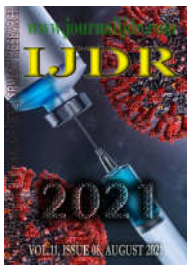
ISSN: 2230-9926

Available online at http://www.journalijdr.com

IJDR

International Journal of Development Research
Vol. 11, Issue, 08, pp. 49562-49567, August, 2021
https://doi.org/10.37118/ijdr.22615.08.2021



RESEARCH ARTICLE OPEN ACCESS

SYSTEMATIC REVIEW OF INCIDENCE AND RISK FACTORS ASSOCIATED WITH INTESTINAL PARASITES IN CHILDREN IN BRAZIL

Johny Adrian Rodrigues Nascimento Oliveira[1]; Wendel Vitor Pereira Durans[1]; Pedro Satiro Carvalho Junior [1]; Andressa Almeida Santana Dias[1], José Cândido Mesquita[1];Joseane Lima Prado Godinho; Ana Paula Muniz Serejo[1,3] and Alan da Silva Lira[4]

[1]Faculdade UNINASSAU São Luis, Departamento de Farmácia e Biomedicina, São Luis, 65040 -840, MA Brasil; [2]Universidade Federal do Maranhão, Departamento de Saúde Pública, São Luis, 65080-805, MA Brasil; [3]Universidade Federal do Maranhão, Programa de Pós graduação de Saúde e Ambiente, São Luis, 65025-560, MA Brasil; [4]Universidade Estadual do Maranhão, Mestradoem Saúde Animal, São Luis, 65.000-000, MA Brasil

ARTICLE INFO

Article History:
Received 10th May, 2021
Received in revised form
19th June, 2021
Accepted 17th July, 2021
Published online 29th August, 2021

Key Words:
Intestinal parasites; Risk factors associated with parasites; Incidence of parasites;
Basic sanitation, Public health.

Corresponding author:
Johny Adrian Rodrigues Nascimento Oliveira.

ABSTRACT

Introduction: Intestinal parasites are a serious public health problem in Brazil and worldwide. the main factors associated with parasitic infections in children are the lack of basic sanitation and food hygiene, the incidence is higher in underdeveloped countries, and socioeconomic status is one of the main causes and may be associated with other various determinants**. Materials and Methods:** This is a systematic review of the incidence and risk factors associated with intestinal parasites in children in Brazil and a survey of the main parasitic infections that cause infection in children. Using as selection criteria articles in Portuguese, English and Spanish from 2010 to 2020 in Google Scholar, SciELO, PubMed databases. **Results:** The age of the children was associated with the occurrence of parasitosis, the knowledge of parents about intestinal parasites was also associated with the incidence. The lack of basic sanitation and socioeconomic conditions proved to be one of the main factors for the incidence of intestinal parasites in children. **Conclusion:** Therefore, more efficient control measures should be proposed for the population, especially parents, taking into account the main associated factors, as a way to reduce the incidence of these parasitic infections in children.

Citation: **Johny Adrian Rodrigues Nascimento Oliveira; Wendel Vitor Pereira Durans; Pedro Satiro Carvalho Junior; Andressa Almeida Santana Dias, José Cândido Mesquita; Joseane Lima Prado Godinho; Ana Paula Muniz Serejo and Alan da Silva Lira. 2021.** "Systematic review of incidence and risk factors associated with intestinal parasites in children in Brazil", *International Journal of Development Research*, 11, (08), 49562-49567.

INTRODUÇÃO

Intestinal parasites are a relevant public health problem in Brazil and worldwide. They are mainly endemic, in developing and underdeveloped countries, affecting socially disadvantaged populations and economically unreasonable. The main form of contamination occurs through ingestion of contaminated food or water and through the skin by small wounds, facilitating the penetration of infective larvae, providing the development of diseases that can lead to malnutrition, anemia, cognitive delay, among other symptoms (BELO *et al*., 2012). According to data from the National Survey, carried out from 2011 to 2015, the Amazon Region concentrates the states with the highest prevalence, especially Pará (7.21%), Tocantins (6.06%) and Amazonas (3, 14%). The highest prevalence was found in the northeast region in the states of Sergipe (6.62%), Maranhão (15.79%), Paraíba (5.09%) and Bahia (4.23%). (EPIDEMIOLOGICAL BULLETIN., 2019) The increase in the prevalence of intestinal parasites is in places where living conditions are unsatisfactory and basic sanitation is inexistent. The country is socioeconomic status is one of the main factors for the development of diseases linked to the lack of basic sanitation, as the lack of knowledge, preparation and cleaning of food and personal hygiene principles facilitates infection in endemic areas, predisposing the population to reinfection. Currently, Brazil is still seeking to develop more specific control measures for the most vulnerable populations, such as children who are subject to greater risk of contamination. (BELO *et al*., 2012). Intestinal parasites are a type of endoparasitism. Parasites belonging to the phyla Protozoa, Platyhelminthes, Nematoda, Acantocephala live in the gastrointestinal tract of man. It is estimated that parasitized individuals harbor at least one species of intestinal parasite, being Trichuris trichiura, Hookworms and Ascaris lumbricoides the ones with the highest frequencies. (FRECKLETON *et al*., 2019). Human susceptibility is universal, so school-age children have an epidemiological importance in the spread of intestinal parasites. This age group is highly susceptible and are responsible for the elimination of large amounts of eggs in the

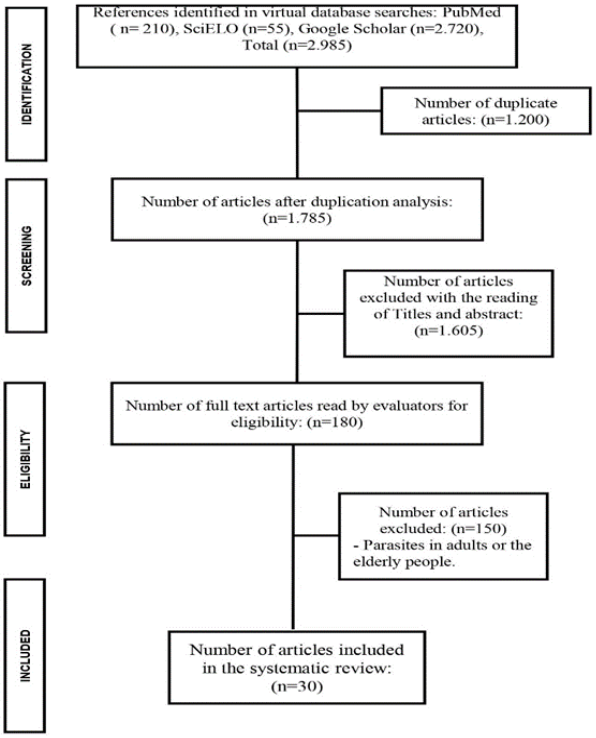
environment through feces. This condition is aggravated when children are exposed to poor hygiene conditions and lack of basic sanitation. (FONSECA, et al., 2018) The highest levels reached by the prevalence and intensity of the infection are among children aged 5 to 14 years, mainly Ascaris lumbricoides and Trichuris trichiura, whereas hookworm disease usually affects adults over 20 years of age. We can observe the acquired immunity of adults by reducing the prevalence and the parasite load, when compared to younger age groups, especially in endemic areas. (ALVES; SANTOS FILHO, 2015). Currently, intestinal parasites persist as an important public health challenge affecting mainly children despite the scientific and technological development for prevention and treatment. It is evident from the social point of view that enteroparasitosis cause a decrease in the quality of life of children and low productivity at school age and damage to the human body in general, damage generated from classic clinical manifestations, such as malnutrition. That way, studying the incidence of intestinal parasites and the factors associated with cases reported in the literature is of paramount importance for the development of control measures for susceptible populations. (CARDOSO *et al*., 2019). On the whole, in countries where population growth does not keep pace with improvements in health, the transmission of various types of parasitic diseases is still perpetuated, as individuals who live in precarious conditions of basic sanitation, water supply, housing and from the lack of personal and collective hygiene habits are the most prone to the acquisition of diseases in the gastrointestinal tract. (SILVA *et al*., 2017). The main factors associated with the incidence of intestinal parasites are linked to the lack of basic sanitation and sanitation of contaminated food. That way, it is necessary to develop strategies and health plans to combat parasitic infections and the predisposition to reinfection in endemic regions. (SANTOS et al., 2014)

MATERIALS AND METHODS

This is a systematic review of the incidence and risk factors associated with intestinal parasites in children in Brazil and a survey of the main parasitic infections that cause infection in children. Using as selection criteria articles in Portuguese, English and Spanish from the period 2010 to 2020 in the Google Scholar, Scientific Electronic Library Online (SciELO), PubMed databases. The descriptors used in the research were: parasitosis in children in Brazil, risk factors associated with parasitosis, incidence of parasitosis. The articles were identified according to the following inclusion criteria: case reports of parasitosis and risk factors reported by region. The exclusion criteria were articles not available in complete data and those that did not represent case reports. The selection of articles followed the PRISMA flowchart (MOHER et al., 2010). For data extraction, tables were created containing the following information: authors, year of publication, age group of children and incidence. were analyzed individually and, later, discussed and crossed in a pertinent analysis of the subject. The search terms used 2,985 articles were found. Of these, 1.200 duplicate articles were excluded. Among the remaining 1.785 after analysis, 1.605 were excluded with the reading of titles and abstract. Among 180 articles eligible by the evaluators, 150 were excluded by the established exclusion criteria. Finally. 30 articles were included in this review, as shown in Figure I.

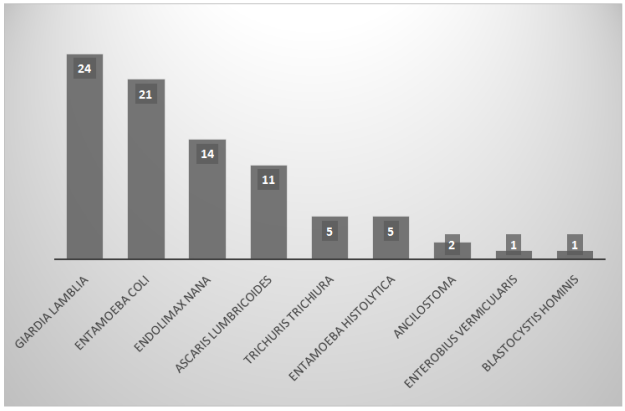
RESULTS AND DISCUSSIO

We can highlight that intestinal parasitosis are not compulsory notification diseases in Brazilian states, and data on the true frequency of these infections are somewhat unknown. National data on intestinal parasites are restricted to specific locations as a priority by the Ministry of Health (TEIXEIRA et al,. 2020). In some epidemiological studies such as Andrade et al. (2010) reports surveys carried out in Brazilian states, in São Paulo carried out with random samples in children under five years of age, at least one species of parasite was found in approximately 70%, with Trichuris trichiura and Giardia intestinalis, Graph I shows the highest incidence of giardia lamblia parasitosis in studies such as Alves et al. (2015), Fernandes et al. (2011), Reuter (2015), Goncalves et al. (2011), Barbosa et al. (2017), Souza et al. (2015), Fonseca et al. (2018), Cardoso et al. (2019), Araújo et al. (2018) report this incidence.



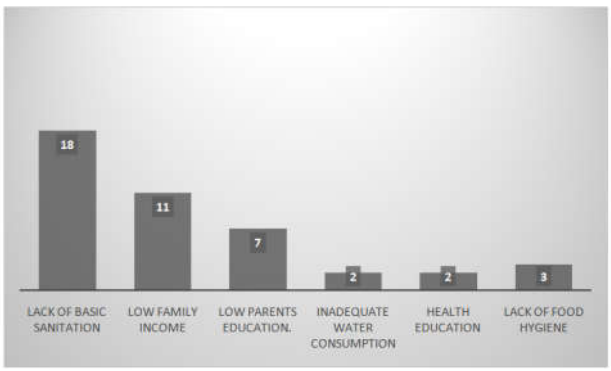
Source: Prepared by the Authors.

Figure I. Flowchart of selection of scientific articles for systematic review



Source: Prepared by the Authors

Graph 1. Incidence of Intestinal Parasitosis in Children in Brazil, based on table 1 (n=30)



Graph 2. Main factors associated the incidence of intestinal parasites in children based on table 3 (n=30)

Table 1. Studies demonstrating the incidence of the most frequent intestinal parasites in Brazil (N=28)

INCIDENCE OF PARASITOSIS	TARGET POPULATION	REFERENCES
Giardia lamblia (5,5%) Ascari lumbricoides (4,4%) Trichuris trichiura (1,1%) Entamoeba histolytica (0,2%) Hymenolepisnana (0,1%)	Children	Alves *et al.* (2015)
Giardia lamblia (58,4%) Entamoeba coli (41,6%)	Children 0-3 yearsold	Fonseca *et al* (2018)
Entamoeba histolytica (14,3%) Entamoeba coli (9,5%) Giardia lamblia (5,5%) Ancilostoma sp (2,1%) Ascaris lumbricoides (1,9%) Enterobius vermicularis (1,5%) Trichuristrichiura (1,1%)	Childrenand teenagers	Belo *et al* (2012)
Ascaris lumbricoides (25,1%). Ancilostomídeo (12,2%). Trichuris trichiura (12,2%)	Children 5-14 years old	Fonseca *et al* (2010)
Entamoeba coli (33,7%). Giardia lamblia (20,9%). Endolimax nana (16,2%). Ascaris lumbricoides (13,9%).	Children 2-10 yearsold	Rodrigues *et al* (2018)
Entamoeba sp (30,3%). Ascaris lumbricoides (21,9%). Giardia lamblia (11%).	Children 4-12 yearsold	Coutinho *et al* (2011)
Ascaris lumbricoides (56,3%). Entamoeba histolytica (89,9%).	Children 2-10 yearsold	Silva *et al* (2014)
Endolimax nana (54%). Entamoeba coli(22%). Giardia lamblia(16%).	Children 6-12 yearsold	Carvalho *et al* (2014)
Endolimax nana (67%). Giardia lamblia (22%). Trichuris trichiura (11%)	Children 1-3 yearsold	Antunes *et al* (2017)
Endolimax nana (64%). Entamoeba coli (26%). G. lamblia (22%)	Children 3-10 yearsold	Cardoso *et al* (2020)
Entamoeba coli (28,9%). Endolimax nana (18,4%).	Children 6-14 yearsold	Cardoso *et al* (2010)
Endolimax nana (33,9%). Entamoeba coli (17,7%). Giardia lamblia (17,7%)	Children	Silva *et al* (2018)
Giardia lamblia Endolimax nana Entamoeba coli	Children 4-7 yearsold	Barbosa *et al* (2017)
Entamoeba histolytica (28%) Entamoeba coli(25%) Giardia lamblia(23%)	Children 0-5 yearsold	Macena *et al* (2016)
Giardia lamblia (26%) Ascaris lumbricoides (17.3%) Endolimax nana (8,7%).	Children 1-10 yearsold	Souza *et al* (2015)
Giardia lamblia (5%) Entamoeba coli(5%) Endolimax nana (5%)	Children 2-6 yearsold	Abreu *et al* (2014)
Endolimax nana (59%). Giardia lamblia (20%).	Children0-5 yearsold	Dias *et al* (2010)
Giardia lamblia. Entamoebahistolytica. Ascaris lumbricoides	Children	Cardoso *et al* (2019)
Endolimax nana. Entamoeba coli. Giardia lamblia.	Children 1-3 yearsold	Andrade *et al* (2017)
Endolimax nana (60%) Entamoeba coli. (26,7%) Giardia lamblia (13,3%)	Children 0-13 yearsold	Camello *et al* (2016)
Giardia lamblia (18,3%)	Children 0-6 yearsold	Fernandes *et al* (2011)
Giardia lamblia (90,0%) A. lumbricoides (10%)	Children	Reuter *et al* (2015)
Ascaris lumbricoides (14,8%). Giardia lamblia (11,1%). Endolimax nana (1,8%). Entamoeba coli (1,8%).	Children 0 -6 yearsold	Silva *et al* (2015)
Blastocystishominis (40,4%) Giardia lamblia (26,4%). Entamoeba coli. (22,8%) Endolimax nana (12,3%).	Children 2-6 yearsold	Santos *et al* (2012)
Giardia lamblia Hymenolepis nana Entamoeba coli (38%). Ascaris lumbricoides (31,%).	Children	Goncalves *et al* (2011) Sousa *et al* (2019)
Giardia lamblia Entamoebacoli.	Children 1-4 yearsold	Araújo *et al* (2018)
Trichuristrichiura Entamoeba coli Ascaris lumbricoides.	Childrenand Young	Baptista *et al* (2013)

Table 2. Incidence of parasites by region according to the studies in table 1 (N=28).

REGIONS OF BRAZIL	FREQUENT PARASITES	STUDIES
NORTH	Endolimax nana Trichuris trichiura Entamoeba coli	Dias *et al* Baptista *et al* Cardoso *et al*
NORTHEAST	Endolimax nana	Carvalho *et al* Cardoso *et al* Silva *et al*
CENTRAL-WEST	Giardia lamblia	Araújo *et al*
SOUTHEAST	Giardia lamblia	Alves *et al* Fonseca *et al* Fernandes *et al* Goncalves *et al* Barbosa *et al*
SOUTH	Giardia lamblia Endolimax nana	Abreu *et al* Souza *et al* Reuter *et al* Antunes *et al* Camello *et al* Andrade *et al.*

Source: Prepared by the Authors

Table 3. Articles with object of study Intestinal parasites and their main factors associated with incidence (n=30)

FACTORS ASSOCIATED THE INCIDENCE	TARGET POPULATION	REFERENCES
Lack of basic sanitation and education.	Children	Alves *et al.* (2015)
Low education of the mother, domestic animals at home.	Children 0-3 yearsold	Fonseca *et al* (2018)
Poverty, Lack of basic sanitation and education.	General population	Andrade *et al* (2010)
Increasing age, sanitary installation.	Childrenand teenagers	Belo *et al* (2012)
Lack of basic sanitation	General population	Busato *et al* (2014)
Low education of the mother, low family income, garbage close to home.	Children 5-14 yearsold	Fonseca *et al* (2010)
The increase in the children is age, the time span of the last appointment	Children 2-10 yearsold	Rodrigues *et al* (2018)
Low education of the mother, lack of basic sanitation and body hygiene, water supply.	Children 4-12 yearsold	Coutinho *et al* (2011)
Socioeconomic, sanitary and basic sanitation conditions, low HDI.	Children 2-10 yearsold	Silva *et al* (2014)
Family socioeconomic status and sanitary conditions in the houses.	Children	Cardoso *et al* (2019)
Well water consumption, destination of faecal waste, family income, parents education	Children 0-5 yearsold	Dias *et al* (2010)
Lack of basic sanitation and sanitary conditions.	Children 3-12 yearsold	Júnior *et al* (2016)
Inadequate water consumption and socioeconomic conditions.	Children 1-3 yearsold	Andrade *et al* (2017)
Socioeconomic conditions	Children 0-6 yearsold	Silva *et al* (2015)
Lack of health education and better living conditions.	Children 2-6 yearsold	Santos *et al* (2012)
Socioeconomic conditions and lack of health education	Children	Goncalves *et al* (2011
Low family income and lack of basic sanitation.	Children	Sousa *et al* (2019)
Lack of basic sanitation and personal hygiene.	Children 1-4 yearsold	Araújo *et al* (2018)
Lack of basic sanitation, personal hygiene and poor food hygiene.	Childrenand Young	Baptista *et al* (2013)
Lack of basic sanitation	Children 6-12 yearsold	Carvalho *et al* (2014)
Habit of walking barefoot, eating habits and personal hygiene.	Children 0-12 yearsold	Silva *et al* (2016)
Lack of knowledge about intestinal parasites.	Children 0-13 yearsold	Camello*et al* (2016)
Socioeconomic, hygienic and cultural conditions.	Children 0-6 yearsold	Fernandes *et al* (2011)
Low parents education, lack of basic sanitation, inadequate water consumption.	Children	Reuter*et al* (2015)
Socioeconomic, environmental and sanitary conditions.	Children 1-3 yearsold	Antunes *et al* (2017)
Lack of basic sanitation and socioeconomic conditions.	Children 3-10 yearsold	Cardoso *et al* (2020)
Lack of basic sanitation and socioeconomic conditions.	Children 6-14 yearsold	Cardoso *et al* (2010)
Personaland food hygiene	Children	Silva *et al* (2018)
healtheducation	Children 4-7 yearsold	Barbosa *et al* (2017)
Lack of basic sanitation, health education.	Children 0-5 yearsold	Macena *et al* (2016)

Source: Prepared by the Authors.

Among the main reasons are the lack of basic sanitation, educational level, socioeconomic and hygienic conditions, inadequate consumption of water and domestic animals at home. In table II the incidences of parasites were separated by regions according to the studies used in the systematic review, in the north and northeast regions the highest incidence was endolimax nana, among the main factors are the consumption of well water, destination of faecal waste, low family income, low parental education. In the south and southeast, the parasite with the highest incidence was giardia lamblia due to lack of basic sanitation, socioeconomic conditions and domestic animals in homes. The results achieved in this review indicate that intestinal parasites in children still remain an important public health problem in Brazil, and the measures currently used for eradication and control are still insufficient. To reduce the rates of parasitic infections, it is necessary to improve multidisciplinary actions and strategies, especially in poorer areas with more difficult access to basic health care.

CONCLUSION

Most of the population, especially children who live in precarious conditions of basic sanitation, housing, water supply and lack of personal and collective hygiene habits, are the most likely to acquire parasitic infections. Therefore, there is a need to formulate and apply intersectoral policy measures that guarantee universal access to health services and the promotion of health and environmental education projects applied mainly to the children is parents. The research evidenced the presence of a direct relationship between the frequency of intestinal parasitosis in children and socioeconomic factors, especially the presence of a sewage system, piped water supply and the mothers is education level. These aspects end up reflecting on the environment in which children live. That way, it is extremely important to investigate the incidence and factors associated with intestinal parasites in children from different regions of Brazil, to organize and plan health actions, aiming at better prevention, treatment and diagnosis of parasitic infections. It is concluded that the socioeconomic and sanitary conditions of the housing, people and environment in which the children are located are the main factors and can significantly contribute to a greater indecency of intestinal parasites and the need for improvements in the planning of institutions government and health. It is also not enough just basic sanitation conditions or public policies, there is also a need for educational practices and guidance on intestinal parasites.

REFERENCES

Abreu LK, Braga LS,Navasconi TR, Silva RCR, (2014). prevalence and socio-epidemiological aspects ofenteroparasitosis in children from the municipal infant education center in janiópolis- pr. Journal. Health e Biol, Janiópolis-Pr., v. 9, n. 3, p. 76-84.

Alves JAR, Santos EF, (2015). Intestinal parasites in childhood. Journal. Asp, São Paulo, p.7-15, 13 fev.

Andrade AO, SáARN, BezagioRC, (2017). prevalence of intestinal parasitosis in children from a municipal child education center in Campo Mourão,pr/brasil.uningá,campomourão,Pr,v.29,n.3,p. 36-41.

Andrade EC,Leite ICG, Rodrigues VO, Cesca MG, (2010).Intestinal parasites: a review of their social, epidemiological, clinical and therapeutic aspects. Journal. Aps, Juiz de Fora, v. 13, n. 2, p. 231-240, 15 jul.

Antunes AS, Libardoni KSB, (2017). prevalence of intestinal parasitosis in children from kindergartens in the municipality of santo ângelo,rs. Journal Context & Health, [S.L.], v. 17, n. 32, p. 144-156, 2 jun. EditoraUnijui. http://doi.org/10.21527/2176-7114.2017.32.144-156.

Araújo MWS, Silva TBM, Nogueira LG, (2018). Prevalence of intestinal parasitosis in children from a municipal child education center in the municipality of Trindade, GO.Vita Et Sanitas, Trindade- Go, v. 12, n. 1, p. 66-79.

Baptista AB, Ramos LS, Santos HAG, (2013). prevalence of enteroparasites and epidemiological aspects of children and young people in the municipality of altamira – pa. Health Research, Altamira-Pa, v. 14, n. 2, p. 77-80.

Barbosa JA, Alvim MM, Oliveira MM, Siqueira RA, Dias TR, Garcia PG, (2017).Analysis of the socioeconomic profile and prevalence of intestinal parasitosis in school-age children in a municipality of Minas Gerais. Journal Hu, Juiz de Fora, v. 43, n. 3, p. 391-397.

BellotoMVT, Junior JES, Macedo EA, Ponce A,Galisteu KA, Castro ED; *et al* (2011). Enteroparasitosis in a population of schoolchildren in the public education system of the Municipality of Mirassol, São Paulo, Brasil. Journal Pan-Amaz Saude, Ananindeua.,v. 2, n. 1, p. 37-44, mar.

Belo VS, Oliveira RB, Fernandes PC; Nascimento BWL, Fernandes FV, Castro CLF.*et al,* (2012).Factors associated with the occurrence of intestinal parasites in a population of children and adolescents. Journal Paulista of Pediatrics,[s.l.],v.30,n. 2, p.195-201.jun..FapUNIFESP(SciELO).http://dx.doi.org/10.1590/s0103-05822012000200007.

Brazil (2018). Ministry of Health. National Health Surveillance Agency. Epidemiological bulletin. geohelminthiases.Vol.49.3-15p

BRAZIL (2018). Ministry of Health. National Health Surveillance Agency. Epidemiological bulletin. geohelminthiases. Vol.49. 3-15p.

Brazil (2019). Ministry of Health. National Health Surveillance Agency. Epidemiological bulletin. geohelminthiases.Vol.49. 33-34p.

BusatoM.A, AntoniolliMA,TeoCRPA,FerrazL,PoliG, Tonini P, (2014).Relationship of intestinal parasites with basic sanitation conditions;DOI: 10.4025/cienccuidsaude.v13i2.18371.Science, Care and Health, v. 13, n. 2, p. 357 - 363, 8 maio.

Camello JT, Cavagnolli NI, Spada PKWDS,Poeta J,RodriguesAD (2016).Prevalence of intestinal parasites and basic sanitation conditions in schoolchildren is homes in the urban area of Caxias do Sul, Rio Grande do Sul.ScientiaMedica,[S.L.],v.26,n.1,p.2-6,30mar. EDIPUCRS.http://dx.doi.org/10.15448/1980-6108.2016.1.21716.

Cardoso AB, Sousa EA, Silva GD, Campelo PNG, Mendes JR, Ventura MCS, *et al*(2020). Epidemiological-socioeconomic profile of enteroparasitosis in children aged 03 to 10 years in Teresina-PI. Brazilian Journal Of Development, [S.L.],v. 6, n. 3,p.11160-11175. Brazilian Journal of Development. http://dx.doi.org/10.34117/bjdv6n3-111.

Cardoso FDP, Araújo BM; Batista HL; Galvão WG, (2010)Prevalence of intestinal parasites in schoolchildren aged 6 to 14 years in the kindergartens of araguaína - tocantins. Pharmacy Electronics, Araguaína-Tocantins, v. 7, n. 1, p. 54-64.

CardosoLA, Cavalcante CS, Morais KF, Medeiros JS, (2019).intestinal parasites in children who attend kindergartens. Journal Of Biology & Pharmacy And Agricultural Management, Campina Grande-Pb, v. 15, n. 1, p. 52-59..

Carvalho NEDS, Gomes NP, (2014). Prevalence of intestinal parasites in children aged 6 to 12 years old at Melvin Jones public school in Teresina-PI.Interdisciplinary,Teresina-Pi,v.6,n.4,p.95-101.

Coutinho HDM, Vasconcelos IAB, Oliveira JW, Cabral FRF, Menezes IRA, (2011). Prevalence of intestinal parasites among children aged 4-12 years in Crato, State of Ceará: a recurrent public health problem. Acta Scientiarum. Health Science, Maringá, v. 33, n. 1, p. 35-41, 19 maio. State University ofMaringa. http://dx.doi.org/10.4025/actascihealthsci.v33i1.8539.

Dias DS, Menezes RAO, Souza MJC, Barbosa FHF, Andrade RF, Souto RNP(2013). risk factors contributing to intestinal parasitosis in children aged 0 to 5 years in macapa – amapá, brasil. Equatorial Science, Macapá, v. 3, n. 1, p. 18-28.

Fernandes FC, Barbosa FHF (2011). occurrence of intestinal parasitosis among children from the Menino jesuskindergartens.in the municipality of dores do indaiá, minas gerais. Equatorial Science, Dores do Indaiá, Mg, v. 1, n. 1, p. 29-37.

Fonseca EOL, Teixeira MG, Costa MCN, Barreto ML, Carmo EH (2010).Prevalence and factors associated with geohelminthiasis in children living in municipalities with a low HDI in the North and Northeast of Brazil. Cad.Publichealth, Rio de Janeiro, p. 143-152, jan.

Fonseca TC, Sousa FF, Carballo FP, Fonseca AR, Rabelo DMRS (2018).Factors associated with intestinal parasites in children who use community kindergartens.Science & Health,[s.l.],v.11,n.1,p.33,17april..EDIPUCRS.http://dx.doi.org/10.15448/1983652x.2018.1.27909.

Freckleton JTV, Oliveira FJA, Costa IN, Pavanelli WR,Conchon, ICMelandaFN (2019).Prevalence of intestinal parasites in children from a city in northern Paraná and associated factors. Semina: Biological and Health Sciences, [S.L.], v. 40, n. 1, p. 89, 5set.StateUniversity of Londrina. http://dx.doi.org/10.5433/1679-0367.2019v40n1p89.

Goncalves ALR, Belizário TL, Pimentel JB, Pennati MPA, Pedroso RS (2011).Prevalence of intestinal parasites in institutionalized children in the region of Uberlândia, State of Minas Gerais.Journal of the Brazilian Society of Tropical Medicine. [online]. 2011, vol.44, n.2, pp.191-193. Epub Apr 29. ISSN 0037-8682.https://doi.org/10.1590/S0037-86822011005000022.

Júnior LG, Oliveira YKC, Saturno RS, Silva AS, Prado RMS (2016).incidence of intestinal parasites in children from a community near a dam in the central hinterland of ceará. X Pharmacy Scientific Show, Quixadá, p. 1-5.

Macena WG, Reis MJ, BarrosRG (2016).Prevalence of intestinal parasitosis in children aged zero to five years old in a municipal school in Teixeira de Freitas, Bahia.Mosaic, Teixeira-Bahia, n. 23, p. 83- 90.

MoherD, Liberati A,Tetzlaff J, Altman DG (2010).PRISMA Group. Preferred reporting items for systematic reviews and meta-analyses: the PRISMA statement. International Journal of Surgery, v. 8, p. 336-341.

Pereira VV, Tibúrcio JD, Alves SN, Silva ES (2010).Assessment of intestinal parasites, nutritional status and social indicators in students from four public elementary schools in the city of Divinópolis-Minas Gerais, Brazil. Neotropical Helminthology, v.4, n. 2, p. 149-157.

Reuter CP, Furtado LBFS, Silva R, Pasa L, Klinger EI, Santos CE,*et al*(2015). frequency of intestinal parasites: a study with children from a daycare in santa cruz do sul - rs. Cinergis, [S.L.], v. 16, n. 2, p. 142-147, 17 set.. APESC - Pro-Education Association inSanta Cruz do Sul. http://dx.doi.org/10.17058/cinergis.v16i2.6426.

Rodrigues SR, Gomes SCS, Lima RJCP, Nascimento JXPT.(2018). IntestinalParasitosis in Children Project: prevalence and associated factors. Journal. Science. Ext. São Paulo, v. 14, n. 3, p. 50-63.

SantanaLA, Vitorino RR, Antonio VE, Moreira TR, Gomes AP (2014).News about giardiasis. Infectology,v.102,n.1,p. 7-9.

Santos J, Duarte ARM,Gadotti G, Lima LM (2014). intestinal parasites in children from a community daycare in Florianópolis, sc, brazil. Journal of Tropical Pathology, [S.L.], v. 43, n. 3, p. 332-340, 9 oct. Federal University of Goias. http://dx.doi.org/10.5216/rpt.v43i3.32201.

SantosSM, Leal CA, Lima CFA, Barbosa JV (2015).Didactic strategies to approach Enterobiosis in basic education. X National Meeting of Research in Science Education–X Enpec, waters ofLindóia, Sp, p. 1-8.

Silva AO, Cunha CRM, Martins WLL, Silva LS, Silva GRC,Fernandes CKC (2017) epidemiology and prevention of intestinal parasites in children from municipal daycare initapuranga – go. College Montes Belos (Fmb), Itapuranga – Go, v. 8, n. 1, p. 1-17, 2017.

Silva MR,Goularte AL,Tomé CF, Pinto ESO, Pinto R (2016). Risk factors related to parasitic diseases in children. VIII Simpac, Viçosa-Mg, v. 8, n. 1, p. 419-425.

Silva MTN, Pontes A, Aragão P, Andrade J, Tavares JN (2014). prevalence of intestinal parasites in children, with low socioeconomic indicators, from Campina Grande (Paraíba). Journal Baiana of Public health, Campina Grande (Paraíba), v. 29, n. 1, p. 121-125.

Silva TO, Andrade TSO, Cavalcante UMB, Lima, CMBL,Freitas, FIS (2018)enteroparasites in children from daycare in the city ofjoãopessoa-pb. Journal Cereus, [S.L.], v. 10, n. 1, p. 29-38, 14 maio. Journal Cereus. http://dx.doi.org/10.18605/2175-7275/cereus.v10n1p29-38.

Sousa FCA, Siqueira HDS, Siqueira FFFS, Oliveira EH, Verde RMCL, Júnior RNCM,*et al*(2019) Prevalence of intestinal parasites in children from a municipal public school. Current Nursing In Derme, Caxias-Ma, p. 90-97.

Souza DCL, Raimundo AFG, Genovês TG, Ribas AD (2015). Prevalence of intestinal parasites in children attending public school and daycare in Barbosa Ferraz - pr. IX Epcc – International Scientific Production Meeting Unicesumar, Barbosa Ferraz - Pr, n. 9, p. 4-8.

Teixeira PA, Fantinatti M, Gonçalves MP, Silva JS (2020).Intestinal parasites and basic sanitation in Brazil: an integrative review study. Brazilian Journal Of Development, [S.L.], v. 6, n. 5, p. 22867- 22890.http://doi.org/10.34117/bjdv6n5-006.

****