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Research Article

# Diagnosis and Treatment of Intestinal Parasites Among Addis Alem Primary School Students, Dessie, Ethiopia

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## Abstract

*Background*: Intestinal parasitic infections remain a significant public health concern among school-aged children in developing countries, particularly in areas with poor sanitation and limited access to clean water. This study aimed to determine the prevalence and distribution of intestinal parasites among students at Addis Alem Primary School in Dessie, Ethiopia. A cross-sectional study was conducted involving 354 students aged 6–15 years. Stool samples were collected and examined using direct saline wet mount techniques. Data were analyzed for prevalence rates across age groups, genders, and parasite species. *Result:* The overall prevalence of intestinal parasites was 3.95% (14/354). Hymenolepis nana was the most prevalent parasite (71.4% of infections), followed by Entamoeba histolytica, Schistosoma mansoni, Giardia lamblia, and Enterobius vermicularis (7.1% each). Age-specific analysis revealed the highest infection rate in the 12–15-year age group (10%) and the lowest in 8–10-year-olds (2.63%). Females had a higher infection rate (5.02%) than males (2.85%). Although the prevalence of IPIs in this study was lower than national estimates, the predominance of H. nana and higher infection rates among females and older students highlight the need for targeted interventions. Improved school-based deworming programs, enhanced water, sanitation, and hygiene (WASH) facilities, and health education are recommended to reduce transmission and mitigate health impacts.

## Keywords

Intestinal Parasites, Schoolchildren, Hymenolepis Nana, Prevalence, Ethiopia, WASH

## 1. Introduction

### 1.1. Background

Intestinal parasitic infections (IPIs) remain a significant public health problem in Ethiopia, particularly among school-aged children. These infections are associated with malnutrition, anemia, and impaired cognitive development. Poor sanitation, lack of clean water, and inadequate hygiene practices contribute to their prevalence. According to the World Health Organization (WHO), soil-transmitted helminth infections affect over 1.5 billion people globally, with school-aged children being the most affected group [1]. Early diagnosis and treatment are crucial in controlling and preventing the spread of these infections. This community service

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project aims to assess the prevalence of intestinal parasites among students at Addis Alem Primary School and provide health education to improve awareness and hygiene practices.

This project will involve screening students for intestinal parasites, identifying the most common parasites, and analyzing risk factors. Additionally, it was include health education programs for students, teachers, and parents to promote hygiene and preventive measures. The findings will help in recommending interventions to local health authorities and the school administration. Studies indicate that school-based interventions, including routine deworming and sanitation improvements, are effective in reducing IPI prevalence [2].

This community service project aims to assess the prevalence of intestinal parasites among Addis Alem Primary School students in Dessie, Ethiopia, and implement awareness programs to mitigate the risks associated with these infections and provide health education to improve awareness and hygiene practices.

### 1.2. Justification of the Project

This project was involved in screening students for intestinal parasites, identifying the most common parasites, and analyzing risk factors. Additionally, it will include health education programs for students, teachers, and parents to promote hygiene and preventive measures. The findings will help in recommending interventions to local health authorities and the school administration. Studies indicate that school-based interventions, including routine deworming and sanitation improvements are effective in reducing IPI prevalence [2].

## 2. Literature Review

Intestinal parasitic infections represent a significant burden of disease in tropical and subtropical regions, disproportionately affecting impoverished communities with inadequate Water, Sanitation, and Hygiene (WASH) infrastructure [3]. In Ethiopia, the situation is particularly severe, with numerous studies reporting high prevalence rates among schoolchildren, often exceeding 50% in various regions, underscoring the endemic nature of the problem [4, 5].

The epidemiological profile of IPIs is diverse. Soil-transmitted helminths (STHs) like *Ascaris lumbricoides*, *Trichuris trichiura*, and hookworms are highly prevalent [6]. However, protozoan infections such as *Giardia lamblia* and *Entamoeba histolytica* are also common causes of diarrheal illness and malnutrition [7]. The dwarf tapeworm, Hymenolepis nana, which is transmitted directly via the fecal-oral route without an intermediate host, is frequently reported in school-based surveys in Ethiopia, pointing to significant issues with personal hygiene and environmental contamination [8, 9]. Schistosomiasis, caused by Schistosoma mansoni, remains a public health concern in areas where human activities bring people into contact with freshwater bodies harboring the intermediate snail host [5].

The health implications of chronic IPIs are profound. They contribute to protein-energy malnutrition, vitamin deficiencies, and iron-deficiency anemia, which can lead to stunted growth, reduced physical fitness, and impaired cognitive function, ultimately compromising school performance and attendance [10, 11]. School-based interventions, including periodic deworming and health education, are recognized as highly effective and cost-efficient strategies for reducing the prevalence and intensity of IPIs [12, 13]. The success of these control programs, however, hinges on the availability of accurate, local epidemiological data to guide targeted and relevant interventions. This study was therefore conducted to provide current data on the prevalence and etiological agents of IPIs among students in Dessie, Ethiopia, to inform such local public health actions.

## 3. Objectives

### 3.1. General Objective

To assess, diagnose and treat intestinal parasitic infections among students of Addis Alem Primary School in Dessie, Ethiopia.

### 3.2. Specific Objectives

1) To identify the prevalence and types of intestinal parasites among Addis Alem Primary School students.
2) To provide health education on hygiene and preventive measures.
3) To recommend interventions to reduce intestinal parasitic infections in the school community.
4) To Provide appropriate anti-parasitic treatment to infected students.

## 4. Methods

### 4.1. Study Design, Area, and Period

A community-based cross-sectional study was conducted at Addis Alem Primary School in Dessie City Administration, South Wollo Zone.

### 4.2. Study Participants

A total of 354 primary school students aged 6-15 years were included in the study. Participants were selected from various grade levels.

### 4.3. Data Collection and Laboratory Processing

Stool samples were collected from each participant using clean, labeled, and leak-proof stool cups. Fresh stool samples were processed and examined microscopically for the pres-

ence of intestinal parasites using the direct saline wet mount technique (Figures 1 and 2).

***Figure 1.*** *Medical Lab Staff Sample Collection and Processing.*

***Figure 2.*** *Sample Collection by Medical Lab Students.*

## 5. Methods of Conducting the Community Service

### 5.1. Identification and Treatment Linkage

1) This study was conducted at Addis Alem Primary School in Dessie, Ethiopia. The target population includes students from different grade levels at Addis Alem Primary School.
2) Stool samples were collected from selected students under hygienic conditions.
3) Samples were examined microscopically for intestinal parasites using direct wet mount and concentration techniques.
4) Results were documented and communicated to school authorities and parents.

### 5.2. Consent and Ethical Approval

The project was approved by the Institutional Community Service and Ethical Review Board of Dessie Health Science College, Dessie, Northeast Ethiopia. Then after at the beginning of the project, the reason for the surveys and procedure for stool sample collection was explained to the study participants and their parents for children participants. Every cones and prone was described for the study participant that

may face during sample collection. If they are willing to participate we were collect the sample and examine it (Figure 3).

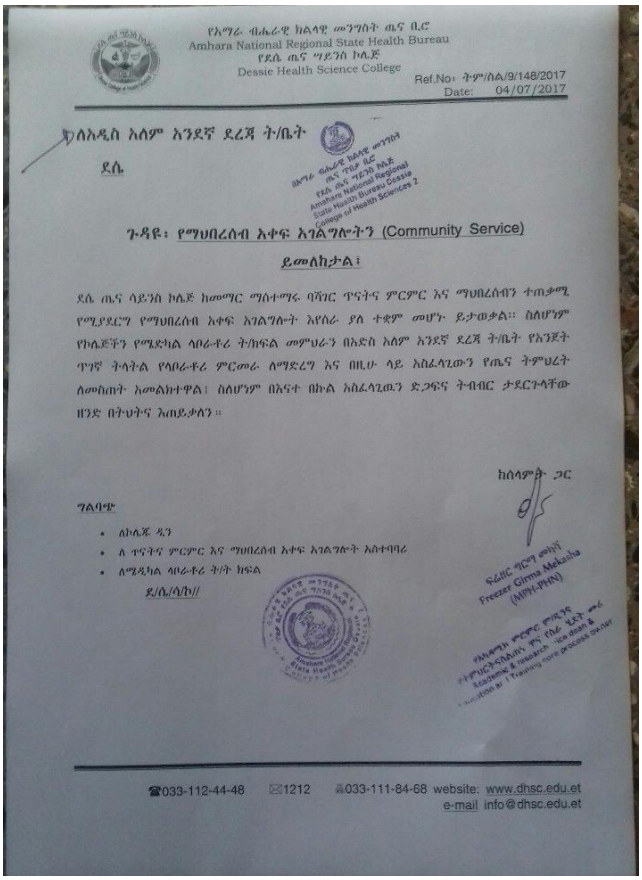
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***Figure 3.*** *DHSC Letters for Adis Alem G/Primary School.*

## 5.3. Health Education/ Awareness and Training

The focus of this awareness-building programmer was to provide an advice for the respective beneficiaries to make their future life effective and healthy. The community of the target areas was trained in life-skills education focusing on, at least, the following issues:

1) Hygiene
2) Sanitation
3) Hand washing

## 5.4. Coordination of the Community Service

The implementation of the programme was coordinated by Department of Medical Laboratory Sciences under the supervision of Dessie Health Science College. The respective department:

1) Lead and coordinate the overall activity of the community service.
2) Take a stool sample from each participants.
3) Perform the laboratory examination of saline wet mount test.
4) Providing and facilitate advise /health education and training program.
5) Facilitate per dime payment for laboratory personnel, health educators and the mini- media members, and other supporting staff.

## 5.5. Sponsoring Organization

1) Dessie Health Science College.
2) Hote Health Center.

## 5.6. Outcome of the Community Service

1) The prevalence rate of intestinal parasites among Addis Alem Primary School students was determined.
2) Increased awareness among students, teachers, and parents about intestinal parasitic infections and their prevention.
3) Improved health and school attendance among students.
4) Strengthened collaboration between schools, health authorities, and the community.
5) The study will provide recommendations for school-based health interventions.

## 5.7. Monitoring and Evaluation

During the project time monitoring and evaluation of the program was mainly undertaking by the coordinator of the program and other interdisciplinary staffs of the remaining project members. Whereas for the sustainability of the program in the future time and day-to-day implementation of the programme during the project time ‘implementation and monitoring committees/ peer group clubs’ was established.

## 5.8. Major Activities and Actions Taken

1) Communicating stakeholders.
2) Preparing reagents and materials for the detection of Intestinal Parasite.
3) Preparing health education packages like role play, brain storming and group discussion.
4) Making a linkage for treatment for the respective Positive with intestinal parasite in to the nearby Hote health center and was given a treatment of albendazole (400mg) for soil-transmitted helminths and Praziquantel (40mg/kg) for schistosomiasis for infected students.
5) All infected students were treated with appropriate anthelmintic medications (e.g., albendazo le, praziquantel) under medical supervision (Figures 4 and 5).


***Figure 4.*** *Hotie Healthe Center Was Given This Prescription.*

***Figure 5.*** *Treatment Was Given for Infected Students.*

A health education session was conducted for students and teachers focusing on (Figure 6):

1) Personal hygiene (hand washing)
2) Use of latrines
3) Drinking safe water
4) Regular deworming schedules


***Figure 6.*** *Health Education Photo.*

Follow-up communication was established with local health authorities to ensure continuous preventive programs.

## 6. Results

A. Over all prevalence

The overall prevalence of intestinal parasites was 3.95% (14/354). *Hymenolepis nana* was the most prevalent parasite (71.4% of infections), followed by *Entamoeba histolytica*, *Schistosoma mansoni*, *Giardia lamblia*, and *Enterobius vermicularis* (7.1% each). Age-specific analysis revealed the highest infection rate in the 12–15-year age group (10%) and the lowest in 8–10-year-olds (2.63%). Females had a higher infection rate (5.02%) than males (2.85%).

B. Age-Specific Prevalence

***Table 1.*** *Age Specifice Prevalence of Diagnosis of Intestinal Parasites Among Addis Alem Primary School Students, Dessie, Ethiopia.*

| Age (year) | Number of student participated | Positive (Ova of parasite seen) result | In percentage (%) |
|---|---|---|---|
| [6-8] | 171 | 7 | 4.09 |
| [8-10] | 114 | 3 | 2.63 |
| [10-12] | 59 | 2 | 3.39 |
| [12-15] | 10 | 1 | 10 |
| Total | 354 | 14 | 3.95 |

The highest prevalence occurred in the 12-15 years group (10%), consistent with studies showing increased risk-taking behaviors in early adolescence. The lowest prevalence in 8-10 year-olds (2.63%) may reflect better hygiene supervision in middle primary grades. (Table 1).

C. Gender-Specific Prevalence

***Table 2.*** *Gender-specifice Prevalence of Diagnosis of Intestinal Parasites Among Addis Alem Primary School Students, Dessie, Ethiopia.*

| Sex | Number of student participated | Positive (ova of parasite seen) result | In percentage (%) |
|---|---|---|---|
| Female | 179 | 9 | 5.02 |
| Male | 175 | 5 | 2.85 |
| Total | 354 | 14 | 3.95 |

Females showed nearly double the infection rate (5.02%, 9/179) compared to males (2.85%, 5/175) ($\chi^2$=1.12, p=0.29). This aligns with findings from Burkina Faso where girls' domestic water-fetching duties increased exposure (8). (Table 2).

D. Parasite Distribution

***Table 3.*** *Parasite Distribution of Prevalence of Diagnosis of Intestinal Parasites Among Addis Alem Primary School Students, Dessie, Ethiopia.*

| Name of parasite | Number of student being positive (ova of parasite seen) with Age distribution and percentage | | | | |
|---|---|---|---|---|---|
| | [6-8] year | [8-10] year | [10-12] year | [12-15] year | Total [6-15] years |
| H. nana | 4 | 3 | 2 | 1 | 10 |
| E. histolytica | 1 | | | | 1 |
| S. mansoni | | 1 | | | 1 |
| G. lamblia | | | 1 | | 1 |
| E. vermicularis | 1 | | | | 1 |

The above table states that the predominance of H. nana (71.4%) suggests ongoing fecal-oral transmission, possibly through contaminated classroom materials or inadequate handwashing [9]. The single S. mansoni case indicates potential water contact with infected streams near the school. Other parasites occurred sporadically (E. histolytica, S. mansoni, G. lamblia, E. vermicularis). (Table 3).

## 7. Discussion

This study found an overall intestinal parasite prevalence of 3.95% among schoolchildren at Addis Alem Primary School. This prevalence is notably lower than the figures reported by many previous studies in Ethiopia, which often reported rates above 20-50% [4, 5, 9]. This lower prevalence could be attributed to recent improvements in regional public health interventions, such as deworming programs, or specific local factors like better WASH conditions in the study area.

The overwhelming predominance of H. nana (71.4% of infections) is a significant finding. This parasite is transmitted directly via the fecal-oral route, and its high prevalence strongly indicates poor personal hygiene practices among the children and likely contamination of the school environment, such as classroom materials [8, 1]. The single case of S. mansoni infection points to the existence of focal transmission and underscores the need for further investigation into local water contact sites and potential snail habitats [5].

The higher infection rate observed in female students (5.02%) compared to males (2.85%) aligns with findings from other studies, such as one in Burkina Faso [14]. This disparity may be linked to gender-based roles, where girls are more frequently involved in domestic chores like fetching water from potentially contaminated sources, cleaning household latrines, and caring for younger siblings, thereby increasing their exposure. The highest prevalence was found in the 12-15 year age group, which may be associated with decreased adult supervision of hygiene practices and increased independence and risk-taking behaviors in early adolescence [15].

## 8. Conclusion and Recommendations

### 8.1. Conclusion

Although the overall prevalence of intestinal parasites in this study was lower than national averages, the significant burden of H. nana and the observed gender and age disparities highlight persistent transmission risks. The findings confirm that intestinal parasitic infections remain a public health concern requiring ongoing attention in the study area.

### 8.2. Recommendations

Based on our findings, we recommend a multi-pronged intervention strategy:

Enhanced School-Based Deworming: Implement biannual mass deworming with albendazole and praziquantel in line with WHO guidelines to target both STHs and schistosomiasis [16].

WASH Infrastructure Improvements: The school should install and maintain functional handwashing stations with soap, ensure a reliable supply of safe drinking water, and provide clean, gender-segregated latrines, particularly with facilities for menstrual hygiene.

Strengthened Health Education: Conduct regular and participatory health education sessions focusing on proper handwashing techniques (e.g., the WHO 6-step method), safe

food handling, and the dangers of contacting potentially contaminated water.

Community and Environmental Health: Public health authorities should investigate and implement measures to control snail populations in local water bodies and promote improved sanitation in the surrounding community to reduce environmental contamination.

## Abbreviations

| | |
|---|---|
| IPIs | Intestinal Parasitic Infections |
| WHO | World Health Organization |
| WASH | Water, Sanitation, and Hygiene |
| DHSC | Dessie Health Science College, Dessie |

## Acknowledgments

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## Author Contributions

**Lubaba Seid Awol:** Conceptualization, Methodology, Project administration, Resources, Supervision, Validation, Visualization

**Ismail Ebrie Ali:** Conceptualization, Formal Analysis, Funding acquisition, Investigation, Methodology, Project administration, Software, Validation, Visualization, Writing – original draft, Writing – review & editing

**Mekonnen Mohammed:** Funding acquisition, Resources, Supervision, Validation

**Kewser Seid Mohammed:** Data curation, Methodology, Visualization, Writing – original draft

**Tilahun Haile Tesho:** Conceptualization, Data curation, Investigation, Methodology, Project administration, Visualization

**Birhanu Getahun:** Data curation, Investigation, Methodology, Writing – review & editing

**Hanan Getahun Yimam:** Conceptualization, Data curation, Funding acquisition, Methodology, Resources, Visualization

**Arebu Gashaw Yimer:** Funding acquisition, Resources, Supervision, Validation

**Kalkidan Teklu Demissie:** Conceptualization Data curation, Investigation Methodology

**Yesuf Ebrahim Adem:** Conceptualization, Data curation, Investigation, Validation, Visualization, Writing – original draft

**Mohammed Kassa Mohammed:** Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Project administration, Resources, Supervision, Validation, Writing – original draft

**Mulugeta Teshome:** Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Software, Validation, Visualization, Writing – original draft

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## Conflicts of Interest

The authors declare no conflicts of interest.

## References

[1] Nokes C, Bundy DAP. Does helminth infection affect mental processing and educational achievement? Parasitol Today. 1994 Jan; 10(1): 14-8. https://doi.org/10.1016/0169-4758(94)90348-4

[2] World Health Organization. Soil-transmitted helminth infections. Geneva: World Health Organization; 2023.

[3] Hotez PJ, Bundy DAP, Beegle K, Brooker S, Drake L, de Silva N, et al. Helminth infections: soil-transmitted helminth infections and schistosomiasis. In: Jamison DT, Breman JG, Measham AR, Alleyne G, Claeson M, Evans DB, et al., editors. Disease Control Priorities in Developing Countries. 2nd ed. Washington (DC): The World Bank; 2006. https://doi.org/10.1596/978-0-8213-6179-5

[4] Alemu A, Tegegne Y, Damte D, Melku M. Prevalence of intestinal parasites and associated risk factors among primary school children in Ethiopia. BMC Infect Dis. 2020 Jul 11; 20(1): 456. https://doi.org/10.1186/s12879-020-05173-6

[5] Sitotaw B, Shiferaw W. Prevalence and risk factors of intestinal parasitic infections among primary school children in Dera District, Northwest Ethiopia. J Parasitol Res. 2020 Apr 30; 2020: 8681247. https://doi.org/10.1155/2020/8681247

[6] World Health Organization. Soil-transmitted helminth infections. WHO; 2021.

[7] Brooker S, Clements ACA, Bundy DAP. Global epidemiology, ecology, and control of soil-transmitted helminth infections. Adv Parasitol. 2006; 62: 221-61. https://doi.org/10.1016/s0065-308x(05)62007-6

[8] Alemu G, Mama M. Prevalence of intestinal parasitic infections among school children in Amhara region. BMC Infect Dis. 2019 Jul 5; 19(1): 457. https://doi.org/10.1186/s12879-019-4090-4

[9] Legesse M, Erko B. Prevalence of intestinal parasites among schoolchildren in a rural area close to Lake Langano, Ethiopia. Ethiop J Health Dev. 2004; 18(2): 116-20. https://doi.org/10.4314/ejhd.v18i2.9961

[10] Tadesse G. The prevalence of intestinal helminthic infections among school children in Babile town, Ethiopia. Ethiop J Health Dev. 2005; 19(2): 140-7. https://doi.org/10.4314/ejhd.v19i2.9982

[11] Tadesse Z, Hailemariam A, Kolaczinski JH. Potential for integrated control of neglected tropical diseases in Ethiopia. Trans R Soc Trop Med Hyg. 2008 Mar; 102(3): 213-4. https://doi.org/10.1016/j.trstmh.2007.09.005

[12] Endris M, Lemma W, Belyhun Y, Moges B, Gelaw A, Angaw B. Prevalence of intestinal parasites in Northwest Ethiopia. Ethiop J Health Sci. 2010 Jul; 20(2): 93-100. https://doi.org/10.4314/ejhs.v20i2.69431

[13] Cheesbrough M. District Laboratory Practice in Tropical Countries, Part 1. 2nd ed. Cambridge University Press; 2005. https://doi.org/10.1017/cbo9780511543470

[14] Erismann S, Diagbouga S, Odermatt P, Knoblauch AM, Gerold J, Shrestha A, et al. Prevalence of intestinal parasitic infections and associated risk factors among school-aged children in Burkina Faso. Am J Trop Med Hyg. 2017 Sep; 97(3): 893-901. https://doi.org/10.4269/ajtmh.16-0173

[15] Speich B, Croll D, Fürst T, Utzinger J, Keiser J. Effect of sanitation and water treatment on intestinal protozoa infection: a systematic review and meta-analysis. Lancet Infect Dis. 2016 Jan; 16(1): 87-99. https://doi.org/10.1016/s1473-3099(15)00349-7

[16] Tadege B, Mekonnen Z, Dana D, Sharew B, Mohammed T, Loha E, et al. Differential effect of mass deworming and targeted deworming for soil-transmitted helminth control in school-aged children: a systematic review and meta-analysis. Lancet. 2022 Apr 2; 399(10333): 1298-308. https://doi.org/10.1016/s0140-6736(21)02612-6