

# Detection of Intestinal Parasitic Ova, Cyst, and Trophozoites at a Teaching Hospital in Southwestern Nepal

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## ABSTRACT

**Introduction:** Intestinal parasitic infections are one of the most common infections in world and account for significant burden of human disease in developing countries. Intestinal parasitosis represents relevant clinical problem responsible for morbidity and mortality in all age groups.

**Objective:** To determine the prevalence of parasitic infection in patients, to isolate various forms (egg, cyst) of intestinal parasites and to find out prevalence rate of intestinal parasitaemia.

**Materials and Method:** This was hospital-based descriptive cross-sectional study conducted at Nepalgunj Medical College after institutional ethical approval from September 16, 2021 to November 21, 2021. Before receiving samples using convenience sampling, data on age, sex, water source, personal hygiene habits, and presence of gastrointestinal tract symptoms were collected. Stool samples were collected from patients in screw-capped plastic containers. Microscopic examinations of smear were made directly from sample under low-power to find eggs or larvae. Data were analysed for simple descriptive analysis using Microsoft Excel: frequency and percent distribution were calculated.

**Result:** Out of 200 stool samples collected, only 32 samples were found to be positive. Hence, the overall prevalence of intestinal parasites was found to be 16% with 32 positive cases, female being highly infected (18, 9%) than males (14, 7%). *Entamoeba histolytica* was seen in 28 (14%), *Giardia lamblia* in two (1%), and *Ancylostoma duodenale* in two (1%).

**Conclusion:** Findings of this study reveal that protozoa were found more prevalent than helminths. Continuing education on personal hygiene and clean drinking water can be advantageous to decrease the prevalence of IPIs.

**Keywords:** *Entamoeba histolytica*; intestinal parasitic infections; prevalence.

## INTRODUCTION

Intestinal parasitic infections (IPIs) are common infection in world.<sup>1</sup> The IPIs caused by soil-transmitted helminths (*Ascaris lumbricoides*, hookworm, and *Trichuris trichiura*), and pathogenic intestinal protozoa (*Giardia intestinalis* and *Entamoeba histolytica*) are major public health concern in low- and middle-income countries.<sup>2</sup>

They account for significant burden of human disease in developing countries.<sup>3</sup>

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The IPIs are commonest causes of diarrhoea in developing countries. Globally 1.5 billion people are infected with soil-transmitted helminths, above 267 million preschool children, and over 568 million school-age children live in intestinal helminths prevalent area.<sup>4</sup> High prevalence of intestinal parasitic infestations is closely correlated to poverty, poor sanitation, and hygiene, and impoverished health services.<sup>5</sup> Patients attending a tertiary care centre in south India study showed different parasites in 22.2% subjects.<sup>6</sup> IPIs are common in Nepal and studies report that 19.9% are infected by intestinal parasite.<sup>7,8</sup>

Transmission of eggs/cyst is more rapid in tropical weather conditions and the eggs are highly fertile and facilitate easier hatching for the larvae. Signs and symptoms of STHs infection are diarrhoea, abdominal pain, protein and blood loss, and physical and cognitive growth retardation.<sup>9</sup>

Stool analysis, a common laboratory test, is also used to confirm presence of specific parasites related to specific clinical condition.<sup>10</sup>

## MATERIALS AND METHOD

A hospital-based cross-sectional study was conducted from September 16, 2021 to November 21, 2021 in the Department of Microbiology, Nepalgunj Medical College Teaching Hospital, Banke, Nepal. The patients with abdominal symptoms were included in this study. The study was approved by institutional ethical committee (Ref. 166/078-079) and informed consent was obtained from all the subjects.

The objectives of this study were to determine the prevalence of parasitic infection in outpatient department (OPD) patients, isolate various forms (egg, cyst) of intestinal parasites and find out the prevalence rate of intestinal parasitaemia.

A total of 200 stool samples were collected utilising convenience sampling technique from OPD patients in a screw-capped plastic container. Patients were requested to collect stool sample avoiding contamination of urine, water and other substances in the container. All the samples

were processed using standard guideline. Before receiving the sample data regarding on age, sex, water source, personal hygiene habits, and presence of gastrointestinal tract symptoms were collected. Microscopic examinations of the smear were made directly from the sample under low-power that enabled to find the eggs or larvae.<sup>11</sup>

Following procedure was done for data collection: A) Saline specimen solution: i) drop of normal saline on a glass slide was placed; ii) little faecal material by using an applicator sticks were taken and mixed with a drop of normal saline; iii) cover slip placed over it. Avoid formation of air bubble below the cover slip. B) Iodine specimen preparation: i) a drop of Lugol's iodine placed on the slide; ii) little faecal material with a drop of iodine solution was mixed; iii) cover slip over the specimen placed.

Data collection was done in a preformed data collection sheet and results. Collected data was coded as per variables and enter in Microsoft Office Excel Worksheet and analysed. Categorical variables were described with counts.

## RESULT

In this present study, 90 (45%) male and 110 (55%) female were included. Out of 200 stool samples collected, only 32 (16%) samples were found to be positive. Among the 32 positive cases, 18 (9%) were female and 14 (7%) were male. The overall prevalence of intestinal parasites was found to be 16% (n = 32), female being highly infected (18, 9%) than male (14, 7%). Among all infected cases only single parasitic infection was detected. Three different species of parasites was recovered out of them two were protozoan parasites and one helminthic parasite. Among two protozoans *Entamoeba histolytica* accounts 28 (14%) and *Giardia lamblia* two (1%). From helminthic parasite, *Ancylostoma duodenale* accounts two (1%).

There were highest study subjects grouped under 21-40 years of age groups and lowest in more than 81 years of age group. Study subjects were divided on the basis of gender and different age group (Table 1).

**Table 1: Distribution of male and female in relation to different age group.**

Age/Sex	Male, n (%)	Female, n (%)	Total, n (%)
0-20 years	23 (11.5)	27 (13.5)	50 (25)
21-40 years	29 (14.5)	40 (20)	69 (34.5)
41-60 years	28 (14)	28 (14)	56 (28)
61-80	6 (3)	13 (6.5)	19 (9.5)
>81	4 (2)	2 (1)	6 (3)
Total	90 (45)	110 (55)	200 (100)

**Table 2: Distribution of parasite findings and gender in relation to different age group, n (%).**

Age/ Parasite	Cyst of <i>Entamoeba histolytica</i>		Cyst of <i>Giardia lamblia</i>		Ova of <i>Ancylostoma duodenale</i>		Total, n (%)
	Male	Female	Male	Female	Male	Female	
Age (years)							
0-20	4 (2)	6 (3)					10 (5)
21-40	6 (3)	4 (2)				2 (1)	12 (6)
41-60	4 (2)						4 (2)
61-80		4 (2)					4 (2)
>81				2 (1)			2 (1)
Total	14 (7)	14 (7)		2 (1)		2 (1)	32 (16)

Based on age, there were similar result of *Entamoeba histolytica* seen in 0-20 years and 21-40 years of age groups. Different intestinal parasite infections were seen on 21-40 years of age group. *Ancylostoma duodenale* were isolated from 21-40 years of age group. *Giardia lamblia* infections were seen on only more than 81 years of age group. *Ancylostoma duodenale* and *Giardia lamblia* both isolated from female patients. Finding of parasites related to gender and different age group are shown on Table 2.

## DISCUSSION

Intestinal parasitosis represents a relevant clinical problem where they are responsible for morbidity and mortality in children, adults and many epidemiological data are available especially in developing countries.<sup>12</sup> Nepal is a landlocked developing country, located in South Asia where diseases such as diarrhoea, gastrointestinal disorders, and intestinal parasites are prevalent.<sup>13</sup>

The several studies carried out in different parts of India have reported high intestinal parasite prevalence from 50% to 65% among school going children.<sup>14</sup>

In Nepal, intestinal parasitosis is still prevalent because most of the family having a relatively low-economic status,<sup>15</sup> where they could not offer quality care and good personal hygiene.<sup>13</sup> Although the prevalence of parasitic infection of Nepal is declining compared to this current study 32 (16%) patients were found to be affected with intestinal parasites and prevalence of current study with previous reports from different parts of Nepal; Kathmandu 19.9%,<sup>8</sup> Kaski 21.3%,<sup>16</sup> and Saptari 33%.<sup>17</sup> The reducing of prevalence of intestinal parasite infections could be due to the periodic deworming and awareness campaigns conducted by the government.<sup>18</sup>

Beside helminths and protozoan parasites were found to be prevalent in this study. The higher prevalence of protozoan infections may be owing to higher contamination of drinking water with protozoa compared to helminths. Three species of parasites were detected in the stool samples. *Entamoeba histolytica* (28, 14%) was the most prevalent species, followed by *Giardia lamblia* (2, 1%) and *Ancylostoma duodenale* accounts (1%). Previous studies have also reported more cases of protozoa than helminthic parasites.<sup>19</sup> In case of

protozoan, most of the previous studies showed there are higher prevalence of *Giardia lamblia* than *Entamoeba histolytica*,<sup>8,17</sup> but in this current study, *Entamoeba histolytica* was most prevalent.

## CONCLUSION

Intestinal parasite infections are important public health problem in Nepal. Current study revealed the prevalence of intestinal parasite infections of hospital coming patients. Furthermore, protozoa were found more prevalent than helminths, which might be linked with drinking water. Health

awareness program should provide all age groups and genders. This study suggests a need for multi-sectoral plans along with awareness of good health practices, installation of mass water filter and chlorination of drinking water which could narrow down the burden of parasitic infections. Molecular techniques would be helpful for a proper diagnosis to implement effective prophylaxis.

**Conflict of interest:** None.



## REFERENCES

1. Dhambhare DG, Bhambe MS, Garg BS. Intestinal parasites prevalence and related factors among school children in the rural area of central India. *J Community Dis.* 2010;42(4):281-6. [[PubMed](#) | [Full Text](#) | [DOI](#)]
2. Hotez PJ, Alvarado M, Basáñez MG, Bolliger I, Bourne R, Boussinesq M, et al. The global burden of disease study 2010: Interpretation and implications for the neglected tropical diseases. *PLoS Negl Trop Dis.* 2014;24;8(7):e2865. [[PubMed](#) | [Full Text](#) | [DOI](#)]
3. M. Endris, Z. Tekeste, W. Lemma, A. Kassu. Comparison of the Kato-Katz, Wet Mount, and Formol-Ether concentration diagnostic techniques for intestinal helminth infections in Ethiopia. *ISRN Parasitology.* 2013;2013:5. [[PubMed](#) | [Full Text](#) | [DOI](#)]
4. WHO. Fact sheet, soil-transmitted helminth infections. <https://www.who.int/en/news-room/fact-sheet/s/detail/soil-transmitted-helminth-infections>. Accessed 2 Feb 2019. [[Full Text](#)]
5. Albonico M, Crompton DW, Savioli L. Control strategies for human intestinal nematode infections. *Adv Parasitol.* 1999;42:277-341. [[Full Text](#) | [DOI](#)]
6. Manochitra K, Padukone S, Philips SA, Parija SC. Prevalence of intestinal parasites among patients attending a tertiary care centre in South India. *Int J Curr Microbiol App Sci.* 2016;5(9):190-7. [[Full Text](#) | [DOI](#)]
7. Rai SK, Gurung CK. Intestinal parasitic infection in high school children of Birgunj city. *J Inst Med.* 1986;8:33-8. [[Full Text](#) | [DOI](#)]
8. Shrestha J, Bhattachan B, Rai G, Park EY, Rai SK. Intestinal parasitic infections among public and private schoolchildren of Kathmandu, Nepal: Prevalence and associated risk factors. *BMC Res Notes.* 2019;12:192. [[Full Text](#) | [DOI](#)]
9. WHO. Preventive chemotherapy for helminth diseases: Progress report, 2014. *WER.* 2016;91(8):93-103. [[Full Text](#)]
10. Eligail AM, Masawi AM, Al-Jaser NM, Abdelrahman KA, Shah AH. Audit of stool analysis results to ensure the prevalence of common types of intestinal parasites in Riyadh region, Saudi Arabia. *Saudi J Biolog Sci.* 2010;17:1-4. [[PubMed](#) | [Full Text](#) | [DOI](#)]
11. Chatterjee KD. *Parasitology (protozoology and helminthology)*. 13th ed. CBS Publishers & Distributors Private Limited, New Delhi. 2009:263-65. [[Full Text](#)]
12. Peruzzi S, Gorrini C, Piccolo G, Calderaro A. Prevalence of intestinal parasite in the area of Parma during the year 2005. *Actobiomed.* 2006;77:147-51. [[PubMed](#) | [Full Text](#) | [DOI](#)]
13. Tandukar S, Ansari S, Adhikari N, Shrestha A, Gautam J, Sharma B, et al. Intestinal parasitosis in school children of Lalitpur district of Nepal. *BMC Res Notes.* 2013;6(1):449. [[Full Text](#) | [DOI](#)]
14. Chakma T, Rao PV, Tiwary RS. Prevalence of anaemia and worm infestation in tribal areas of Madhya Pradesh. *J Indian Med Assoc.* 2000;98(9):570-1. [[PubMed](#) | [Full Text](#) | [DOI](#)]
15. Sherchand P, Joshi DR, Adhikari N, Gurung K, Pant K, Pun R, et al. Intestinal parasitosis among school going children. *JHAS.* 2010;1(1):12-5. [[Full Text](#) | [DOI](#)]
16. Chandrashekhar T, Joshi H, Gurung M, Subba S, Rana M, Shivananda P. Prevalence and distribution of intestinal parasitic infestations among school children in Kaski District, Western Nepal. *JMBR.* 2005;4(1):78-82. [[Full Text](#) | [DOI](#)]
17. Gupta R, Rayamajhee B, Sherchan SP, Rai G, Mukhiya RK, Khanal B, et al. Prevalence of intestinal parasitosis and associated risk factors among school children of Saptari district, Nepal. *Trop Med Health.* 2020;48:73. [[Full Text](#) | [DOI](#)]
18. Adhikari S, Shrestha NL. School led total sanitation: A successful model to promote school and community sanitation and hygiene in Nepal. In: James W, Joep V, Christine S, Carmen DS, Peter R, editors. *Beyond construction use by all, A collection of case studies from sanitation and hygiene promotion practitioners in South Asia.* London: Water Aid;2008:113-25. <http://www.irc.nl/page/40578>. [[Full Text](#) | [DOI](#)]
19. Rai SK. Changing trend of infectious diseases in Nepal. In: *Infectious Diseases and Nanomedicine III.* Singapore: Springer; 2018:19-38. [[Full Text](#) | [DOI](#)]