iguaçú University - UNIG, Rio de Janeiro, Brazil. The researchers identified the following nematode helminths: *Ascaris lumbricoides*, *Enterobius vermicularis*, *Trichuris trichiura*, Ancylostomatidae, cestodes of the species *Hymenolepis nana* and protozoa of the species *Entamoeba histolytica/dispar*, *Entamoeba coli*, *Endolimax nana*, *Giardia lamblia* and *Cryptosporidium* spp. The positive samples for enteroparasitoses corresponded to 85,6% of the total. The prevalence of parasitism among Kayapós Indians was higher than that found among children of the Toba Qom ethnic group.

The prevalence of enteroparasitoses among Yanomami Ethnic people in the Province of Roraima, Brazil, was investigated by Confalonieri *et al.*<sup>[24]</sup>, who found a total prevalence of intestinal parasitoses of 67%. The following species were found: *Trichuris trichiura* (43,3%), *E. histolytica/dispar* (40,0%), Ancylostomatidae (30,0%), *Enterobius vermicularis*

(13,3%). Some parasite species presented low incidence: two cases of *A. lumbricoides*, two of *Capillaria* spp., One case of parasitism by *Strongyloides stercoralis* and one case of *Giardia lamblia*. The parasitological profile of the Toba Qom ethnic group differs radically from that found among the Yanomami people, coinciding only in the low prevalence of *Ascaris lumbricoides*.

The incidence of parasitoses among the Pankarare Ethnic group living in the region of Raso da Catarina in the city of Glória, Province of Bahia, Brazil, was studied by Oliveira *et al.*<sup>[25]</sup> The researchers analysed 134 faecal samples, finding a 37,1% of positivity. Nematode helminths of the family Ancylostomatidae (20,44%), cestodes of the *Hymenolepis nana* species (1,46%), and the protozoa *Entamoeba histolytica/dispar* (4,38%), *Entamoeba coli* (21,9%), *Endolimax nana* (6,57%), *Giardia lamblia* (8,03%), and *Cryptosporidium* spp. (4,38%). The results of the species prevalence differ substantially from those registered among Toba Qom Ethnic people in Paraguay.

Norberg *et al.*<sup>[26]</sup> investigated the occurrence of enteroparasitoses among Terena Ethnic people in the city of Miranda, Province of Mato Grosso do Sul, Brazil. The researchers examined 134 samples through conventional parasite diagnostic techniques. Among the examined samples, 103 (76,86%) were positive to helminths and protozoa. The following species were identified: *Ascaris lumbricoides* (31,3%), Ancylostomatidae (6,72%), *Enterobius vermicularis* (6,72%), *Strongyloides stercoralis* (5,22%), *Trichuris trichiura* (17,91%), *Hymenolepis nana* (8,21%), *Taenia* spp. (2,24%), *Entamoeba histolytica/dispar* (5,24%), *Entamoeba coli* (24,63%), *Endolimax nana* (3,73%), *Giardia lamblia* (17,16%), *Cryptosporidium* spp. (0,75%). The parasitological profile of the Terena Ethnic people differs substantially from that found among the Toba Qom, both in the incidence and prevalence of intestinal parasites.

Vieira-Silva<sup>[27]</sup> performed a parasitological research of faeces of Xavante Ethnic people established in the city of Pimentel Barbosa, Province of Mato Grosso, Brazil, revealing that among 196 faecal samples the most prevalent parasite species were *Ascaris lumbricoides* (23,5%), *Hymenolepis nana* (20,4%), *Entamoeba coli* (31,6%) and *Entamoeba histolytica* (7,7%). It is remarkable the difference of the parasitological profile reported between the people of the Xavante Ethnic group and the Toba Qom.

The prevalence of enteroparasites among children under 13 years old living in the Xakriabá indigenous territory in the Province of Minas Gerais, Brazil, was investigated by Siqueira *et al.*<sup>[28]</sup> The researchers examined 2973 faecal samples and found a high prevalence of protozoans *Entamoeba histolytica/dispar* (16,9%), *Giardia intestinalis* (18,4%), and low prevalence of helminths: *Schistosoma mansoni* (1,2%), *Hymenolepis nana* (2,2%), Ancylostomatidae (3,7%), *Strongyloides*

*stercoralis* (0,4%). These authors considered that the high prevalence of protozoa suggests the contamination of water sources with faeces, probably due to the precarious conditions of basic sanitation and hygiene. Among the Toba Qom Ethnic people, Protozoa also represents the highest prevalence, but with a different species profile of that found among the Xakriabá.

The researchers Assis *et al.*<sup>[14]</sup> performed the analysis of intestinal parasitoses among indigenous people of the Maxakali Ethnic group, established in the Province of Minas Gerais, Brazil. The research revealed a high parasitism rate (90,3%) and the more prevalent species were: *Entamoeba histolytica* (48,9%), Ancylostomatidae (37,9%), *Giardia lamblia* (32%), *Schistosoma mansoni* (23,7%), *Hymenolepis nana* (18,6%), *Strongyloides stercoralis* (5,4%), *Ascaris lumbricoides* (4,9%) and *Trichuris trichiura* (0,5%). There is a marked difference between the profile and the parasitological diversity between the indigenous people of the Maxakali Ethnic group and those of the Toba Qom Ethnic group.

The environmental conditions and the prevalence of intestinal parasitism of the Xukuru-Kariri Ethnic group established in the city of Caldas, Minas Gerais, Brazil, were investigated by Simões *et al.*<sup>[29]</sup> Faecal samples from 60 individuals showed a positivity of 66.6% for enteroparasites. The prevalences were: *Entamoeba histolytica* (6,7%), *Entamoeba coli* (60%), *Endolimax nana* (1,8%), *Giardia duodenalis* (6,6%).

A study of traditions, life style, and hygiene habits of indigenous people of the Jaraguá-Ytu community in the Province of São Paulo, Brazil, was performed by Ribeiro.<sup>[30]</sup> The examination of faeces of 55 people of this community presented positivity of 41.8% for enteroparasitoses. Among the parasitic agents found, *Giardia lamblia* (56.5%) was the most prevalent species, followed by *Entamoeba coli* (52.1%), *Hymenolepis nana* (39.1%), *Endolimax nana* (34.75%) and *Ascaris lumbricoides* (4.3%). The poor conditions of housing and hygiene were pointed out by the author as the main factors that leads to the transmission of parasitic agents. Among the Toba Qom indigenous people, *Giardia lamblia* had only 7.77% of positivity, *Entamoeba coli* 25.55%, *Hymenolepis nana* 11.11%, *Endolimax nana* 8.88% and *Ascaris lumbricoides* 1.11%.

The prevalence of intestinal parasitoses among Warao indigenous ethnic group of the María López community, in the city of Benítez, Province of Sucre, Venezuela, was studied by Guilarte *et al.*<sup>[31]</sup> The studied population was composed by 126 people with ages ranging from 2 to 64 years old. The main parasitic agents were: Hookworm (79.6%), *Trichuris trichiura* (69.76%), *Blastocystis* spp. (55.84%), *Ascaris lumbricoides* (25.58%), *Hymenolepis nana* (1.29%) and the Protozoa *Endolimax nana* (49.35%), *Entamoeba coli* (44.15%), *Iodamoeba butschlii* 38%), *Giardia duodenalis* (9.09%), *Chilomastix mesnili* (3.89%), *Entamoeba histolytica/dispar* (2.59%).

The authors emphasized that hygiene habits were determinant for the high prevalence, indicating that 81.75% of the people in this community defecate in the soil. The two parasitic agents most prevalent among the Warao, Ancylostomatidae and *Trichuris trichiura* were not even found among the examined individuals of the Toba Qom ethnic group, which exemplifies how different the parasitological profiles of these population groups are.

A cross-sectional study to determine the prevalence of intestinal parasites among indigenous people of the San Antonio de Raudalito community in the Province of Bolívar, Venezuela, was performed by Devera *et al.*<sup>[32]</sup> These authors examined 62 faecal samples of people with ages from six months to 72 years and the prevalence of parasites was 88.7%, with no significant differences in parasitism between the age groups. There were 55 positive cases, and 83.6% presented polyparasitism. Protozoa species found were *Entamoeba coli* 40 (64,5%), *Giardia lamblia* 17 (27,4%), *Entamoeba histolytica/dispar* 13 (21,0%), *Iodamoeba butschlii* 12 (19,3%), *Endolimax nana* 6 (9,7%), *Chilomastix mesnili* 2 (3,2%), and the Chromista *Blastocystis* spp. 36 (58,1%). Among the helminths, Ancylostomatidae 20 (32,3%), *Trichuris trichiura* 4 (6,5%), *Hymenolepis nana* 1 (1,6%), *Strongyloides stercoralis* 1 (1,6%).

The researchers Gavina *et al.*<sup>[33]</sup> investigated the incidence of enteroparasitoses among 62 indigenous children of the Nasa de Caldon Reserve, in the Province of Cauca, Colombia. The positivity rate for intestinal parasites was 95.2%, represented by the following species: *Blastocystis* spp. (87,1%), *Entamoeba coli* (72,6%), *Endolimax nana* (50%), *Entamoeba histolytica/dispar* (46,8%), *Entamoeba hartmanni* (41,9%), *Ascaris lumbricoides* (32,3%), *Giardia intestinalis* (30,6%), *Chilomastix mesnili* (30,6%), *Iodamoeba butschlii* (25,8%), *Trichuris trichiura* (17,7%), *Cryptosporidium* spp. (3,2%), *Enterobius vermicularis* (1,6%). The high rate of parasitism reflects on clinical problems diagnosed in this infant population: anaemia (21.0%), chronic malnutrition (35.5%) and acute malnutrition (8.1%). The authors considered that the high prevalence of intestinal parasites is directly related to the contamination of the environment with faeces and inadequate sanitation conditions, which allow the contamination of water and soil.

The researchers Atêncio *et al.*<sup>[34]</sup> verified the occurrence of intestinal parasites among children under 5 years old from indigenous communities of the Province of Zulia, Venezuela. A total of 173 faecal samples were examined and protozooses predominated over helminthoses. The prevalence of enteroparasites was determined in 71%, with the following specific frequencies: *Blastocystis* spp (31,2%), *Entamoeba coli* (28,9%), *Endolimax nana* (25,4%), *Entamoeba* complex (28%), *Giardia lamblia* (19,7%), *Chilomastix mesnili* (4,6%), *Iodamoeba butschlii* (4%), *Pentatrichomonas hominis* (4%), *Ascaris*

*lumbricoides* (32,4%), *Trichuris trichiura* (9,2%), *Strongyloides stercoralis* (8%), Ancylostomatidae (4,6%), *Hymenolepis nana* (3.5%).

Mohd-Shaharuddin *et al.*<sup>[35]</sup> investigated intestinal parasitic diseases in indigenous communities in Malaysia. Among 411 participants, the researchers found a prevalence rate of 72,7%. Among the most frequent species in this population, there were *Trichuris trichiura* (58,4%), *Ascaris lumbricoides* (45,5%) and Ancylostomatidae (23,1%). The authors highlight as the main factors for the transmission cycle of parasitic agents the use of untreated water, poverty and precarious sanitary conditions of that population. We emphasize that these conditions are practically the same in almost all the indigenous communities around the world, and determinants for the high incidence of enteroparasitoses.

## CONCLUSION

This research found infections by helminths, cestodes, protozoa and the Chromista *Blastocystis* spp. affecting the children of Toba Qom ethnic group, with positivity for 58 samples (64,44%). The parasitological profile of the children of the Toba Qom population of the San Francisco de Asis community presents quite different characteristics when compared to the other indigenous groups reported in the scientific literature. This fact suggests that socio-cultural, environmental, health and hygiene characteristics peculiar to each population group influence in a determinant way the prevalence and variety of parasitic species that affect the diverse population groups. The results of this research were the basis for the treatment of parasitoses and the design of preventive actions regarding the transmission of these diseases.

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