



Prevalence of Soil Transmitted Helminths Among Boarding School Children in Sokoto, Nigeria

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ABSTRACT

The study was carried out to investigate the prevalence and intensity of soil transmitted helminths in Almajiri integrated school Sokoto. The school is fully boarding and funded by Islamic Organization (Zaqa'At). Fecal samples of 50 children were collected and analyzed using formol ether concentration technique. A total of (74%) prevalence was recorded. Children between the age of 11-13 showed the highest prevalence of (44%), followed by age group 14-16 which shows (20%), infection and 8-10 age group shows the prevalence of (10%). Differential prevalence of parasite species showed 44% *A. lumbricoides*, (26%), *S. stercoralis* and (16%), *T. trichuira* and (3%) hookworm infection. Data suggested that STH are important public health problem in the studied school and hence actions is imperative against improper disposal of human faeces, insufficient supplies of potable water, poor personal hygiene.

Keywords: Helminths, nematodes, intestinal parasites

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INTRODUCTION

Soil transmitted helminths are parasites that are transmitted by soil contamination of food or drinking water. Infections and transmission of such helminthes are propagated by poor hygienic habits such as indiscriminate disposal of human and animal faeces. Five species are responsible for widespread diseases in human and these include *Ascaris lumbricoides*, *Trichuris trichura*, hookworm (*Necator americanus*, *Ancylostoma duodenale*) and *Strongyloides stercoralis* (Ojunrongbe *et al.*, 2013).

Soil transmitted helminthes have been among the major chronic parasitic infections distributed throughout the world. Globally, about 4.5 billion individuals are at risk and more than 2 billion peoples are infected of which about 450 million suffer from the infection at school-age (WHO, 2014).

Soil transmitted helminthes (STH) infection is a major health problem of children from rural areas of developing countries and it is an important cause of morbidity in school age children, especially primary school pupils (4 - 15 years) who harbor the highest prevalence of worm infestation (Aboya *et al.*, 2011; Adebayo and Akinlabi, 2006). Approximately 2 billion people are infected with STH worldwide, which are endemic in most tropical countries; however, this might be an underestimated of the true global distribution (Albonica *et al.*, 2008; Saboya *et al.*, 2013). Generally, STH infection is associated with poverty, lack of sanitation, impaired hygiene and overpopulation (Ojunrongbe *et al.*, 2013; Booker *et al.*, 2006).

In Nigeria, a considerable amount of human and animal wastes are discharged into the soil daily, leading to the contamination of the soil with STH eggs and larva (Adeyeba and Tijani, 2002; Damen *et al.*, 2010). Infection may be direct or indirect through secondary sources such as contaminated food, water, vegetables and fruits, since most STH infections are acquired through the fecal oral route.

The risk of the individual suffering from STH infection related morbidity appears to be a joint function of the number of species harbored and/or the infection intensity of any species (Mukhopodhyay *et al.*, 2008). Other significant morbidities attributed to intestinal helminthes include growth retardation, anaemia, vitamin A deficiency and impaired intellectual performance (Hotez, 2011; Ojunrongbe, 2013). The relationship between malnutrition and geo-helminths infection which is common in poor family and it is complex and depends on some parameters such as the social, economic and physical environments in which an individual life. Based on these facts, we selected Almajiri integrated school for our study where level of sanitation is poor.

MATERIALS AND METHODS

Sample Collection

50 samples were collected from the children. All males between the age of 8 to 16. Each child was given a sterile universal container to provide their morning stool. Samples were collected from the children and transported to the parasitology

laboratory, Department of Biological Sciences, Usmanu Danfodiyo University, Sokoto for parasitological study.

confirmed using chart. Prevalence was calculated and tables were prepared.

Sample Analysis

The method of analysis used was formol ether concentration technique. 1g of stool samples was transferred in a glass container and 4ml of 10% formaline was added to it. The glass container was shaken vigorously. Again, 3ml of 10% formaline was added in the glass container. Sieve was used to sieve the solution in order to remove larger particles present in the stool sample. The solution was transferred in a test tube and 4ml of ethyl-acetate was added in the tube containing the solution, the tube was shaken very well. The content was transferred to centrifuge tube and the tubes were inserted in a centrifuge machine, the machine was run at 3500 revolutions per minutes, for five minutes after which the tube was removed and the supernatant was discarded. The remaining sediment was transferred on a glass slide. Cover slip was used to cover the slide carefully. The slides were then mounted on the microscope, and parasites eggs were viewed and identified and

RESULTS

After slide preparation, Fecal slides were microscopically examined for Soil transmitted helminthes. The studied population showed an overall prevalence of 74%. Table 1 shows the prevalence of parasites among studied children. Prevalence of parasites based on student's age group revealed that 8-10-year age group had least infection (10%), while 11-13 age group are highly infected (44%), but infection rate reduced with further increase in the age as prevalence declined to 20% in 14-16-year age group (Table 2). The distribution of STH based in different age groups showed that age group 11-13 had the highest prevalence of (57%) of *A. lumbricoides* and (14%) of *T. trichura*, (25%) of *S. stercoralis* and (7.1%) of Hook worms' infection (Table 3). Table 4 showed the intensity of infection in the studied population, the intensity was analyzed based on WHO guideline.

Table 1: prevalence of parasites among studied children

No. Examined	No. Infected	% Infected
50	37	74%

Table 2: Prevalence of parasites among studied children based on age

Age Range	No. of Examined	No. of Infected	% of Infected
8 - 10	8	5	10%
11 - 13	28	22	44%
14 - 16	14	10	20%
Total	50	37	74%

Table 3: Parasite distribution among studied children

Age Range	No. Examined	% <i>A. lumbricoides</i>	% <i>T. trichura</i>	% <i>S. stercoralis</i>	% <i>A. doudeuale</i>
8 - 10	8	2(4%)	2(4%)	1(2%)	0(0%)
11 - 13	28	16(32%)	4(8%)	7(14%)	2(4%)
14 - 16	14	4(8%)	2(4%)	5(10%)	1(2%)
Total	50	44%	16%	26%	3%

Table 4: Parasite Intensity among studied children

Organism	Heavy	Moderate	Light
<i>A. lumbricoides</i>	18	4	0
<i>T. trichura</i>	7	1	0
<i>S. stercoralis</i>	11	2	2
Hookworm	3	0	0
Total	39	7	2

Light infection- 1-2 eggs; Moderate- 3-4 eggs; Heavy- 5 eggs above

DISCUSSION AND CONCLUSION

The result of current study revealed that the prevalence of STH among school aged children in Almajiri integrated school was 74%, in which the age group 8-10 had 10% prevalence, 11-13 had 44% and 14-16 had 20% prevalence. Orders of occurrence of parasites were, *A. lumbricoides* had the highest prevalence of 44% followed by *S. stercoralis* with 26%, *T. trichuira* with 16% and hookworm with the least infection of only 3%. High prevalence of *A. lumbricoides* can be due to the reason that female *A. lumbricoides* has a fairly high fecundity (200,000-234,000 eggs / day; Chatterjee, 2009) and hence numerous eggs were encountered during study, also they remain viable in moist soil for long period which show high rate of survival in parasite. The source of water for everyday need in the school is an open water reservoir and pupils use their buckets to fetch water from reservoir directly, for bathing/ washing purpose and the same bucket use in their toilets. Probably from toilet to bathroom they spread infection. Pupils used their hand instead of spoon to eat food without washing their hands properly. These pupils usually help in agricultural activities carried out within the school by their teachers. Most of them used to play football in school premises, bear footed; which may cause penetration of helminthes larvae or eggs. All these factors contribute to high prevalence of parasites among studied children as well as constant re-infection among children and in the school. The result was comparable with the report in southern Nigeria (Adeyeba, 2011; Ogbe et al., 2002) in which *A. lumbricoides* was recorded as the highest prevalent followed by *S. stercoralis*, *T. trichuira* and hookworm.

The result obtained in this study, however imposes a heavy burden upon the health and well being of children, and those who are persistently exposed to infection are likely to be debilitated. Therefore prompt intervention and care in such type of schools is urgently needed, with provision safe drinking water, personnel hygiene and basic amenities. Government should appoint some officials to inspect such kind of schools time to time.

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