



## Prevalence of Helminthic Infection Among Primary School Children in Owerri Municipal

\*Ejionye Kizito Udochukwu<sup>1</sup>, Adinuso Joy A.<sup>1</sup>, and Chidinma Igwe<sup>1</sup>

<sup>1</sup> Department of Public Health, Faculty of health Science, Imo State University, Owerri

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\*Corresponding author: [Ejionye Kizito Udochukwu](#)

Department of Public Health, Faculty of health Science, Imo State University, Owerri

### Abstract

Soil-transmitted helminth (STH) infection continues to pose a significant public health concern among primary school children in resource-limited environments like Nigeria. Intestinal helminthiasis is a major cause of malnutrition, anaemia, stunted growth, and poor school performance. This study evaluated the frequency of helminthic infection among elementary school children in the Owerri Municipal Local Government Area, Imo State, Nigeria. A descriptive cross-sectional methodology was employed. We got 180 faeces samples from students aged 4 to 15 years old at three different elementary schools. We used normal saline wet-mount and saturated sodium chloride flotation procedures to look at them under a microscope. Data were analysed using Chi-square at  $P < 0.05$ . Out of the 180 samples, 17 (9.44%) were positive for helminth infection, and 163 (90.56%) were negative. City Primary School had the greatest rate (17.65%), while Development Primary School had the lowest (3.64%). More men (18.33%) than women (5%) were infected. The frequency was highest among children aged 7 to 9 years (12.79%). Four helminths were identified: *Ascaris lumbricoides* at 12 (6.66%), *Trichuris trichiura* at 3 (1.67%), hookworm at 2 (1.11%), and *Schistosomes* at 0%. The type of parasite and the school the student went to were both statistically significant predictors of infection ( $P < 0.05$ ). To lower the number of infections, it is suggested that mass deworming programs be strengthened and hygiene education be increased.

**Keywords:** Helminths, Soil-transmitted helminths, Prevalence, Primary school kids, Imo State, Nigeria.

### Introduction

Helminthic infections, often referred to as intestinal parasites or soil-transmitted helminths (STHs), persist as a significant public health challenge for children in low-resource and developing nations [1]. Common soil-transmitted helminths (STHs) are hookworms (*Necator americanus*, *Ancylostoma duodenale*), roundworms (*Ascaris lumbricoides*), and whipworms (*Trichuris trichiura*). These parasites, along with schistosomes, infect almost two billion people worldwide, with the greatest impact on school-aged children [2].

Heavy intestinal helminth infections are linked to malnutrition, anaemia, stunted growth, impaired cognitive development, decreased academic performance, gastrointestinal problems, and heightened school absenteeism [3, 4]. About 807 million people have *A. lumbricoides*, 604 million have *T. trichiura*, 576 million have hookworms, and 207 million have schistosomes. These parasites do well in places with bad sanitation, not enough clean water, and not enough hygiene [5].

The 2020–2030 WHO Neglected Tropical Diseases (NTD) Roadmap set specific STH aims, such as getting rid of it as a public health problem (<2% moderate-to-heavy severity), cutting the need for preventive chemotherapy tablets by 50%, and getting more money from the government for deworming efforts [6].

Numerous studies indicate that the incidence rates of STH among school children remain high in Nigeria, despite current mass deworming campaigns [7, 8]. Risk factors encompass poverty, inadequate environmental sanitation, ambulation without footwear, ingestion of unwashed fruits and vegetables, unclean water, overcrowding, and deficient hygiene practices [9, 10].

To come up with good intervention techniques, you need to know how STHs spread, how they are passed on, and how common they are in different age and gender groups. The objective of this study is to ascertain the frequency and distribution of helminthic diseases among primary school students in Owerri Municipal, Imo State, Nigeria, thereby supplying valuable epidemiological data to inform public health initiatives.

## MATERIALS AND METHODS

### Study Area

The study was conducted in Owerri Municipal Local Government Area, Imo State. Owerri Municipal covers approximately 75 km<sup>2</sup> and lies between Latitude 5°21'N and Longitude 7°21'E. The climate is humid tropical with a long rainy season (April–October) and an annual temperature above 20°C. The population largely comprises civil servants, traders, and artisans.

Three government primary schools were selected purposively: City Primary School Owerri., Development Primary School 1 Owerri and Ikenegbu Primary School Owerri

### Study Population and Sample Size

The study population consisted of 450 pupils aged 4–15 years. A sample of 180 pupils (60 per school) was selected through simple random sampling. Of these, 120 were females and 60 males.

### Sampling Technique

Purposive sampling was used to select the three schools, while balloting was used to randomly select 60 pupils from each school. Participants were further stratified by sex.

### Ethical Considerations

Approval was obtained from the Public Health Institutional Research Committee of Imo State University. Permission was granted by the Zonal Education Department, and verbal consent was obtained from parents through the Parent-Teacher Association. Pupils were instructed on proper stool collection procedures.

### Specimen Collection and Laboratory Examination

Fresh morning stool samples were collected into labelled sterile containers. Macroscopic examination assessed colour, consistency, presence of blood, mucus, worms, or proglottids. Microscopic examination was conducted using: Normal saline wet mount and Concentrated saturated sodium chloride flotation technique  
Helminth ova and larvae were identified under ×10 and ×40 objective lenses following standard methods.

### Statistical Analysis

Data were summarized using simple percentages and presented in tables. Chi-square ( $\chi^2$ ) was used to test associations between variables at a significance level of  $P < 0.05$ .

## RESULTS

**Table 4.1: Prevalence of Soil Transmitted Helminth Infection according to Schools.**

School	Number Examined	Number Infected (%)
City Primary School, Owerri	68	12 (17.65)
Development Primary School Owerri	55	2 (3.64)
Ikenegbu Primary School Owerri	57	3 (5.26)
Total	180	17 (9.44)
Pearson Chi-Square ( $\chi^2$ ): 5.91	Df: 2	P-Value: 0.05

Overall prevalence was 9.44% (17/180). The highest prevalence occurred at City Primary School (17.65%), and the lowest at Development Primary School (3.64%) ( $\chi^2 = 5.91$ ,  $P = 0.05$ ).

**Table 4.2: Prevalence of Soil Transmitted Helminth Infection with respect to Sex**

Sex	Number Examined	Number Infected (%)
Male	60	11 (18.33)
Female	120	6 (5.00)
Total	180	17 (9.44)
Pearson Chi-Square (x2): 6.62 Df: 1		P-Value: 0.05

Males had a significantly higher infection rate (18.33%) than females (5%) ( $\chi^2 = 6.62$ ,  $P = 0.05$ ).

**Table 4.3: Prevalence of Soil Transmitted Helminth Infection with Respect to Age**

Age	Number Examined	Number Infected (%)
4 – 6yrs	43	1 (2.33)
7 – 9yrs	86	11 (12.79)
10 – 12yrs	30	3 (10.00)
13 – 15yrs	21	2 (9.5)
Total	180	17 (9.44)
Pearson Chi-Square (x2): 7.81 Df: 3		P-Value: 0.05

Children aged 7–9 years had the highest prevalence (12.79%), followed by 10–12 years (10%), while ages 4–6 years had the lowest (2.33%) ( $\chi^2 = 7.81$ ,  $P = 0.05$ ).

**Table 4.4: Prevalence according to Type of Intestinal Helminths and Schistomes**

Parasite	Number Found	Infected Prevalence (%)
A. Lumbricoides	12	6.66
T. Trichiura	3	1.67
Hookworm	2	1.11
Schistosomes	0	0
Total	17	9.44
Pearson Chi-Square (x2): 7.80 Df: 3		P-Value: 0.05

With respect to parasites, *Ascaris lumbricoides* was the most predominant parasite (6.66%) while Hookworm had the least prevalence (1.11%).

## DISCUSSION

The overall prevalence of 9.44% found in this study is far lower than the rates seen in other Nigerian and African studies. For example, it was 42% in Nnewi [11], 33.5% in Lafia [12], 30.3% in other parts of Imo State [13], and 50% in Ethiopia [14]. This relatively low prevalence may be due to better health education programs, more awareness of personal cleanliness, and more mass deworming activities by government and non-governmental health groups in Owerri Municipal. Many schools in the municipality have also benefited from efforts to improve sanitation, such as providing working toilets, cleaner classrooms, and health talks through school health programs. These variables together make it less likely that soil will become contaminated or parasites will spread, which means that infection rates are lower than in areas where these kinds of interventions are limited or not always followed.

The significantly elevated infection rate seen at City Primary School indicates significant disparities in environmental and infrastructure conditions among the schools examined. The inequalities may be attributed to variations in access to clean water for handwashing, the availability and appropriate utilisation of toilet facilities, waste disposal practices, and the general sanitation standards of the school compound. This finding is consistent with previous research that has consistently demonstrated that socioeconomic position, footwear practices, household density, and sanitary infrastructure greatly affect the transmission of soil-transmitted helminths (STH) [15]. Schools situated in highly populated or economically disadvantaged regions generally demonstrate elevated infection rates, attributable to heightened environmental pollution and insufficient hygiene procedures.

The elevated infection incidence among male students aligns with prior studies [16], which suggest that males are more likely to participate in outdoor activities, rough play, and soil-related recreational behaviours that increase their exposure to infective helminth eggs and larvae. Boys may also be less likely to follow suggested hygiene habits, such as washing their hands often, especially before meals or after using the bathroom. Some studies, however, have found that women are more likely to have it [17], which may be because of variations in how women and men handle household chores. In certain areas, girls collect water, help with housework, or care for younger siblings, which puts them in more places where they could get sick. These differing results show how environmental, behavioural, and cultural factors all work together to affect STH transmission in different places.

The current study's age-related trends indicated that children aged 7 to 9 years demonstrated the highest prevalence of infection. This pattern aligns with established developmental patterns, as children in this age bracket typically exhibit greater independence, allocate more time to outside activities, and often participate in unsupervised play. These behaviours increase their chance of coming into contact with contaminated soil, particularly in settings with inadequate sanitation. On the other hand, smaller children (4–6 years) may be less exposed because their parents or teachers watch them more closely. Older students (10–12 years) usually know more about hygiene and are less likely to engage in risky play behaviours.

*Ascaris lumbricoides* was identified as the most common helminth species in our investigation, corroborating existing findings that *A. lumbricoides* is the predominant intestinal nematode in tropical and subtropical areas with poor sanitation [18]. Its eggs are quite tough and can live in soil for a long time, which makes it more likely that kids may eat them because they often touch their mouths or play barefoot. The high number of *Ascaris* also points to continuous contamination of the environment, even while deworming operations are still going on. This shows that both treatment and environmental sanitation need to be addressed in a coordinated way.

## Conclusion

This study showed that helminthic infections were moderately frequent among primary school children in Owerri Municipal, with *Ascaris lumbricoides* being the most common parasite. There were strong links between infection, sex, age, and where the school was located.

Even if there are still deworming activities, STH transmission continues, showing that more has to be done.

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