

*Full Length Research Paper*

# Prevalence of Intestinal Nematodes among Children in a Secondary Health Care Delivery in Osogbo, Nigeria

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## Abstract

The prevalence of intestinal nematodes were determined among 200 children between the age of 6 years and 12 years which consist of 123 males and 77 females attending children emergency clinic, State Hospital, Asubiaro, Osogbo, Osun-State, between the month of October 2010 and March 2011. The fecal samples were examined microscopically using direct smear method with saline and iodine preparations and concentration method for the presence of parasites. The result obtained from this study showed that 106 (53%) were found to be positive for intestinal nematodes while 94 (47%) were negative. The age distribution pattern showed that the age range 8-9 years had the highest prevalence rate for *Ascaris lumbricoides* 30 (41.7%) and Hookworm 15 (20.8%) , it was discovered that it was only the age range 10-12 years that had *Strongyloides stercoralis* 1 (1.3%). In this study, the percentage prevalence of *Ascaris lumbricoides* was 70 (35%), Hookworm was 35 (17.5%), and *Strongyloides stercoralis* was 1(0.5%). The study also reveals that male children (55.3%) have higher prevalence rate than female (50.6%). Thus, there is need for intense mass campaign for improved personal hygiene and proper sewage disposal in this area to avoid endemic of intestinal infection among inhabitants and for the people to re-examine and re-evaluate their nutritional practices as malnutrition are secondary to poverty.

**Keywords:** Prevalence, Intestinal nematodes, Children, Health care delivery.

## INTRODUCTION

Gastro intestinal nematodes infection is among the most prevalent worldwide although this is largely acknowledge only by those working in the field (Stepek et al., 2006). It is estimated that there are 3.5billion cases worldwide of which 450million are individual who are seriously ill as a result and the majority being children, children are at high risk because of their tendency to play in soil or work around barefoot. Approximately 125,000 deaths occur per year and these are mainly due to infections with the hookworms or *Ascaris lumbricoides* (Stepek et al., 2006).

Intestinal nematodes infections are among the most common and neglected infections worldwide (Peter et al., 2008), they are among the most prevalent afflictions of humans living in areas of poverty in the developing world. Two billion individual were reported (WHO; 2002)

to be parasitized with helminthic worms, majority of them living in resource poor settings, 80% of these live in sub-Saharan Africa (Davis et al., 2003). However recent report by WHO 2011 put the figure at 800million infected children who are in need of treatment. The African medical and research foundation in 2007 indicated that the young children particularly affected by intestinal helminthes are from poor background, citing failure to use latrine as the major reason for the increase in the spread of parasitic helminthic worms. Epidemiological survey have reveals that poor sanitary condition such as defecation and feacal contamination of water bodies are the most important factors leading to intestinal worm infestation (Brooker et al., 2008) while the spread is due to personal hygiene (Van Eijk et al., 2009).

It infects people either by ingestion of the larvae or direct penetration of the skin which enter the blood stream and eventually making their way into the small intestine (Arora and Arora, 2005).

In Nigeria, ascariasis is very prevalent especially

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among children (Holland *et al.*, 1992). *Ascaris*-related abdominal complications are usually among major causes of hospitalization in pediatric surgery wards. Strongyloidiasis constitutes a considerable problem causing dermatitis associated with intense itching, malabsorption and bleeding in gut and is frequently fatal in immunodeficient individuals (Cheesbrough, 1998).

The study was aim at establishing the prevalence and distribution among age and gender.

## MATERIALS AND METHODS

### Study Area

The study was conducted in State Hospital, Asubiaro, Osogbo, located in Osogbo Local Government Area, Osun-State, for a period of six months (October, 2010 to March, 2011).

### Study Population

Two hundred (200) children aged six to twelve (6 – 12) years were selected randomly from children clinic at the outpatient department (OPD) of State Hospital, Asubiaro, Osogbo after seeking their parent consent after which questionnaires were filled and were briefed of the importance and significance of the study. Though not all subject presented with major symptoms of intestinal parasitic infection.

### Inclusion Criteria

Primary school age children, ages between 6 and 12 years, with or without symptoms of diarrhea were included in the study.

### Exclusion Criteria

Children below the age of 6 years and children above 12 years old were not included in the study.

### Collection of Samples

The parents of the children were first contacted before the collection of the sample. The children whose parent consented were given questionnaire asking for their age, sex, source of drinking water, toilet facilities. Each patient was given a clean, pre-labeled, dry and wide mouth specimen bottle. The patients were instructed to collect small sample of their stool inside the bottles and should avoid contamination with urine right there in the hospital. The fecal samples from all the 200 children were transported to the parasitology laboratory of the

hospital for processing immediately, when delay is unavoidable; the specimen was preserved in the refrigerator at a temperature of 4<sup>0</sup>C.

### Stool Examination

Stool samples were initially examined for their appearance, consistency as well as the presence of mucus and/or blood on arrival of the samples at the laboratory. Smear of the samples were examined using x40 objective lens. Flootation method was used.

### Statistical Analysis

Infection rate of the examined individuals were based on the total number of individual examined.

Percentage infection (prevalence) = Number of infection x 100/ Number examined

## RESULTS

Table 1 and 3 shows the prevalence of intestinal nematodes according to gender and age, table 2 the distribution of intestinal nematodes according to age.

## DISCUSSION

*Ascaris lumbricoides*, *Strongyloides stercoralis* and *Hookworm* are seen in this study to be prevalent intestinal nematodes encountered. The result obtained in this study shows *A. lumbricoides* to have the highest prevalent (35%), followed by hookworm 17.5% while the least prevalent was *S.stercoralis* (0.5%). The pattern seen in the present investigation is consistent with findings of Adeyeba and Akinlabi (2002) and Ekpenyong and Eyo (2008). The most common encountered parasite was *Ascaris lumbricoides*, this study is in conformity with the one done by Agi (1997) where he recorded high prevalence of *Ascaris lumbricoides* among primary school children in Delta, Nigeria. A percentage of prevalence as high as 35 (*A.lumbricoides*) in this study, reflects that the poor unhygienic practices of children has not change with passage of time and this keep enhancing the transmission of helminthic parasite over years.

The results presented in table1 and 2 show that one of the children had *S.stercoralis*. It could mean that there is a lot of walking barefooted among the children. The presence of *S.stercoralis* was reported by Ozumba and Ozumba (2002) in their study, they were of the view that a large population of the inhabitants of their study area, walked barefooted since the infection is contracted through skin penetration.

With intestinal nematodes infection as regards to

**Table 1. Prevalence of Intestinal Nematodes According to Gender**

Gender	Number of specimen collected	No of <i>Ascaris lumbricoides</i>	No of Hookworm	No of <i>Strongyloides stercoralis</i>	Total No of positive parasite
Male	123	40(32.5%)	27(22%)	1(0.8%)	67(55.3%)
Female	77	30(39%)	8(10%)	0(0%)	39(50.7%)
Total	200	70(35%)	35(17.5%)	1(0.5%)	106(53%)

**Table 2. Distribution of Intestinal Nematodes according to Age**

Age (years)	Number of specimen collected	No of <i>Ascaris lumbricoides</i>	No of Hookworm	No of <i>Strongyloides stercoralis</i>	Total No of positive parasite
6-7	50	15(30%)	12(24%)	0	27(54%)
8-9	72	30(41.7%)	15(20.8%)	0	45(62.5%)
10-12	78	25(32%)	8(10.3%)	1(1.3%)	34(17%)
Total	200	70(35%)	35(17.5%)	1(0.5%)	106(53%)

**Table 3. Prevalence of intestinal nematodes**

Age (years)	No. examined	No. infected	Percentage infection
6-7	50	27	25.5%
8-9	72	45	42.5%
10-12	78	34	32.1%
Total	200	106	53%

age, table 2 shows that children between 8 and 9 years of age were the most infected. This might be because at this age, this group attends to their personal care with not much help from their parents, also they are quite expose to much contact with soil contaminated faeces. This is however contrary to the findings of Ozumba and Ozumba (2002) who reported that the 12-17 teenagers had the highest rate of infection. Table 2 also shows that intestinal nematodes infection was low among children between 6-7 years of age in the present study. This is contrary to the findings of Ekpenyong and Eyo (2008) who reported from their findings that children between age 4 and 6 years had the highest incidence of *A.lumbricoides* infection and explained this to be due to an underdeveloped immunity to parasitic infections. It would however be expected that at the age less than 7 years parents still monitors and restrict the outdoor activities of this children as well as been active in taking care of their personal hygiene, they probably do not go farming with their parents at this age thus not expose to soil contaminated faeces.

Gender wise, both males and females were infected with intestinal nematodes suggesting equal exposure to the parasites. A comparisons in the percentage of infection for both sexes as shown in table 1, shows the males to be more carriers than the females. The only *S.stercoralis* encountered was from the male sample, this can be attributed to the fact that male do participate in more outdoor activities than their female counterpart in this region, contrary to the findings of Ekpenyong and Eyo (2008), who from their study, indicated that intestinal

nematodes infection were more common in females than in males. They suggested that the prevalence of parasitic infections were sex dependent while an earlier report by Nairain (2000) indicated that the difference could be related to the levels of exposure.

In table 3, the study had shown that the prevalence of intestinal parasite is high, out of 200 samples examined, 106 (53%) had various parasites namely *Ascaris lumbricoides*, *Hookworm* and *Strongyloides stercoralis*. Despite the fact that the subject examined were not all diarrhea patients and not all manifest major symptoms of intestinal parasitic infections, infection rate was relatively high in the population. This occur with the study of Oguoma et al., (2008) who identified higher prevalence rate of infection among the studied resident homes who were not presented with any symptoms of infection than the subject in health institution.

More so the locality lack portable drinking water and most of their rivers and stream are contaminated with faeces and this may be the reason why most of the children there are infected because they drink from such streams. During this study it was observed that male children have higher prevalence of intestinal nematodes (55.3%) this could be as a result of behavioral pattern, this agrees with the work of Atu et al., (2006) who observed a higher prevalence in male than female. The high prevalence rate of *Ascaris* in Osogbo in this work is with the work carry out in Ile-Ife by Holland et al., 2000.

In conclusion, the study has documented a very high prevalence of intestinal nematodes among subjects examined who were not diarrhea patient and do not

manifest major symptom of parasitic intestinal infection, re-emphasizing the need for intermittent de-worming.

What is needed is to adopt drug treatment for those already infected similar to the Nation Immunization Programme to alleviate the suffering of the already infected population and prevent the parasite they harbor from passing into the environment and infecting the others. Sanitary movement such as safe, efficient and hygienic environment of water, safe efficient and hygienic disposal of faeces as identified by Oguoma et al., (2008), important with a regular and effective use of water for hand washing after contact with stools. Hygienic food preparation and health education to encourage individual to adopt behavioral change is advocated.

Emphasis should be place on child care because of the high prevalence and density obtained among children 1-12 years of age for instance. A government policy may exempt them from medical bill and also the creation of special pediatric center for intensive care may be necessary. The federal and state government should provide pipe borne water to rural areas and to the communities at large.

## REFERENCES

- Adeyeba OA, Akinlabi AM (2002). *Intestinal parasitic infections among schoolchildren in a rural community, southwest Nigeria. Nigerian Journal of Parasitology*, 23: 11– 18.
- African Medical and Research Foundation, (AMREF), 2007. *The child Health Course, Unit 15: Common Problems of the newborn*, pp. 1-27.
- Agi PI (1997). *Comparative helminth infections of man in two rural communities of the Niger Delta, Nigeria. West African Journal of Medicine* 16 (4): 232-236.
- Arora DR, Arora B (2005). *Medial Parasitology* 2nd Edition CBS 4 pg 39-40.
- Atu BOG, Galadima M, Alice F (2006). *Prevalence of intestinal parasites in Etulo, Benue State Nigeria. Nigeria Journal of Parasitology*, vol. 7:1-16.
- Brooker S, Hotez PJ, Bundy DA (2008). *Hookworm-Related Anaemia. Among Pregnant Women: A Systematic Review. PLoS. Negl. Trop. Dis.* 2: e291.
- Cheesbrough M (1998). *Medical Laboratory Manual for Tropical Countries Part 1*. Cambridge University Press New York pp. 183-239.
- Davis A, Cook C, Zumla A (2003). *Schistosomiasis: Manson's Tropical Diseases. London: Elsevier Science*; 21 2003, 1431-1469.
- Ekpenyong EA, Eyo JE (2008). *Prevalence of Intestinal Helminths Infections among School Children in Tropical Semi UrbanCommunities. Animal Research International* (2008) 5(1): 804– 810.
- Holland CV, 'Iarcain P (2000). *The public health importance of Ascaris lumbricoides. Parasitology*, 121: 51 - 71.
- Holland CV, Crompton SWT, Asaolu SO, Crichton WB, Torimiwo SEA, Walters DE (1992). *A possible genetic factor influencing protection from infection with Ascaris lumbriconides in Nigerian children. Journal of Parasitology* 78:915-916.
- Oguoma VM, Anyasodor AE, Mbata TI (2008). *Prevalence of intestinal protozoan parasite among children aged 5-12years in Owerri Metropolis South Eastern Nigeria Tropical Journal of Health Sciences* 15(2): 43-48.
- Ozumba UC, Ozumba N (2002). *Patterns of Helminth Infection in the Human Gut at the University of Nigeria Teaching Hospital, Enugu, Nigeria Journal Health Science.* 48(3): 263-268.
- Peter JH, Paul JB, Jeffrey MB, Charles HK, Edward JP, Jacobson J (2008). *Helminth Infections: the great neglected Tropical Diseases. The Journalof Clinical Investigation*, 118(4): 1311-1321
- Stepak G, Buttle DJ, Duce IR, Behnke JM (2006). *Human gastrointestinal nematode infections: are new control methods required? Int J Exp Pathol.* 2006 Oct; 87(5): 325–341.doi: 10.1111/j.1365-2613.2006.00495.x
- Narain K., Rajguru SK, Mahanta J (2000). *Prevalence of Trichuris trichiura in relation to socio-economic and behavioural determinants of exposure to infection in rural Assam. Indian Journal Medical Research*, 112: 140– 146.
- Van Eijk AM, Lindblade KA, Odhiambo F (2009). *Geohelminth Infections among Pregnant Women in Rural Western Kenya; aCross-Sectional Study. PLoS Negl. Trop. Dis.* 3: e370.
- World Health Organisation Report (2013). *Intestinal worms.*
- World Health Organization (2002). *The prevention and control of schistosomiasis and soil transmitted Helminthiasis. Geneva.*

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