

# Intestinal protozoa and helminths among Terena Indians in the State of Mato Grosso do Sul: high prevalence of *Blastocystis hominis*

Protozoários e helmintos intestinais entre índios Terena  
do Estado do Mato Grosso do Sul: alta prevalência de *Blastocystis hominis*

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## ABSTRACT

A parasitological survey was carried out among Terena Indians living in the Tereré settlement in the municipality of Sidrolândia, State of Mato Grosso do Sul, Brazil. Single samples of feces from 313 Indians were processed by means of the spontaneous sedimentation method. In the population studied, 73.5% were infected with at least one intestinal parasite or commensal. Protozoa predominated. *Blastocystis hominis* (40.9%), *Entamoeba coli* (33.2%) and *Entamoeba histolytica/Entamoeba dispar* (31.6%) were the most common. Bivariate analysis showed that females were generally more infected and presented higher rates of infection by *Entamoeba histolytica/Entamoeba dispar* and *Entamoeba coli*. Males were more infected by hookworms and *Strongyloides stercoralis* than females. The precarious sanitary conditions of the Tereré settlement are probably a contributory factor towards the high prevalence of intestinal protozoa.

**Key-words:** *Blastocystis hominis*. Intestinal parasites. Commensals. Indians. Brazil.

## RESUMO

Um inquérito parasitológico foi realizado em índios Terena da aldeia Tereré, do município de Sidrolândia, Estado do Mato Grosso do Sul, Brasil. Amostras únicas de fezes de 313 índios foram processadas pelo método de sedimentação espontânea. Na população estudada, 73.5% estavam infectados por pelo menos um parasita ou comensal intestinal. Os protozoários predominaram. *Blastocystis hominis* (40.9%), *Entamoeba coli* (33.2%) e *Entamoeba histolytica/Entamoeba dispar* (31.6%) foram os mais comuns. A análise bivariada demonstrou que as mulheres estavam mais infectadas no geral e apresentavam maior taxa de infecção para *Entamoeba histolytica/Entamoeba dispar* e *Entamoeba coli*. Os homens estavam mais infectados por ancilostomídeos e *Strongyloides stercoralis* que as mulheres. As precárias condições sanitárias da aldeia Tereré são provavelmente um fator contribuinte para a alta prevalência de protozoários.

**Palavras-chaves:** *Blastocystis hominis*. Parasitas intestinais. Comensais. Índios. Brasil.

Studies on the health of indigenous people of the Terena ethnic group have been distinguished by focusing on the fields of nutrition, autoimmune diseases, degenerative diseases and alcoholism<sup>1 2 3 4 12 18 22 25 29</sup>. However, data on the prevalence of intestinal protozoa and helminths among this ethnic group are very scarce in the literature.

In 1972, Perez, Artigas and Ponte<sup>24</sup> conducted a parasitological survey among 415 individuals who were attended at health centers in the State of São Paulo that serve Guarani, Kaingangue and

Terena Indians. However, these authors did not discriminate their parasitological results according to ethnic group, which made it impossible to analyze infection among the Terena separately. Subsequently, Alves<sup>3</sup> estimated the prevalence of intestinal protozoa and helminths among 244 Terena children from the Limão Verde community, which is located in the municipality of Aquidauana (State of Mato Grosso do Sul). This study was the first and until now the only record of intestinal parasites and commensals that was exclusively focused on populations of this ethnic group.

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**Table 1 - Prevalence rates of protozoa and helminths among Terena Indians from Sidrolândia, State of Mato Grosso do Sul, according to age groups, sex and species.**

Age groups (years)	number	Prevalence rates (%)										
		Bh	Ec	Eh/Ed	En	Hn	Gl	Hk	Ss	Ib	Al	Ev
≤ 4	59	27.1	5.1	10.2	5.1	3.4	18.6	-	-	-	-	-
5-9	41	46.3	63.4	48.8	29.3	29.3	14.6	2.4	7.3	2.4	2.4	-
10-19	85	42.4	37.6	37.6	23.5	11.8	4.7	15.3	2.4	2.4	1.2	1.2
20-39	79	45.6	27.8	25.3	22.8	2.5	1.3	8.9	6.3	5.1	-	-
40-59	34	38.2	50.0	52.9	8.8	-	5.9	2.9	2.9	2.9	-	-
≥ 60	15	53.3	26.7	20.0	26.7	-	6.7	-	6.7	-	-	-
Total	313	40.9	33.2	31.6	19.2	8.3	8.0	7.0	3.8	2.6	0.6	0.3
Males	167	35.9	26.9	26.3	15.6	7.8	6.6	10.2 <sup>c</sup>	6.0 <sup>d</sup>	2.4	-	0.6
Females	146	46.6	40.4 <sup>a</sup>	37.7 <sup>b</sup>	22.6	8.9	9.6	3.4	1.4	2.7	1.4	-

Bh: *Blastocystis hominis*, Ec: *Entamoeba coli*, Eh/Ed: *Entamoeba histolytica/Entamoeba dispar*, En: *Endolimax nana*, Hn: *Hymenolepis nana*, Gl: *Giardia lamblia*, Hk: Hookworms, Ss: *Strongyloides stercoralis*, Ib: *Iodamoeba butschlii*, Al: *Ascaris lumbricoides*, Ev: *Enterobius vermicularis*.

a:  $p = 0.012$ , b:  $p = 0.032$ , c:  $p = 0.020$ ; d:  $p = 0.034$

The present study provides data on the prevalence of intestinal protozoa and helminths among Terena Indians in the municipality of Sidrolândia, Mato Grosso do Sul.

## MATERIAL AND METHODS

**Population studied.** With a population estimated as 16,000 people in 2001, the Terena Indians that live in the State of Mato Grosso do Sul are scattered across a few municipalities: Miranda, Aquidauana, Anastácio, Dois Irmãos do Buriti, Sidrolândia, Nioaque and Rochedo. The territory of their settlements was occupied in the eighteenth century, when they migrated to Mato Grosso do Sul from the Chaco region of Paraguay<sup>16</sup>. This study was conducted in the Tereré settlement, which is located on the outskirts of the urban area of the municipality of Sidrolândia, 70km from Campo Grande.

**Survey.** A parasitological survey was carried out between November 1998 and February 1999, among the whole population of the Tereré settlement. Single samples of feces from the 313 Indians living in this settlement were preserved in MIF solution (merthiolate-iodine-formaldehyde) and were processed by means of the spontaneous sedimentation method<sup>19</sup>. The data were analyzed using the STATA software, version 9.0, and comparisons between groups were made by means of bivariate analysis using the chi-square test ( $X^2$ ), taking statistical significance at the level of 5%. The work was carried out with the help of health agents for the welfare of the indigenous population. The study was granted prior approval by the Research Ethics Committee of the Federal University of Mato Grosso do Sul. All the participants who needed treatment received it after the survey had been accomplished.

## RESULTS

The results showed that 73.5% of the population was infected with at least one species. Protozoa predominated and were identified in 66.5% (208/313) of the subjects, while helminths

were present in 18.5% (58/313). Table 1 summarizes the findings from the parasitological survey. *Blastocystis hominis* (40.9%), *Entamoeba coli* (33.2%) and *Entamoeba histolytica/Entamoeba dispar* (31.6%) were the most common protozoa. Among the helminths, *Hymenolepis nana* and hookworms were found in 8.3% and 7% of the samples, respectively. Only two cases of *Ascaris lumbricoides* were found.

The chi-square test showed that females were generally more infected, presented higher rates of infection by protozoa than did males ( $p = 0.001$ ) and higher rates by *Entamoeba histolytica/Entamoeba dispar* and *Entamoeba coli* ( $p = 0.032$  and  $p = 0.012$ , respectively). Although generally less infected, males presented higher infection rates in relation to hookworms and *Strongyloides stercoralis* ( $p = 0.020$  and  $p = 0.034$ , respectively).

The level of infection by *Blastocystis hominis* was lower among children ≤ 4 years of age and equal among the individuals in all the other age groups. *Entamoeba histolytica/Entamoeba dispar* was most prevalent among adults aged 40-59 years and also present in almost half (48.8%) of the children aged 5-9 years. *Giardia lamblia* predominated among children ≤ 4 years old.

With regard to infection by two or more protozoa and/or helminths, 24.3% of the individuals had only one parasite or commensal, 26.2% had two, 15% had three, 6.1% had four and 1.9% had five. There was no difference in the level of infection by two or more protozoa and/or helminths between the sexes ( $p = 0.577$ ), but there were differences between age groups. Infection by two or more protozoa and/or helminths was more frequent among children aged 5-9 years, and this group was statistically similar to the groups in the age ranges of 10-19 and 40-59 years.

## DISCUSSION

In the present survey, Indians presented high rates of infection. Our results resemble those obtained by Alves<sup>3</sup>, in which 70.1% of the Terena children analyzed presented some parasite or

commensal in their feces. There was also low prevalence of helminths like *Ascaris lumbricoides* (1.6%) and hookworms (4.1%), and absence of *Trichuris trichiura*. *Giardia lamblia* had the highest prevalence (30.2%), followed by the commensal species *Entamoeba coli* (20.9%). Among the other protozoa and helminths, the frequencies obtained were: *Endolimax nana*, 15.9%; *Iodamoeba butschlii*, 11.4%; *Hymenolepis nana*, 10.6%; *Strongyloides stercoralis*, 3.3%; and *Taenia* sp., 0.4%<sup>3</sup>. Infections by *Entamoeba histolytica/Entamoeba dispar* and *Blastocystis hominis* were not reported.

A high (31.6%) proportion of the population studied presented infection with *Entamoeba histolytica/Entamoeba dispar*. Studies among Brazilian indigenous populations have demonstrated that infection with *Entamoeba histolytica/Entamoeba dispar* is often the most prevalent of the infections with protozoa<sup>8 14 15 17 20 21</sup>. Because of the possibility that the individuals infected might present symptomatic conditions, caused by the species *Entamoeba histolytica*, a better investigation should be conducted in the Tereré settlement, using specific diagnostic tests for differentiating between *Entamoeba histolytica* and *Entamoeba dispar*.

The parasitological profile found among the Terena Indians is also close to some reports on the Brazilian indigenous population in the literature, in which helminths presented low prevalence<sup>8 13</sup>. These populations had all undergone some type of therapeutic intervention, which was possibly one of the factors contributing towards the observed low prevalence of helminths. In the Tereré settlement, treatments with anti-helminth agents had occasionally been carried out over the years preceding the collection of the material for this study, which was done by health agents for indigenous communities working for the municipal health department. Although no periodic parasitological surveys had been carried out to prove the effectiveness of treatments administered previously among the Terena, several studies have emphasized the importance of using mass medication for controlling intestinal parasitosis<sup>7 8 13 26 27</sup>.

Another important finding was the high prevalence of *Blastocystis hominis*, which was observed in practically all age groups and was the commonest species in the Tereré settlement. This protozoan, whose pathogenicity is still a matter for debate<sup>5 9</sup>, has rarely been reported among Brazilian indigenous populations. The possible explanations for this are failure by analysts to recognize it under the microscope, use of incorrect techniques or failure to attribute importance to the forms encountered<sup>5 6 10</sup>. In one rare record, Palhano-Silva<sup>23</sup> reported low prevalence of *Blastocystis hominis* (7.9%) among Suruí Indians in the State of Rondônia. In the Terena population, the high prevalence of *Blastocystis hominis* coincides with the high prevalence also observed for other protozoa. At present, there is no specific explanation for this finding other than the possibility of high transmission through water. The spontaneous sedimentation method, although not the most sensitive for diagnosing certain species such as *Strongyloides stercoralis*, has demonstrated adequate results for *Blastocystis hominis* when the sample was previously fixed in formal-based conserving media at 10% concentration<sup>6 28</sup>. Therefore, we believe that the results obtained

here satisfactorily reflect the frequency of this protozoan among the population, even though this did not occur for *Strongyloides stercoralis*.

Infection by two or more protozoa and/or helminths was very common, and affected almost half (49.2%) of the population. Our study also demonstrated a difference between the sexes, such that women were more infected in general. This could indicate greater exposure to waterborne transmission among the women, caused by the particular habits of the women in this community, which were not, however, covered in this study. The men presented greater infection by hookworms and *Strongyloides stercoralis*. This was also observed (for hookworms) by Miranda *et al*<sup>20</sup>, among indigenous men of the Tembê ethnic group. Although some studies have suggested that men have greater contact with infecting forms that are contained in the soil, new studies relating age groups to activity and sex should be conducted to clarify this question better<sup>11</sup>.

We can highlight the precarious sanitary conditions in which the Terena Indians live as a contributory factor towards the high general prevalence observed in the Tereré settlement. These people get their water supply from an artesian well and most of them use rudimentary cesspit systems. The high degree of soil and water contamination, which is characteristic of places with a low level of sanitation, is probably responsible for the health conditions reported.

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