

Clinical, parasitological and socioeconomic evaluation of children attended in the pediatrics of the community Nosso Lar- vergel do Lago, Maceió-Alagoas



<https://doi.org/10.56238/Connexpemultidisdevolpfut-147>

Renata Marcela Cavalcante Ferreira Ferro

CESMAC University Center, Brazil
Medical student.

Maria Eduarda Ramos Silvestre

CESMAC University Center, Brazil
Medical student

Ana Carolina Medeiros de Almeida

CESMAC University Center, Brazil
Full Professor

Gilsan Aparecida de Oliveira

CESMAC University Center, Brazil
Full Professor

Emanuel Felipe Marques Bezerra

CESMAC University Center, Brazil
Medical student

Livia Lorena Santos Moura

CESMAC University Center, Brazil
Medical student

Maria Karoline Gomes Silva

CESMAC University Center, Brazil
Medical student

ABSTRACT

School-age children comprise a group with a greater propensity to exposure in contaminated

environments, which favors the involvement of pathologies caused by geohelminths. Therefore, the present study aims to verify the clinical and socioeconomic changes associated with infection by parasitosis in children. This is a cross-sectional observational study to verify the clinical, parasitological and socioeconomic alterations of children attended in the pediatrics of the community our home, located in the neighborhood Vergel do Lago, Maceió-AL. It was found among the samples of biological material that 20.4% were positive for gastrointestinal helminths, of which 66.7% were positive for *Ascaris lumbricoides*, 22.2% for *Ancylostoma duodenalis* and 11.1% for *Hymenolepis diminuta*, as well as that 39% of the children ingest water from the tap, 42.8% do not have the habit of sanitizing their hands before meals and more than half do not have basic sanitation in their Residences. It was also observed that most mothers had incomplete elementary education and most had an income of up to 1 minimum wage. Thus, it is concluded that sanitation and hygiene conditions contributed to the number of positives. The prevalence of *Ascaris lumbricoides* suggests low adherence to the habit of hand hygiene by children. Most of them lived with about seven people and in a rented house, with low income, evidencing their precarious socioeconomic level. In addition, the mothers' low level of education predisposes them to significant resistance to return with the stool sample.

Keywords: Parasitosis, Development, Children, Hand hygiene, Socioeconomic factors.

1 INTRODUCTION

Enteroparasitosis are diseases caused by protozoa or helminths that present part of the evolutionary cycle developed in the human digestive tract (Fonseca, et al., 2010). Parasites are directly related to the conditions of hygiene, sanitation, education and housing of the population. Abdominal pain, diarrhea, nausea or vomiting, increased gas production, reduced appetite, weight loss, fever, and shortness of breath are symptoms that may be associated with parasitosis. In addition to other



nonspecific signs such as anemia, anal itching and melena are common in infections caused by *Trichuris trichiura* and *Entamoeba Histolytica*, which occur more frequently in older children (Aguiar-Santos, et al., 2013). The high magnitude and wide geographical distribution of enteroparasitosis, coupled with the negative repercussions they can cause in the human body, have given these infections a relevant position among the main health problems of the population (Teixeira, et al., 2020).

Millions of people are affected by geo-helminths worldwide, especially school children due to their greater exposure to contaminated environments (Nunes, et al, 2016). Soil-transmitted helminth infections (geohelminthiasis) impose a great burden on poor populations worldwide (Teixeira, et al 2004). In addition, within the context of underdeveloped and developing countries in which there is a deficient public system of basic sanitation (Oliveira, et al., 2016), young children represent a population where the problem worsens, since enteroparasitosis can be analyzed as cofactors of infant mortality (Chieffi, 2001) and also affect the nutritional balance, inducing intestinal bleeding, competing for the absorption of micronutrients and reducing the food intake and growth of the individual, in addition to affecting the cognitive development of the child.

According to Santos (2020), the most common nematodes in Brazil are: *Ascaris lumbricoides*, *Trichuris trichiura*, ancilostomídeos (*Ancylostoma* and *Necator*), *strongyloides* (*Strongyloides stercoralis*) and oxiúros (*Enterobius vermicularis*). The most common flatworms are tapeworms (*Taenia solium* – of the pig; *T. saginata* – of the ox and *Diphyllo bothriumlatum* – fish tapeworm) and *Hymenolepis* (*H. nana* or *H. diminutive* – also known as dwarf tapeworm) (Aguiar-Santos, et al., 2013). At the level of Maceió, a survey conducted in 14 squares, it was found that 10 of these were positive for some type of parasite, where 42.85% of *Strongyloides stercoralis*, 35.71% *Entamoeba Histolytica*, 21.42% egg *Ascaris lumbricoides* and 7.1% of *Ancylostoma spp* and *Hymenolepis nana* of the samples collected (Moraes, et al., 2020). The geohelminths that cause the greatest burden of morbidity and for which there are diagnostic techniques and control measures proven feasible are the *Ascaris lumbricoides* or *Trichuris trichiura* and hookworms (Dias, et al., 2013).

There is a direct relationship between the prevalence of intestinal parasitosis and basic sanitation and personal hygiene conditions, including the origin of the water used (Lander, et al., 2012). It was observed that there is a direct relationship between these socioeconomic indicators and high rates of diagnoses of intestinal parasitosis (SBP, 2019). This ends up having a direct relationship with the level of education of the person responsible for the hygiene of the food that the child will ingest and with the sanitation in the place where he performs recreational activities such as, for example, playing (SBP, 2020). Nevertheless, the economic difficulties encountered by some families lead to long working hours by the parents, which provides a lower direction of time for children who end up not maintaining good hygiene habits.



In general, the diagnosis of helminthiasis is made through the examination of fecal samples or other samples containing eggs, larvae and even the adult worm (Araújo, *et al.*, 2013) (Porto, 2019). Macroscopic examination of the stool for its color, consistency, visualization of the presence of any worm or its segments, or of blood or mucus can give a clue about the etiological agent. The technique of Hoffman, Pons and Janer (HPJ) is performed by the mechanism of spontaneous sedimentation, with the principle of detection of helminth eggs (Ferreira, *et al.*, 2006). To perform this method it is necessary to mix the feces with water, its filtration with surgical gauze and the maintenance at rest in a period of 2 to 24 hours for sedimentation to occur. Subsequently, part of the sedimentate is pipetted under the slide and stained with lugol for analysis under the microscope (Almeida, *et al.*, 2010). With regard to the use of PARATEST, the method allows the diagnosis of practically all species of helminths and protozoa most common in human parasitism in our environment. In addition to reducing much of the work such as dilution, concentration, filtration, conservation and definition of the sample quantity; offers a cleaner filtrate (Oliveira, 2020). In addition to the direct analysis of feces, the diagnosis of some helminthiasis can be made or inferred by other tests, such as blood count, serology and molecular tests (Ferreira, *et al.*, 2006).

Faced with the scenario of great social vulnerability and sanitary conditions, the objective of this research was to identify the clinical symptoms, perform parasitological examination and analyze the socioeconomic conditions of the children attended in the community of Vergel do Lago. In order to relate the data collected with the results of the samples and perform the clinical diagnosis, trace the epidemiological profile of the population in question and direct the appropriate treatment when necessary.

2 METHODOLOGY

A cross-sectional observational study was carried out to verify the clinical, parasitological and socioeconomic alterations of children attended in the pediatrics of the community our home, located in the neighborhood of Vergel do Lago, in the city of Maceió - AL. Where pediatric clinical care was performed in children from 0 to 13 years old, collection of biological material and the application of a questionnaire. Another part of the research related to the processing of biological material was developed in the School Laboratory of the Biomedicine Course of the CESMAC University Center.

The samples were obtained from children in clinical care, with the consent of the parents or guardians and were collected after acceptance to participate in the research, reading and signing of the Term of Free and Informed Consent (ICF). Therefore, the sampling was obtained by convenience. Children whose guardians had not signed the ICF or those in which their guardians refused to participate or did not attend the service that was previously marked through clinical records



for the community according to their routine activities did not participate in the research. The consultations were carried out for eight months, weekly.

Questionnaires and the Informed Consent Form (ICF) were applied with the endorsement of the deliberative opinion of the CEP (Research Ethics Committee) under the approval protocol number (50286621000000039) to the person responsible for the child in order to be aware of the research and the possibility of dropping out at any stage, in addition to the authorization to carry out the research.

After application of the ICF, the children together with their guardians were directed to the clinical office for evaluation, weighing, height, anamnesis and clinical physical examination (Chieffi, 2001). All the children attended, accompanied by their guardians, received a collection pot with prior identification to collect the biological material (feces) at home, which was delivered for analysis at a date and time established and agreed upon on the day of the consultation. Those responsible were instructed on how to perform the collection and packaging procedure and the place of delivery of the material for analysis. After receiving the samples, they were sent to the School Laboratory for processing and analysis.

The stool samples were submitted to the spontaneous sedimentation technique described by Holffman, Pons and Jeans (HPJ) and PARATEST in order to visualize eggs and larvae, and twelve slides were prepared, among which 6 from HPJ and 6 from PARATEST, thus enabling an increase in sensitivity and accuracy in detection.

3 FINDINGS

A total of 98 consultations and application of socioeconomic questionnaires and 44 parasitological analyses of feces were performed. The low level of education of the mothers predisposes to significant resistance to return with the stool sample, even after all the orientations about the importance of the test, which hindered an amplified analysis of the population.

Regarding the analysis of age and sex, the data collected showed that, among the 98 participants, 45% are girls and that, of these, approximately 52.3% have a prevalent age range between 1 and 5 years. For boys, who correspond to 55% of respondents, are also predominantly within the range of 1 to 5 years was 44.4%. Furthermore, it is noted that the presence of children over 10 years of age is low for both sexes, with an index of only 7.1% of the total, with the majority being 1-5 years old, which corresponds to 48% of the total number of children attended (Table 1).



Table 1 - Age group by gender

Age group	Gender		Total
	Boys	Girls	
Less than 1 year	4	6	10
1-5 years	24	23	47
5-10 years	21	13	34
Over 10 years	5	2	7
Total	54	44	98

Source: Authors of the research

Most of the children 39 (39.79%) had height between 0.7 and 1m, and had height between 1 and 1m10cm. Weight ranged from 11 to 20 kg (42.85%) and 21 to 32 kg (27.55%) for most children. It was observed that 22.4% of the children were overweight, being 15 children with obesity and 7 with overweight.

When conducting the interview with the application of the questionnaire, 67.4% of the parents or guardians reported that the children lived with 4 to 7 people in the same residence, of which 31 (31.6%) were in their own home and 55 (56.1%) in a rented house and all in the urban area of the region (100%).

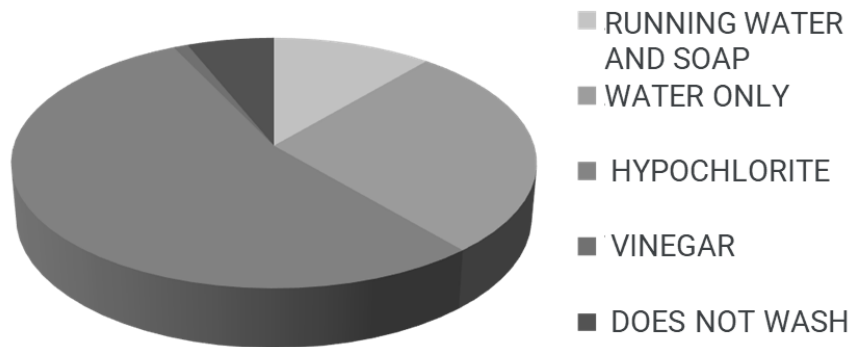
Most of the fathers had completed high school as their level of education, while most mothers studied between the 5th and 8th grade in elementary school and the family income of up to one minimum wage in 54.1% of the cases. Most children study in public school and started their studies between 3 and 4 years of age, and only 6 of them have ever failed school once.

By analyzing the origin of the water used for consumption in the homes of the interviewees, it was noted that 60 (61%) is mineral and 38 (39%) comes from taps. It is worth mentioning that 54% do not have basic sanitation in their homes and when it does, 31.1% is a cesspool septic and 18.4% sewage treatment network, with the majority (84.7%) of the interviewees having garbage collected a few times a week.

For the hygiene of fruits and vegetables we have the behavior observed in the graph:



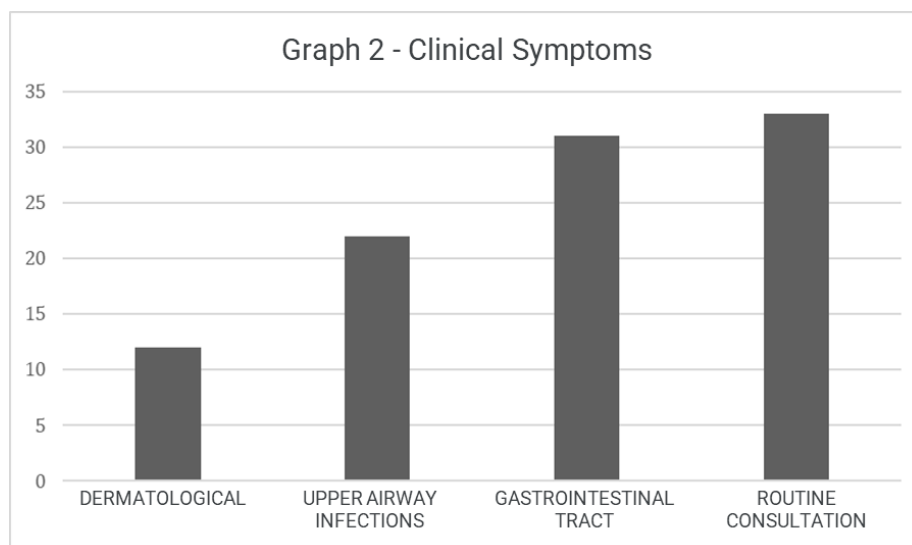
Graph 1 - Way to clean fruits and vegetables



It is possible to observe that, although most children sanitize their hands with hypochlorite, most of them wash only with water.

Of the 98 children attended, 39 (39.8%) Usually Playing barefoot in squares or streets near their homes, 65 (66.3%) have contact with street animals that are in these locations, but most do not have pets at home. Regarding the habit of sanitizing hands before meals, it was observed that, among those who are old enough to wash their hands, 42.8% of them did not have this habit and, among those who did, most usually wash with soap and water.

The parents or guardians reported that 42 (42.9%) of the children had recently had diarrhea or weight loss, and at the time of the consultation, it was observed that most of the children had gastrointestinal symptoms, followed by upper airway and dermatological infections. (graph 02).





It can be observed that among the children who presented clinical symptoms, the prevalence of the consultations was focused on the symptoms of the gastrointestinal tract.

Of the 98 participants, 44 (45%) delivered a sample of biological material (feces), among the analyses, 9 (20.4%) were positive, 6 for *Ascaris lumbricoides*, 2 for *Ancylostoma duodenale* and 1 for *Hymenolepis diminuta*, the others 35 (79.5%) negative (no worms were found in the analyzed samples).

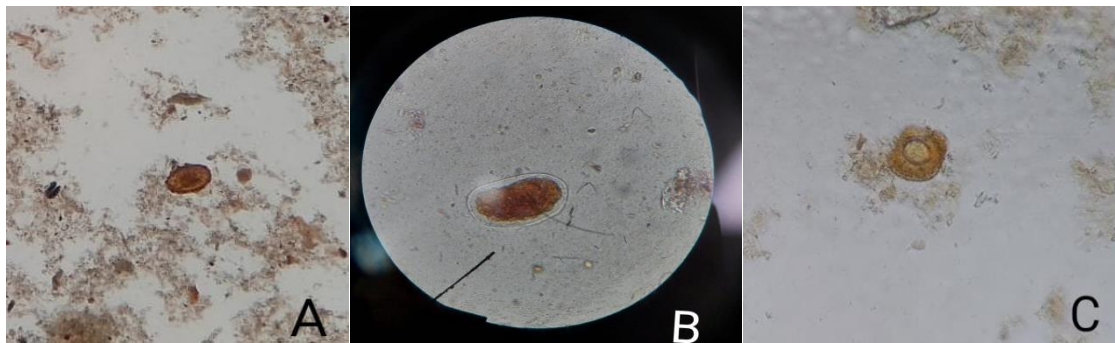


Figure 01-Samples positive to the Hoffman test and PARATEST with identification of eggs in the objective of 10X and 40X. A: egg of *Ascaris lumbricoides*; B: *Ancylostoma duodenale* egg; C: embryonated egg of *Hymenolepis diminuta*

According to those responsible for the children, 75 (76.5%) did not use any dewormer recently, among the 23 children who used it, 10 (43.5%) took Albendazole, 4 (17.4%) Annita, 1 (4.3%) ivermectin and 8 (34.8%) did not know the name of the medication.

4 DISCUSSION

The precarious socioeconomic condition associated with poor hygiene habits, lack of basic sanitation, as well as the high number of residents in the same non-own living environment, showed an association with the prevalence of gastrointestinal symptoms in the population investigated in the present study. "Since, there is a direct relationship between socioeconomic indicators of underdevelopment and high rates of diagnosis of parasitosis "(Santos, *et al.*, 2020).

With regard to sanitation, there is a direct relationship between basic sanitation conditions and the presence of parasites (Lander, *et al.*, 2012). Since The risks of transmission are higher in environments devoid of sanitary infrastructure. Based on this principle, it is possible to correlate what was found in this study, since more than half of the population reported not having an adequate sanitation network, also emphasizing that among the owners only a small percentage is favored by an adequate treatment network. "Precarious hygiene conditions, lack of access to water and basic sanitation, are a serious public health problem, affecting the poorest and most vulnerable populations" (Days, *et al.*, 2013).



It is also worth noting that poor hygiene habits, such as not washing hands before meals, justify the mechanism of infection of enteroparasitosis that usually occurs orally-fecally, (Dk Diagnostics) (Nascimento and Anjos, 2015), as well as contact with street animals and hygiene that is already insufficient in this age group corroborate the emergence of intestinal parasitosis (Cleofe, *et al.*, 2018).

Along with sanitary factors, the environments frequented by these children also have a great influence on the spread of parasitological infections. Places such as daycare centers and schools that often do not offer adequate hygiene conditions enable interpersonal contact and, consequently, the spread of pathogens (Pereira, *et al.*, 2010).

In addition, there was a low return of biological material, even after all the information transmitted during the research about the importance of the test, which evidenced the correlation of the low level of education of those responsible for the children about public health. Since, the low level of education on the part of mothers reflects the conduct of poor hygiene conditions on the part of children, such as the act of playing barefoot and not having the habit of washing their hands (Oliveira and Silva, 2016).

The prevalence of children of age among those positive for enteroparasitosis accentuates the greater severity of prognosis, since the low age group contributes to the infant mortality associated with these pathologies. This can be observed through changes in nutritional balance, which leads to possible intestinal bleeding and malabsorption of nutrients, hindering the growth of the individual when parasitized by some gastrointestinal helminth (Santos, *et al.*, 2020). In addition, similar studies have shown that 10.7% of children with positive tests for enteric microorganisms are overweight, which is related to inadequate food intake and is generally associated with a deficit of important nutrients (Pires, *et al.*, 2016).

5 CONCLUSION

It was concluded that the low sanitation conditions associated with poor hygiene conditions contributed to the number of positive samples, due to the fact that some children had previously used antiparasitic drugs. Finally, the prevalence of *Ascaris lumbricoides* Among the samples analyzed, it proposes low adherence to the habit of hand hygiene by children.

In view of the results found, it was observed that the prevalence of the consultations were male children, with a predominance of the age group between 1 and 5 years. Regarding housing, most of the children lived with about seven people and in a rented house, with an income of up to 1 minimum wage, which evidenced the low socioeconomic level of the population. Associated with this, the low level of education of the mothers predisposes to significant resistance to return with the stool sample, even after all the orientations about the importance of the test, which hindered an amplified analysis of the population.



Regarding gastrointestinal symptoms, most of the children presented complaints during the consultation, however, in view of the total number of analyzed, we obtained a low percentage of positive ones. In addition, it was concluded that the low sanitation conditions associated with poor hygiene conditions contributed to the number of positive samples, due to the fact that some children had previously used antiparasitic drugs.

Finally, the prevalence of *Ascaris lumbricoides* Among the samples analyzed, it proposes low adherence to the habit of hand hygiene by children.



REFERENCES

- Aguiar-Santos, A.M., Medeiros, Z., Bonfim, C., Rocha, A.C., Brandão, E., Miranda, T., Oliveira, P., Sarinho, E.S.C. (2013). Avaliação epidemiológica de doenças negligenciadas em escolares: filariose linfática e parasitoses intestinais. *Jornal de Pediatria* [online], v. 89, n. 3, pp. 250-255.
- Almeida, A.B.P.F., Cavaleiro, A.C., Sousa, V.R.F. (2010). Larvas de helmintos em áreas de recreação de creches de Cuiabá, Mato Grosso. *Semina: Ciências Agrárias*, 469:472-31.
- Araújo, A.J.U.S., Kanamura, H.Y., Dias, L.C.S., Gomes, J.F., Araújo, S.M. (2003). Coprotest® quantitativo: quantificação de helmintos em amostras fecais utilizando-se sistema de diagnóstico comercial. *J. Bras. Patol. Med. Lab.*, 9:115-124.
- Barbosa, J.A., Alvim, M.M., Oliveira, M.M., Siqueira, R.A., Dias, T.R., Garcia, P.G. (2017). Análise do perfil socioeconômico e da prevalência de enteroparasitoses em crianças com idade escolar em um município de Minas Gerais. *HU Revista*, 391:397-43.
- Brasil. Ministério da Saúde. Secretaria de Vigilância em Saúde. (2017). Coordenação Geral de Desenvolvimento da Epidemiologia em Serviços. *Guia de Vigilância em Saúde – 2ª ed.* Brasília: Ministério da Saúde, 2017. Disponível em:
- Chieffi, P.P., Gryscek, R.C.B., Amato Neto, V. (2001). *Parasitoses intestinais: diagnóstico e tratamento.* São Paulo: Lemso editorial.
- Cleofê, M.A.Z, Alexandre, V., Rosana, F.S.S., Andrezza, P.B, Michelle, M.M.S. (2018). Análise protoparasitológica e microbiológica em amostras de crianças de 0 a 6 anos de idade atendidas por creche em Campinas-SP. *Cuidarte enfermagem*, 12(2): 223-227.
- Dias, D.S., Menezes, R.A.O., Souza, M.J.C., et al. Fatores de risco que contribuem para as parasitoses intestinais em crianças de 0 a 5 anos em Macapá- Amapá, Brasil. 2013; 3: 1-13.
- DkDiagnostics: Inovação a serviço da saúde. Quais os benefícios que obtenho usando Paratest?
- Farias, V.A., Alves, I.C., Cavalcante, I.M.S., Bispo, E.S., Silva, T.G., Almeida, C.S. (2020). A prevalência da contaminação do solo por geo-helmintos em praças públicas da cidade de Maceió-AL. *SEMPESq*, novembro 5-7; Maceió, Brasil. 6.
- Ferreira, H, Lala, P.R.E., Monteiro, C.M., Raimondo, L.M. (2006). Estudo epidemiológico localizado da frequência e fatores de risco para enteroparasitoses e sua correlação com o estado nutricional de crianças em idade pré-escolar. *Publicatio UEPG Ciências biológicas e da saúde*, 12: 33-40.
- Fonseca, E.O.L., Teixeira, M.G., Barreto, M.L., Carmo, E.H., Costa, M.C.N. (2010). Prevalência e fatores associados às geo-helminthiases em crianças residentes em municípios com baixo IDH no Norte e Nordeste brasileiros. *Cadernos de Saúde Pública*, N.1, V 26, P.143 -152.
- Lander, R.L., Lander, A.G., Houghton, L., Williams, S.M., Costa-Ribeiro, H., Barreto, D.L., Mattos, A.P., Gibson, R.S. (2012). Factors influencing growth and intestinal parasitic infections in preschoolers attending philanthropic daycare centers in Salvador, Northeast Region of Brazil. *Cadernos de Saúde Pública*, 8: 2177-2188.
- Moraes, G.F.Q., Castro, F.M.A., Teixeira, A.P.C. (2020). Infecções pulmonares relacionadas com parasitos humanos. *Journal of Medicine and Health Prmotion*, 5: 43-56.



- Nascimento, L.M.S. (2015). Plano de intervenção para reduzir a presença de parasitoses intestinais em crianças da comunidade do Alecrim, em Girau do Ponciano-AL. UFMG, Curso de especialização estratégia saúde da família.
- Nunes, B.C., Pavan, M.G., Jaeger, L.H., Monteiro, K.J.L, Xavier, S.C.C., Monteiro, F.A., Bóia, M.N., Carvalho-Costa, F.A. (2016). Spatial and Molecular Epidemiology of *Giardia intestinalis* Deep in the Amazon, Brazil. *Plos One*, 11(7): 1-8.
- Oliveira, B.A.S. (2020). Diagnóstico automático de ovos de parasitos intestinais em humanos a partir de imagens microscópicas utilizando redes neurais convolucionais. Programa de Pós-Graduação em Engenharia Elétrica, 1-60.
- Oliveira, E.S.L., Silva, J.S. (2016). Índice de parasitoses intestinais nas zonas urbana e rural do município de Caputira- estado de Minas Gerais. *Biology*, 14: 143-152.
- Pereira, V.V., Tibúrcio, D.J., Alves, S.N., da Silva, E.S. (2010). Avaliação de parasitoses intestinais, estado nutricional e indicadores sociais em alunos de quatro escolas do ensino fundamental público da cidade de Divinópolis-Minas Gerais- Brasil. *Aphia*, 4(2): 1-9.
- Pires, E.C.R., Guimarães, F.P., Diniz, J.C., Froeseler, M.V.G., Mata, L.C.C. (2016). Abordagem interdisciplinar das parasitoses intestinais em escolares da microrregião de sete lagoas-MG. *Revista Científicas da UNIPAR*, 20: 111-116.
- Porto, CC. (2019). *Semiologia Médica*. 8ª ed. Rio de Janeiro: Guanabara.
- Santos, K.R., Ciro, E.R., Miranda, L.S.R., Lino, M.N., Sousa Júnior, S.C. (2020). Comparação entre três técnicas coproparasitológicas na investigação de parasitos intestinais de seres humanos. *Revista Eletrônica Acervo Saúde*, 52: 1-9.
- Sociedade Brasileira de Pediatria. (2019). Parasitoses Intestinais. Departamento Científico de Gastroenterologia, 7:1-24.
- Teixeira, P.A., Fantinatti, M., Gonçalves, M.P., da Silva, J.S. (2020). Parasitoses intestinais e saneamento básico no Brasil: estudo de revisão integrativa. *Brazilian Journals*, 6: 22867- 22890.
- Teixeira, J.C., Heller, L. (2004). Fatores ambientais associados às helmintoses intestinais em áreas de assentamento subnormal, Juiz de Fora, MG, 9: 301-305.
- Valadares, M.B, Fonseca, H.M, Welter. (2014), A. Parasitos intestinais em sanitários públicos da cidade de Palmas-TO. *Revista CEREUS*, 6: 1-16.