

STUDIES ON INTESTINAL HELMINTHIASIS AMONG SCHOOL CHILDREN IN OSOGBO LOCAL GOVERNMENT AREA OF OSUN STATE, SOUTH-WESTERN NIGERIA

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ABSTRACT: Intestinal helminthiasis is one of the neglected parasitic diseases currently receiving attention from the international organization. This study was conducted in six selected primary schools in Osogbo town, southwestern Nigeria. Faecal samples from 336 pupils were examined using direct smear and formol ether concentration method. Out of the 336 samples examined, 103 (30.1%) were positive for one or more intestinal parasites. Three helminth parasites were identified in the faecal samples namely; *Ascaris lumbricoides* (24%), hookworm (6%) and *Trichuris trichura* (3%) with cases of mixed infection; *A. lumbricoides* and hookworm (1.20%), *A. lumbricoides* and *T. trichura* (0.3%), Hookworm and *T. trichura* (0.3%). None of the parasites was sex – dependent since the parasites were found in both sexes and all age groups. The infections were school dependent as public schools have significantly higher prevalence ($p < 0.05$) than the private schools. The study revealed that poor socio economic status, large family size, low education level and poor environmental situation are the major contributory factors to the relatively high prevalence of helminthiasis recorded. Level of prevalence and intensity can be reduced by children targeted treatment program and school based deworming programmes.

KEY WORDS: Intestinal helminthes, school-aged children, mixed infection, Nigeria

Human parasitic worms are among the most prevalent chronic infection in human in developing countries and major cause of disease burden among children throughout the world (WHO, 2000). More than 2,000 million people are infected by soil transmitted helminthes (STH) worldwide, of which more than 300 million suffer from associated severe morbidity (Montessor et al., 2002). Climate is an important determinant factor for transmission of these infections in the tropical and sub-tropical areas, with adequate moisture and warm temperate essential for larva development. Equally important determinants are poverty and inadequate clean water supplies and sanitation (Mahfooz et al., 2010). Morbidity and rate of transmission of STH infections are directly related to the number of worms harbored in the host (Bethony et al., 2009).

Intestinal helminthes are transmitted by eggs ejected in human faeces; which in-turn contaminate the soil and water sources in area that lack adequate sanitation (Sam-Wobo et al., 2012). It has been shown that multiple infections with intestinal helminth are very common (Sam-Wobo et al., 2008). Heavy infestation with *Ascaris lumbricoides* and *Trichuris trichura* causes protein energy malnutrition and may interfere with appetite, growth physical fitness cognitive development and school performance in malnourished children (WHO, 2010). Hookworm infestation is a leading cause of Anaemia (Roche & Layrisse, 2001). Whipworm infestation in children causes growth retardation and anaemia (Bundy & Cooper, 1993).

In many developing countries, the only education children receive is in primary school, and this is the age when they are more frequently infected by helminthes. This infection could thwart the effort of a country to provide basic school education (Partnership for child development, 1999), especially in a school age children. In view of the negative socio – economic impact of these parasite infections on children, there is a need for the development of good preventive and control measures against intestinal infection. This cannot be done effectively without baseline data on the occurrence of parasitic infection on a particular area.

The result of this study will be useful to both researcher and health authority in diagnosis, planning and implementing control programmes for intestinal helminths infections in the area. To best of our knowledge, there is paucity of information on human intestinal helminthiasis have been reported in Osogbo Local Government. The present study is an effort to determine the prevalence and associated risk factors of intestinal helminths infection among school children in Osogbo, southwestern Nigeria.

MATERIALS AND METHODS

Study Area

The study was conducted in Osogbo, (latitude 7°46N and Longitude 4°36E), the capital of Osun State in Southwestern Nigeria with a population of 156,694. The study population was randomly drawn from six primary schools in Osogbo Local Government area.

The pupils were between 3 and 14 age bracket.

Ethical Clearance

Consent and Ethnical clearance

Prior to the commencement of the study, permission was obtained from the zonal education department of the Osogbo Local Government. Verbal consent was also sought from the parents of the participating pupils through the Parent -Teacher Association of each school. The purpose of the study was explained to them. The study was conducted with 336 consented individuals.

Questionnaire Survey

Structure questionnaires were administered on each respondent so as to collect social demographic data including age, sex, and source of water.

Parasitological Survey

Preparation of faecal smear and identification of parasite

A total of three hundred and thirty six (336) pupils participated in the study.

The Specimen bottles were distributed on the eve of the day of examination and the pupils were given direction to avoid contaminating the faeces with soil and other objects.

Each pupil was instructed to deposit his/her faeces on a clean paper and to place about 5g of faeces with the aid of a clean stick in the sample bottle and cork it firmly. The container was identified by label containing the child name. Stool samples were collected from the pupils as soon as they arrived at the school premises. Samples were transported to Microbiology and Parasitology Laboratory of Ladoke Akintola University of Technology Teaching Hospital, Osogbo, within four hours of passage in order to ensure proper identification of hookworm eggs (WHO, 2003). The appearance of each stool was first carefully examined Macroscopic for, consistency, blood, Mucus or adult worm using X10 and X40 objective lenses. The faecal samples were then examined microscopically for intestinal helminthes by direct smear saline method. Negative samples were later subjected to concentration method. The number of each species of eggs in the

entire preparation were counted and recorded to give appropriate number of eggs/g of stool (WHO, 2003).

Data Analysis

The data obtained were analyzed using Chi – square statistical package. The differences were considered to be statistically significant when P-value obtained was less than 0.05.

RESULTS

Of the three hundred and thirty six (336) pupils examined, 103 (31%) were infected with intestinal helminth. Three intestinal helminth parasites were identified, namely *Ascaris lumbricoides*, Hookworm and *Trichuris trichura*. *A. lumbricoides* had the highest prevalence 79(24%) while *T. trichiura* had the least prevalence 9(3%). The prevalence of Hookworm was 2(6%). The prevalence of mixed infection due to Hookworm and *Trichuris* was 1(0.30%) and that of Hookworm and *A. lumbricoides* was 4(1.19%) (Table 1). Table 2 presents the prevalence of the infection in relation to the sex. There was no significant variation in the prevalence of *A. lumbricoides* ($p>0.05$) in males as compared with the females. Similarly, the total prevalence of hookworm among males, (6.5%) was not statistically different ($p>0.05$) from the total prevalence among females (6.1%).

The prevalence of helminth infection was generally even across the age groups. The lowest prevalence was in age group 3-5 15 (24.2%) while the highest prevalence was in age 6-8 50(34.5%) (Table 3).

The prevalence of helminth infection was higher in public schools as compared with private schools with the exception of *T. trichura* which had higher prevalence in private school (7%) than primary schools (2%). The prevalence of *A. lumbricoides* and hookworm was higher in public schools than private schools (Table 4).

DISCUSSION

Intestinal parasitic diseases remain a public health problem especially faecal contamination of food and water (Jimenez-Gonzalez et al., 2009). This is more common in school-going children and it is associated with high morbidity and mortality and economic loss to the county (WHO, 2008). The present study on intestinal helminthiasis shows that *A. lumbricoides* is more prevalent among the school children in Osogbo Local Government Area. This result and those reported by Adeyeba & Tijani (2002), Sam-Wobo et al. (2005), Anantaphruti et al. (2004), Uneke et al. (2007) showed that *A. lumbricoides* is common throughout Nigeria. In the present study, the 31% overall prevalence of intestinal helminth agreed with 37.3% reported by Anosike et al. (2005) and several other reports from different parts of Africa (Dada et al., 1993). The high prevalence of *Ascaris* infection may be attributed to high level of unhygienic practices or the habit of defecating indiscriminately in open places among school children which eventually contaminate the environment. Intestinal parasites have been reported to have deleterious effect on school children (Adeyeba & Akinlabi, 2002).

The presence of *T. trichura* infection in the study area was not unexpected though in a low infestation rate, since it is known that similar condition which influences the endemicity of *A. lumbricoides* also influences its endemicity (O'larcalin & Holland, 2000). The reason accounting for this could be that *T. trichura* is less resistant to cold, drought and dry climate (Crompton & Nesheim,

2002). Surprisingly infestation with Hookworm was low in this study while it was prevalent in many other studies (Merid et al., 2001; Ijagbone & Olagunju, 2006; Osazuwa et al., 2011). Results of present study, like previous studies reveal no significant variation among sex. Reason being that the risk factors of the problem are equal (Agbolade & Odaibo, 1986; Mafiana & Omotayo, 1989; Taiwo & Agbolade, 2000).

Result of this survey shows that intestinal helminthiasis is most prevalent among age group 6-8 and 9-10 years. This is due to the fact that children in this age are school –aged pupils. They do not take much care about the cleanliness of the hands and clothing. They do not wash their hands frequently, particularly before meals and after going to toilet (Ahmad Khan et al., 2004), all these are contributory to the transmission of helminthiasis. None wearing of shoes by children, playing on wet grounds could also expose them to Hookworm infection.

In present study, it was observed that the population with a better socio-economic status has comparatively low prevalence and intensity of the infection, as children from public schools had high prevalence and intensity than those in private schools. Socio-economically stable families can keep personal hygiene and cleanliness of house hold and their belongings. Sufficient house space also prevents over- crowding and heavy faecal pollution of premises. Good sanitary facilities are a very effective measure to control helminthiasis (Mahfouz et al., 2010).

In conclusion, the present study reveals that intestinal helminth is highly prevalent among school- age children in Osogbo Local Government Area. The high intestinal helminth prevalence supports the idea that children are the most affected groups. It is therefore suggested that intervention methods have to be adopted to reduce intestinal helminthes infection among children. This may include improving sanitation and personal hygiene through continuous health education, mass deworming and periodic treatment of schools children. Ministry of Environment should regularly check the level of hygiene among the populace and fine defaulters.

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Table 1. Intestinal Helminths Infection among School Children in Osogbo Local Government Area.

Parameters	Frequency of occurrence	Percentage of occurrence
Number Examined	336	100
Number Infected	103	30.65
Number Infected with <i>Ascaris</i>	79	23.51
Number Infected with Hookworm	21	6.25
Number Infected with <i>Trichuris</i>	09	2.68
Mixed Infection		
Double Infection with Hookworms and <i>Trichuris</i>	01	0.30
Double Infection with Hookworms and <i>Ascaris</i>	04	1.19
Double Infection with <i>Ascaris</i> and <i>Trichuris</i>	01	0.30

Table 2. Prevalence of the infection by Sex of school Children in Osogbo Local Government Area.

SEX	NUMBER EXAMINED	ASCARIS	HOOKWORM	TRICHURIS
MALE	155	23.2%	6.5%	1.9%
FEMALE	181	23.9%	6.1%	3.3%

Prevalence %

Table 3. Prevalence of the Infection by Age Group of School Children in Osogbo Local Government.

AGE (YRS)	NUMBER EXAMINED	ASCARIS	HOOKWORM	TRICHIRUS
3 -5	62	19.4%	1.6%	3.2%
6 -8	145	23.4%	7.8%	3.4%
9 -11	94	25.5%	7.5%	1.1%
12 -14	35	25.9%	5.7%	2.9%

Prevalence %

Table 4. Prevalence of *Ascaris Lumbricoides*, *Trichuris* and Hookworm in Public and Private School in Osogbo Local Government Area.

SCHOOLS	Number Examined	<i>A. lumbricoides</i>	<i>T. trichuris</i>	Hookworm
PUBLIC SCHOOL	175	55%	2%	12%
PRIVATE SCHOOL	161	26%	7%	9%

Prevalence %