

INTESTINAL NEMATODE PARASITES AMONGST SCHOOL CHILDREN ATTENDING SOME PRIMARY SCHOOLS IN MBAITOLI LOCAL GOVERNMENT AREA, IMO STATE, NIGERIA.

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ABSTRACT

Intestinal parasitosis remains an important public health problem in underdeveloped and developing countries. Intestinal nematode parasites comprise an important group of human endoparasites that infect mostly school age children. This research was carried out to determine the prevalence of intestinal nematode parasites (INP) in children attending two primary schools in Mbaitoli Local Government Area, Imo State, South-Eastern Nigeria. Two hundred faecal samples from 200 school children were examined using direct smear. The overall infected samples were 85(42.50%), comprising 43(21.50%) females and 42(21.00%) males. Three intestinal nematode parasite species were indentified: *Ascaris lumbricoides*, *Trichuris trichiura* and hookworm. When ranked by proportion, parasite loads were found as follows: *Ascaris lumbricoides* (67.06%), hookworm (27.06%) and *Trichuris trichiura* (21.18%). Statistical analysis indicates a significant difference ($p>0.05$) in prevalence of the parasites with *Ascaris lumbricoides* having the highest rate of prevalence. There were single and double infections in the study. We conclude that there is a pronounced intestinal nematode parasitic burden amongst school children in Mbaitoli Local Government Area, Imo State, Nigeria. Therefore, regular de-worming exercise with appropriate antihelminthes, education on personal hygiene and other health campaign programmes if carried out in the rural areas will improve the health status of school children.

Keywords: *Intestinal parasitosis, Nematode parasites, Ascaris lumbricoides, Trichuris trichiura, Hookworm.*

INTRODUCTION

Intestinal parasitosis is still an important public health problem in underdeveloped or developing countries. It is known to be affected by several factors including personal hygiene, dietary habits, education levels of the community, socioeconomic status, climatic and other environmental factors. Intestinal parasites are more frequently encountered during school age, mostly linked to relatively less developed hygienic habits. When burden in children is pronounced intestinal parasites might cause serious health conditions and problems and notably diarrhea, malnutrition, mental retardation and even death (Ukpai and Ugwu, 2003).

Helminthes are among the most common parasites of human that cause gastrointestinal infections, especially in the tropical and subtropical parts of developing parts of the world (Mbanugo and Abaziri, 2003). Parasitic helminthes infection is of serious public health problem, especially in areas of low environmental quality and for the people of low nutritional status (Kitty, *et al.*, 2003).

Intestinal Nematode Parasites (INP) comprises an important group of endoparasites located in the intestine. Common intestinal parasites of humans includes: *Ascaris lumbricoides* (large roundworm), *Enterobius vermicularis* (pinworm, seatworm or threadworm), *Trichuris trichiura*, (whip worm), *Ancylostoma duodenal* and *Necator americanus* (hookworm), and *Strongyloides stecoralis* (Ayanda, *et al.*, 2010). Human intestinal nematode parasites are still a public health concern in Nigeria, as they infect mostly school age children and their infections tend to be high in the age group 5-14 years (Albonico, *et al.*, 1999). Although infections are well controlled in the urban settings of the country, they are mostly limited to rural areas. The present study on the prevalence of intestinal nematode parasites has been carried out mainly amongst school children attending some primary schools in the rural communities in Mbaitoli Local Government Area, Imo State, South-Eastern Nigeria, where little or no work has been done.

This research was geared towards determining the prevalence of intestinal nematode parasites amongst primary school pupils in Umunoha and Umuduru Community primary schools in Mbaitoli Local Government area, Imo State, Nigeria.

MATERIALS AND METHODS

Study Area

The study was conducted in Mbaitoli Local Government Area, of Imo State, an area located between the geographical coordinates of 5°35'28"N and 7°3'55"E. The area is marked by two distinct seasons: rainy and dry seasons. The area is traversed with a number of fresh water bodies. Basic social amenities are lacking with no or poor sewage disposal system in most communities. Farming and trading are the major occupation of inhabitants of this area.

Study Population

Two hundred (200) stool samples from two (2) community primary schools in Mbaitoli Local Government area were examined. 100 samples were collected from each school (50 males and 50 females). Compliance of the pupils was achieved through the combined efforts of the head teachers who acknowledged the impact of public health from the team of researchers and the approval of local health authority

Microscopy

The direct smear method for the identification of eggs of intestinal helminthes, as described by Cheesbrough (1998) was used.

Procedure: From each feacal sample collected in wide mouthed bottle, about 0.10gm was taken using applicator stick and emulsified on a drop of physiological saline placed on the labeled glass slide. A smear was made sufficiently thin so that the cover slip does not float on it. The smear was then covered with a clean cover slip. The prepared slide was mounted on the microscope and examined for the presence of intestinal nematode parasite (INP) eggs under x10 and x40 objectives of the microscope.

Statistical Analysis

The results were analyzed for statistical significance using Chi square (X^2) test. $P > 0.05$ was considered significant.

RESULTS

Two hundred feacal sample from 100 male and female students were examined out of which 85 (42.50%) were positive for INP. Three INP species were identified, namely: *Ascaris lumbricoides*, *Trichuris trichiura*, and hookworm. Among those

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infected with INP, 67.06% of the school children were infected with *Ascaris lumbricoides*, followed by hookworm (27.06%) and *Trichuris trichiura* (21.18%) see Table 1. The children were infected with both single species (84.71%) and double species (15.29%) of INP, Table 2. Among the nematode infectants, infection with *Ascaris lumbricoides*, was the commonest type among the infected subjects of children infected with INP in two primary schools (Table 3) shows that prevalence rates of INP in community primary school, Umunoha (22.00%) and Umuduru primary school, Obinoha (20.50%) did not differ significantly. Table 4 shows that school children within the age cohort of 6-8 years had the highest intestinal nematode parasite infection (23.00%). The age-group recorded equal infection rate of (11.50%) in the Community Primary School Umunoha and Umuduru Primary School Obinoha. Intestinal nematode parasite infection decreased as the ages of the school children increased. Gender related INP infection (Table 5) showed that females (12.50%) were more infected than males (9.50%) in community Primary School Umunoha, while in Umuduru Primary School, Obinoha, the reverse (9.50% of infected females and 11.50% of males) were the results.

Table 1: Overall Prevalence of Intestinal Nematode Parasites (INP) According to Species

| INP Species | Number of Subjects Infected | Percentage (%) |
|-----------------------------|--------------------------------|----------------|
| <i>Ascaris lumbricoides</i> | 57 | 67.06 |
| Hookworm | 23 | 27.06 |
| <i>Trichuris trichiura</i> | 18 | 21.18 |

Table 2: Frequency of intestinal nematode parasites (INP) infection according to parasite species

| INP Species | Number of Subjects Infected | Percentage (%) |
|-------------------------------|--------------------------------|----------------|
| Infected single infection | 72 | 84.71 |
| <i>Ascaris lumbricoides</i> | 44 | 51.76 |
| <i>Trichuris trichiura</i> | 18 | 21.18 |
| Hookworm | 10 | 11.76 |
| Double infection | 13 | 15.29 |
| <i>Ascaris lumbricoides</i> | 13 | 15.29 |
| Total positive for INP | 85 | 100.00 |

Table 3: Prevalence of Intestinal Nematode Parasites in Community Primary School, Umunoha (CPSU) and Umuduru Primary School, Obinoha (UPSO)

| School | Number of Subjects Examined | Number of Subjects infected | % Infected |
|--------|-----------------------------|-----------------------------|------------|
| CPSU | 100 | 44 | 22.0 |
| UPSO | 100 | 41 | 20.50 |
| Total | 200 | 85 | 42.50 |

Table4: Age-group related INP infections in community primary school Umunoha (CPSU) and community primary school Obinoha (UPSO).

| Age-group in years | Number Examined | | Number Infected | | Total Infected |
|--------------------|-----------------|------|-----------------|------------|----------------|
| | CSPU | UPSO | CSPU | UPSO | |
| 6 - 8 | 34 | 35 | 23(11.50%) | 23(11.50%) | 46(23.00%) |
| 9 - 11 | 34 | 33 | 16(8.00%) | 14(7.00%) | 30(15.00%) |
| 12 - 14 | 32 | 32 | 5(2.50%) | 4(2.00%) | 9(4.50%) |
| Total | 100 | 100 | 44(22.00%) | 41(20.50%) | 85(42.50%) |

Table 5: Gender-related INP Infections in Community Primary School Umunoha (CSPU) and Umuduru Primary School, Obinoha (UPSO)

| Age-group in years | Number of Pupils Infected % | | | | | |
|--------------------|-----------------------------|-----------|-----------|------|-----------|----------|
| | CSPU | Male | Female | UPSO | Male | Female |
| 6 - 8 | 23 | 11(5.50%) | 12(6.00%) | 23 | 13(6.50%) | 10(5.0%) |
| 9 - 11 | 16 | 6(3.00%) | 10(5.00%) | 14 | 7(3.50%) | 7(3.50%) |
| 12 - 14 | 5 | 2(1.00%) | 3(1.50%) | 4 | 3(1.50%) | 1(0.50%) |
| Total | 44 | 19(9.50) | 25(12.50) | 41 | 23(11.50) | 18(9.50) |

Overall males infected = 42(42.00%)

Overall females infected = 43(43.00%)

DISSCUSSION

Apparently, the number of infected school children in this study [85(42.50%)] was moderate taking into account the location of the schools which are in the rural

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communities far away from the state capital. However, the infecting nematode species are commonly parasitic on humans (Ayanda *et al.*, 2010) and well documented in the rural areas in developing countries (Glickman *et al.*, 1998, Marnell *et al.*, 1992 and Bethany *et al.* 2006) , especially in Nigeria (Adeyeba and Akinlabi, 2002, Damen *et al.*, 2011, Ukpai and Ugwu, 2003 and Alli *et al.*, 2007). *Ascaris lumbricoides* represented the highest proportion as seen in Table1. This is similar to the findings of previous workers in southeastern zone of Nigeria, e.g. Uhuo *et al.*, (2011), Mba and Amadi (2001), Dada Adebola *et al.*, (2005) and Opara *et al.* , (2003). The levels of infection were single and double infection with triple infection abscent. In theory there should either be no child or smaller number of children harbouring three or more species of endoparasites, acknowledging the natural difference of surviving rates of different species of parasites in the human alimentary tracts. What this suggests would either be that there were low possibilities of exposures to multiple species infections or that the natural tolerance of school children in this study was not compromised by any factor.

Table 3 reveals that the prevalence rates of INP did not differ in the two study schools, community primary school, Umuoha and Umuohuru primary school Obinoha. Both are public schools located in rural communities populated by peasant farmers. The communities lack pipe-borne water and maintain low level of environmental stimulation. Either the school environments or homes of the school children can potentially be medium in the spreading of intestinal nematode parasites. These include water, food, and mouth-to-anus cycle the last medium is known to the common habit of young children (Boreham *et al.*, 1990) especially in unsanitary environments and among less sanitary-trained children.

The relationship between prevalence of intestinal nematode parasites and the age groups of the school children during the present study could be said to be that of inverse proportion. Rate of prevalence of INP was high among pupils in the age bracket of 6-8 years [46(23.00%)] while pupils in the age cohorts of 12-14 years recorded low prevalence rate of 4.50% (n = 9) as seen in Table 4 this could be due to the fact that the youngest age category (6-8 years) engages in high level of contaminated soil activities due to regular playing. Moreover, this group is known for maintaining poor personal hygiene as this plays a role in INP infection. This finding is in conformity with the work of Uhuo, *et al.*, (2011) which states that the incidence of more intestinal helminth infection in lower age group as opposed in the higher age group shows that advanced knowledge in personal hygiene that comes

with advancement in education can play a role in incidence of intestinal parasite infection.

Sex-related prevalence of intestinal nematode parasites infection reveals that out of 100 males sampled 42 were infected while 43 out of 100 female samples had INP infection. This shows that both gender were equally infected. This could be as a result of the fact that school children regularly play in contaminated soil and maintain low level of personal hygiene irrespective of gender. However, gender-related infection in the two study schools Community Primary School Umunoha and Umuduru Primary School Obinoha, differed as seen in Table 5. Female pupils were more infected than the males in the former whereas the opposite was the case of the latter. The difference could be due to level of exposure to infected soils in the communities where the schools are located. Males or females might be more exposed to contaminated soil contact in each of the communities.

The standard of living and awareness on hygiene are in appalling states in this study area. No or less emphasis and sensitization on good personal and environmental hygiene are routes of contacting parasitic nematode infections. This could be real in the present study area. Worm burden and non de-worming exercise are major causes of intestinal nematode parasite infections in the rural areas such as this, where these diseases are attributed to poor people, peasant farmers and indiscriminate disposal of faecal materials which contributes mostly to re-infections of INP. The findings of this study therefore emphasize the need for primary schools in Mbaitoli Local Government Area of Imo State, Nigeria to be provided with good water scheme, construct water system type of toilet (water closet) in schools and carry out de-worming exercise on school aged children in the study area. In addition, instructing children on correct personal habits which are not conducive to INP infections and to practice good personal hygiene can be effective and safe substitute for repeated de-worming, thereby reducing the opportunity for the emergence of drug resistant INP.

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