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Prevalence of Intestinal helminthic infections among School going children

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Abstract

Intestinal parasitic worms are one of the major problems in worldwide. Parasitic worms are organisms that can live and replicate in the gastrointestinal system. The soil-transmitted helminths (STHs) such as *Ascaris lumbricoides*, *Ancylostoma duodenale*, *Trichuris trichiura* and *Schistosoma mansoni* are more commonly infect humans especially children. These STHs are transmitted through the fecal oral route as a result of poor sanitary practices. This cross sectional study includes 480 School going children was studied in order to determine the prevalence and intensity of soil-transmitted helminths and their relationships with the associated risk factors. There are two fresh faecal samples were collected from each children and which were examined by direct microscopy, Harada-Mori culture technique and conventional Iodine and Saline wet mounts. The prevalence of helminthic infection was found to be 54 (11%) out of 620 children and 480 (89%) of children haven't infections. The prevalence rate ranged in males (57%) was more than females (43%). The most prevalence rate was reported in age groups 4 to 7 years old, and the lowest prevalence was related to age group 8 to 11 years old. The pathogenic intestinal worm *Ascaris lumbricoides* (roundworm) were the most predominant isolates followed by *Ancylostoma duodenale* (hookworm) and *Trichuris trichiura* (whipworm) among School children. No case of *Schistosoma mansoni* was identified. This study revealed significant burden of intestinal helminthic infections and highlights the need for preventive and intervention measures such as deworming campaign, improve water quality for domestic use, health education, good sanitation, personal hygiene, uses of appropriate deworming medicines such as Albendazole, Mebendazole and other anthelmintic drugs were useful to avoid and reduce the transmission of soil-transmitted helminths.

Keywords: Children, Helminths, Hookworm, Roundworm

Introduction

Soil-transmitted helminth (STHs) infections are widely distributed and, since they are linked to a lack of sanitation, occur wherever there is poverty. Hookworms commonly affect lungs and small intestine. Humans acquire hookworms through roundworm eggs and larvae found in dirt contaminated by feces⁶. These infections are highly endemic in populations with low socio economic status, poor hygiene, oral faecal transmission, favouring larval skin penetration, contaminated water supplies and high population densities¹⁰.

WHO estimated that more than a billion people are chronically infected with STHs. It mainly affects people in developing nations in the tropics and subtropics due to poor sanitation. *Ascaris lumbricoides*, hookworms (*Ancylostoma duodenale* and *Necator americanus*) and *Trichuris trichiura* are the most common STHs with global prevalence of about 1,000, 900-1300, and 500 million people, respectively¹⁴. The intestinal helminthic infection such as Ascariasis, Ancylostomiasis and Trichuriasis is caused by *Ascaris lumbricoides*, *Ancylostoma*

duodenale, and *Trichuris trichuria*, respectively. The common symptoms are including abdominal pain, vomiting, fatigue, nausea, diarrhea, bloody or worm in stools, weight loss, chronic diarrhea and anaemia (iron deficiency) in severe cases.

Intestinal Schistosomiasis is caused by *Schistosoma mansoni* and infections are transmitted by contact with freshwater containing parasite larvae. Schistosomiasis is endemic in 76 countries worldwide and 662 million people infected worldwide, 85% are from Africa². In Tanzania, Schistosomiasis is highly endemic, and its prevalence varies from one region to another, with a prevalence of up to 80% in highly endemic areas⁸.

School going children remain hard to reach the mass drug administration programmes in control of STHs infections in under developing countries. Currently, STHs persist exclusively in the poorest populations⁵. Preschool, School aged children and adults are more exposures to harbor the intestinal worms as a result diminished physical fitness and impaired memory³. These lead to impair childhood educational performance, reduce school attendance, with hookworms being well known causes of anaemia because of intestinal blood loss.

Control of STHs in the study area requires an integrated strategy that involves provision of health education to communities, regular treatments, and provision of adequate safe water supply and sanitation facilities. Thus, the purpose of this study was to determine the prevalence rate of intestinal helminthic

infections among School going children and to estimate the group more affected in the rural area of Dar-Es-Salaam in Tanzania.

Materials and Methods

A cross-sectional descriptive study was undertaken to establish the prevalence and intensity of soil-transmitted helminthic infections among school children in Luqman Islamic Seminary Secondary School children in rural area of Dar-Es-Salaam in Tanzania. This study includes 480 School going children (275 Boys and 205 Girls) and their age groups are 4 to 11 years old (**Table 1**). Two fresh faecal samples were collected from each child in wide mouthed plastic containers with identification numbers and names. Microscopic examination of the stool samples for hookworms, ova or larvae were examined by Saline and Iodine direct wet mount, within 1 hr after preparation in order to capture hookworm eggs before they hatch⁷. The positive hookworm ova samples further proceed to Harada-Mori culture technique¹¹. The stool sample nearly 0.5-1.0 gm smeared on one end of a filter paper and placed carefully in a test tube containing water in such a way that the smeared area was clear of the water. One third of the filter paper was then dipped into the water in the test tube. Then, the tube was incubated at temperature of 26-28°C and kept under observation for one week. The cultured filariform larvae were concentrated by centrifugation, observed under the microscope by Lugol's iodine staining method.

Table 1. Gender among School children

S. No	Gender	Total Children n = 480	Percentage (%)
1.	Boys	275	57%
2.	Girls	205	43%

Inclusion criteria:

Inclusion criteria were based on selection of healthy students and not used any of deworming medicines.

Exclusion criteria:

Exclusion criteria were School children, who had a history of being health issues and used drugs for deworming within a period of one month before the study.

Results and Discussion

This cross-sectional study was performed on 480 School going children. Out of 480 cases, 275 (57%) were males and 205 (43%) were females. The prevalence rate of gut worm infections were 54 (11%) and 426 (89 %) of children haven't infections (**Table 2**). The most prevalence rate was reported in age groups 4 to 7 years old, and the lowest prevalence was related to age group 8 to 11 years old (**Table 3**).

The prevalence rate ranged in males (57%) was more than females (43%) (Figure 1). In this study showed intestinal roundworm *Ascaris lumbricoides* were the most predominant isolates found in both boys (58%) and girls (52%), followed by *Ancylostoma duodenale* were found (26%) boys, (30%) girls and *Trichuris*

trichiura were found (16%) boys, (18%) girls students (Figure 2 & 3). Hence, *Ascaris lumbricoides* were the most predominant isolates followed by *Ancylostoma duodenale* and *Trichuris trichiura* among School children.

Table 2. Prevalence and intensity of intestinal helminths among School children

S. No	Contents	Total Numbers	Percentage (%)
1.	Total case study	480	100%
2.	Presence of intestinal helminths	54	11%
3.	Non intestinal helminths	426	89%

Table 3. Parasitic positivity with the age (n = 54)

S. NO	Student Age Group	Total Boys n = 31	Total Girls n = 23
1.	4 - 5	18	11
2.	6 - 7	9	8
3.	8 - 9	3	3
4.	10 - 11	1	1

Figure 1.

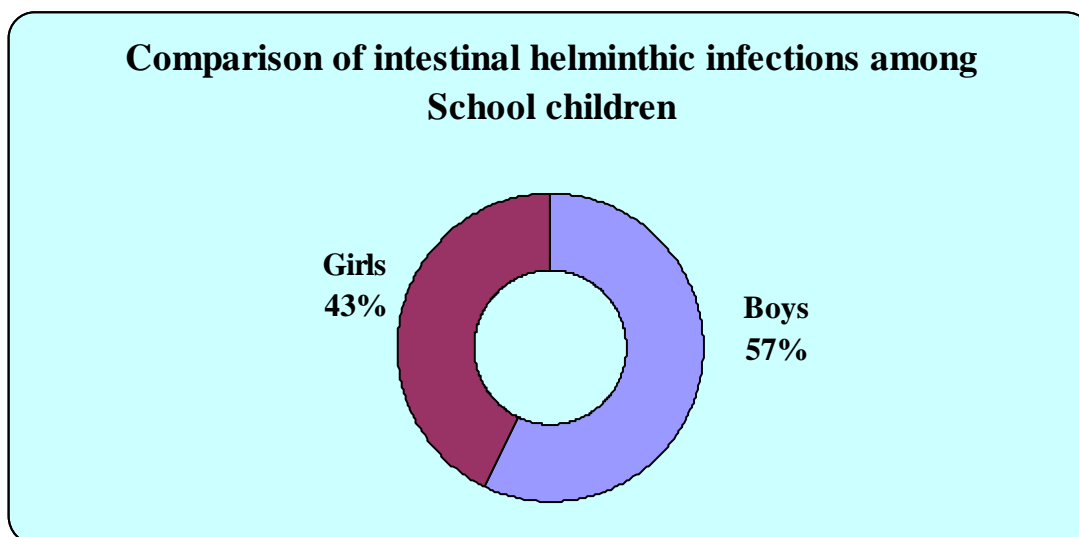


Figure 2.

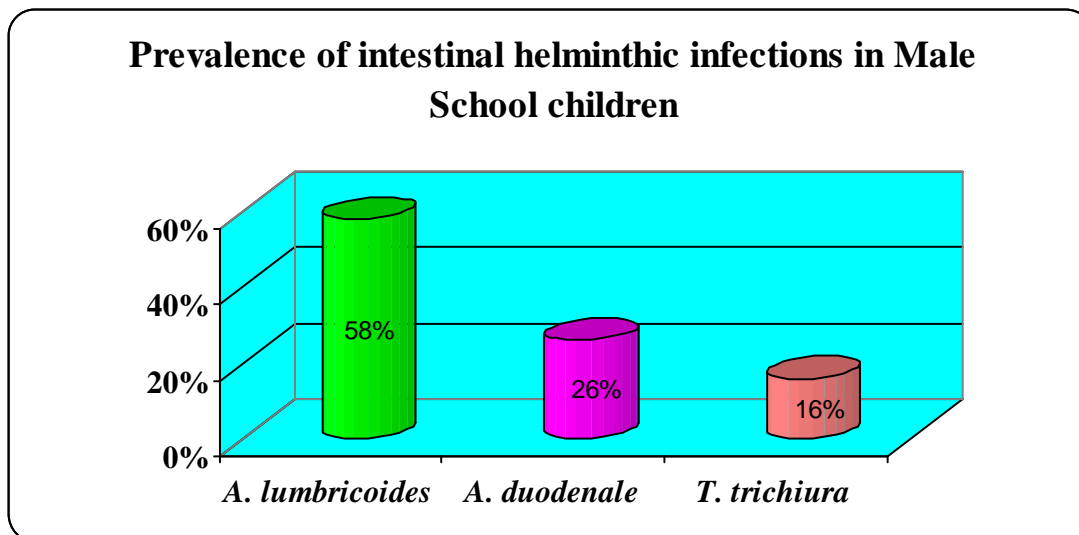
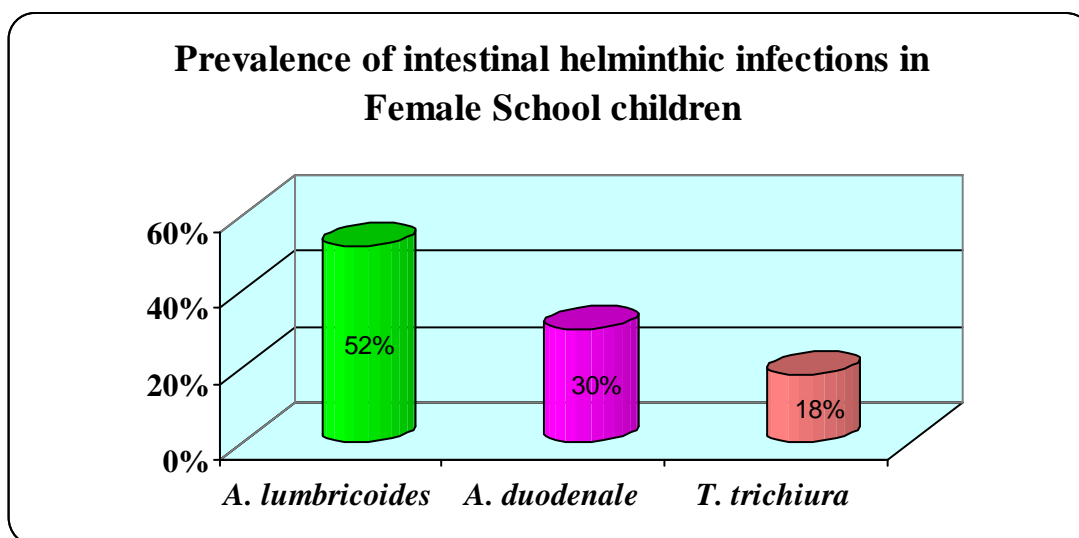


Figure 3.



All age groups are affected in epidemic areas but children are infected more often than adults. The results also showed that the infection occurred more in younger children below 7 years old than in older children. In addition, a high degree of over crowding and low socioeconomic level increases the vulnerability to helminthiasis. Other researchers have reported similar results. These results are contrary to the studies conducted among children in Southern Sudan^{4, 9}. Study done by Tarimo among primary School children in Temeke district, Tanzania showed

high level of knowledge regarding STHs where 72.4% of them knew at least one of its transmission mode¹³. It was also statistically significant that the level of knowledge on STHs was increasing with age. In addition, the comparison result showed that male children have more susceptible to helminthic infections than the female children except *A. duodenale* which infect female children than male children in this study. Early identification of abdominal symptoms helps in the early detection of parasitic infection which helps in effective treatments those who infected parasitic infections.

According to this study and other studies that carried out on children, the prevalence of *A. lumbricoides*, *A. duodenale* and *T. trichiura* helminthic infections in School children could be due to lack of awareness about intestinal helminthic infections in children about the role of personal hygiene in controlling the disease. It's necessary to improvement of sanitation and provision of clean water. One of the important complications of intestinal parasitic infestation is malnutrition, which in turn leads to underweight and also prone for many other infections.

The intensity of infections was categorized according to the World Health Organization limits as light, moderate or high. Regarding the intensity, among the 480 School children 54 children were found positive. This study highlights the importance of hygiene in School children as an additional opportunity for mass drug administration programme in Tanzania. In addition, community participation in providing health education to children at home should be improved as well as the risk factors such as toilet facilities, hand washing facilities, water for domestic use to avoid and reduce the transmission of soil-transmitted helminths¹².

Conclusion

The study result showed that the prevalence and intensity of soil-transmitted helminths infections among School children is generally high. The results also indicate that poor personal hygiene, improper toilet habits, not wearing shoes and poor socioeconomic conditions to be powerful determinants of these infections. The National deworming health program activities should be carrying out among School children in frequently manner. The community based provisions of adequate safe water supply, sanitation facilities, health education to children are needed to control these parasitic infections. Further, anthelmintic drugs such as Albendazole, Mebendazole and other anthelmintic drugs were prescribed to those who were found to be positive for the helminthes.

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