

**SOCIOECONOMIC CONDITIONS OF PEOPLE AFFECTED BY PARASITOSIS IN
BRAZIL: AN INTEGRATIVE REVIEW**

**CONDIÇÕES SOCIOECONÔMICAS DAS PESSOAS ACOMETIDAS POR
PARASITOSE NO BRASIL: UMA REVISÃO INTEGRATIVA**

**CONDICIONES SOCIOECONÓMICAS DE LAS PERSONAS AFECTADAS POR
PARASITOSIS EN BRASIL: UNA REVISIÓN INTEGRADORA**

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ABSTRACT

Objective: To describe the socioeconomic conditions of people affected by parasites in Brazil, through the analysis of studies that expose the incidence of these diseases and the determining socioeconomic factors. **Method:** Integrative review whose search was carried out from the terms "parasitic diseases", "socioeconomic conditions", "Brazil" and Boolean operator "AND" in the Latin American and Caribbean Literature in Health Sciences (Lilacs), Online System of Search and Analysis of Medical Literature (Medline), Online Scientific Electronic Library (SciELO) and National Library of Medicine of the United States (Pubmed). Publications in Portuguese, Spanish and English were included; between 2017 and July 2022; that addressed socioeconomic aspects; which included all types of parasites. **Results:** Of the 173 articles found, 12 were chosen. The samples included children, garbage collectors, fishermen, caretakers, among others. **Conclusion:** There was a higher frequency of parasites in people with lower income, low education, men and minors.

Descriptors: Parasitic diseases; Socioeconomic Factors; Brazil.

RESUMO

Objetivo: Descrever as condições socioeconômicas das pessoas acometidas por parasitoses no Brasil, por intermédio da análise dos estudos que exponham a incidência desses agravos e dos fatores socioeconômicos determinantes. **Método:** Revisão integrativa cuja pesquisa foi realizada a partir dos termos “parasitic diseases”, “socioeconomic conditions”, “Brazil” e operador booleano “AND” no Literatura Latino-Americana e do Caribe em Ciências da Saúde (Lilacs), Sistema Online de Busca e Análise de Literatura Médica (Medline), Biblioteca Eletrônica Científica Online (SciELO) e Biblioteca Nacional de Medicina dos Estados Unidos (Pubmed). Foram incluídas publicações em português, espanhol e inglês; entre 2017 e julho de 2022; que abordassem aspectos socioeconômicos; que incluíram todos os tipos de parasitoses. **Resultados:** Dos 173 artigos encontrados, 12 foram escolhidos. As amostras incluíram crianças, catadores de lixo, pescadores, caseiros, entre outros. **Conclusão:** Evidenciou-se maior frequência de parasitoses em pessoas de menor renda, baixa escolaridade, homens e menores de idade.

Descritores: Doenças parasitárias; Fatores Socioeconômicos; Brasil.

RESUMEN

Objetivo: Describir las condiciones socioeconómicas de las personas afectadas por parásitos en Brasil, a través del análisis de estudios que exponen la incidencia de estas enfermedades y los factores socioeconómicos determinantes. **Método:** Revisión integradora cuya búsqueda se realizó a partir de los términos "enfermedades parasitarias", "condiciones socioeconómicas", "Brasil" y operador booleano "Y" en la Literatura Latinoamericana y del Caribe en Ciencias de la Salud (Lilacs), Sistema de Búsqueda en Línea y Análisis de Literatura Médica (Medline), Biblioteca Electrónica Científica en Línea (SciELO) y Biblioteca Nacional de Medicina de los Estados Unidos (Pubmed). Se incluyeron publicaciones en portugués, español e inglés; entre 2017 y julio de 2022; que abordó aspectos socioeconómicos; que incluía todo tipo de parásitos. **Resultados:** De los 173 artículos encontrados, se eligieron 12. Las muestras incluyeron niños, recolectores de basura, pescadores, cuidadores, entre otros. **Conclusión:** Hubo mayor frecuencia de parásitos en personas de menores ingresos, baja escolaridad, hombres y menores de edad.

Descritores: Enfermedades parasitarias; Factores Socioeconómicos; Brasil.

INTRODUCTION

The Pan American Health Organization emphasizes the need not to postpone the treatment of neglected infectious diseases, which threaten the lives of more than 200 million people in the Americas.¹ These include parasitic diseases, which affect around 49 million children in Latin America and the Caribbean, and whose prevalence in Brazil, according to a recent systematic review, is 46%.² The Brazilian Society of Pediatrics also points out that polyparasitism is present in 15-37% of cases.³

Intestinal parasitic diseases can be caused by platyhelminths, nematodes or protozoa. Clinical manifestations vary according to factors related to the environment, the parasite and its parasite load and virulence, and the host, depending on nutrition and immune compromise. In Brazil, the main parasitic diseases include: ascariasis, hookworm disease, enterobiasis, trichuriasis, teniasis, schistosomiasis, amoebiasis and giardiasis.³

Among the complications that can accompany these infections are impaired physical and intellectual development, which are important, especially for children, but which have repercussions in adult life, related, for example, to productivity and the maintenance of poverty.^{2,3} The main people to fall ill from these infections are people

living in poverty, who are more vulnerable due to their lack of access to prophylactic measures such as health education, access to drinking water, basic sanitation and housing.^{1,3}

Between 2010 and 2017, infectious and parasitic diseases were mapped in Brazil, finding high criticality for these diseases in 40.5% of municipalities, especially in the North, Northeast and Midwest of the country. This critical state was associated with "proportion of poverty", "garbage in the surroundings", "sewage in the surroundings" and "female-headed households", while "adequate sewage" was identified as a protective factor.⁴ With this panorama and time frame in mind, this integrative review aims to describe the socioeconomic conditions of people affected by parasitic diseases in Brazil between 2017 and 2022, by analyzing recent studies that expose the relationship between the incidence of these diseases and socioeconomic factors.

METHOD

Identification, data sources, search strategy and Identification

An integrative literature review was carried out, a methodology that enables information from primary studies to be compiled and a broad understanding of a research topic to be achieved.⁵ In this sense, this design consists of six stages:

identification of the topic and selection of the research question; establishment of inclusion and exclusion criteria; identification of the pre-selected and selected studies; categorization of the selected studies; analysis and interpretation of the results and presentation of the review/synthesis of knowledge.⁵

Thus, this study was guided by the following research question: "What is the panorama of the socioeconomic conditions of people affected by parasitic diseases in Brazil?". The survey of articles was carried out using a combination of free-text search terms and medical subject headings (MeSH) and keywords focusing on synonyms for income, schooling, basic sanitation, occupation and parasitic diseases in Brazil.

The descriptor "parasitic diseases" is characterized by directing research towards diseases caused by parasites. Furthermore, the term "socioeconomic conditions" encompasses indices relating to social and income factors. In addition, the descriptor "Brazil" delimits the space from which the data is to be extracted.

The search strategy used was ((parasitic diseases) AND (socioeconomic conditions)) AND (Brazil). The following databases were used: Latin American and Caribbean Health Sciences Literature (Lilacs), Online Medical Literature Search and Analysis System (Medline), Scientific Electronic Library Online (SciELO) and the

US National Library of Medicine (Pubmed) on August 1, 2022.

Inclusion and exclusion criteria

The *Rayyan* digital platform was used to select and read the articles, and this stage was conducted blindly by two independent health evaluators, who resolved any differences by consensus. The following inclusion criteria were applied: studies published in Portuguese, Spanish and English; articles published between 2017 and July 2022; studies addressing the socioeconomic conditions of people affected by parasitosis in Brazil; studies that used standardized and valid instruments to measure situations of vulnerability; studies that included all types of parasitic diseases. Case reports, reviews, protocols, editorials, letters to the editor, non-free studies and studies that did not measure parasitic diseases in Brazil and their socioeconomic relations were excluded.

Article selection and eligibility

The data was organized into structured forms in *Microsoft Excel 2010 software* containing the titles, authors, year of publication, place of study, sample (quantity, gender, age, education, occupation, access to basic sanitation and income) and parasitic diseases (main results). After this, the interpretation process considered the quality, clarity and relevance of the results presented

to the research topic of this manuscript, as well as the limitations found. This information was then summarized and included in Table 1.

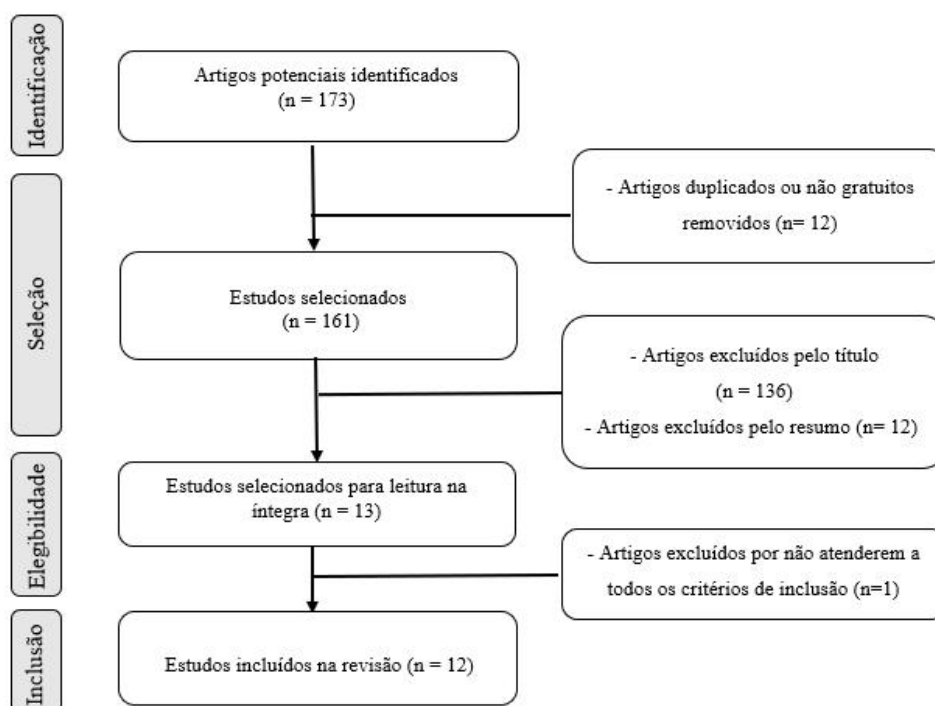
In the identification stage, a total of 173 articles were found. In the selection stage, 12 articles were excluded because they were found in more than one database or because they were not free, 136 articles were excluded because their titles were too far from the research topic and 12 articles were excluded after reading the abstracts because they were not directly related to the

aim of this study, leaving 13 articles. In the eligibility stage, one article was excluded after full reading because it did not have the required variables, leaving a total of 12 titles. In the inclusion stage, the 12 approved titles were included and tabulated.

RESULTS

After applying the inclusion and exclusion criteria, 12 articles were selected to make up the bibliographic sample base for this review (Figure 1).

Figure 1 - Study selection flowchart



Source: Authors (2022)

As for the regionalization of the 12 studies selected, four (33.33%) were from the northeast (three (25.0%) from Bahia and

one (8.33%) from Alagoas), three (25.0%) from the southeast (Rio de Janeiro), two (16.68%) from the south (Rio Grande do

Sul), one (8.33%) from the center-west (Mato Grosso do Sul), one (8.33%) from the north (Acre) and one (8.33%) from the island of Fernando de Noronha.

The surveys covered individuals of all ages and both sexes for the most part. The results included workers from garbage collectors' cooperatives, residents of neighborhoods near lagoons and forests, men, women and children living in agglomerations, on islands and fishermen. Most of these individuals had low levels of

education and income. In general, the most commonly diagnosed parasitic diseases in the studies were: *Giardia duodenalis*, *Entamoeba Histolytica*, *Ascaris lumbricoides*, *Entamoeba coli* and *Endolimax nana*.

The data relating to the selected studies and information characterizing the socio-economic conditions of the participants in the studies analyzed are shown in Table 1.

Chart 1 - Systematization of data on parasitosis and socioeconomic conditions in Brazil obtained from the selected studies.

Data on socio-economic conditions and parasitic diseases					
Author/methodology/year of publication	Sample size, gender and age	Spatial cut-off	Main results:		
			Parasite causing the infection	Socio-economic data	Basic sanitation, hygiene and treated water

ALVES, S.S. et al./estudo transversal/ 2021. ⁶	116 children and adolescents (Female: 48, Male: 68) 4 to 17 years	Vitória da Conquista, Bahia, Brazil	77.6% of parasitized individuals. <i>Giardia duodenalis</i> (35.5%), <i>Entamoeba histolytica</i> and <i>Entamoeba dispar</i> (16.6%), <i>Enterobius vermicularis</i> (3.3%) and <i>Ascaris lumbricoides</i> (1.1%)	83.6% of participating families had an income of less than or equal to one minimum wage	97.8% had treated water; 76.7% had a sewage system; 86.7% had access to garbage collection; 72.2% consumed filtered or boiled water at home and 41.1% said they sanitized fruit and vegetables before consumption
VILAR, M. E. M. et al./estudo descritivo e transversal/2021. ⁷	105 people (Female: 55, Male: 50) No specific age group	Boipeba Island, municipality of Cairu, Bahia, Brazil	69.6% of individuals had intestinal parasites, of which 32.4% were monoparasitic and 37.2% polyparasitic. <i>Ancylostoma sp.</i> (18.1%) and <i>Entamoeba coli</i> (43.8%).	Housewife (n= 11); Fisherman (n=10); Shellfish gatherer (n=7); Student (n=42); Homemaker (n=4) Driver (n=2); Food handler (n=5) General Services (n=8) Other (n=16)	105 people had untreated piped water; 46 people used artesian well water
CRISOSTOMO, B. L. et al./estudo observacional, retrospectivo e descritivo 2019. ⁸	2,304 people (Female: 1,363, Male: 941) No specific age group	Feira de Santana, Bahia	1,112 (48.3%) of the sample had parasitic infections, including: <i>Giardia lamblia</i> (8.7%); <i>Entamoeba histolytica</i> (6.6%), <i>Ancylostomideo sp.</i> (4.6%); <i>Ascaris lumbricoides</i> (2.0%); <i>Hymenolepis sp.</i> (1.7%) and <i>Schistosoma mansoni</i> (1.6%).	Not available	70% of the dwellings were made of straw, with dirt floors, no treated water and no toilets

ZANOTTO, M. et al./estudo descritivo e analítico/2018. ⁹	124 people (Female: 66, Male: 58) Between 6 and 11 years old	Ipê, Rio Grande do Sul	8.1% of the sample had parasitic infections, including <i>Entamoeba coli</i> (50%), <i>Giardia intestinalis</i> (20%), <i>Enterobius vermicularis</i> eggs (20%) or multiple parasites.	Elementary school (first to fifth grade)	4% of the population did not have drinking water in their homes; 89.5% of households had garbage collection
SILVA, C. A. et al./estudo descritivo e analítico/ 2017. ¹⁰	30 people (gender not informed) 22 to 67 years old	Cruz Alta, RS	8% had <i>Endolimax nana</i> cysts and 4% had <i>Ascaris lumbricoides</i> eggs	Garbage collectors	23 people had access to sewage
MELO; A. G. S et al./estudo epidemiológico, transversal, prospectivo, descritivo e quantitativo/ 2018. ¹¹	750 people (gender not informed) No age	Marechal Deodoro-Alagoas	The overall prevalence of schistosomiasis was 18% among the sample	51.5% of fishermen reported having a family income of less than one minimum wage	(97%) of the fishermen did not previously treat their drinking water; domestic waste was sent to septic tanks (63.6%), while the rest was sent to the Mundaú lagoon and rivers bordering the homes
CARVALHO, M. C. et al./estudo transversal/2021. ¹²	341 people (Female: 147, Male: 194) 0 to > 60 years	Fernando de Noronha Island	The prevalence of IgG <i>anti-Toxoplasma gondii</i> antibodies was 50.4%	Elementary school (n= 73), secondary school (n=166) and higher education (n=92)	294 people consumed treated water; 35 used rainwater/well water; 136 consumed cooked meat; 109 had cats at home

<p>IGNACIO, C. F. et al./estudo transversal/2017.¹³</p>	<p>1,230 people (gender not informed) 0 to > 60 years</p>	<p>Complexo de Mangueiros -RJ</p>	<p><i>Endolimax nana</i> (n = 95, 16.0%) and <i>Entamoeba coli</i> (n = 65, 10.9%) were the most frequently identified agents, followed by <i>Giardia intestinalis</i> (n = 24, 4.0%) and <i>Ascaris lumbricoides</i> (n = 11, 1.8%)</p>	<p>Income: n=841- Non-poverty; n=164- poverty; n=81- Extreme poverty. Schooling: n=331- illiterate; n=418- complete elementary school or above</p>	<p>Risk factors found: overcrowding in households, clandestine water connections to official networks, loose animals (e.g. dogs, rats and cats) and accumulation of waste despite regular collection</p>
<p>LANA, R. M. et al./estudo descritivo e analítico/2017.¹⁴</p>	<p>2,274 people (Female: 1,112, Male: 1,162) The average age was 25.5 years</p>	<p>Upper Juruá-Acre</p>	<p>A total of 442 (19.9%) people reported having malaria in the last 12 months, 104 (23.53%) were interviewed and 338 their housemates. At household level, 233 (44.8%) reported at least one episode of malaria in the last 12 months</p>	<p>170 agricultural workers; 47 fishermen/boatmen; 06 sellers of products collected in the forest; 14 market workers; 73 government employees; 12 drivers or boatmen, 303 beneficiaries of social programs such as Bolsa Família, Bolsa Verde and Bolsa Pesca; 158 beneficiaries of: retirement, health aid, unemployment aid and pensioners</p>	<p>88 people out of the total sample had piped water at home; 147 used water from natural reservoirs; 283 disposed of waste improperly</p>
<p>JUNIOR, M. G. H. et al./ estudo descritivo e analítico/2017.¹⁵</p>	<p>66 people (Female: 26, Male: 40) 19 to 67 years old</p>	<p>Campo Grande - Mato Grosso do Sul</p>	<p>Intestinal parasites were found in 29 individuals (43.9%). <i>Endolimax nana</i> (22.7%), <i>Entamoeba coli</i> (21.1%), <i>Giardia lamblia</i> (6.1%), <i>Entamoeba histolytica</i> and <i>Entamoeba dispar</i> (4.5%)</p>	<p>Waste pickers: Most of the subjects (65.1%) had never been to school or completed elementary school and the income for 42.4% was one minimum wage or less</p>	<p>Among the 66 participants, 97.0% reported having access to piped water (3.0% did not answer) and 95.5% reported the habit of washing food before consumption (4.5% did not answer).</p>

			and <i>Ascaris lumbricoides</i> (4.5%) were the most prevalent species.		
BORDIGNON, J. C. P. et al./estudo transversal/2022. ¹⁶	624 people (gender not informed) 20 to 59 years old	Manguinhos -Rio de Janeiro	23.8% of the sample had parasitic infections, including <i>Entamoeba coli</i> (50%), <i>Giardia intestinalis</i> (20%), <i>Enterobius vermicularis</i> eggs (20%) or multiple parasites.	Most of those interviewed reported having incomplete primary education; Monthly family income of two to four minimum wages (34.6%); Area with socio-environmental vulnerabilities and its Human Development Index is among the lowest in the city of Rio de Janeiro.	The majority of interviewees (71.2%) reported treating the water before human consumption, with filtration being the most cited technique (66.2%); Microbiological and physical-chemical analysis showed that 36% of the samples were unfit for consumption; The primary source of water for consumption was from the public network (96.5%).

FARIA, C. P. et al./estudo transversal/2017. ¹⁷	3245 people (Female: 1,564, Male: 1,681) 1 to 93 years	Evandro Chagas National Institute of Infectious Diseases (FIOCRUZ, RJ)	569 (17.5%) people were infected with at least one parasite. The most common protozoa were <i>Endolimax nana</i> (28.8%), <i>Entamoeba coli</i> (14.8%), <i>Entamoeba histolytica</i> and <i>Entamoeba dispar</i> (13.5%), <i>Blastocystis hominis</i> (12.7%).	Seventy-five percent of the participants (n = 427) had more than primary schooling	Not available
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Source: Authors (2022)

DISCUSSION

Among the populations studied, the most common parasitic diseases were those caused by *Ancylostoma* sp., *Giardia duodenalis*, *Entamoeba coli* and *Endolimax nana*. In this context, *Giardia duodenalis* has already been considered by other studies as the parasite with the highest incidence and as the most prevalent waterborne agent in the world.¹⁸ In addition, the well-known social determinants of health linked to parasitosis have also been demonstrated in previous studies. It is well known that the Human Development Index (HDI) is directly related to parasitic diseases, which are more prevalent in the more impoverished areas of the country, namely the North and Northeast regions.¹⁹

In addition, some studies have found a positive association between younger individuals (young children) and gender (males) with intestinal parasites. This finding corroborates evidence from other studies that have also found this relationship between gender, age and parasite contamination. These studies have shown a significant association between the male sex and the high prevalence of parasites, which can be explained by the behavioral difference between the sexes.²⁰⁻²² Since this group is often more exposed to the peridomiciliary environment during times of recreation, they have a habit of walking barefoot, associated with greater neglect of personal hygiene habits.²⁰⁻²²

Most of the interviewees reported having incomplete primary education, never

having attended school or having completed primary education, and the income of almost half was one minimum wage or less. In addition, the occupations of garbage collectors, agricultural workers and fishermen were common in the study samples. In addition, in one of the articles, a large part of the sample were beneficiaries of social programs such as Bolsa Família, Bolsa Verde and Bolsa Pesca. This finding corroborates the evidence found in previous literature, since intestinal parasites are found more frequently in low-income individuals with lower levels of education. Similarly, a study of Amazonian children revealed, through spatial analysis, a significant *cluster* for helminthiasis in an area of poor housing conditions.²³

Looking at the bigger picture, studies have found similar socioeconomic profiles in people affected by parasites. In this sense, a study of asymptomatic children in a community in Buenos Aires (Argentina) showed a high prevalence of fecal-oral parasites (83.3%) and polyparasitism as striking findings, with the main determinants of environmental health being those related to the disposal of excrement and water supply.²⁴ Similarly, in Roma populations in eastern Slovakia, serological markers of infection with *Toxoplasma gondii* and *Toxocara spp.* were observed much more frequently among Roma than non-Roma individuals.²⁵ In Latin America and the

Caribbean, it is estimated that one in three people are infected with geohelminths and around 46 million children between the ages of 1 and 14 are at risk of infection with these parasites.²⁶

Thus, the inversely proportional relationship between the incidence of parasites and good socioeconomic and educational conditions is evident.²⁷ Several robust studies correlate parasitosis and its recurrence with poor health conditions, education and lack of investment in integrative care by multi-professional teams which, in addition to doctors, should include nurses, nursing technicians, psychologists, among others.²⁸⁻³⁰

Given this panorama, parasitoses are part of the group of neglected tropical diseases, and because they are associated with poverty and marginalization, they do not receive due national and international attention, a reality that is reflected in the investments made to tackle them, which are considered insufficient. In addition, historically they have not been a priority on the agendas of ministries of health, public research centers or pharmaceutical companies that produce drugs and diagnostic tests.²⁶

CONCLUSION

There was a higher frequency of intestinal parasites among people with lower

incomes, less schooling, younger age (children) and males. These findings reinforce the need for public policies that ensure the population has access to prophylactic measures, such as better working conditions, drinking water, basic sanitation and health education.

With regard to the limitations inherent in the study design itself, future studies of a more robust methodological quality are needed to enable the socio-economic profile of people affected by parasitic diseases in Brazil to be traced with a greater confidence interval, as well as the determining socio-economic factors. In addition, as this is a secondary study, the limitations of the studies included may be reflected in the results of this study. Finally, the inclusion criteria relating to languages may have restricted the scope of the search.

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