

Prevalencia de parasitismo intestinal en niños de la comunidad indígena U'wa en Boyacá, Colombia

Intestinal parasitism prevalence in children of the U'wa indigenous community in Boyacá, Colombia

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Abstract

Objective: To determine the prevalence of intestinal parasitism in children under 15 years of age in the U'wa indigenous community in the municipality of Guican, Boyacá.

Methodology: This is a descriptive cross-sectional study conducted with 125 children under the age of 15, who belong to the U'wa indigenous community of the Güican municipality. The presence of intestinal parasites was evaluated through the implementation of two direct stool tests. Statistical analysis and processing were performed with the SPSS version 22 program.

Results: The prevalence of parasites was 72% CI 95%. The most frequent parasites were *Blastocystis* spp. 43.3%; *Entamoeba histolytica/dispar*

35.5%; *Ascaris lumbricoides* 12.2% and *Giardia intestinalis* with 11.1%. The non-pathogenic parasites found were *Entamoeba coli* 30%; *Endolimax nana* 24.4% and *Iodamoeba butschlii* 5.5%. Polyparasitism was 50% and was associated with being under 7 years of age and having more than 4 clinical manifestations.

Conclusions: Indigenous communities are considered a vulnerable population since they do not have basic health services and have a high prevalence of infectious diseases that can generate some complications, especially in children under 15 years of age. This study revealed the dynamics of parasitic infections in the U'wa indigenous community that have implications in public health and in the health-disease context, in order to carry out interventions in a comprehensive way to improve the health condition.

Key words: Parasitic diseases, indigenous population, prevalence, helminthiasis, protozoan infections.

Resumen

Objetivo: Determinar la prevalencia de parasitismo intestinal en niños menores de 15 años de la comunidad indígena U'wa, del municipio de Güicán, Boyacá.

Metodología: Estudio descriptivo de corte transversal en 125 niños menores de 15 años, pertenecientes a la comunidad indígena U'wa del municipio de Güicán. Se evaluó la presencia de parásitos intestinales a partir de dos exámenes coprológicos directos. El procesamiento y análisis estadístico se realizó con el programa SPSS versión 22.

Resultados: La prevalencia de parásitos fue del 72% IC 95%. Los parásitos más frecuentes fueron *Blastocystis* spp. 43.3%; *Entamoeba histolytica*/dispar 35.5%; *Ascaris lumbricoides* 12.2% y *Giardia intestinalis* con 11.1%. Los parásitos no patógenos hallados fueron *Entamoeba coli* 30%; *Endolimax nana* 24.4% y *Iodamoeba butschlii* 5.5%. El poliparasitismo fue de 50% y se asoció con ser menor de 7 años de edad y tener más de 4 manifestaciones clínicas.

Conclusiones: Las comunidades indígenas se consideran una población vulnerable puesto que no cuentan con los servicios básicos de sanidad, tienen alta prevalencia de enfermedades infecciosas que pueden generar algunas complicaciones, especialmente en los menores de 15 años. Con este estudio se conoció la dinámica de las infecciones parasitarias en la

comunidad indígena U'wa que tienen implicaciones en la salud pública y en el marco del contexto salud-enfermedad, con el fin de realizar intervenciones de manera integral en busca de mejorar el estado de salud.

Palabras clave: Enfermedades parasitarias, población indígena, prevalencia, helmintiasis, infecciones por protozoos (DeCS).

Introduction

Intestinal parasite infections have become a serious public health problem, mainly in developing countries, as they are highly prevalent, affect individuals of all ages and can lead to medical complications (1).

The prevalence of intestinal parasitism in children is closely related to poverty, being especially associated with inadequate personal hygiene and inadequate cleaning of food that is consumed raw; the failure of sanitary services that cause an inadequate supply of drinking water and fecal contamination of the environment due to poor disposal of garbage and human and animal excrement (2,3).

Parasites can cause different clinical manifestations and the severity of the damage caused by intestinal parasitic infections depends on the species of parasites, intensity and evolution of the infection, the interactions of the parasites with recurrent infections, and the immunological and nutritional health status of the population (4).

The World Health Organization estimates that more than 2 billion people in the world have diseases due to intestinal parasites and estimates that one fifth of the countries of Central and South America are affected by the following parasites: *Ascaris lumbricoides*, *Trichuris trichiura*, *Ancylostoma*, *Entamoeba histolytica* complex, *Giardia lamblia* and *Blastocystis spp* (5).

There are about 83 indigenous ethnic groups in Colombia, with more than 1,300,000 people, distributed in scattered settlements in rural areas that are difficult to access. Indigenous settlements are characterized by high morbidity caused by acute diarrheal diseases, vector-borne diseases, and intestinal parasites (6). High prevalence rates of 100% have been reported in these communities, as in studies conducted in three reservations of

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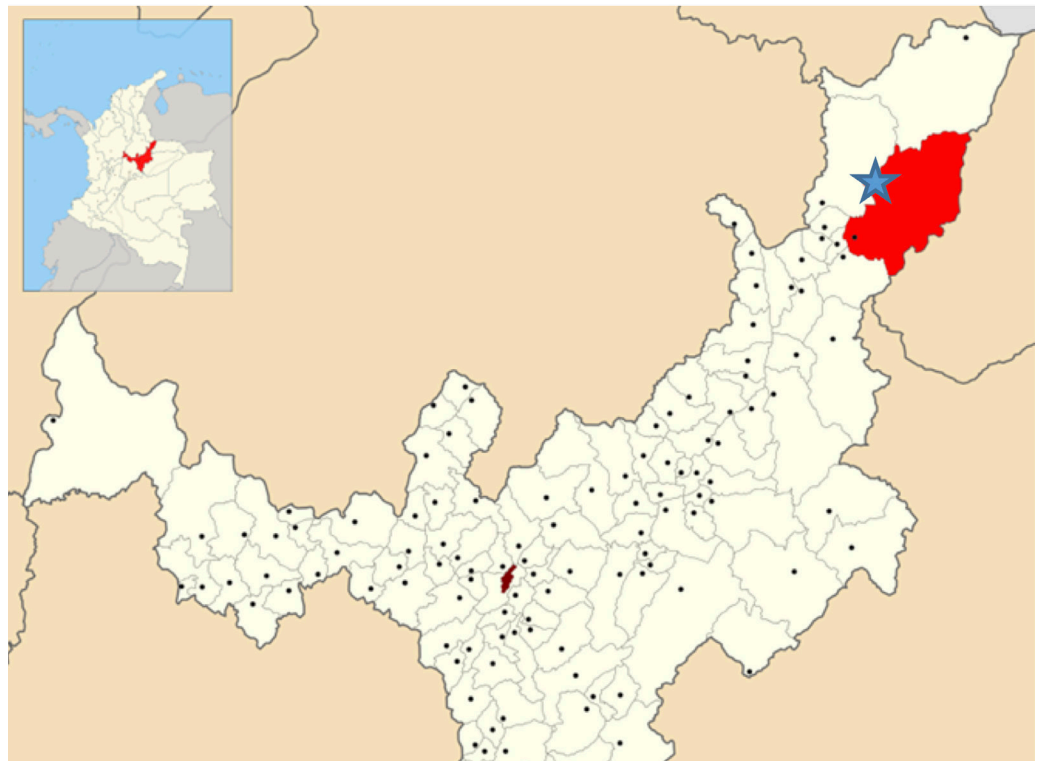


the Embera Katío ethnic group (7). The objective of this research was to determine the prevalence of intestinal parasitism in children under 15 years of age in the U'wa indigenous community of northern Boyacá.

Materials and methods

a. Study population and design: An analytical observational study, 125 children under 15 years of age were included, who belonged to the U'wa indigenous community of the municipality of Güicán. The location of this community is in the southeastern area of the department of Boyacá, in the municipalities of Cubara and Güicán, with an approximate extension of 110137 hectares (8) (Figure 1), although this population is geographically distributed in the departments of Arauca, Boyacá, Santander, Casanare and Meta.

Figure 1. U'wa indigenous community located in the department of Boyacá (Estrella) (9).



The U'wa are characterized for being a nomadic people, therefore, they move throughout the year, according to the cycle of the seasons, between the different thermal floors where they manage a diverse economy that they must take advantage of. Nomadism, among other factors, means that the U'wa do not have basic services such as drinking water supply and sewage, among others (3, 8).

b. Data collection: A survey was applied to the guardians of the participants in which sociodemographic and clinical variables were included. For the collection of the stool sample, appropriate containers were given, explaining that it should be collected spontaneously on different days, for a total of two samples per each, then they were labeled with the name and age of the participant, subsequently they were transported to the laboratory of the health center of Güicán where a direct examination was carried out.

c. Statistical analysis: The database was recorded in Excel and analyzed in the SPSS version 22 statistical program. The univariate analysis was performed by determining absolute and relative frequencies in the categorical variables; in the case of quantitative variables, measures of central tendency and measures of dispersion were calculated according to the distribution of the variable. In the bivariate and multivariate analysis, Pearson's Chi-square and Odds Ratio measurements were performed with their respective 95% CI (<1 as a protective factor, >1 as a risk factor and 1 without association), with a subsequent analysis using the binary logistic regression model with the method introduced.

d. Bias: To reduce the risk at the time of selecting the participants, it was decided to include in the research all the children who had the approval of their parents. In order to reduce the risk of memory and information, three of the researchers in charge of collecting the information, along with the parents, consulted each of the participants and observed the area in which they lived. Finally, the data and complete histories were analyzed, considering the inclusion and exclusion criteria.

Ethical Statement: Sample collection and data collection were carried out in accordance with ethical standards to guarantee confidentiality, benefits, and minimum risk for participants, who previously signed the informed consent form, in accordance with the terms of Resolution 8430 of 1993, issued by the Ministry of Health and Social Protection of Colombia.

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Results

The total population included in the study was 125 participants, the average age was 7.8 years (\pm 5.4 years), of whom 52.8% were female and 47.2% male. The most predominant age group was between 0 and 5 years old with 52.8% (Table 1).

Tabla 1. Sociodemographic variables of the child population.

Variables	n	%	IC 95%
Age groups			
From 0 to 5 years old	66	52.8	44.05; 61.55
From 6 to 10 years old	36	28.8	20.86; 36.74
From 11 to 15 years old	23	18.4	11.61; 25.19
Sex			
Male	59	47.2	38.45; 55.95
Female	66	52.8	44.05; 61.55

The prevalence of intestinal parasitic infection in the indigenous population was 72%. Among the pathogenic parasites found, the most prevalent was *Blastocystis spp* with 43.3%, followed by *Entamoeba histolytica/dispar* with 35.5%, *Ascaris lumbricoides* with 12.2% and *Giardia intestinalis* with 11.1%. The non-pathogenic parasites found were *Entamoeba coli* with 30%; *Endolimax nana* 24.4% and *Iodamoeba butschlii* with 5.5% (Table 2).

Table 2. Prevalence of parasites in the population studied (n=90)

	N°	%	IC 95%
Non-pathogenic parasites			
<i>Entamoeba coli</i>	27	30	20.53; 39.47
<i>Endolimax nana</i>	22	24.4	15.57; 33.32
<i>Iodamoeba butschlii</i>	5	5.5	0.82; 10.29
Pathogenic parasites			
<i>Blastocystis spp</i>	39	43.3	33.1; 53.57
<i>Complex Entamoeba histolytica/dispar</i>	32	35.5	25.67; 45.44
<i>Ascaris lumbricoides</i>	11	12.2	5.45; 18.99
<i>Giardia intestinalis</i>	10	11.11	4.61; 17.6
<i>Uncinarias</i>	1	1.11	0.0; 3.2
Type of infection			
Simple	45	50.	39.67; 60.33
Polyparasitism	45	50.0	39.67; 60.33

Fifty percent of the participants had polyparasitism of which 34.4% had two parasites and 15.5% had three. Among the most frequent dual com-

binations of parasites were *Entamoeba histolytica/dispar* and *Entamoeba coli* complex with 13.5%, followed by *Blastocystis spp* and *Entamoeba histolytica/dispar* with 9.2%, finally *Ascaris lumbricoides* and *Endolimax nana* with 6.1%; while in people who had parasitic triads the most frequent were *Entamoeba histolytica/dispar*, *Giardia intestinalis* and *Ascaris lumbricoides* with 9.1% followed by *Endolimax nana*, *Blastocystis spp* and *Iodamoeba butschlii* with 4%.

Within the symptomatology presented by the studied population, we found that abdominal pain was the most frequent symptom with 64.4%, followed by vomiting with 52.2%, diarrheal stools with 50% and asthenia, adynamia and anorexia with 46.6%; being constipation the least frequent with 8.8%, followed by anal pruritus with 7.7% and pallor with 3.3% (Table 3).

Table 3. Symptomatological and microorganism characteristics found.

Clinical symptoms	n	%	IC 95%
Abdominal pain	58	64.4	54.56;74.33
Vomiting	47	52.2	41.9; 62.54
Diarrheic stools	45	50.0	39.67; 60.33
Asthenia and/or adynamia.	42	46.6	36.36;59.67
Anorexia	42	46.6	36.36;59.67
Weight loss	37	41.1	30.95;51.28
Fever or chills	15	16.6	8.96; 24.37
Constipation	8	8.8	3.01;14.77
Anal pruritus	7	7.7	2.24; 13.31
Other (bloody stools, pale skin)	3	3.3	0.00;7.04

Evaluating the factors associated with polyparasitism (Table 4), a statistically significant association was found, where it was observed that children under 7 years of age and with more than 4 clinical symptoms are 2.76 and 5.78 respectively more likely to present polyparasitism.

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Table 4. Polyparasitism associated factors in the study population.

Variable	Polyparasitism (n=45)	Simple (n=45)	ORA*	IC 95%	p
Male	21	23	0,83	0,36; 1,91	>0,05
Under 7 years old	25	14	2,76	1,16; 6,55	<0,05
Having more than 4 clinical symptoms	37	20	5,78	2,20; 15,16	<0,05
*ORA: Odds Ratio Ajusted					

Discussion

In the present study, a prevalence of intestinal parasitism of 72% was found, similar to that reported in the indigenous people of the Cañamomo-Lomapieta indigenous reservation, which was 73% (10); lower than what was described in Venezuela in the Waraos indigenous people (100%) (11) and in the Wiwa indigenous reservation of the Sierra Nevada de Santa Marta with 96.4% (12). The high prevalence of intestinal parasitism in these communities is due to risk factors such as the lack of water treatment, the way garbage is disposed of, living with animals inside and outside the home, and inadequate management of excrement, according to reports in the literature (12,14).

In this population, a higher prevalence of parasitic infection was observed in the female gender, similar to other Latin American studies (15, 16), but different from international studies where gender does not play a role (17). The variability in these populations confirms the absence of association between gender and the presence of infection (OR: 2.28 (95% CI: 0.73, 7.12)) (10). Regarding age, the group with the highest prevalence was between 0 and 5 years with 52.8%, different to that mentioned by Luna Monroy et al, in which they found a higher presence in the 5 to 10 years group with 42.7% and only 29.8% in the 0 to 5 years group (18). Regarding the prevalence of parasites, the presence of similar pathogenic parasites such as *Blastocystis spp*, *Entamoeba histolytica/dispar*, *Ascaris lumbricoides*, *Giardia intestinalis* and *Uncinarias* was found (12, 19). However, the most prevalent parasite in the present study was *Blastocystis spp*, which agrees with other studies such as the one carried out in indigenous communities of the Beni River 40.3% (18), but with a higher prevalence percentage in other indigenous reservations that varies between 94% and 87.1% (12, 19), and in the general infant population with 71.1% and 88% (20, 21). *Endolimax nana* was the most frequent commensal with 24.4%, which agrees with what has

been reported in other indigenous communities (22 - 25) and in the general infant population (20).

It is important to consider that the U'wa community is normally located at an altitude of 2700 meters above sea level, which corresponds to a cold temperature, which makes the presence of *geohelminths* difficult, however, in the present study *Uncinaria* 1% was found, a phenomenon that may be related to the fact of being a nomadic community (8).

Abdominal pain was the most frequent clinical symptom, followed by nausea, vomiting, diarrheal stools, asthenia, adynamia and anorexia, coinciding with those reported in other studies carried out in indigenous communities (23, 26, 27) and in the general child population (28, 29). Less frequent symptoms include constipation, anemia and anal pruritus (30).

The prevalence of polyparasitism of 50% was similar to that reported by other authors with 52.1% (31), however, it varies with other investigations where the prevalence is lower with 36% (32) or higher 84% (33). Like other studies, it has been found that children under 5 years old have a higher risk of presenting polyparasitism (34, 35), this can be associated to different variables such as the lack of drinkable water, poor hygienic habits, lack of use of footwear and attitudes of the child (36).

Indigenous communities are considered a vulnerable population because they lack basic health services and have a high prevalence of infectious diseases, which can generate complications such as anemia, malnutrition, growth and developmental disorders (37 - 39).

In conclusion, this study allows to know the dynamics of parasitic infections in the indigenous community, which have implications in public health and in the health-disease context, in order to carry out interventions in an integral way to improve the health status. As parasitism is a frequent entity that affects the vulnerable population (indigenous community and children under 5 years of age), health promotion and prevention measures should be taken to reduce the prevalence of this infectious disease in this population.

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