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Estimating and mapping the incidence of giardiasis in Colombia, 2009–2013[☆]



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SUMMARY

Background: Giardiasis is one of the most common intestinal infections in the world. There have been no national studies on the morbidity of giardiasis in Colombia. In this study, incidence rates of giardiasis were estimated for the years 2009–2013.

Methods: An observational, retrospective study of the giardiasis incidence in Colombia, 2009–2013, was performed using data extracted from the personal health records system (Registro Individual de Prestación de Servicios, RIPS). Official population estimates from the National Department of Statistics (DANE) were used for the estimation of crude and adjusted incidence rates (cases/100 000 population). **Results:** During the period studied, 15 851 cases were reported (median 3233/year; 5-year cumulated crude national rate of 33.97 cases/100 000 population). Of these, 50.3% were female; 58.4% were <10 years old and 14.8% were 10–19 years old. By region, 17.7% were from Bogotá (10.07 cases/100 000 population, 2009), 10.9% from Antioquia (9.42, 2009), 8.6% from Atlántico (15.67, 2009), and 6.5% from Risaralda (33.38, 2009). Cases were reported in all departments (even insular areas).

Conclusions: As giardiasis is neglected in many countries, surveillance is not regularly undertaken. Despite its limitations, this study is the first attempt to provide estimates of national giardiasis incidence with consistent findings regarding affected age groups and geographical distribution.

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1. Introduction

Infections due to *Giardia lamblia* (synonymous with *Giardia intestinalis* and *Giardia duodenalis*), or giardiasis, are probably among the most common gastrointestinal conditions caused by protozoa, particularly in children, throughout the world, and especially in developing countries. This flagellated organism has been associated with acute manifestations such as diarrhoea, abdominal cramps, weight loss, nausea, and vomiting.¹ In most

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cases, usually in healthy individuals, symptoms generally subside within <4 weeks. Nevertheless, giardiasis sometimes has long-term consequences, including chronic diarrhoea with or without intestinal malabsorption, recurrent abdominal pain, and weight loss.^{1–3}

The epidemiology of giardiasis is well known in many countries, including the associated social and climatic factors.^{4,5} Data from surveys, excluding documented outbreaks, indicate that in industrialized countries, the prevalence rate ranges between 2% and 5%.¹ In contrast, the rate varies from 20% to 30% in developing countries.¹ However, a limited number of population-based studies have been performed in these countries, particularly in Latin America.

In Latin America, recent studies from Venezuela (2008) have found giardiasis prevalence ranging from 7.41% to 7.69%.^{6,7} In Cuba, the last national survey carried out in 2009 estimated an overall prevalence of *Giardia* infection of 6.02%.⁸ However, in Colombia, no study has been conducted at the national level on the morbidity of giardiasis, except for a very limited number of studies published so far from this country regarding the disease in humans.^{9,10}

The most recently published study in Colombia (2014), reported a point-prevalence of 11.17% (95% confidence interval (CI) 7.78–14.58%) in children (1–5 years old) from day care centres in Ibagué, Tolima.¹¹ In a previous study in Bogotá (2006), giardiasis point-prevalence was found to be 6.3% (95% CI 3.95–8.72) in children 5–12 years old.¹²

As part of an effort to enhance the control and risk assessment of giardiasis, the Regional Information System, the Universidad Tecnológica de Pereira (through the Research Group of Public Health and Infection), and the Ministry of Health are working together on the academic analysis of epidemiological information on infectious diseases at the regional and national level,^{13–15} including giardiasis. The aim of this study was to estimate the incidence of giardiasis in Colombia between 2009 and 2013 and to develop geographical information system (GIS)-based epidemiological maps for this protozoan disease in the country.

2. Methods

Colombia is a South American country made up of 32 departments (main administrative level) (Figure 1). The Colombian territory presents climatic, geographic, and epidemiological conditions suitable for the transmission of *Giardia* and other intestinal protozoa. As in other tropical countries, Colombia comprises large areas where environmental factors such as

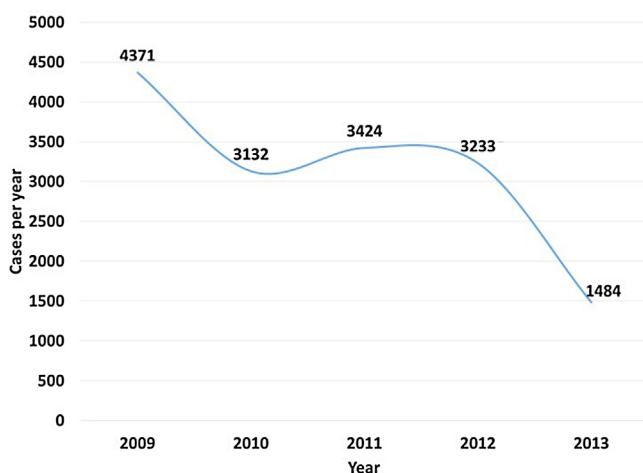


Figure 1. Number of giardiasis cases in Colombia, 2009–2013.

temperature, humidity, precipitation, and altitude, as well as socio-economic factors, are suitable for transmission. This disease is not under surveillance and there is no effective prevention and control program.

For this observational, retrospective study, the epidemiological data were collected from the so-called personal health records system (Registro Individual de Prestación de Servicios, RIPS). The International Classification of Diseases 10th revision (ICD-10) code A07.1 was used, given the fact that giardiasis is not included in the surveillance system, to obtain the number of cases from each department of the country by year (2009–2013). Data were obtained with the agreement of the Ministry of Health through the Protection Information System (SISPRO) via a client access server, which allowed cases to be retrieved from the SISPRO server on a local computer. SISPRO RIPS data used for this study came from confirmed cases; the data have been revised in terms of data quality and were obtained initially from data from the National Institute of Health, Colombia and later from SISPRO and its data cubes system. Data for this study came from 33 reference notification units, one per department, and were later consolidated and centralized in Bogotá in the SISPRO system. Currently revised and consolidated data are available for the period 2009–2013. The quality of the RIPS data in Colombia has been described elsewhere.^{16,17}

There are no official national guidelines for the management of giardiasis in Colombia or focused diagnosis and treatment documents. The diagnosis of giardiasis is based mainly on copro-parasitological direct evaluation in health system laboratories, where most cases are detected by passive surveillance of stool samples. *Giardia* cysts and/or trophozoites must be seen on microscopy of at least one faecal specimen or duodenal aspirate from the patient.

Using official reference population data (National Administrative Department of Statistics, DANE), estimates of annual incidence rates for all departments of the country during the study period were calculated (32 departments and the capital district, for 5 years; cases/100 000 population) to provide the first estimates of giardiasis incidence in the country by department. Incidence rates were estimated by age group.

In addition, national maps showing the distribution of giardiasis by department by year were generated. Microsoft Access was used to import incidence rates by department and year, to the GIS software. The open source client GIS software used was Kosmo Desktop 3.0 RC1. Access to the required geographic data and result-sharing with institutional support was provided by the spatial data infrastructure for the country, the Instituto Geográfico Agustín Codazzi (National Geographic Institute Agustín Codazzi, IGAC). The shapefiles of departments (.shp) were linked to data table databases through spatial join operation in order to produce digital maps of annual incidence rates by department.

3. Results

During the study period, a total of 15 851 cases were reported in Colombia, with a median of 3233 cases per year (ranging from 1484 to 4371 per year) (Figure 1). The number of cases decreased during the study period from 4371 in 2009 (9.72 cases/100 000 population-year) to 1484 in 2013 (3.15 cases/100 000 population-year) (Figure 1). The cumulated crude national rate was estimated to be 33.97 cases/100 000 population × 5 year (Table 1).

Of the total cases, 17.7% were from Bogotá, the capital of the country (10.07 cases/100 000 population in 2009), 10.9% were from Antioquia (9.42 in 2009), 8.6% were from Atlántico (15.67 in 2009), and 6.5% were from Risaralda (33.38 in 2009) (Table 1). Nevertheless, Risaralda, Guanía, Guaviare, Magdalena, and Huila presented the highest cumulated incidence rates for the period

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