BJGH Brazilian Journal of Global Health
Revista Brasileira de Saúde Global

Parasitological diagnosis through COPROPLUS® technique in women followed up by Gynecology service during COVID-19 pandemic

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ABSTRACT

OBJECTIVE

To perform parasitological diagnosis in patients followed by the Gynecology service located in the southern zone of São Paulo's capital during COVID-19 pandemic period.

METHOD

Stool samples were subjected to parasitological analysis using the COPROPLUS® methodology. In addition, medical records were reviewed to collect information on medication use, age, and SARS-CoV-2 infection. The results of these analyses were forwarded to the Gynecology and Obstetrics service for medical evaluation.

RESULTS

A total of 103 fecal samples from women were analyzed, revealing a positivity rate of 22.3%. There were 23 positive patients, considering both mono-infections and poly-infections. Parasites such as *Blastocystis* spp. (39.3%) and *Giardia duodenalis* (17.9%) were found, along with commensals like *Endolimax* nana (35.7%) and *Entamoeba coli* (7.1%). No cases of helminth infections were detected.

CONCLUSION

These results help to demonstrate that, even with heightened hygiene and care during the pandemic period, positive cases of parasites and commensals were still found in the fecal samples analyzed.

KEYWORDS

Protozoa; Women; COVID-19 pandemic.

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INTRODUCTION

Intestinal parasitoses represent a significant public health challenge, especially in developing countries, where inadequate sanitation and lack of healthcare access contribute to the high prevalence of these infections. Among the most common etiological agents are protozoa and helminths, which can negatively impact human health, including malnutrition, anemia, and immunological complications.[1] In vulnerable populations, such as women of reproductive age or those with specific clinical conditions, these problems can be even more pronounced.[2,3] The detection and control of these infections are therefore essential for improving quality of life and reducing the global burden of these diseases.

Studies suggest that parasitological techniques performed individually on a single stool sample have low sensitivity.[4] Uparanukraw et al. (1999)[5] demonstrated that analyzing multiple samples increases the sensitivity of the technique. On the other hand, COPROPLUS® is a technique for collecting and filtering a single fecal sample, based on the concentration of parasitological structures. It is a practical adaptation with high diagnostic sensitivity when compared to traditional standard methods that require multiple stool samples.[6]

In the context of COVID-19 pandemic, factors such as changes in hygiene habits and the prophylactic use of antiparasitic medications, such as ivermectin, may have influenced the landscape of parasitic infections. Thus, the present study aimed to identify parasites and commensals in patients followed up at the Gynecology outpatient clinic of Wladimir Arruda Teaching Hospital (HEWA) during COVID-19 pandemic.

METHODS

Ethical Aspects

This study was approved by the Research Ethics Committee of Santo Amaro University under opinion reference number 4.099.178.

Study Population

A total of 103 fecal samples from women followed up at the Gynecology outpatient clinic of Wladimir Arruda Teaching Hospital (HEWA), located in Jardim das Imbuias neighborhood, in the southern zone of São Paulo's capital, were analyzed during COVID-19 pandemic period. The patients were divided into groups according to their clinical characteristics (Table 1). In addition, information was collected from available medical records, such as age, use of medication administered as COVID-19 prophylaxis, and comorbidities.

Table 1 - Characterization of the study population groups treated in the Gynecology service.

Clinical condition	n
Control	45
Diabetic	2
Pregnant	19
Corticosteroid use	7
Menopause	19
More than one comorbidity*	11

*Diabetes and menopause (n=4); Pregnant and corticosteroid use (n=1); Corticosteroid use and menopause (n=3); Diabetes, corticosteroid use and menopause (n=1); Pregnant and diabetic (n=1); Corticosteroid use and diabetes (n=1).

Source: (Authors, 2024)

Sample Processing and Analysis

The collected stool samples were immediately placed in temperature-controlled thermal boxes and transported to the university laboratory of Unisa Research Center (URC).

The stool samples were processed immediately after collection by using COPROPLUS® method (NL Diagnóstica, São Paulo, Brazil). An aliquot of the stool samples was placed in a vial containing preservative solution and homogenized by using circular motions. After 15 minutes, the samples were poured, and a drop was placed on a microscope slide along with a drop of Lugol's iodine, then covered with a coverslip. Three slides were prepared for each sample and examined under optical microscopy at 10x and 40x magnification by two different observers to improve the test's sensitivity.

Data Analysis

All data obtained in this study were recorded and presented in relative form.

RESULTS AND DISCUSSION

Characterization of the Study Population

It was observed that the group composed of pregnant patients had the lowest mean age (31.4 years), followed by the group of chronic corticosteroid users (34.4 years), with both groups presenting a lower mean age than the control group itself (35.2 years) (Table 2). The menopause group had the highest mean age (56.0 years), followed by the group of women with more than one comorbidity (51.6 years).

Table 2 - Mean and standard deviation of the ages of the patients included in the study according to the clinical characteristics of the group.

	Mean age	Standand deviation
Control	35.2	9.26
Diabetics	45.0	7.07
Pregnant	31.4	4.14
Corticosteroid use	34.4	9.20
Menopause	56.0	6.85
More than one comorbidity*	51.6	14.06

Source: (Authors, 2024)

Parasitological Stool Examination Analysis

A total of 103 fecal samples were examined using COPROPLUS® technique, with positivity detected in 23 patients (22.3%). Among the positive results, both parasites and commensals were identified, with mono-infections and poly-infections being recorded. Mono-infections accounted for 78.3% and poly-infections for 21.7%. For the analysis, the total number of cases was considered, including both mono-infections and poly-infections, counting 28 parasitic occurrences.

Among all detected cases, regarding human parasites, 39.3% were infections by *Blastocystis* spp. and 17.9% by *Giardia duodenalis*. No helminths were detected in the tested samples. Concerning commensals, *Endolimax nana* was found in 35.7% of cases and *Entamoeba coli* in 7.1%.

The study by Gondim *et al.* (2019)[7], conducted in another state of the federation (MG), considered a population similar to the one analyzed in our research. On the other hand, the authors reported a higher number of positive cases for intestinal parasites and commensals (41.7% in pregnant women and 37.3% in non-pregnant women). Additionally, the reported results were similar to ours regarding the identified parasites and commensals (*Endolimax nana*, 17.1% and *Giardia intestinalis*, 17.1%), as well as the absence of intestinal helminths.

In the present study, no cases of *Strongyloides stercoralis* infection were diagnosed in the studied population. Among the possible hypotheses, we can highlight the "prophylactic" use of ivermectin during the COVID-19 pandemic, a practice detected in 14.7% of the patients in this study. Ivermectin is indicated for the treatment of parasitic diseases such as strongyloidiasis, onchocerciasis, filariasis, scabies, and pediculosis.[8]

With COVID-19 pandemic, personal hygiene habits intensified. More frequent handwashing, the use of hand sanitizer, and food hygiene became routine habits. Social isolation reduced people's contact with the external environment as well and, consequently, with possible sources of transmission of this parasite.[9]

Although the pandemic improved people's hygiene habits, basic sanitation is something beyond the control of the

studied population. This fact may justify the identification of parasites and commensals such as *Blastocystis spp*. and *Endolimax nana*, respectively, since both can be transmitted through cysts found in untreated water.

Association between parasitological results and the clinical status of the patients

An analysis was carried out considering the presence of parasites and commensals in each study group (Table 3).

Table 3 - Association between the parasites found and the respective groups of patients treated at HEWA, 2021.

	Blastocystis spp. n (%)	*Giardia duodenalis* n (%)	*Endolimax nana* n (%)	*Entamoeba coli* n (%)
Control	5 (45.5%)	3 (60%)	5 (50%)	2 (100%)
Diabetics	-	-	-	-
Pregnant	2 (18.2%)	-	2 (20%)	-
Corticosteroid use	1 (9.1%)	-	1 (10%)	-
Menopause	1 (9.1%)	-	2 (20%)	-
More than one comorbidity*	2 (18.2%)	2 (40%)	-	-

Source: (Authors, 2024)

As illustrated in the table, it can be seen that *Blastocystis spp*. infection was detected in almost all groups. This supports the current literature, which has shown that this is the most frequently found protozoan in human stool parasitological examinations, with a prevalence ranging from 30% to 50% in developing countries.[10,11]

It was observed that the diabetic group did not present any positive diagnoses for either parasites or commensals. Paradoxically, the group with the highest positivity for any parasite or commensal was the control group. By observing these data, we can see that the absence of any clinical condition made the participants more vulnerable to intestinal parasitic infections. Promoting educational measures linked to primary healthcare may be an important educational strategy for this group, as well as for the general population.

CONCLUSION

Even in a scenario of heightened concern with handwashing, it was possible to identify parasitic and commensal protozoa in the stool samples of the patients, indicating issues in the water supply system and/or the absence of specific diagnosis and treatment over the years.

REFERENCES

1. Ahmed M. Intestinal Parasitic Infections in 2023. Gastroenterology Res. 2023 Jun;16(3):127-140.
2. Garg S, Garg A, Ravishankar N, Garg V. Prevalence of intestinal parasitic infections among the pregnant women in South and South East Asian countries: A systematic review and meta-analysis. Trop Parasitol. 2024 Jul-Dec;14(2):71-83.
3. Deku JG, Okyere DO, Buabeng S, Edziah FS, Bedzina I, Kinanyok S, et al. The burden and trend of intestinal parasitosis among women at Berekum, Ghana: a 9-year retrospective study. BMC Infect Dis. 2024 Nov 12;24(1):1287.
4. Inácio SV, Gomes JF, Falcão AX, Martins SB, Soares FA, Nery Loiola SH, et al. Automated Diagnostics: advances in the aiagnosis of Intestinal parasitic infections in humans and animals. Front Vet Sci. 2021 Nov 23;8:715406.
5. Uparanukraw P, Phongsri S, Morakote N. Fluctuations of larval excretion in Strongyloides stercoralis infection. Am J Trop Med Hyg. 1999;60:967–73.
6. Silva CP, Barnabe AS, Mello TR, Ferraz RR, Aranda KR. Perfil de desempenho de técnicas coproscópicas Coproplus® e Hoffman, Pons e Janner no diagnóstico de giardíase. Rev Epidemiol Control Infect. 2024;10(2).
7. Gondim CN, Chagas AA, Barçante TA, Alvarenga IM, Oliveira MM, Barçante JM. Frequency of enteroparasites in non-pregnant women and their children and pregnant women attended at a public health unit. Rev Inst Adolfo Lutz. 2019;78:e1771.
8. Lo NC, Addiss DG, Buonfrate D, Amor A, Anegagrie M, Bisoffi Z, et al. Review of the WHO guideline on preventive chemotherapy for public health control of strongyloidiasis. Lancet Infect Dis. 2024 Oct 28:S1473-3099(24)00595-4.
9. Wong LW, Ong KS, Khoo JR, Goh CBS, Hor JW, Lee SM. Human intestinal parasitic infection: a narrative review on global prevalence and epidemiological insights on preventive, therapeutic and diagnostic strategies for future perspectives. Expert Rev Gastroenterol Hepatol. 2020 Nov;14(11):1093-1105.
10. Melo GB, Mazzaro MC, Gomes-Gouvêa MS, Santos ÉA, Souza LV, Elias-Oliveira J, et al. Blastocystis subtypes in patients with diabetes mellitus from the Midwest region of Brazil. Rev. Inst. Med. Trop. São Paulo [Internet]. 2021.
11. Xu WR, Wang GS, Li Q, Zheng JX, Guo ZY, Chen JX, et al. Blastocystis hominis infection among children with diarrhea under five years of age in Guangzhou City]. Zhongguo Xue Xi Chong Bing Fang Zhi Za Zhi. 2023 Jan 6;34(6):598-603.