

## Impact of the Covid-19 Pandemic on Intestinal Parasitic Infections: A 5-Year Retrospective Study in a Tertiary Care Hospital in Lucknow

Mohd Saqib Hasan\*, Suruchi Shukla, Prerna Singh, Astha Yadav and Gopa Banerjee

Microbiology, King George's Medical University, India

\*Corresponding Author: Mohd Saqib Hasan, Microbiology, King George's Medical University, Lucknow, Uttar Pradesh, India.

Received: May 25, 2024; Published: June 08, 2024

### Abstract

**Introduction:** Intestinal parasitic infections (IPIs) constitute a substantial global health challenge, particularly in developing nations where environmental, socioeconomic, and health factors contribute to their widespread prevalence. This study focuses on protozoan parasites and soil-transmitted helminths, assessing their prevalence and exploring potential shifts in infection rates amid the COVID-19 pandemic.

**Material & Methods:** A retrospective analysis of 3070 stool samples collected from patients admitted to a tertiary care hospital in Lucknow, spanning from January 2018 to December 2023, was conducted. The data were categorized by age groups, gender, and seasonal variations. Statistical analyses, including chi-square tests and t-tests, were employed to evaluate the significance of differences in infection rates across seasons and pre-and post-COVID-19 periods.

**Results:** The study revealed varying prevalence rates across age groups, with the 20-40 age group exhibiting the highest IPI prevalence at 9.6%. Gender disparities were observed, with higher rates in males. Notably, a decrease in IPI cases was observed post-2020, aligning with the onset of the COVID-19 pandemic. *Giardia intestinalis*, *Entamoeba histolytica*, *Ancylostoma duodenale*, *Hymenolopsis nana*, *Ascaris*, and *Strongyloides* were identified in the stool samples, with a shift in prevalence post-2020.

**Conclusion:** This retrospective study provides insights into the complex relationship between the COVID-19 pandemic and the prevalence of intestinal parasitic infections. The observed decline in IPI cases post-2020 suggests the unintended positive consequences of pandemic-induced lifestyle changes on parasitic infections and effect of antiparasitic drugs which were taken prophylactically during pandemic. However, the study acknowledges limitations, and future research employing more sensitive diagnostic methods is recommended.

**Keywords:** protozoan parasites; retrospective study; prevalence; covid-19; intestinal parasitic infections

### Introduction

Intestinal parasites pose a significant health challenge, particularly in developing nations where factors such as poor sanitation, inadequate personal hygiene, poverty, illiteracy, and tropical weather conditions contribute to their widespread prevalence [1]. Globally, an estimated 60% of the population is affected by intestinal parasites, with a notable impact on morbidity and mortality, particularly among children [2].

Protozoan parasites like *Entamoeba histolytica* and soil-transmitted helminths such as *Ascaris lumbricoides* and *Hymenolepis nana* contribute to gastrointestinal disturbances, causing infections and posing a substantial public health concern. The World Health Organization (WHO) identifies amoebiasis, giardiasis, and cryptosporidiosis as major contributors to parasitic morbidity, with millions of infections reported worldwide [3].

Coronavirus Disease 2019 (COVID-19) has emerged as a global health crisis, caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), with the initial cases identified in Wuhan, China, in December 2019. Rapidly spreading worldwide, the World Health Organization declared it a pandemic on March 11, 2020 [4]. Beyond its immediate health implications, the COVID-19 pandemic has significantly impacted lifestyles and quality of life [5], affecting individuals across all age groups [6]. To curb the spread of the virus, countries have implemented preventive measures, including social distancing and stay-at-home policies [7].

Since the prevalence of IPIs is directly associated with environmental sanitation, overcrowding, and personal hygiene [8], health education is effective in reducing IPIs. Therefore, due to the observance of personal and social health during the COVID-19 pandemic, the current study aimed to assess the prevalence of IPIs among patients were admitted in tertiary care hospital in Lucknow by reviewing the available data of hospital information system databases in the pre-and post-COVID-19 pandemic.

## Materials and Methods

This retrospective study aimed to evaluate the incidence of intestinal parasitic infections in 3070 stool samples received at the Department of Microbiology, King George's Medical College, spanning from January 1, 2018, to December 31, 2023.

The collected data were analyzed with a focus on seasonal variation, dividing the samples into distinct seasons to discern any patterns in infection rates. Additionally, the study sought to compare the incidence of intestinal parasitic infections before and after the COVID-19 era, categorizing the data into two periods: up to December 31, 2019, and from January 1, 2020, onwards. Statistical analyses, including chi-square tests or t-tests, were employed to assess the significance of any differences observed in infection rates across seasons and between the two time periods. Ethical considerations were paramount, ensuring adherence to ethical standards and obtaining necessary approvals, particularly when handling sensitive patient data. The findings of this study will not only contribute to our understanding of seasonal variations in intestinal parasitic infections but also shed light on potential changes in infection rates associated with the COVID-19 era.

## Results and Discussion

<i>Age Group</i>	<i>&lt;20 YEARS</i>	<i>20-40</i>	<i>40-60</i>	<i>&gt;60</i>
Positive Findings	28	51	23	5
Total Sample	491	530	1214	835
Prevalence	5.7%	9.6%	1.8%	0.5%

**Table 1:** Age-wise distribution of patient.

[Table 1] In this study, the incidence of IPI is evident across all age groups, with the 20-40 age group exhibiting the highest prevalence at 9.6%, followed by the age group below 20 years (5.7%). Strikingly, the prevalence of intestinal parasites exhibited a notable gender disparity, with higher prevalence rates in males compared to females.

[Table 2] In this retrospective study spanning six years, a total of 3070 stool samples were collected and meticulously screened for intestinal parasites. Microscopic examination revealed specific instances, with 72 cases positive for *Giardia*, 11 for *Entamoeba histolytica*, 15 for *Ancylostoma duodenale*, 4 for *Hymenolopsis nana*, 4 for *Ascaris*, and 1 for *Strongyloides*.

Organism	Pre covid		Post covid				Total
	2018	2019	2020	2021	2022	2023	
Giardia	17	18	1	2	20	14	72
Entamoeba	2	6	0	1	2	0	11
Ascairs	0	2	0	0	0	2	04
Ankylostoma	7	4	0	0	2	2	15
H.nana	2	2	0	0	0	0	04
Strongyloides	0	1	0	0	0	0	01
Sample size	623	869	157	254	610	557	3070
Prevalance	4.4%	3.7%	0.6%	1.1%	3.9%	3.2%	3.4%

**Table 2:** Yearly Distribution of Intestinal parasites.

A notable shift in intestinal parasite cases was observed post-2020, contrasting with the pre-COVID era.

Parasitic infections are endemic worldwide and have been described as constituting the greatest single worldwide cause of illness and disease [9]. These infections are usually associated with poor sanitary habits, lack of access to safe water and improper hygiene. The degree of each factor and the prevalence of infections vary from one region to the other [10].

In our study, we found the highest infection prevalence in 20-40 age group than in <20 which is similar to study by Teimouri et al where age group of 30-39 has highest prevalence [11].

In present study, Among the stool samples showing combined protozoal infections, Giardia intestinalis and Entamoeba species showed high prevalence of 2.70% than the combined helminthic infections A. lumbricoides, and hookworm which was 0.61%% and nematode H. nana and Strongyloides which was 0.16% which is similar to a study done by Fernandez MC et al. 2002 and Younes N et al but specific parasites are different it may be due to different geographical location and different type of subject selection criteria are in different study mention in table: 3 [11-14].

Study	Year	Sample Size	Giardia	Entamoeba	Ascaris	Ankylostoma	H.nana	Strongyloides
Teimouri et al [11]	2022	13686	0.6%	0.7%	0.00		0.01%	0.02%
Destew et al [14]	2021	403	14.7%	19.1%	6.4%	4.2%	0.0	0.0
Tigabu, A et al [13]	2019	364	5.5%	28%	4 %	10.8%	0.8%	2%%
Present Study	2023	3070						

**Table 3:** Table showing distribution of parasitic infection across the different study.

A study by Tigabu et al shows very high prevalence of parasitic infection it may be due there inclusion criteria. They include only gastrointestinal symptomatic patients.

In this investigation, the yearly distribution demonstrates a heightened prevalence in 2018 and 2019 in contrast to the subsequent years after 2020. This suggests a decrease in Intestinal Parasitic Infection (IPI) prevalence during the post-COVID era, consistent with similar patterns identified in a study conducted by Teimouri et al [11].

This observation may be attributed to the close association of Intestinal Parasitic Infections (IPI) with factors such as personal hygiene, environmental sanitation, and overcrowding. Therefore, emphasizing personal and social health practices, particularly during the COVID-19 pandemic, along with the prophylactic administration of the antiparasitic drug ivermectin, could contribute to decreasing the prevalence of parasitic infections after the COVID-19 pandemic.

### *Limitations of the Study*

The current study acknowledges certain limitations. Firstly, biases and variations in diagnostic practices were recognized, and despite these limitations, the study concludes with a thorough interpretation of the results. The paper also highlights potential implications for future research or interventions in public health. The methodology employed in the study was meticulously documented to enhance reproducibility and ensure the reliability of the findings.

Secondly, a notable limitation of the study involves the examination of only a single stool specimen from each participant, which was deemed inadequate. Additionally, the methods employed were not highly sensitive. The study suggests that utilizing a triple faeces test could have significantly increased the frequency of detecting parasitic occurrences compared to relying on a single sample. This underscores the importance of considering these limitations when interpreting the study's outcomes.

### **Conclusion**

This retrospective study provides insights into the complex relationship between the COVID-19 pandemic and the prevalence of intestinal parasitic infections. The observed decline in IPI cases post-2020 suggests the unintended positive consequences of pandemic-induced lifestyle changes on parasitic infections and effect of antiparasitic drugs which were taken prophylactically during pandemic. However, the study acknowledges limitations, and future research employing more sensitive diagnostic methods is recommended.

### **References**

1. Sadeghi H and Borji H. "A survey of intestinal parasites in a population in Qazvin, north of Iran". *Asian Pac J Trop Dis* 5 (2015): 231-233.
2. Kang G., et al. "Prevalence of intestinal parasites in rural Southern Indians". *Trop Med Int Health* 3.1 (1998): 70-5.
3. World Health Organization. *Prevention and Control of Intestinal Parasitic Infections*. Geneva: WHO. (2002).
4. Roberts DL, Rossman JS and Jarić I. "Dating first cases of COVID-19". *PLoS Pathog* 17 (2021): 1009620.
5. Sharma A., et al. "Severe acute respiratory syndrome coronavirus -2 (SARS-CoV-2): a global pandemic and treatments strategies". *Int J Antimicrob Agents* 56 (2020): 106054.
6. Liu W., et al. "Detection of COVID-19 in children in early January 2020 in Wuhan". *China N Engl J Med* 382 (2020): 1370-1371.
7. World Health Organization. *Coronavirus disease 19* (2020): 73.
8. Feleke BE., et al. "Intestinal parasitic infection among household contacts of primary cases, a comparative cross-sectional study". *PLoS ONE* 14 (2019): 0221190.
9. J Keiser and J Utzinger. "The drugs we have and the drugs we need against major helminth infections". *Adv Parasitol* 73 (2010): 197-230.
10. Teimouri A., et al. "Intestinal parasitic infections among patients referred to hospitals affiliated to Shiraz University of Medical Sciences, southern Iran: a retrospective study in pre- and post-COVID-19 pandemic". *Environ Sci Pollut Res* 29 (2022): 36911-36919.
11. Fernandez MC., et al. "A comparative study of the intestinal parasites prevalent among children living in rural and urban settings in and around Chennai". *J Comm Dis* 34 (2002): 35-9.
12. Younes N., et al. "Socio-demographic influences on the prevalence of intestinal parasitic infections among workers in Qatar". *Parasit Vectors* 1186 (2021): 13071-020.

13. Tigabu A., et al. "Prevalence and associated factors of intestinal parasitic infections among patients attending Shahura Health Center, Northwest Ethiopia". BMC Res Notes 12 (2019): 333.
14. Destaw Damtie., et al. "Human: Intestinal Parasitic Infections: Prevalence and Associated Risk Factors among Elementary School Children in Merawi Town, Northwest Ethiopia". Journal of Parasitology Research (2021): 8894089-10.

**Volume 6 Issue 6 June 2024**

**© All rights are reserved by Mohd Saqib Hasan., et al.**