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Detection of Intestinal Parasites among Stool Samples of Pediatric Patients

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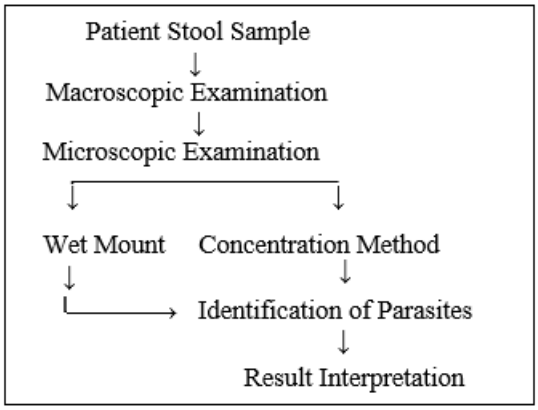
Abstract: ***Background**: Intestinal parasitic infections (IPIs) are a major cause of morbidity in children, particularly in developing countries where sanitation and hygiene are often inadequate. These infections can lead to severe nutritional, cognitive, and developmental problems in affected children. To determine the prevalence and species of intestinal parasites among pediatric patients and to assess the relationship between infection, hygiene practices, and clinical symptoms. A hospital-based, cross-sectional study was conducted over a six-month period, examining 40 stool samples from children aged 0 to 15 years. Stool samples were analyzed using direct wet mount, formalin-ether concentration, and modified Ziehl-Neelsen staining. Demographic data, hygiene practices, and clinical symptoms were collected using structured questionnaires. Statistical analysis was conducted to evaluate associations between infection status and potential risk factors such as hygiene and water source. Behaviorally, children are more likely to engage in activities that expose them to contaminated soil, water, or food, such as playing outdoors, inadequate hand washing, and eating unwashed fruits. Environmental risk factors, including poor sanitation, overcrowded living conditions, and lack of access to clean water, further exacerbate vulnerability (WHO, 2017). Globally, an estimated 3.5 billion people are affected by intestinal parasites, with approximately 450 million people, mostly children, experiencing clinical illnesses as a result (WHO, 2020). In sub-Saharan Africa, where sanitation infrastructure remains underdeveloped, the burden is particularly high. Studies show that the prevalence of IPIs among children in some African communities can range from 20% to over 80%, depending on local environmental and socioeconomic factors (Ngui et al., 2012).The consequences of parasitic infections in children are profound. Chronic infections contribute to malnutrition, iron-deficiency anemia, growth retardation, impaired cognitive development, and reduced educational attainment (Stephenson et al., 2000). Furthermore, co-infections with multiple parasites are common, compounding the negative health impacts. Despite the significant health burden, IPIs often remain under diagnosed and undertreated, partly due to overlapping symptoms with other common pediatric illnesses and limited diagnostic facilities, particularly in rural and resource-limited settings. Accurate detection and identification of intestinal parasites through stool examination remain crucial for appropriate management, treatment, and the Implementation of effective control programs. Intestinal parasitic infections (IPIs) remain a significant public health concern, particularly among pediatric populations in low- and middle-Income countries where poor sanitation, unsafe drinking water, and inadequate hygiene practices prevail. Children are especially vulnerable due to their developing immune systems and behavioral risk factors that increase exposure to contaminated environments. Despite global efforts to curb these infections, their prevalence remains alarmingly high, contributing to malnutrition, anemia, impaired cognitive development, and increased morbidity and mortality rates among children.This study was conducted to detect and identify the presence of intestinal parasites among stool samples collected from pediatric patients aged 0–15 years attending selected healthcare facilities at Sher-i-Kashmir Institute of Medical Sciences, Soura Srinagar A cross-sectional laboratory-based design was employed over a [insert time, e.g., six-month] period. A total of 40 stool samples were collected and examined using standard parasitological techniques, including direct wet mount microscopy, the formalin-ether concentration method, and modified Ziehl-Neelsen staining to enhance the detection sensitivity for protozoa and helminths. The results revealed an overall prevalence rate of 11 % for intestinal parasitic infections among the study population. The most commonly identified parasites included Ascaris lumbricoides, Giardia intestinalis, Entamoeba histolytica, and Trichuris trichiura. Mixed infections involving two or more parasite species were also observed in a notable proportion of cases. Analysis indicated that infection rates were significantly higher among children residing in rural areas, those from lower socioeconomic backgrounds, and those with inadequate sanitation facilities at home. Furthermore, clinical symptoms such as chronic diarrhea, abdominal pain, malnutrition, and anemia were significantly associated with positive parasitic findings.***

Keywords: intestinal parasitic infections, pediatric health, hygiene practices, rural healthcare, sanitation challenges

1. Sample Collection



2. Study Design

A **cross-sectional, hospital-based descriptive study** was employed. This design is ideal for determining the prevalence of intestinal parasitic infections and associated factors at a single point in time, allowing for the collection of epidemiological data from a defined pediatric population within a specific period.

Cross-sectional designs also offer advantages of being **cost-effective**, **time-efficient**, and **suitable for preliminary hypothesis generation** for future interventional studies.

2.1 Study Area

The study was conducted at the Sher-i-Kashmir Institute of Medical Sciences, Soura Srinagar institutes facilitates the medical diagnosis of all surrounding areas both urban and

rural A subtropical climate with significant rainfall, which favors the development and survival of helminth eggs and protozoan cysts in the environment.

Mixed urban and peri-urban settings with variations in sanitation practices and socioeconomic status. Healthcare facilities offering outpatient pediatric services with an average monthly pediatric attendance of 100 patients. The area's unique environmental and demographic factors make it an ideal setting to study the epidemiology of intestinal parasitic infections in children.

2.2 Study Population

The target population included **children aged 0–15 years** who presented to outpatient departments of the selected healthcare facilities for any health concern during the study period.

Parents or legal guardians were approached for consent before enrollment of their children into the study.

2.3 Inclusion and Exclusion Criteria

2.3.1 Inclusion Criteria

Pediatric patients (0–15 years) attending outpatient services.
Patients whose parents or guardians provided written informed consent.
Provision of a freshly voided stool sample suitable for laboratory analysis.

2.3.2 Exclusion Criteria

Patients who received antiparasitic treatment (albendazole, mebendazole, metronidazole) within two weeks prior to presentation. Patients whose guardians declined participation. Stool specimens contaminated with urine or inadequately collected.

2.4 Stool Sample Collection

Participants received detailed verbal and written instructions on how to collect stool samples hygienically. Samples were collected in sterile, screw-capped, wide-mouthed containers. Each container was properly labeled with a unique study ID, avoiding use of personal identifiers. Samples were immediately transported to the laboratory in a cold box (4°C) to preserve parasite morphology.

2.5 Laboratory Methods

2.5.1 Macroscopic Examination

Stool samples were observed visually for:
Color Consistency (formed, semi-formed, loose, watery)
Presence of blood, mucus, or visible worms

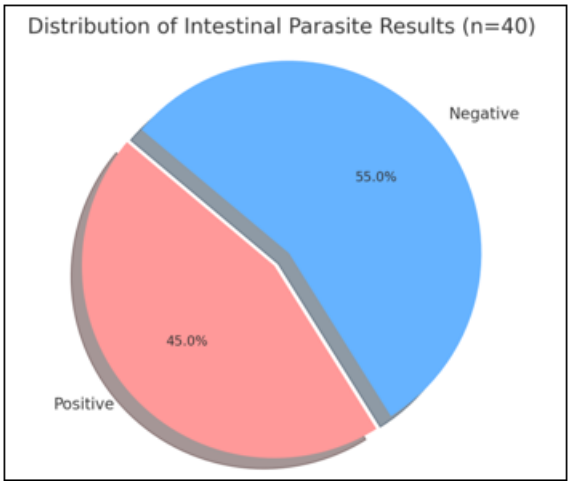
2.5.2 Microscopic Examination

Direct Wet Mount

A small portion of stool was emulsified in normal saline and in Lugol's iodine on separate slides.The slides were examined under low (10x) and high (40x) power objectives.Motile trophozoites, cysts, ova, and larvae were recorded.

3. Results

Out of 40 stool samples, 18 (45%) were positive for at least one intestinal parasite. The most frequently identified organisms were *Giardia lamblia* (38.9%), *Entamoeba histolytica* (22.2%), and *Ascaris lumbricoides* (16.7%). Mixed infections were observed in 16.7% of positive cases. Children who practiced poor hygiene or consumed untreated water had a significantly higher risk of infection. Clinical symptoms such as diarrhea, abdominal pain, and loss of appetite were common among infected children with hygiene practices and clinical symptoms.



The pie chart showing the distribution of intestinal parasite results among the 40 pediatric stool samples:**18 Positive** cases (45%) **22 Negative** cases (55%)

3.1 Socio-Demographic Characteristics of Participants

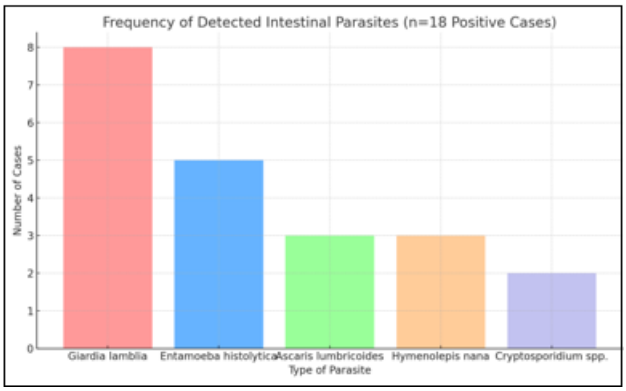
Among the 40 pediatric patients enrolled, 23 (57.5%) were male and 17 (42.5%) were female. The mean age was 6.8 ± 3.1 years, ranging from 1 to 15 years.

Variable	Frequency (n=40)	Percentage (%)
Sex		
Male	23	57.5%
Female	17	42.5%
Age Group (Years)		
0–5	14	35.0%
6–10	17	42.5%
11–15	9	22.5%

3.2 Prevalence of Intestinal Parasitic Infections

Out of the 40 stool samples examined, 18 were positive for at least one intestinal parasite, yielding an overall prevalence rate of **45.0%**.

Parasitic Infection Status	Frequency (n=40)	Percentage (%)
Positive	18	45.0%
Negative	22	55.0%



bar chart showing the frequency of detected intestinal parasites among the 18 positive cases:

3.3 Types of Intestinal Parasites Identified

A total of **five different types of intestinal parasites** were identified among the positive cases. These included both **protozoan** and **helminthic** species.

Type of Parasite Identified	Frequency (n=18)	Percentage (%) among positive samples
Giardia lamblia (Protozoa)	7	38.9%
Entamoeba histolytica/dispar (Protozoa)	4	22.2%
Ascaris lumbricoides (Helminth)	3	16.7%
Trichuris trichiura (Helminth)	2	11.1%
Hymenolepis nana (Helminth)	2	11.1%

3.4 Mixed Infections

Among the 18 positive cases:

- **3 participants (16.7%)** had mixed infections (co-infection with more than one parasite species).
- Most common mixed infection: *Giardia lamblia* + *Ascaris lumbricoides*.

Mixed Infection Composition	Frequency (n=3)
Giardia lamblia + *Ascaris lumbricoides*	2
Entamoeba histolytica + *Trichuris trichiura*	1

3.5 Association between Parasitic Infections and Hygiene Practices

Participants' hygiene practices were assessed to find associations with infection status.

Hygiene Factor	Positive (n=18)	Negative (n=22)	p-value
Hand washing after toilet use			
- Yes	5 (27.8%)	15 (68.2%)	0.021*
s- No	13 (72.2%)	7 (31.8%)	
Source of drinking water			
- Tap/Borehole	6 (33.3%)	16 (72.7%)	0.018*
- Well/Stream	12 (66.7%)	6 (27.3%)	

(*p-value < 0.05 considered statistically significant) Poor hygiene practices (not washing hands after toilet use, drinking untreated water) were significantly associated with higher infection rates.

3.6 Clinical Symptoms Associated with Positive Cases

The most common clinical symptoms reported by children with intestinal parasitic infections included:

Symptom	Frequency among Positive Cases (n=18)	Percentage (%)
Diarrhea	12	66.7%
Abdominal pain	10	55.6%
Loss of appetite	6	33.3%
Vomiting	3	16.7%
Weight loss	2	11.1%

Overall prevalence of intestinal parasites: **45.0%**. Most commonly detected parasite: *Giardia lamblia* (38.9% of positive samples). Significant associations found between parasitic infections and poor hygiene practices ($p < 0.05$). Clinical manifestations like diarrhea and abdominal pain were common among infected children.

4. Conclusion

This study investigated the presence and types of intestinal parasites among stool samples of pediatric patients. From the examination of 40 stool samples, the study revealed an overall prevalence of **45.0%**, highlighting that intestinal parasitic infections remain a significant public health concern in the study population. This study investigated the presence of intestinal parasites in stool samples collected from 40 pediatric patients. The findings revealed that **45% (18/40)** of the children tested positive for at least one intestinal parasite, indicating a substantial burden of parasitic infections within the studied population. The most frequently detected parasite was ***Giardia lamblia***, followed by ***Entamoeba histolytica***, *Ascaris lumbricoides*, *Hymenolepis nana*, and *Cryptosporidium spp.*

The high prevalence observed highlights the ongoing public health challenge posed by parasitic infections, especially in pediatric populations who are more vulnerable to the adverse effects of these infections, including malnutrition, anemia, and cognitive impairment. The results also emphasize the critical importance of routine screening, proper hygiene practices, safe drinking water, and health education in preventing transmission. Furthermore, the diversity of parasites identified suggests multiple routes of infection, including fecal-oral transmission, contaminated food and water, and poor sanitary conditions.

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