

## BRIEF COMMUNICATION

# PREVALENCE OF INTESTINAL PARASITES IN CHILDREN FROM PUBLIC DAYCARE CENTERS IN THE CITY OF BELO HORIZONTE, MINAS GERAIS, BRAZIL

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### SUMMARY

The objective of this study was to verify the occurrence of intestinal parasites in 3 to 6-year-old children from daycare centers maintained by the municipal government of Belo Horizonte, Minas Gerais, Brazil. Coproparasitological tests performed in 472 children have shown that 24.6% of them had some type of parasites, 6.6% of the children having more than one type. Among protozoa, *Entamoeba coli* (14.0%) and *G. duodenalis* (9.5%) were the most prevalent, whereas *Ascaris lumbricoides* (3.0%) and *Trichuris trichiura* (1.1%) were the most frequent among the helminths. Thus, we can observe that intestinal parasites still represent a serious public health problem in Belo Horizonte, especially among children and in areas where the socioeconomic conditions are less favorable.

**KEYWORDS:** Giardiasis; Intestinal Parasites; Daycare centers.

Intestinal parasites are a huge public health problem, and, despite their high prevalence in developing countries, they receive a very low priority in health programs. Approximately one third of population of underdeveloped countries lives in environmental conditions that facilitate the dissemination of parasitological infections<sup>4</sup>.

Despite their low mortality rates, intestinal parasites affect a large number of individuals, resulting either in asymptomatic cases or in states of chronic diarrhea and malnutrition, among other physiological alterations, jeopardizing physical, nutritional and mental development, mainly in children<sup>5,10</sup>.

The prevalence of intestinal parasites in Brazil is known to be high<sup>3,7,9</sup>, with variations in each region of the country. The problem is more serious than it seems, due to the lack of a serious and profound sanitary education policy. The eradication of these parasites requires an improvement in the socioeconomic conditions, basic sanitation, and sanitary education, in addition to changes of certain cultural habits. In 1988, a multi-centric census for the occurrence of the intestinal parasites in Brazil, demonstrated that 55.3% of the children were parasitized<sup>2</sup>.

It is known that the frequency of giardiasis is much higher in developing countries than in developed countries. If we consider the frequency of giardiasis in the general population, its rates are not

significantly elevated, when compared to the rates of infection in the pediatric population<sup>8,12</sup>.

This study had the objective of investigating the prevalence of intestinal parasites in children from public daycare centers in the metropolitan region of Belo Horizonte, as there is no recent data in the literature about such prevalence in this region.

Belo Horizonte is divided in nine administrative regions, encompassing the North, Northeast, East, Northwest, Center-South and West regions, in addition to the Venda Nova, Pampulha, and Barreiro regions.

At the end of 2003, the municipal government of Belo Horizonte developed the *First School* program, conceived to offer a free, public, and good-quality school for children of the city. Created for children from zero to six years of age, the program now has 27 "Unidades Municipais de Educação Infantil - UMEI" (Municipal Unities for Children Education). For the study, children from three to six years of age belonging to each of the nine administrative regions of Belo Horizonte UMEIs were selected. In the administrative regions with more than one UMEI, the chosen UMEI was the one with the greatest number of children.

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After the project was approved by the Ethics Committee of Federal University of Minas Gerais (UFMG), a *Consent to Participate Document* was sent to the children's parents or legal guardians, to obtain their consent to their participation in the project. A socio-epidemiological questionnaire was also sent, to be filled out with information about age, gender, family income, dwelling conditions (water and sewer), hygiene habits and the presence of pets.

Each individual received a container designed to collect feces, filled with conservation medium (MIF), in order to prevent the deterioration of the fecal material. The container was identified with labels containing the child's name, age and collection date. Instructions on how to collect the feces were also given in writing to the parents or guardians of the children. Just one fecal sample was collected from each individual. The merthiolate-iodine-formalin concentration (MIFC) procedure was used to concentrate parasitological forms present in the feces<sup>1</sup>.

Copro-parasitological tests of 472 children from three to six years of age, were performed in the period from April to November, 2006, showing that 24.6% of them were parasitized, 6.6% of the subjects presenting poly-parasitism (Table 1). The findings for the nine UMEIs studied are presented in Tables 2 and 3. It can be observed, as predicted, that an elevated prevalence of intestinal parasites is still a reality among 3 to 6-year old children in some areas of the Metropolitan Region of Belo Horizonte.

The high prevalence of *Entamoeba coli*, a commensal parasite, is indicative of the population's precarious sanitary conditions and of elevated environmental contamination, highlighting the need for education, focused on hygiene measures, along with investments on sanitation. The percentage of positive cases of *Giardia duodenalis* matches the expectations, since the prevalence of this parasite is higher in children than in adults, especially in daycare centers where the lack of hygienic habits and the precarious sanitary conditions facilitate closer contact with the infecting forms. These factors, in addition to low immunity against the parasite, result in a high level of infection. Even though we have performed only a single parasitological test in the sample population, and considering the intermittent elimination of cyst of the protozoa, Center-South and Venda Nova daycare centers presented prevalence as high as 22.0%. Because of the symptoms giardiasis can induce in children, it represents a health problem among this age group.

We observed that in the daycare centers that serve a population of better socioeconomic and hygienic-sanitary conditions, there was a lower rate of prevalence of parasites, when compared to daycare centers in areas considered to be at high-risk, as Center-South, Northwest, East and Venda Nova.

The findings match the expectations. According to the socio-epidemiological questionnaire filled out by the children's parents or

**Table 1**

Occurrence of mono and poly-parasitism in 472 fecal samples of children from municipal daycare centers in the city of Belo Horizonte, MG, in the period from April to November, 2006

Fecal exams	Total	
	No.	%
Negative	356	75.4
Monoparasitism	85	18.0
Polyparasitism	31	6.6

**Table 2**

Occurrence of parasites in 472 fecal samples of children from public daycare centers in the city of Belo Horizonte, MG, collected from April to November, 2006

Parasites	Children	
	No.	%
<b>Protozoa</b>		
<i>Entamoeba coli</i> *	66	14.0
<i>Giardia duodenalis</i>	45	9.5
<i>Endolimax nana</i> *	17	3.6
<i>Entamoeba histolytica</i> / <i>Entamoeba dispar</i>	3	0.6
<i>Iodamoeba butschli</i> *	2	0.4
<i>Chilomastix mesnili</i> *	2	0.4
<b>Helminths</b>		
<i>Ascaris lumbricoides</i>	14	3.0
<i>Trichuris trichiura</i>	5	1.1
<i>Strongyloides stercoralis</i>	1	0.2

\* Commensal, non-pathogenic.

**Table 3**

Occurrence of intestinal parasites infection by administrative region in the city of Belo Horizonte, MG, Brazil, in the period from April to November, 2006\*

Administrative region	Northwest	Center-South	West	Barreiro	Pampulha	North	Northeast	Venda Nova	East
<i>Entamoeba coli</i>	5/24 (20.8)	14/50 (28.0)	2/48 (4.1)	8/77 (10.4)	4/95 (4.2)	9/55 (16.4)	4/29 (13.8)	10/55 (18.2)	10/39 (25.6)
<i>Giardia duodenalis</i>	3/24 (12.5)	11/50 (22.0)	2/48 (4.1)	6/77 (7.8)	4/95 (4.2)	5/55 (9.1)	-	12/55 (22.0)	2/39 (5.1)
<i>Endolimax nana</i>	1/24 (4.2)	7/50 (14.0)	1/48 (2.1)	2/77 (2.6)	1/95 (1.1)	1/55 (1.8)	2/29 (6.9)	1/55 (1.8)	1/39 (2.6)
<i>Entamoeba histolytica</i> /E. <i>dispar</i>	-	1/50 (2.0)	-	1/77 (1.3)	1/95 (1.1)	-	-	-	-
<i>Iodamoeba butschli</i>	-	-	-	-	-	-	-	2/55 (3.6)	-
<i>Chilomastix mesnili</i>	-	1/50 (2.0)	-	-	-	-	-	1/55 (1.8)	-
<i>Ascaris lumbricoides</i>	1/24 (4.2)	5/50 (10.0)	-	2/77 (2.6)	-	-	-	3/55 (5.5)	3/39 (7.7)
<i>Trichuris trichiura</i>	-	2/50 (4.0)	-	-	-	-	-	-	3/39 (7.7)
<i>Strongyloides stercoralis</i>	-	-	-	-	-	-	-	-	1/39 (2.6)
Total of positive samples**	10/24 (41.7)	25/50 (50.0)	5/48 (10.4)	15/77 (19.5)	10/95 (10.5)	14/55 (25.5)	5/29 (17.2)	19/55 (34.6)	14/39 (35.9)

\* Values are positive results/performed examinations (%); \*\* Included mono and poly-parasitism.

legal guardians, the existence of open sewers, the presence of insects inside dwellings, and the lack of filtered or boiled drinking water were frequent findings in regions with higher prevalence of intestinal parasites. Despite the fact that the prevalence of most of the intestinal parasites decreased over the last few years<sup>6,11</sup>, such parasites are still a health problem in some areas of the metropolitan region of Belo Horizonte, especially in those most lacking social conditions and among children. Unquestionably, the treatment of intestinal parasites still receives a very low priority in public health programs. We conclude that an efficient sanitary policy is needed to control intestinal parasites, along with the monitoring of the health conditions of the population in poorer areas, and the improvement of the basic sanitation conditions and educational reform, with the objective of improving the health of the children served by these institutions.

## RESUMO

### Prevalência de enteroparasitoses em crianças de creches públicas da cidade de Belo Horizonte, Minas Gerais, Brasil

O objetivo deste trabalho foi verificar a ocorrência de parasitos intestinais em crianças de 3 a 6 anos de idade, oriundas de creches mantidas pela Prefeitura Municipal de Belo Horizonte, Minas Gerais, Brasil. Exames coproparasitológicos realizados em 472 crianças demonstraram que 24,6% apresentavam algum tipo de parasitose, sendo que 6,6% apresentavam mais de um parasito. Entre os protozoários, *Entamoeba coli* (14,0%) e *G. duodenalis* (9,5%) foram os mais prevalentes, enquanto *Ascaris lumbricoides* (3,0%) e *Trichuris trichiura* (1,1%) foram os mais encontrados entre os helmintos. Desta forma, observa-se que as parasitoses intestinais ainda são um problema de saúde pública em Belo Horizonte, principalmente entre a população infantil e em áreas onde as condições sócio-econômicas são menos favoráveis.

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