

Research Note

**Toxoplasma Infection and Soil-transmitted Helminthiases in
Brazilian Children**

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Human toxoplasma infection is distributed worldwide and several papers have reported high prevalence rates in tropics including Latin America (Remington *et al.*, 1970; Frenkel and Ruiz, 1980; Sousa *et al.*, 1988). It was supposed that the people in some of these areas may be infected through oocysts-contaminated soil. In this paper, we describe results of study on the prevalence rate of toxoplasma infection in relation to soil-transmitted helminthiases among primary school children in Brazil.

Recife, located in the northeastern part of Brazil, is a port city with a population of one million. Two schools in Recife were chosen for testing. One in Varzea (VAR) is located in the suburbs, where sanitary conditions are poor. The other in Madalena (MAD) is in the city center and has good sanitation. Stool and serum samples were collected from 108 students in VAR

and 18 students in MAD (age range from 6 to 12 years old). Fecal samples were examined by Kato-Katz method and sera were examined for anti-toxoplasma antibodies (toxoplasma antibody, toxo-Ab) by indirect latex agglutination test (Eiken Chemical Co. Ltd., Tokyo). The data were evaluated with Fisher's exact probability test for significance of difference.

Seventy three (68%) of the students in VAR were found to be positive for helminth eggs; *Ascaris lumbricoides* 45%, *Trichuris trichiura* 46% and hookworm 5%. Of the students in MAD, only one (6%) was positive for helminth eggs. Toxo-Ab was positive (titer $\geq 1:32$) in 91 (84%) of the students in VAR and 7 (39%) of the students in MAD. Thus, the students in VAR were significantly higher ($P < 0.001$) than those in MAD in regard to the prevalence ratio of both helminthic infections and toxo-Ab. Of the students in VAR, there was no significant difference between younger (6-8 years old, $N = 55$) and older (9-12 years, $N = 53$) students in positive rate of toxo-Ab (84% vs 85%). In addition, it was shown that as a high percentage as 64% of the students in VAR had toxo-Ab titers of 1:1024 or higher, suggesting that most of the infected children there were recently infected.

A previous survey conducted in 1964, for toxoplasma infection in military recruits of Brazil, revealed that 67% of them were dye test positive (Lamb and Feldman, 1968). By the present study, it was made clear that the primary school children were also highly infected with

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Table. Results of stool examinations and tests for anti-toxoplasma antibody among primary school children in Recife, Brazil

	Stool examination*				Toxo-Ab test						
	No.(%) persons posi. for helminth eggs	No. persons posi. for			No.(%) persons posi. for toxoplasma	Reciprocal titers					
		A.l.	T.t.	H.w.		≤16	32	64	256	1024	4096 ≤
School in VAR (N = 108)	73 (68%)	49	51	6	91 (84%)	17	0	1	21	35	34
School in MAD (N = 18)	1 (6%)	0	1	0	7 (39%)	11	0	0	2	4	1

*A.l.: *Ascaris lumbricoides*, T.t.: *Trichuris trichiura*, H.w.: hookworm

Toxoplasma gondii. The prevalence of toxoplasma infection was much higher in the group of children highly infected with soil-transmitted helminths than in another group with fewer helminthic infections. This fact may strongly suggest that they had frequent contact with the soil and other sources, which were highly contaminated with toxoplasma oocysts as well as soil-transmitted helminth eggs. Our findings also support the results of the previous studies on the relation of toxoplasma infections to polluted environmental conditions (Frenkel and Ruiz, 1980; Barbier *et al.*, 1983; Sousa *et al.*, 1988).

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