

Research article

# Prevalence of Intestinal Parasites from the Fingers of School Children in Ohaozara, Ebonyi State, Nigeria

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## Abstract

Intestinal parasitic infections caused by soil – transmitted helminthes are pernicious and are among the ten most common infections in the world. They have become a global public health burden and this burden is even higher among children in developing countries. The consequences of intestinal parasitic infections among children includes; stunted growth, iron deficiency anaemia, reduced haemoglobin, malaise, reduced physical activity, Vitamin A deficiency, impaired cognitive functions and learning ability. In developing countries particularly, intestinal parasites have been known to cause significant morbidity and mortality. They can be transmitted through flies, however, they adhere to fingernails and contaminated fingernails are salient sources of infection. The aim of our study is to investigate the prevalence of intestinal parasite eggs in the fingernails of primary school children in Ohaozara, Ebonyi State, Nigeria and determine the source of the infection. Swab samples were obtained from the fingernails of the subjects. The nails were swabbed into a clean sterile container containing normal saline. Finger nail clippings were collected from both hands of each subject using sterile nail clippers and placed in labeled containers containing normal saline. Samples were examined by direct microscopy using Lugol's iodine and Eosin preparations. Sediments from the nail clippings were examined after digestion with 10% Potassium hydroxide and centrifugation at 2500rpm for 5minutes. A total of 325 pupils comprising of 140 males and 185 females were enlisted for this study. The prevalence of intestinal parasites among the overall population studied is 57.2% (186 of 325). The parasites isolated from the fingernails of the primary school pupils are; *Ascaris lumbricoides*, *Enterobius vermicularis*, *Trichuris trichiuria*, and *Ancylostoma duodenale* with prevalence rates of 20.0%, 17.8%, 12.9% and 6.5% respectively. The prevalence of the intestinal parasites among the population studied was statistically significant ( $p < 0.05$ ). **Copyright © AJBCPS, all rights reserved.**

**Keywords:** Parasites, Fingernails, Children, Infection

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## 1. Introduction

Intestinal parasitic infections have become a global public health burden and this burden is even higher among children in developing countries. The consequences of intestinal parasitic infections among children includes; stunted growth, iron deficiency anaemia, reduced haemoglobin, malaise, reduced physical activity, Vitamin A deficiency, impaired cognitive functions and learning ability (Stephenson *et al.*, 1998 and Sackey *et al.*, 2003).

Some 3.5 billion people are infected and 450 million become ill as a result of intestinal parasitic infections (WHO, 1998). From 1998 to 2002, an average of 1329 food borne disease outbreaks were reported to the Center for Disease Control and Prevention (CDC) each year (Lynch *et al.*, 2006).

Intestinal parasitic infections caused by soil – transmitted helminthes are pernicious and are among the ten most common infections in the world (WHO, 1987). The World Health Organization (WHO) estimated that 270million pre-school and over 600million school children in developing countries are living in areas where the parasites are extensively transmitted and are therefore in need of treatment and prevention interventions (WHO, 2010)

Intestinal parasites have a cosmopolitan distribution. However, their endemicity depends on factors such as sociodemographic variables associated with poverty such as reduced access to adequate sanitation, potable water and healthcare as well as the prevailing climatic and environmental conditions (Mata, 1982; WHO, 1996; Montessoro *et al.*, 1998). Local customs such as the use of human and animal fertilizers are also contributing factors.

In developing countries particularly, intestinal parasites have been known to cause significant morbidity and mortality. The fecal-oral route is significant in the transmission of parasitic infections to humans through poor personal hygiene. When the soil becomes contaminated, the eggs in the soil can be transferred onto vegetables, door handles etc and then onto the hands from where it is transferred to the mouth (Kagei, 1983; Mustafa *et al.*, 2001).

Intestinal parasites adhere to fingers, fruits, vegetables, instruments, door handles and money (Ayeh – Kumi *et al.*, 2009). They can also be transmitted by flies (WHO, 1987). However, their adherence to fingernails are salient sources of infection (Ismid and Rukmono, 1983). Hence, the presence of intestinal parasites in the fingernails is an indication of one of the routes of transmission of the parasite, it is a pointer to the presence of an active infection or a source of parasitic infection. It is also an indication of poor personal hygiene associated with children from rural areas. Such children present a potent source of transmission to the larger community through sharing of common equipments in school, playing with one another and outright autoinoculation by means of finger biting and sucking, common among children of such age.

This study aimed to investigate the prevalence of intestinal parasite eggs in the fingernails of primary school children in Ohaozara Local Government Area in Ebonyi State, South Eastern Nigeria and determine the source of the infection as an indicator of the overall hygienic standard of children from such areas.

## 2. Materials and Methods

### 2.1 Ethical Considerations

Informed consent was obtained from the Local Government Education Secretary, the Headmasters/Headmistress of the schools studied and from the students.

### 2.2 Study Population

The study was conducted among primary school pupils attending three different primary schools in Ohaozara, Ebonyi state. Simple random sampling technique was employed in selecting the subjects recruited for this study.

### 2.3 Sample Collection

Sociodemographic data like age, sex and size of family and highest education level of parents or guardians were obtained with the aid of a structural questionnaire. Swab samples were obtained from the fingernails of the subjects. The nails were swabbed into a clean sterile container containing normal saline.

Finger nail clippings were collected from both hands of each subject using sterile nail clippers and placed in labeled containers containing normal saline.

## 2.4 Laboratory Analysis

A drop of the mixture of the swabbed sample with normal saline was transferred, using a sterile plastic Pasteur pipette to the centre of a scrupulously cleaned grease free slide and carefully covered with a clean cover slip, avoiding air bubbles and over floatation. Direct microscopic examination of the samples for ova of helminthes was carried out using X10 and X40 objectives respectively.

The nail clipping were immersed in 10% Potassium hydroxide solution for 24hours and subsequently centrifuged for 5minutes at 2500rpm. The supernatant was discarded while the sediment of each specimen was stained with Lugol's Iodine and Eosin and subsequently examined under microscope using X10 and X40 objectives respectively. Eggs of parasites were identified by characteristic egg morphology using standard procedures.

## 2.5 Data Analysis

The prevalence of parasites was presented as descriptive statistics while the relationship between several variables and the presence of parasites was determined by the Chi square test.  $P < 0.05$  was considered significant at 95% confidence interval. Data analysis was performed with the aid of Statistical Programme for Social Sciences (SPSS) version 18.0

## 3. Results

Three schools were studied. They include Community Primary School, Ogharugo, Community Primary School, Okposi and Community Primary School, Umuekuma. The numbers of subjects from each of the schools are 120, 100 and 125 respectively. A total of 325 pupils comprising of 140males and 185 females were enlisted for this study. The ratio of males to females is 1:1.3. The age of the participants ranges from 4years to 14 years, with a mean age of 6years.

The prevalence of intestinal parasites among the overall population studied is 57.2% (186 of 325). The parasites isolated from the fingernails of the primary school pupils are; *Ascaris lumbricoides*, *Enterobius vermicularis*, *Trichuris trichiuria*, and *Ancylostoma duodenale*, with prevalence rates of 20.0%, 17.8%, 12.9% and 6.5% respectively (table 1 and figure 1). The prevalence among the schools studied is presented in table 2.

The prevalence of the intestinal parasites among the population studied was statistically significant ( $p < 0.05$ ). However, there was no significant difference between the prevalence of the infection among pupils'  $\leq 6$ years and those  $\geq 6$ years ( $p > 0.05$ ). There was also no significant difference in the prevalence of the infection among the gender. It was however observed that the prevalence was lower among children from smaller families than those from large families.

**Table 1:** Prevalence of Intestinal Parasites among the Population Studied

Parasite	n	Prevalence (%)
<i>Ascaris lumbricoides</i>	65	20.00
<i>Enterobius vermicularis</i>	58	17.8
<i>Trichuris trichiura</i>	42	12.9
<i>Ancylostoma duodenale</i>	21	6.5
<b>Total</b>	<b>186</b>	<b>57.2</b>

**Table 2:** Prevalence of Intestinal Parasites Among The Schools Studied

parasite	Ogharugo	Okposi	Umuekuma	Total
<i>A. lumbricoides</i>	38	18	9	65
<i>E. vermicularis</i>	19	27	12	58

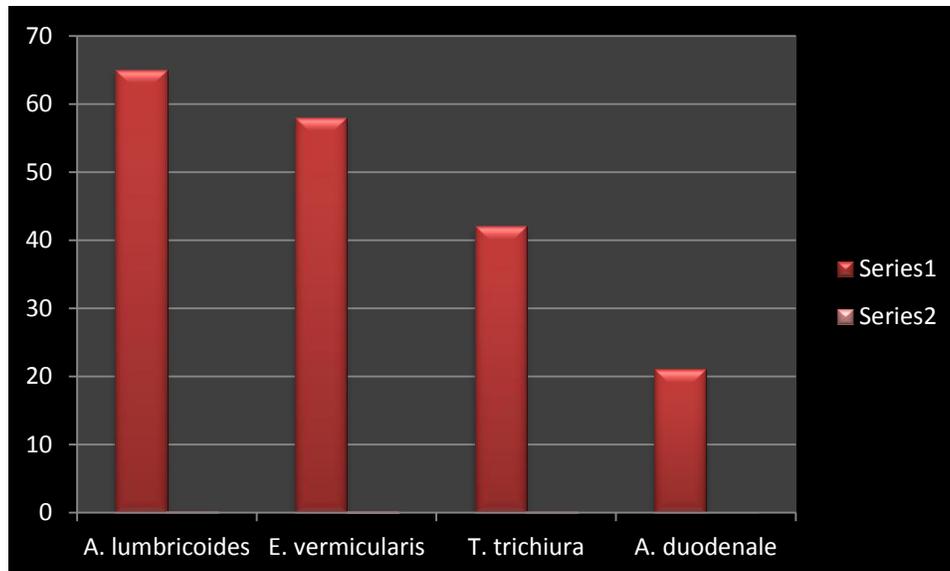
<i>T. trichiura</i>	13	12	17	42
<i>A. duodenale</i>	11	4	6	21
Total	81	61	44	<b>186</b>

Key:

Ogharugo implies Community Primary School, Ogharugo

Okposi implies Community Primary School, Okposi

Umuekuma implies Community Primary School, Umuekuma



**Figure 1:** Bar chart showing the prevalence of intestinal parasites among the population studied

#### 4. DISCUSSION

Soil transmitted helminth infections represent a major public health problem in poor and developing countries and have constituted a universal burden which does not only depend on regional ecological condition but also on the development of the people (Ukpai *et al.*, 2003).

The control and prevention of intestinal infections, either by parasites or bacteria requires understanding of the epidemiological aspects of the problem, for guidance in the design of practical and economic control and prevention measures. High prevalence of intestinal parasites is largely due to poor personal hygiene and environmental sanitation, lack of potable water, poverty, ignorance of health promotion practices and impoverished health services (Suriptiastuti and Manan, 2011).

Most common intestinal parasitic infections of man are fecal borne infections and the transmission occurs either directly from hand to mouth or indirectly through food and water. The transmission of these parasites within the community is directly related to human habits with regards to personal hygiene, feeding habits, defecation, cleanliness and level of education. Therefore, their prevalence in the community can be used as an indicator of the living conditions and environmental sanitation levels, as well as the socioeconomic status of the community (Suriptiastuti and Manan, 2011).

In our study, the prevalence of intestinal parasites observed among the primary school pupils was found to be 57.2%(186 of 325). This is comparable to a prevalence of 98.7% and 83.9% found in other studies conducted in Abeokuta, Nigeria and in Central Jakarta respectively (Idowu and Rowland, 2006; Suriptiastuti and Manan, 2011). It

is however in contrast to a prevalence of 21% found among school children in Baglung, Nepal (Shrestha *et al.*, 2012).

The relatively high prevalence rate of intestinal parasites observed in this study is a reflection of poor personal hygiene. It is known that hand to mouth transmission is a potent route of transmission for the most intestinal parasites; hence the relatively high prevalence indicates a lower level of education on personal and hand hygiene. It was observed that the parasite eggs were markedly lower among primary school pupils with trimmed fingers and who are from homes where their parents had higher education, as compared to those from homes where the level of education is low. The higher prevalence of the parasites in Community Primary School Ogharugo as compared to other schools studied appears to be a reflection of the very poor, debilitated and almost non-existent toilet facilities and improper waste management system. Hence, environmental sanitation plays a pivotal role in the transmission of most intestinal parasites.

This study underscores the importance of teaching hand washing and personal hygiene to pupils and teachers; as well as inculcating a habit of periodic deworming exercise. The provision of potable water and efficient waste disposal facilities to schools in most developing countries especially those in rural areas where they are almost non-existent cannot be overemphasized. This factor will limit the rate of transmission of the parasites to other children and also prevent autoinfection.

#### 4.1 Conclusion

In this study, there was high prevalence of intestinal parasites in the fingernails of primary school children. Effective means of preventing the transmission of these parasites includes; provision of good toilet facilities and waste management system, integration of deworming programme into the existing health infrastructure, prompt treatment of infected persons and proper education on good personal hygiene and hand washing skills.

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