Rev. Inst. Med. trop. S. Paulo
45(3):173-176, May-June, 2003

BRIEF COMMUNICATION

INTESTINAL PARASITES AND COMMENSALS AMONG INDIVIDUALS FROM A LANDLESS CAMPING IN THE RURAL AREA OF UBERLÂNDIA, MINAS GERAIS, BRAZIL

Maria Cecília OLIVEIRA, Claudio Vieira da SILVA & Julia Maria COSTA-CRUZ

SUMMARY

We evaluated the occurrence of intestinal parasites and commensals among children and adults from a landless camping in the rural area of Uberlândia, State of Minas Gerais, Brazil, from October to November 2001. Stool samples from 78 individuals were examined by both the Baermann-Moraes and Lutz methods. Fifty-one (65.4%; CI 54.8 – 76.0) individuals were found to be infected, 23 (45.1%) children and 28 (54.9%) adults, of whom 34 (66.7%) were mono-infected, 9 (17.6%) bi-infected, and 8 (15.7%) poly-infected. In conclusion, the high prevalence of intestinal parasites and commensals suggests that parasitological exams should be periodically carried out in addition to the sanitation education and health special care in this population.

KEYWORDS: Enteroparasites; Epidemiology; Rural area; Landless camping.

The movements for the land ownership, particularly prominent among the social conflicts in Brazil, are characterized by the formation of organizations, such as the landless movement that claims the development of the agrarian reform in the country. The actions of these groups are based on the occupation of lands called unproductive, where camps are first installed and then transformed in settings after proper legalization by the Instituto Nacional de Colonização e Reforma Agrária (INCRA). Such settings are constituted of allotments where families with low socioeconomic level live in dwelling places, which present precarious hydro-sanitation conditions[22].

The first National Census on projects of agrarian reform settings, accomplished between December 1996 and January 1997, demonstrated that enteroparasitoses occupy the second highest index among the 20 more frequent diseases in the landless population in the whole Brazil, showing a prevalence of 14.8%. The positivity rates of such parasitoses in the different geographical areas were thus distributed: 17.4% in the Northeast, 15.5% in the North, 13.1% in the Center-West, 11.6%, in the Southeast, and 5.6% in the South[22].

Several agrarian reform settings and camps are found in the area of the Triângulo Mineiro, Brazil. Although these settings and camps represent a significant progress for diminishing the problems related to the agrarian issue in the country, they present intensely precarious conditions related to the education, the agricultural production and mainly the health.

Considering these epidemiological data, the present study aimed to verify the occurrence of intestinal parasites and commensals in children and adults from a landless camping in the rural area of Uberlândia, Minas Gerais, Brazil. As also reported by ROCHA *et al*.[20] the intestinal commensals were included because they share the same mechanisms of transmission of protozoa parasites and could serve as indicators of the socioeconomic and sanitation conditions of this population.

This study was conducted according to the ethical guidelines of the Brazilian Health Ministry concerning research on human beings[14] and was approved by the Research Ethics Committee of the Federal University of Uberlândia.

In the rural area of Uberlândia, there is a landless movement-affiliated camping that is located on the Rio das Pedras farm, 20 kilometers away from the city, which is consisted of 17 tents of canvas, two septic cesspools, and the drinking water is non-piped and untreated.

Seventy-eight individuals have lived in this area, being 46 (59%) male and 32 (41%) female, with age ranging from 1 to 70 years (mean age 24.8 years ± 18.4 SD). All the landless camping inhabitants were submitted to coprological exams carried out in two fecal samples, which were collected on alternate days, without preservative by using universal collectors, from October to November 2001. Samples were previously identified and sent to the Laboratory of Parasitology, Federal University of Uberlândia for parasitological testing. Stool samples were analyzed

Laboratório de Parasitologia, Instituto de Ciências Biomédicas, Universidade Federal de Uberlândia, Uberlândia, MG, Brasil
Correspondence to: Julia Maria Costa-Cruz, Laboratório de Parasitologia, Instituto de Ciências Biomédicas, Universidade Federal de Uberlândia. Av. Pará 1720, 38400-902 Uberlândia, MG, Brasil. Fax: +55-34-3218.2333. e-mail: costacruz@ufu.br

by both the BAERMANN-MORAES[2,16] and LUTZ[11] methods, and after lugol staining of the sediment, four slides per sample were examined by two investigators, with a total of 624 slides analyzed in light microscopes (Nikon, Japan) at 100 x and 400 x magnification. All the individuals received the exam results and the positive cases for parasites were referred to the nearer health unit in order to receive specific treatment.

Statistical analysis was performed using the Fisher test. A 95% confidence interval (CI) was stipulated. Results were considered significant if *P* was less than 0.05.

Fifty-one (65.4%; CI 54.8 – 76.0) individuals were found to be infected, 23 (45.1%) children and 28 (54.9%) adults ($P > 0.05$). Of the infected individuals 34 (66.7%) were mono-infected, 9 (17.6%) bi-infected, and 8 (15.7%) poly-infected. When analyzing the different causes of infection, 24 (47.0%; CI 33.0 – 61.0) individuals were infected with protozoa, 15 (29.4%; CI 16.9 – 41.9) with helminths, and 12 (23.6%; CI 12.0 – 35.2) with both infections.

According to sex, the positivity rate for intestinal parasites and commensals in the studied population was 32/78 (41.0%) for male and 19/78 (24.4%) for female ($P < 0.05$). Considering positive cases, the indexes verified were 32/51 (62.7%) for male and 19/51 (37.3%) for female ($P < 0.05$). Regarding the age groups, positivity rate was: 1-15 years (29.5%; CI 19.3 – 39.7), 16-30 years (20.6%; CI 11.7 – 29.5), 31-45 years (5.1%; CI 0.2 – 9.9), 46-60 years (6.4%; CI 1.0 – 11.8) and 61-70 years (3.8%; CI 0 – 8.0). Statistically significant difference was verified when comparing positivity rates obtained between 1-15 and 31-70 years old ($P < 0.02$).

Table 1 shows the distribution of intestinal parasite and commensal infections by age among inhabitants of the studied population. Among parasites, *Hymenolepis nana* was the most frequent helminth (14.1%; CI 6.5 – 21.7) and *Giardia lamblia* (11.5%; CI 4.4 – 18.6) the major pathogenic protozoa identified. No parasite was detected in stool samples from individuals in the 61-70 year age group. It was observed 34 cases of intestinal commensals infection, from which *Entamoeba coli* was the most frequent (25.6%) and showed statistically significant difference from each parasite occurrence ($P < 0.02$).

The population rising in the rural areas has contributed for increasing the prevalence of parasitic infections[4]. The parasite species detected in the present study are considered as epidemiologically and clinically important due to their consequences for the general state of health. Accordingly, LUDWIG *et al*.[10] stated that these parasites represent one of the main debilitating factors, frequently associated with chronic diarrhea and malnutrition, impairing the physical and intellectual development, particularly of the youngest groups.

The occurrence of intestinal parasite and commensal infections hereby registered (65.4%) was similar to the findings of KOBAYASHI *et al*.[9] that reported indexes of 70% in individuals of various ages, inhabitants from a rural area in Holambra, São Paulo, and to the results of FERREIRA *et al*.[7] (59.7%) in a study accomplished with school children living in a landless farm work settlement in Campo Florido, Minas Gerais. However, our positivity rates were higher than those obtained by GIRALDI *et al*.[8] (48.1%) and FERREIRA & MARÇAL[6] (22.3%) when analyzing students from rural area in Rolândia, Paraná and Uberlândia, Minas Gerais, respectively.

Some studies carried out in Brazil have correlated the frequency of intestinal parasites with some environmental, socioeconomic factors and basic sanitation conditions[10,13,15,18], thus justifying the high infection indexes found in such surveys.

Although our results showed statistically significant difference concerning infection rates according to sex, suggesting that men may have more contact with soil, studies carried out in rural area of Brazil[6-9] did not demonstrate this difference.

H. nana and *G. lamblia* were respectively the helminth and the pathogenic protozoa most frequently verified in all individuals analyzed (14.1% and 11.5%, respectively) and in the children group (30.0% and 26.6%, respectively). Such findings were also observed by FERREIRA *et al*.[7] that reported indexes of 30.5% for *G. lamblia* and 9.7% for *H. nana* infections among school children living in a landless farm work settlement in Minas Gerais. Concerning *G. lamblia* infection our results could be different if the FAUST[5] method had been used, since it is a specific method for protozoa diagnosis.

Table 1
Distribution of intestinal parasite and commensal infections by age among inhabitants of a landless camping in the rural area of Uberlândia, Minas Gerais, Brazil

Intestinal parasites and commensals	Age (years)					
	1 ⊢ 15 (n = 30) No. (%)	16 ⊢ 30 (n = 21) No. (%)	31 ⊢ 45 (n = 12) No. (%)	46 ⊢ 60 (n = 11) No. (%)	61 ⊢ 70 (n = 4) No. (%)	Total (n = 78) No. (%)
Entamoeba coli	7 (23.3)	8 (38.1)	2 (16.6)	2 (18.2)	1 (25.0)	20 (25.6)
Endolimax nana	6 (20.0)	4 (19.0)	1 (8.3)	1 (9.1)	2 (50.0)	14 (17.9)
Hymenolepis nana	9 (30.0)	2 (9.5)	0	0	0	11 (14.1)
Giardia lamblia	8 (26.6)	1 (4.8)	0	0	0	9 (11.5)
Enterobius vermicularis	6 (20.0)	1 (4.8)	0	0	0	7 (9.0)
Hookworm	2 (6.6)	2 (9.5)	0	1 (9.1)	0	5 (6.4)
Strongyloides stercoralis	0	1 (4.8)	3 (25.0)	1 (9.1)	0	5 (6.4)
Trichuris trichiura	1 (3.3)	1 (4.8)	0	2 (18.2)	0	4 (5.1)
Taenia sp	2 (6.6)	0	0	0	0	2 (2.6)

Although specific methods for the diagnosis of *Enterobius vermicularis* were not used, it was possible to detect a higher occurrence (9.0%; CI 2.8 – 15.2) when compared to other findings, such as 2.6%[1], 1.9%[6] and similar to indexes (6.9% and 4.0%) obtained in other studies[7,12] in the area of the Triângulo Mineiro. As for *H. nana* occurrence, a possible explanation for these findings would be the gathering conditions of the studied population.

Positivity rate of 6.4% (CI 1.0 – 11.8) was detected for hookworms, agreeing with the indexes reported by other authors (3.8, 6.9 and 4.4)[6,7,8] and was lower than the index found by KOBAYASHI *et al.*[9] (19.8%). On the other hand, the results obtained for *Strongyloides stercoralis* infection (6.4%; CI 1.0 – 11.8) confirm the high occurrence of such parasite in this area, as previously described by MACHADO & COSTA-CRUZ[12] and OLIVEIRA *et al.*[17], since indexes lower than 1% are considered as sporadic, while indexes from 1 to 5% and higher than 5% are considered as endemic and hyperendemic, respectively[19].

Regarding *Trichuris trichiura* infection, the positivity rate found (5.1%; CI 0.2 – 10.0) differed from the results obtained by FERREIRA *et al*.[7] that did not detect infection with such parasite, and were higher than the index found by GIRALDI *et al*.[8] (0.1%). No *Ascaris lumbricoides* infection was detected as also observed by FERREIRA *et al*.[7] in the landless farm work settlement in Minas Gerais. The reasons for this are unknown. In the rural area of Uberlândia, FERREIRA & MARÇAL Jr.[6] detected 1% of *A. lumbricoides* and *T. trichiura* infections and GIRALDI *et al*.[8] verified 1.25% for *A. lumbricoides* and 0.1% for *T. trichiura* infections in the rural area of Rolândia, Paraná. Although the *Ascaris-Trichuris* association is frequently observed[3,9,21,23], our results may indicate that *A. lumbricoides* life cycle has not been completed in this landless camping, as well as in the landless settlement nearby Uberlândia[7].

Studies carried out in rural areas from Brazil[6-9] did not demonstrate *Taenia* sp infection. The result of the present study showing 2.6% (CI 0 – 6.1) of positive cases becomes alarming since the detected eggs could be from *Taenia solium*, and associating with the swine rearing in the place, such factors might represent potential mechanisms for transmission of the taeniasis-cysticercosis complex.

Taken together, it can be concluded that this population presented high indexes of intestinal parasites and commensals during the analyzed period, indicating the necessity for implementing programs of health education to the individuals living in landless camping in Brazil.

RESUMO

Parasitos e comensais intestinais entre indivíduos de um acampamento de sem-terras na área rural de Uberlândia, Minas Gerais, Brasil

Avaliou-se a ocorrência de parasitos e comensais intestinais entre crianças e adultos de um acampamento de sem-terras na área rural de Uberlândia, Minas Gerais, Brasil, no período de outubro a novembro de 2001. Amostras de fezes dos 78 indivíduos foram examinadas pelos métodos de Baermann-Moraes e Lutz. Cinqüenta e um (65,4%; IC 54.8 – 76.0) indivíduos estavam infectados, 23 (45,1%) crianças e 28 (54,9%) adultos, dos quais 34 (66,7%) estavam monoparasitados, 9 (17,6%) biparasitados e 8 (15,7%) poliparasitados. A elevada ocorrência de parasitos e comensais intestinais aponta para a necessidade da realização de exames parasitológicos periódicos, educação sanitária e acompanhamento das condições de saúde desta população.

REFERENCES

1. ALMEIDA, L.P. & COSTA-CRUZ, J.M. - Incidência de enteroparasitoses em habitantes do município de Araguari, Minas Gerais. **Rev. Cent. Ciênc. bioméd. Univ. Fed. Uberlândia, 4**: 9-17, 1988.

2. BAERMANN, G. - **Eine einfache methode zur auffindung vor Ankylostomum (Nematoden). Larven in Erdproben**. Mededeel mit H. Geneesk. Batavia, Lab. Weltevreden Feestbundel, 1917. p. 41-47.

3. BUNDY, D.A.P.; COOPER, E.S.; THOMPSON, D.E. *et al.* – Epidemiology and population dynamics of *Ascaris lumbricoides* and *Trichuris trichiura* infection in the same community. **Trans. roy. Soc. trop. Med. Hyg., 81**: 987-993, 1987.

4. CHAN, M.S. - The global burden of intestinal nematode infections – fifty years on. **Parasit. today, 13***:* 438-443, 1997.

5. FAUST, E.C.; SAWITZ, W.; TOBIE, J. *et al.* - Comparative efficiency of various technics for the diagnosis of protozoa and helminths in feces. **J. Parasit., 25**: 241-262, 1939.

6. FERREIRA, C.B. & MARÇAL JÚNIOR, O. - Enteroparasitoses em escolares do distrito de Martinésia, Uberlândia, MG: um estudo-piloto. **Rev. Soc. bras. Med. trop., 30**: 373-377, 1997.

7. FERREIRA, P.; LIMA, M.R.; OLIVEIRA, F.B. *et al.* - Ocorrência de parasitas e comensais intestinais em crianças de escola localizada em assentamento de sem – terras em Campo Florido, Minas Gerais, Brasil. **Rev. Soc. bras. Med. trop., 36:** 109-111, 2003.

8. GIRALDI, N.; VIDOTTO, O.; NAVARRO, I.T. & GARCIA, J.L. - Enteroparasites prevalence among daycare and elementary school children of municipal schools, Rolândia, PR, Brazil. **Rev. Soc. bras. Med. trop., 34**: 385-387, 2001.

9. KOBAYASHI, J.; HASEGAWA, H.; FORLI, A.A. *et al.* - Prevalence of intestinal parasitic infection in five farms in Holambra, São Paulo, Brazil. **Rev. Inst. Med. trop. S. Paulo, 37**: 13-18, 1995.

10. LUDWIG, K.M.; FREI, F.; ÁLVARES, F.F. & RIBEIRO-PAES, J.T. - Correlação entre condições de saneamento básico e parasitoses intestinais na população de Assis, Estado de São Paulo. **Rev. Soc. bras. Med. trop., 32**: 547-555, 1999.

11. LUTZ, A. - O *Schistosomum mansoni* e a schistosomatose, segundo observações, feitas no Brazil. **Mem. Inst. Oswaldo Cruz, 11**: 121-155, 1919.

12. MACHADO, E.R. & COSTA-CRUZ, J.M. - *Strongyloides stercoralis* and other enteroparasites in children at Uberlândia city, state of Minas Gerais, Brazil. **Mem. Inst. Oswaldo Cruz, 93**: 161-164, 1998.

13. MARZOCHI, M.C. & CARVALHEIRO, J.R - Estudos dos fatores envolvidos na disseminação dos enteroparasitas. III. Distribuição dos fatores envolvidos na disseminação dos enteroparasitas. **Rev. Inst. Med. trop. S. Paulo, 20**: 31-35, 1978.

14. MINISTÉRIO DA SAÚDE – **Resolução Nº 196/96** sobre pesquisa envolvendo seres humanos. Brasília, Conselho Nacional de Saúde, 1996.

15. MONTEIRO, C.A.; CHIEFFI, P.P.; BENICIO, M.H.A. *et al.* - Estudo das condições de saúde das crianças do município de São Paulo (Brasil), 1984/1985. VII. Parasitoses intestinais. **Rev. Saúde públ. (S. Paulo), 22**: 8-15, 1988.

16. MORAES, R.G. - Contribuição para o estudo do *Strongyloides stercoralis* e da estrongiloidíase no Brasil. **Rev. Serv. Saúde públ. (Rio de J.), 1**: 507-624, 1948.

17. OLIVEIRA, L.C.M.; RIBEIRO, C.T.; MENDES, D.M.; OLIVEIRA, T.C. & COSTA-CRUZ, J.M. - Frequency of *Strongyloides stercoralis* infection in alcoholics. **Mem. Inst. Oswaldo Cruz, 97**: 119-121, 2002.

18. PEDRAZZANI, E.S.; MELLO, D.A.; PRIPAS, S. *et al.* - Helmintoses intestinais. II. Prevalência e correlação com renda, tamanho da família, anemia e estado nutricional. **Rev. Saúde públ. (S. Paulo), 22**: 384-389, 1988.

19. PIRES, M.L. & DREYER, G. - Revendo a importância do *Strongyloides stercoralis.* **Rev. Hosp. Clín. Fac. Med. S. Paulo, 48**: 175-182, 1993.

20. ROCHA, S.R.; SILVA, J.G.; PEIXOTO, S.V. *et al.* - Avaliação da esquistossomose e de outras parasitoses intestinais, em escolares do município de Bambuí, Minas Gerais, Brasil. **Rev. Soc. bras. Med. trop., 33**: 431-436, 2000.

21. SALDIVA, S.R.; SILVEIRA, A.S.; PHILIPPI, S.T. *et al. - Ascaris-Trichuris* association and malnutrition in Brazilian children. **Paediat. Perinat. Epidem., 13**: 89-98, 1999.

22. SCHIMIDT, B.V.; MARINHO, D.N.C. & ROSA, S.L.C. - **Os assentamentos de reforma agrária no Brasil.** Brasília, Ed. da Universidade de Brasília, 1998.

23. SMITH, H.M.; DE KAMINSKY, R.G.; NIWAS, S.; SOTO, R. & JOLLY, P. - Prevalence and intensity of infections of *Ascaris lumbricoides* and *Trichuris trichiura* and associated socio-demographic variables in four rural Honduran communities. **Mem. Inst. Oswaldo Cruz, 96**: 303-314, 2001.

Received: 11 June 2002
Accepted: 6 May 2003