

Artículo original

Prevalence of intestinal coccidian in preschool children from San Felix City, Venezuela

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Abstract: Many epidemiological aspects of intestinal coccidiosis in Bolivar State are not known. There are no studies done in apparently health children. The purpose of this study was to determine intestinal coccidian prevalence in preschool children attending the S.E.U. Teresa de la Parra preschool located in San Felix, Bolivar State, Venezuela. The universe included 109 children, and 73 were included in the study. A spontaneous evacuation fecal sample was collected from each child, preserved in 10% formaldehyde, and analyzed by a formaldehyde-ether technique, and Kinyoun stain. Sixty seven percent of the universe was evaluated (73/109). Eighty seven point seven percent of the children were infected by some parasite and/or commensal. Ten enteroparasite species were diagnosed, and *Blastocystis hominis* (37%) and *Giardia lamblia* (27.4%) were the most frequent of the protozoa. Among the helminthes, the most common were *Ascaris lumbricoides* and *Trichuris trichiura* with 35.6% each. Prevalence of intestinal coccidian was 10.9% and *Cryptosporidium* spp. was the only one diagnosed in eight cases (10.9%). The infection did not show any age predilection, but there was a gender bias, since 87.5% of those infected were females. Only three of the cases (37.5%) with *Cryptosporidium* spp. had diarrhea. In conclusion, a relative high rate of intestinal coccidiosis in the preschool children evaluated was determined.

Keywords: Intestinal coccidian, preschool children, *Cryptosporidium*

Prevalencia de coccidios intestinales en niños pre-escolares de San Félix, Venezuela

Resumen: En el estado Bolívar se desconocen muchos aspectos epidemiológicos de las coccidiosis intestinales. En niños aparentemente sanos no se tiene ningún estudio. El objetivo del trabajo fue determinar la prevalencia de coccidios intestinales en niños matriculados en el pre-escolar U.E.E. Teresa de la Parra de San Félix, estado Bolívar. El universo fue de 109 niños y la muestra estudiada de 73. Se obtuvo una muestra fecal por evacuación espontánea de cada pre-escolar, la cual fue preservada en formol al 10% y analizada mediante la técnica formol-éter y coloración de Kinyoun. Se evaluó el 67% del universo (73/109). El 87,7% de los niños estaba infectado por algún parásito y/o comensal. Se diagnosticaron un total de 10 especies de enteroparásitos, siendo *Blastocystis hominis* con 37% y *Giardia lamblia* con 27,4% los más frecuentes, dentro de los protozoarios. Entre los helmintos los más comunes fueron *Ascaris lumbricoides* y *Trichuris trichiura* con 35,6% cada uno. La prevalencia de coccidios intestinales fue 10,9%, siendo *Cryptosporidium* sp. el único diagnosticado con 8 casos (10,9%). La infección no tuvo predilección por la edad pero si con relación al género, siendo el femenino el más afectado (87,5%). Sólo en tres de los casos (37,5%) con *Cryptosporidium* sp. se presentó diarrea. En conclusión, se determinó una prevalencia relativamente elevada de coccidiosis intestinal en los preescolares evaluados.

Palabras clave: Coccidios intestinales, pre-escolares, *Cryptosporidium*

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Introduction

Intestinal coccidiosis is an important parasitic disease caused in humans mainly by the *Cryptosporidium*, *Isoospora* and *Cyclospora* genus [1]. These infections have received special attention in the last three decades due to the AIDS pandemic, since they have a higher prevalence in individuals

with some type of immunodeficiency. These three coccidian are important causes of diarrhea in children and adults [1-4].

In spite of their great importance as pathogens in immunodeficient individuals [3,5,6], it has been shown that they also affect apparently healthy or with no type of immunodeficiency persons [3,7-11]. In child populations

with no immunological alteration due to HIV infection, the epidemiology of these parasite infections has not been adequately studied.

In Venezuela, there are several studies of Cryptosporidiosis [2,12,13], some of Isosporiosis [14-16], and a few regarding *Cyclospora cayetanensis* [17-20]. In Bolivar State, there is a widespread ignorance in relation to the epidemiology of these parasite infections. Due to the lack of regional studies, we decided to do a study with the main object of determining the prevalence of these intestinal coccidian in a sample of preschool children enrolled in the Teresa de la Parra State Educational Unit, in the Buen Retiro locality of San Felix, Bolivar State.

Materials and methods

The study was a cross-sectional investigation carried out between May and July 2003 at the Teresa de la Parra State Educational Unit (SEU) in the Buen Retiro locality, Caroni Municipality, at the periphery of San Felix, considered as a suburban area. The universe included the total of children enrolled in the SEU during the 2003-2004 periods, corresponding to two morning sections and two afternoon sections, for 109 children. All children participated voluntarily and their parents gave their informed consent for their inclusion in the study. The children were summoned through an invitation sent to their parents and a single spontaneous evacuation fecal sample was requested. The inclusion criteria's were informed consent from parents, clinical evaluation, and a single stool sample of each child.

Identification data including age, gender, home address, as well as interesting clinical and epidemiological data, were recorded in a control card designed for the study. An adequate sample collector vial was given to each child with written indications of how to obtain the sample. Once the sample was received, it was preserved in a 10% formaldehyde solution for later analysis by the formaldehyde-ether technique, and staining with the Kinyoun method [21] at the Coproparasitological Diagnosis Laboratory of the Department of Parasitology and Microbiology of the Health Sciences School of Ciudad Bolivar. Each child was also clinically evaluated and parents subjected to an oriented anamnesis.

For the statistical analysis, we used descriptive statistics. The variables were studied by the Chi square test and by the statistical computer program SPSS 8 for Windows.

The study was revised, and approved by the Grade Papers Committee of Universidad de Oriente, which assessed the ethical aspects of the study.

Results and discussion

Sixty seven percent of the population was evaluated (73/109). Thirty-six children did not provide a sample, because their parents did not approve their inclusion in the study. The group studied included 38 females and 35 males, and the age of the largest age group evaluated was

6 years old (71.2%) (Table 1). Eighty seven point seven percent of the children were infected by some parasite or commensal. Parasite infections did not show age preference in the infected children ($p>0.05$) but they did show a gender related bias ($p<0.05$), since females were more affected (87.5%). Sixty seven point one percent (49/64) of the infected children were polyparasitized.

Ten enteroparasite species were diagnosed, being

Table 1. Preschool children evaluated from S.E.U "Teresa de la Parra", San Félix City, Bolivar State, Venezuela

Age (years)	Gender				Total	
	Female		Male		No.	%
	No.	%	No.	%		
4	1	25	2	75	3	4.1
5	9	50	9	50	18	24.7
6	28	53.8	24	46.2	52	71.2
Total	38	52.1	35	47.9	73	100.0

Blastocystis hominis with 37%, and *Giardia lamblia* with 27.4% the most frequent among the protozoa. Among the helminthes, *Ascaris lumbricoides* and *Trichuris trichiura* were the most common with 35.6% each (Table 2). A high prevalence of intestinal parasites with helminth predominance has also been determined in other localities in Venezuela and Bolivar State by other authors [22,23]. Regarding intestinal coccidian, a relative high prevalence was determined, over 10%, and *Cryptosporidium* spp. was the only coccidian identified (Table 2). No cases of

Table 2. Prevalence of intestinal parasites in preschool children from S.E.U "Teresa de la Parra", San Félix City, Bolivar State, Venezuela

Parasites	No.	%
Helminthes		
<i>Ascaris lumbricoides</i>	26	35.6
<i>Trichuris Trichiura</i>	26	35.6
Hookworm	02	2.7
Protozoan		
<i>Blastocystis hominis</i>	27	37.0
<i>Giardia lamblia</i>	20	27.4
<i>Entamoeba coli</i>	16	21.9
<i>Endolimax nana</i>	09	12.3
<i>Iodamoeba butschlii</i>	09	12.3
<i>Cryptosporidium</i> sp.	08	10.9
<i>Entamoeba histolytica/E. dispar</i>	04	5.5

Cyclospora cayetanensis or *Isospora belli* were diagnosed, even though studies done in Venezuela [14,15,19,20], and in Bolivar State [16] mention the presence of these coccidian. Similar results have been reported previously [2,17,24,25]. When children with diarrhea under 5 years old were studied, coccidian prevalence rates are usually higher [2,10,26,27]. Nevertheless, in apparently healthy children, or in the general population, these parasites are not searched systematically, as revealed by the lack of studies in this respect [25,26].

Seven cases (87.5%) of cryptosporidiosis had clinical manifestations possibly due to an intestinal parasite. Only three (37.5%) of these cases with *Cryptosporidium* spp. had diarrhea, and the prevalence of diarrhea in the

total population evaluated was 9.6% (7/73). Even though cryptosporidiosis is more common in patients with diarrhea or immunosuppressed [1,4,5-8,10,26,27], it has been reported that immunocompetent individuals of all ages can also be affected, even though at lesser rates [3,7-11,25].

Regarding age, children less than 6 years old were the most affected since this group was larger. Studies carried out in Ciudad Bolívar have shown that the child population is the most affected when groups of healthy persons of all ages are evaluated [25].

Regarding gender, females were the most affected. Nevertheless, due to the small number of cases, it is not possible to draw definitive conclusions. Other studies in larger number of individuals are needed to confirm these preliminary observations.

Most cryptosporidiosis cases were associated with other parasites, with important polyparasitism. Among the associated parasites, *G. lamblia*, was an important diarrhea producing agent (Table 3), and this is the reason that the clinical manifestations can be superimposed in some of these children. Similar observations have been reported previously [10,26].

Conclusion

Relatively high intestinal coccidian prevalence was determined in preschool children from the Teresa de la Parra SUE in San Félix, Bolívar State, being *Cryptosporidium* spp. the only coccidian diagnosed.

Table 3. Preschool children infected with coccidian. S.E.U. Teresa De La Parra, San Félix City, Bolívar State, Venezuela

Cases	Age (years)	Gender	Parasites	Diarrhea
1	5	Female	Only <i>Cryptosporidium</i> sp.	No
2	6	Female	Only <i>Cryptosporidium</i> sp.	Yes
3	5	Female	<i>Cryptosporidium</i> sp.- <i>Giardia lamblia</i> - <i>Entamoeba coli</i>	No
4	6	Female	<i>Cryptosporidium</i> sp.- <i>Entamoeba histolytica</i> / <i>E. dispar</i> - <i>Ascaris lumbricoides</i>	No
5	5	Female	<i>Cryptosporidium</i> sp.- <i>Entamoeba coli</i> - <i>Endolimax nana</i> - <i>Iodamoeba butschlii</i> - <i>Ascaris lumbricoides</i>	No
6	6	Female	<i>Cryptosporidium</i> sp.- <i>Giardia lamblia</i>	Yes
7	6	Female	<i>Cryptosporidium</i> sp.- <i>Giardia lamblia</i> - <i>Ascaris lumbricoides</i>	No
8	6	Male	<i>Cryptosporidium</i> sp.- <i>Giardia lamblia</i> - <i>Ascaris lumbricoides</i> - <i>Trichuris trichiura</i> -Hookworm	Yes

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