

Original Research Article

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## Spectrum of Intestinal Parasitic Infections (IPIs) in Pediatric Population in a Tertiary Care Hospital

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### ABSTRACT

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Parasitic infections are among the most common infections and one of the biggest health problems of the society worldwide. Pediatric age group have the highest morbidity compared with other age groups and by treating these children, the disease burden in the total population is reduced. The aim of this study was to determine the spectrum of intestinal parasitic infections in pediatric population attending the pediatric tertiary care hospital. Study was performed on 1029 stool specimens of pediatric age group from February 2017 to July 2017. Specimen were collected and examined with saline and iodine wet mount preparations. The negative samples were subjected to further screening by formal ether concentration technique. Prevalence of intestinal parasitic infections was 10.39%. Among the protozoa, *Giardia lamblia* (58%) was the most common, followed by *Entamoeba histolytica* (9.8%). *Ascaris lumbricoides* (24%) was the most common helminth found. Health education, good sanitation and availability of clean drinking water supply will go a long way in decreasing the global burden of intestinal parasitic infections.

### Introduction

Intestinal parasitic infections are among the most common infections worldwide<sup>1</sup>. It is estimated that some 3.5 billion people around the world are affected as a result of these infections, the majority being children<sup>2</sup>. Intestinal parasitic infections (IPI's) are a serious health problem affecting mainly the developing countries<sup>3, 4</sup>. These infections can lead to anemia, malnutrition and cognitive impairment in pediatric population<sup>4-6</sup>.

The widespread nature and global impact of these infections is revealed by the fact that infections by Soil Transmitted Helminths (STHs) have been included as 'Neglected Tropical Diseases' (NTDs) in the initiative taken by WHO<sup>7</sup>.

While *Giardia* is the most common water borne parasite infecting man worldwide<sup>8</sup>, roundworms (*Ascaris lumbricoides*) are the most prevalent STH in the country<sup>9</sup>. Several studies have dealt with the prevalence and risk factors associated with IPIs by mass survey of specific population in a localized area<sup>10-12</sup>.

As an outcome, IPIs were detected mostly in asymptomatic carriers.

This study was conducted to determine the Spectrum of IPIs among symptomatic pediatric population attending a Tertiary Care Hospital, New Delhi over a period of 6 months.

## Materials and Methods

The study was conducted in the Department of Microbiology, Lady Hardinge Medical College, New Delhi from February 2017 to July 2017. A total of 1029 stool samples from 1029 pediatric patients attending the various outpatient departments and admitted in indoor wards were processed for detection of ova and cysts as per physician's request. Samples were collected in wide mouthed containers having no preservative and were transported to the laboratory within 2 hours of collection. The stool samples were observed macroscopically for the presence of adult worms and segments of *Tinea* species. The same samples were also screened microscopically for the presence of ova, cysts and trophozoites by saline and iodine preparations. The samples negative were subjected to further screening after formal ether concentration technique<sup>13</sup>.

## Statistical analysis

Patient details and all the relevant data were analysed and recorded in Microsoft Excel 2010. Cases were divided in three age groups, 0-5 years, 6-10 years and 11-14 years (Table 1).

## Results and Discussion

A total of 1029 cases were studied comprising of 610 (59.28%) males and 419 (40.7%) females. The prevalence of IPIs was 10.39% (107 cases). The parasitic infection was

highest in the age group of 6-10 years (10.37%) (Table 1). The spectrum of different IPIs has been shown in (Table 2). The most common parasite was cyst of *Giardia lamblia* (58%) followed by *Ascarislumbricoides* (24%). Mixed infections were seen in 4 cases (3.73%) (Table 3). Prevalence of IPIs were more in outpatients (11.49%) compared to inpatients (9.38%) (Table 4). Prevalence of *Giardia lamblia* and *Ascarislumbricoides* infection was highest in the age group 0-5 years (Table 5).

The present study showed the occurrence of different intestinal parasites of public health importance in a pediatric population. Poor socio-economic and unhygienic conditions have been largely associated with this global burden, as has been demonstrated in studies from rural<sup>14-16</sup> and urban<sup>17, 18</sup> slum areas. We found a prevalence of 10.39% which is in accordance with the studies by Manish Kumar *et al.*,<sup>19</sup> Kotian *et al.*,<sup>20</sup> Ragunathan *et al.*,<sup>21</sup> and Davane *et al.*,<sup>22</sup> but low when we compare it with the studies by DS Shubha *et al.*,<sup>23</sup> Bora D *et al.*,<sup>16</sup> and Nasir Salam *et al.*,<sup>24</sup>. In all the above studies, a certain population/group with associated risk factors like poverty, poor sanitation has been studied whereas in our study, prevalence of IPI among symptomatic patients attending the tertiary care hospital have been considered which is the probable reason for the low prevalence, highlighting the fact that asymptomatic carriers of IPIs might make up the bulk of the global burden<sup>19</sup>.

**Table.1** Age groups

Age group (in years)	Total	Positive no. (%)
0-5	502	46 (9.16%)
6-10	347	36 (10.37%)
11-15	180	25 (13.8 %)

**Table.2** Intestinal parasites isolated from stool samples

Agents causing IPIs	No. (%)
<i>Giardia lamblia</i>	65 (58%)
<i>Entamoeba histolytica</i>	11 (9.8%)
<i>Ascarislumbricoides</i>	27 (24%)
<i>Hymenolepis nana</i>	05 (4.4%)
<i>Ancylostomaduodenale</i>	03 (2.6%)
<i>Trichuristrichiura</i>	01 (0.89%)
<b>TOTAL</b>	<b>112</b>

**Table.3** Multiple Parasitic infections

<i>Ascarislumbricoides</i> + <i>Giardia lamblia</i>	1
<i>Ascarislumbricoides</i> + <i>Hymenolepis nana</i>	1
<i>Trichuristrichiura</i> + <i>Ascarislumbricoides</i> + <i>Giardia lamblia</i>	1
<i>Entamoeba histolytica</i> + <i>Giardia lamblia</i>	1

**Table.4** Distribution of intestinal parasites in outpatients and inpatients

	Positive no. (%)	Negative no. (%)	Total
<b>Inpatient</b>	50 (9.38%)	483 (90.61%)	533
<b>Outpatient</b>	57 (11.49%)	439 (88.50%)	496

**Table.5** Prevalence of IPIs in various age groups (age in years)

Agents	0-5 no. (%)	6-10 no. (%)	11-15 no. (%)
Cyst of <i>Giardia lamblia</i> (65)	32 (49.23%)	26 (40%)	7 (10.77%)
Cyst of <i>Entamoeba histolytica</i> (11)	5 (45.45%)	5 (45.45%)	1 (9.09%)
<i>Ascaris lumbricoides</i> (27)	10 (37.04%)	7 (25.93%)	10 (37.04%)
<i>Hymenolepis nana</i> (05)	2 (40%)	2 (40%)	1 (20%)
<i>Ancylostoma duodenale</i> (03)	2 (66.67%)	1 (33.33%)	0 (0.00%)
<i>Trichuris trichiura</i> (01)	1 (100%)	0 (0.00%)	0 (0.00%)

Also the wide variation in the prevalence of intestinal parasites may be due to variations in factors like local quality of drinking water

supply, sanitation and other environmental conditions<sup>20</sup>. In the present study, it was observed that prevalence of intestinal parasitic

infection among females (10.5%) and males (10.3%) were comparable. *Giardia lamblia* was the most prevalent protozoa in this study which is in accordance with many studies conducted previously<sup>20, 25, 26</sup>. It gets transmitted by feco-oral route by drinking contaminated water as it is a common environmental contaminant of water supply. The most common STH seen in our study was *Ascaris lumbricoides* which was also observed in other studies<sup>10, 27, 28, 29</sup>.

### Limitations

Firstly, we missed asymptomatic patients as it was not a prevalence study. About 90% of infected individuals remain asymptomatic and hence do not present to the hospital<sup>30</sup>. Secondly, single stool examination was done while optimal laboratory diagnosis of intestinal parasitic infection requires the examination of at least three stool specimens collected over several days.

The study revealed the widespread distribution of intestinal parasites among symptomatic pediatric patients. It highlights the need for deworming, integrated drug treatment and hygiene education in children and their parents. Good hygiene and sanitary condition, availability of clean drinking water supply and education will play an important role in reducing the prevalence of IPIs in the near future.

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