

## Characterization of Children Under 15 Years Old with Intestinal Parasitism

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### Abstract

**Background:** Intestinal parasitism is a major global health problem because of its high prevalence and universal distribution. It is an important cause of morbidity in children around the world.

**Objective:** To characterize children under 15 years old with Intestinal parasitism.

**Methods:** An observational descriptive and cross-sectional study was carried out in Guáimaro between June 2017 and July 2018. The universe was formed by 59 children under 15 years old with diagnosis of intestinal parasitism confirmed by serial examination of feces.

**Results:** There was a higher frequency of infection in children from one to four year of life and *Giardia lamblia* as the most frequent parasite. The main risk factors that appear to be associated with intestinal parasitism was drinking unboiled water, the most frequent symptoms was abdominal pain was, the antiparasitic medication more used was the metronidazole and duodenitis was the main complication.

**Conclusion:** The greater incidence of children with intestinal parasitism from 1 to 4 years old, there was a predominance of parasitosis caused by *Giardia*, the epidemiological factors with more influence was drinking unboiled water and abdominal pain as the main symptoms. The metronidazole was the antiparasitic more indicated and the duodenitis was the most common complications.

**Keywords:** Child; Intestinal Parasitism; *Giardia lamblia*; Treatment

### Introduction

Intestinal parasitosis is a morbid state in which parasites inhabit man's intestine, causing alterations in intestinal functioning. In general, there are two large groups of human endoparasites, protozoa and helminths, the latter are divided into baskets, trematodes and nematodes. Parasitic diseases have now been troubling due to the high indica of people who present them. It is estimated that there are 3.5 billion parasitic individuals in the world and approximately 450 million have parasitic disease; of this the largest proportion corresponds to the child population [1].

In underdeveloped countries in South America and Asia, the prevalence of intestinal parasitosis in age is straining and preschool vary from 26.2% to 80.5%. In Latin America, intestinal parasitosis have become a real public health problem; approximately 80% of the popu-

lation is affected, especially in countries where marginal or rural areas prevail, and in socially and economically depressed urban areas [2].

Intestinal parasites are most commonly observed in marginal populations where deficiency in basic drinking water and sewerage services are prevalent, with the child population being mostly affected, due to immune immaturity and the short development of hygienic habits. The transmission of parasites is favored by faecal contamination of consumer water, soil and food and sociocultural factors, such as socioeconomic and educational level and population hygiene practices [3].

Intestinal parasitosis are infections of the digestive tract, which can be caused by the ingestion of protozoa cysts, eggs or worm larvae, or by transcutaneous larvae penetration from the soil. Each parasite will perform a specific route in the host and affect one or more organs, depending on this route. Among the most prevalent parasites are, protozoa (*Giardia lamblia*, *Entamoeba histolytica*, *Blastocystis hominis* and *Cryptosporidium*) and helminths (oxides (*Enterobius vermicularis*), *Ascaris lumbricoides*, *Trichuris trichiura*, *Ancylostoma duodenale* and *Tenia*) [4].

Among intestinal protozoa the most common in children are *Giardia intestinalis* and *Entamoeba histolytica*. It is estimated that around 280 million people worldwide are infected by *Giardia lamblia* and 50 million by *Entamoeba histolytica*. *Giardia lamblia* is the most common protozoa intestinal infection in the world population, in developed countries its prevalence ranges from 2 - 8% and in underdeveloped it reaches between 20 - 30%. In recent years they have grown in protozoan importance such as *Cryptosporidium*, *Cyclospora cayetanensis* and *Isoospora belli* very frequently associated, there is also considered *Blastocystis hominis*, the latter, increasingly mentioned as agent of acute diarrhoeal frames [5]. *Blastocystis hominis* is the most common protozoan parasites in stool samples, universally ranged, with a prevalence in the general population in developing countries of 3 - 50% and one point five to 10% in developed countries. It was initially considered to be a diner; however, it is now known to be pathogenic and is associated with a wide range of gastrointestinal and extraintestinal disorders [6].

*Enterobius vermicularis* is the most common helmite, there are 400 million people infected with this parasite in the world. Helminthiasis is prevalent infections in developing countries, especially those with high rates of unmet basic needs, which mainly affect children [7]. It is estimated that more than two billion individuals are infected globally. It is further estimated that 300 million people suffer from associated severe morbidity, resulting in between 10,000 - 135,000 deaths per year and an estimated four point nine million years of life lost to disability, of which 65% correspond to Uncinariias, 22% to *Ascaris lumbricoides* and the remaining 13% to *Trichuris trichiura*. In Latin America and the Caribbean, an estimated 100 million people are infected with *T. trichiura*, 84 million with *Ascaris lumbricoides* and 50 million with *Uncinariias* [8].

In Cuba, the prevalence of intestinal parasitism is not known exactly, although a prevalence of 12 to 15% intestinal parasitism in the country is estimated [9].

From the above it was decided to carry out the study with the aim to characterize children under 15 years of age with diagnosis of intestinal parasitism.

### Methodology

A descriptive cross-sectional observational study was conducted in Guáimaro in the period June 2017 and June 2018 with the aim of characterizing children under 15 years of age with diagnosis of intestinal parasitism.

The universe of study consisted of 59 children from 0 to 14 years of age carrying some type of intestinal parasitosis confirmed by isolation of the agent by coproparasitological examination of the faeces who attended a pediatric consultation.

The information was obtained through the following techniques: the observation that allowed to identify the sex of the child. The interview with the mother to know the age of the child (< 1, 1 - 4, 5 - 9, 10 - 14 years), risk factors (homovectors, pets inside the home, ingestion of unboiled water, barefoot walking, digital suction, outdoor fecalism) and clinical manifestations (abdominal pain, bloating, vomiting, skin lesions, diarrhea, anal itching, hyporexia). Review of the individual health medical history that allowed information on the type of parasite (*Giardia*, ameba) to be collected. Oxide, ascaris, *Blastocystis hominis*), pharmacological treatment (Mebendazole, Metronidazole, Secnidazole, Nitazoxanide), associated complications (malnutrition, anemia, poor absorption). Finally, the information was collected on a data collection pin (Annex 1) that was prepared in response to the objectives of the investigation and which once completed constituted the primary record of the investigation.

The information was analyzed with descriptive statistics and the results were presented textually and in simple frequency distribution tables, using summary measures for qualitative variables absolute frequencies and percentages.

The institution’s Ethics and Teaching and Research committees were approved for the study. The participating mothers were then informed of the reasons for the study, of their duties and rights, their written approval was requested by signing the informed consent act to the mother.

**Results**

Table 1 shows the distribution of children diagnosed with parasitosis by age group, 27 (45,8%) children were placed in the age group of 1 - 4 years, 17 (28,8%) 5 - 9 years, 13 (22%) 10 - 14 years and 2 (3,4%) were under a year old.

Age groups	Frequency	%
Under the age of 1	2	3,4
1 - 4 years	27	45,8
5 - 9 years	17	28,8
10 - 14 years old	13	22,0
Total	59	100,0

**Table 1:** Children with parasitosis according to age groups.

Table 2 shows the types of parasites found, as seen in 24 (40,7%) *Giardia lamblia*, at 12 (30,5%) *Enterobius vermicularis* (Oxide), at 12 (20,3%) *Entamoeba histolytica* and 5 (8,5%) *Blastocystis hominis*.

Parasite	Frequency	%
<i>Giardia lamblia</i>	24	40,7
<i>Vermicularis enterobius</i>	18	30,5
<i>Entamoeba histolytica</i>	12	20,3
<i>Blastocystis hominis</i>	5	8,5
Total	59	100,0

**Table 2:** Types of parasites.

**Source:** Individual health story.

Table 3 shows the risk factors that favored parasitism disarm, at 32 (54,2%) unboiled water was found to be ingested at 24 (40,7%) the presence of more supplies at home and 17 (28.8%) bad health habits. At 14 (23.7%) vectors were detected in the house, 12 (20,3%) practiced digital suction and toenails, 8 (13,6%) they had a habit of walking barefoot. In most children, more than one risky condition coincided.

Risk factors	Frequency (59)	%
Ingestion of unboiled water	32	54,2
Presence of pets at home	24	40,7
Bad hygiene habits	17	28,8
Presence of vectors at home	14	23,7
Digital suction	12	20,3
Walking barefoot	8	13,6

**Table 3:** Risk factors.

Table 4 presents the clinical manifestations of patients with intestinal parasitism, as can be seen 31 (52,5%) children had abdominal pain, 23 (39%) diarrhoea, 21 (35.6%) hyporexia and 14 (23.7%) Bloating. Other manifestations found were: vomiting in 9 (15,3%), skin lesions at 8 (13.6%) and anal itching at 7 (11.9%).

Manifestations	Frequency	%
Abdominal pain	31	52,5
Diarrhea	23	39,0
Hyporexia	21	35,6
Bloating	14	23,7
Vomiting	9	15,3
Skin lesions	8	13,6
Anal itching	7	11,9

**Table 4:** Clinical manifestations.

Table 5 shows that 26 (44%) children were tied with metronidazole, 14 (23,7%) with mebendazole, 8 (13.6%) with secnidazole and 6 (10,2%) with tinidazole and 5 (8,5%) children re-collected other antiparasitics.

Drugs	Frequency	%
Metronidazole	26	44,0
Mebendazole	14	23,7
Secnidazole	8	13,6
Tinidazole	6	10,2
Other	5	8,5
Total	59	100,0

**Table 5:** Farm antiparasitic aces indicated.

**Source:** Individual health story.

Table 6 shows that at 50 (84,7%) children diagnosed with full parasitosis found complications, such as: duodenitis in 31 (52.5%), poor absorption in 9 (15,3%), urticaria at 5 (8.5%), malnutrition in 3 (5.1%) 2 (3,4%).

Complications	Frequency	%
Duodenitis	31	52,5
Malabsorption	9	15,3
Urticaria	5	8,5
malnutrition	3	5,1
Anemia	2	3,4
No	9	15,3
Total	59	100,0

**Table 6:** Complications present in children with intestinal parasitism.

**Source:** Individual health story.

### Discussion and Conclusion

The result found coincides with the report of a study conducted by Hernández Alfaro MC., *et al.* [9] which reports the predominance of preschool children. Research conducted by other authors [10-12] demonstrated a predominance of parasitism in preschoolers, because they expand group and community influences, increase their range of action and maternal control and make minor. However, other research conducted in the Bolivarian Republic of Venezuela by Nastasi Miranda JA [13] reports that most children were between 5 and 9 years old, which does not match the result found in this research.

The report of Hernández Alfaro MC., *et al.* [9] reports that the most common parasite was *Giardia lamblia*. A similar result reflects the report of a study conducted by Coca Ramón L., *et al.* [14] in the Flor de Amistad children’s circle of the municipality Cerro de la Ciudad de la Habana to the *Giardia lamblia* as the most frequent parasite. However, research conducted by Nastasi Miranda JA [13] to determine the overall prevalence of intestinal parasites in bolivar City Educational Units indicates the predominance of *Blastocystis*. Another study that was conducted in República Bolivariana de Venezuela by Núñez Gómez Y., *et al.* [15] indicates prevalence of *Entamoeba histolytica*.

The work carried out in Colombia shows different results, Bouwmans Marlieke CH., *et al.* [16] point out that *the Giardia duodenalis* and Rodríguez Sáenz AY [17] *the Entamoeba histolytica*. In the last decade, one of the most common protozoa is *Giardia lamblia*, Altamirano Zevallos FV [18]. The prevalence rate of this protozoa in the studied population was 24%.

Valverde Peralta CM., *et al.* [11] in Ecuador report that Ameba Histolytica is the most common. In recent years *Blastocystis hominis*, a protozoa causing acute diarrhoeal paintings, have grown in importance, setting aside the assumption that it is only a diner [6].

With regard to the risk factors found in the study, there is agreement with the report of a study conducted by Coca Ramón L., *et al.* [14] in a children’s circle of Havana’s municipality Cerro who detected that the risk factors that abounded most in the group of children with intestinal parasitism were: drinking unboiled water, eating nails, habiting digital suction and walking barefoot.

Rodríguez Saenz AY [17] in the Municipality of Soracá - Boyacá of Colombia points out that the non-use of drinking water for food preparation, walking barefoot, having contact with land and coexistence with domestic animals, were the main risk factors of intestinal parasitism found.

Finding viable *Giardia lamblia* cysts in the gut of flies for 24 hours, as well as some cockroach species for several days, has made it possible to postulate the importance of these vectors in the transmission of this disease [10].

Spiny Muñoz DY, *et al.* [19] in Colombia Factors associated with parasitism or intestinal found that 84.3% does not apply any treatment to consumer water, 59% disposal of litter in the open field and almost all people have contact with animals inside the home or in perimysium.

Serpa Andrade CA, *et al.* [20] in its Educational Intervention on Intestinal Parasitism it emphasizes that poor hand washing, and nail cleaning are factors that influence the prevalence of intestinal parasitism; this is added to bad hygiene habits and unknownness. Inadequate or non-existent vegetable washing can also be potential vehicles of eggs from pathogenic parasites, such as those of *Ascaris lumbricoides* and *Trichuris trichiura*, as well as cysts from *Giardia lamblia* and *Entamoeba histolytica*.

Walking barefoot should be taken as a risk factor for contagion with multiple infectious diseases, considering in the study that 60% of children used this practice, which makes it a greater predisposition to acquire free-living parasites or also geohelminths such as *Necator americanus* or *Ancylostoma duodenale*, since these are parasites that abound in the soil and can enter skin until they reach colonize different organs of the body, develop anemia, which ends in the delay of growth and cognitive progress of the child [15].

Pets, especially canines, by having a close relationship with humans become a source of contamination of different pathogens, as is the case with zoonotic gastrointestinal parasites. These parasites also affect human health, as through contact with the pet, food, water and soil contaminated with faeces, they can be transmitted to man, developing diseases such as dermatitis caused by larva migrans cutaneous (*Ancylostomiasis*) and intestinal infections (*Giardia*) [21].

The presence of pigs are reservoirs of intestinal protozoa such as *Balantidium coli* and *Blastocystis hominis*. Despite all the benefits that animals provide, they are potentially disease transmitters and hygienic and health measures must be taken to prevent them from deteriorating human health [22].

The poor habit of eating your nails is a factor that is related to the high prevalence of *Enterobius vermicularis*, as poor hand washing and nail cleaning are conditions that favor the appearance of this parasite. Not washing vegetables is another important risk factor in parasitism, because they can be potential vehicles of eggs from pathogenic parasites such as those of *Ascaris lumbricoides* and *Trichuris trichiura*, as well as cysts of *Giardia lamblia* and *Entamoeba histolytica* [4].

With regard to clinical manifestations, the study carried out by Diéguez Leyva K [23] in a children's circle in the municipality of Puerto Padre notes that abdominal pain and diarrhoea were the symptoms that predominated in children with complete parasites. A result that matches that of this investigation.

Research carried out in the Bolivarian Republic of Venezuela by Núñez Gómez Y, *et al.* [15] in the state of Aragua and by Cuñat Ladrón de Guevara Y, *et al.* [4] in Lara State agree that diarrhoea was the most common manifestation, followed by abdominal discomfort.

Torres Campoverde FM study [24] notes that the main clinical manifestations of children with intestinal parasitosis are: abdominal pain, hyporexia, nausea, vomiting, malnutrition and anemia. This is consistent with a previous study conducted in Peru by Bances García FB, *et al.* [25] who in addition to the symptoms already described reported a high percentage of diarrhoea. The explanation for these events is based on *Giardia lamblia's* injury to the intestinal mucosa, mainly the duodenum and jejunum. This action is done by fixing the trophozoites by means of suction cups producing atrophy and inflammation by secretive products and excretory of parasite that injure the whole. There is also injury by increasing bacterial flora that by unfolding bile salts and hindering the absorption and decrease of digestive enzymes, such as disaccharidases, trypsin and lipase, which increase fat removal and contribute to poor absorption of electrolytes, solutes and water, leading to weight loss, stunting and alterations in nutritional status.

With links to the treatment of intestinal parasitism, a study that compared the efficacy and safety of Nitazoxanide and Albendazole the treatment of giardiasis symptomatic in children concluded that both antiparasitics proved effective and safe in treatment in children and adds that Nitazoxanide is 2.5 and 50 times more potent than albendazole and metronidazole, respectively [25].

A study conducted in Colombia by Fernández-Niño JA., *et al.* [26] reports that a combined strategy of health education and chemotherapy with Albendazole in single doses of 400 mg orally for the control of geohelminthiasis by *Ascaris lumbricoides*, *Trichuris trichiura* and *Uncinarias* was effective.

Albendazole acts at the cytoskeleton level of the parasite but has also been found to inhibit encystation by up to 30% and may decrease the rate of gastric excretion. At the trophozoite level the drug leads to loss of adhesion, as it was found to alter the suckorial disc. Metronidazole is the antiparasitic of choice for the treatment of protozoa, acts on proteins that carry electrons in the respiratory chain of anaerobic bacteria, while in other microorganisms it is introduced among the DNA chains inhibiting the synthesis of nucleic acids [27].

Regarding the complications of intestinal parasitism, Núñez Gómez Y., *et al.* [15] when studying intestinal parasitism in Lagunita, Girardot municipality, Venezuela notes that approximately 50% of patients develop complications such as chronic diarrhoea, hives, malnutrition and/or low peso and intestinal malabsorption.

The work of Rodríguez Sáenz AY [17] in Colombia reports that malnutrition is the most common complication of intestinal parasitism. Meanwhile, Nicholls S [10] argues that intestinal helminths affect nutrition, growth, physical development and learning, with consequences that can last throughout their lives and affect their school performance and work productivity and, consequently, their ability to generate income.

Order A., *et al.* [28] report chronic malnutrition as the main complication and add in their article that it is due to the decrease in the absorption of nutrients and enzymatic activity villous with lactose intolerance and increased fecal loss of protein nitrogen, fats and vitamins.

One article raises that parasitic infection; because of their exfoliating activity lead to anemia, decreased nutrient absorption and perhaps other subclinical processes that lead to energy losses significant enough to trigger malnutrition [29].

One article summarizes the complications associated with parasitic infection and notes that those found were: multiple pulmonary and hepatic abscesses, subocclusive syndrome, intestinal occlusion, Loffler syndrome, biliary peritonitis by perforation of the common liver duct, cholangitis and hypochromic microcytic anemia [30].

It was concluded that in children diagnosed with intestinal parasitism, predominance of preschoolers, males, *Giardia* infection and those taking unboiled water was found. The most common manifestation was abdominal pain, metronidazole was the most indicated antiparasitic drug and duodenitis was the most common complication.

### Annex 1

#### Data collection plan ill

##### 1. Age group

- < 1 year
- 1 - 4 years
- 5 - 9 years

- 10 - 15 years

**2. Type of intestinal parasitism.**

- *Giardia* \_\_
- *Ameba* \_\_
- *Ascaris* \_\_
- Oxide \_\_
- *Taenia* \_\_
- *Trichuris*\_\_

**3. Risk factors for intestinal parasitism**

- Presence of flies and cockroaches \_\_
- Animals in the home \_\_
- Do not wash your hands before ingesting food \_\_
- Do not wash your hands after defacer \_\_\_\_
- Do not wash vegetable \_\_
- Walking barefoot \_\_\_\_
- Consumption of unboiled water \_\_
- Presence of pets inside the house \_\_

**4. Manifestations associated with intestinal parasitism.**

- Abdominal pain \_\_
- Diarrhea \_\_\_\_
- Anal itching \_\_\_\_
- Urticaria \_\_
- Insomnia \_\_
- Loss of appetite \_\_
- Milk intolerance \_\_



### 5. Drug indicated

- Mebendazole \_\_\_
- Metronidazole \_\_\_
- Secnidazole \_\_\_
- Nitazoxanide \_\_\_
- Otro\_\_\_

### 6. Complications of intestinal parasitism

- Malnutrition \_\_\_\_
- Allergy \_\_\_
- Lack of vitamins \_\_\_\_
- Anemia \_\_\_
- Poor absorption \_\_\_
- Immunodeficiency \_\_\_.

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