

The incidence of intestinal nematodes in primary school children in Ezza North Local Government Area, Ebonyi State Nigeria

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ABSTRACT

*The research was carried out to determine the incidence of intestinal nematode infection in primary school children in three primary schools in Ezza North Local Government Area, Ebonyi State. Eight hundred faecal samples were examined using direct smear method. Out of the number examined, 204 (25.5%), comprising 395 males (27.6%) and 405 (23.5%) females were infected with intestinal nematodes of *Ascaris lumbricoides* (20.0%), *Strongyloides stercoralis* (0.4%) Hookworm (3.5%) and *Trichuris trichuria* (1.3%). Sex was found to be a strong factor influencing the prevalence. Statistical analysis indicates a significance difference ($p < 0.05$) between parasites with *Ascaris lumbricoides* having the highest prevalence of infection. Therefore, regular deworming exercise with albendazole, a product of antihelminthes will improve the health status of the children while early diagnosis, personal hygiene and health campaign programme if carried out in rural areas will impact the knowledge of good hygiene on people.*

Keywords: Prevalence, Parasites, Nematodes, Faecal, Antihelminthes.

INTRODUCTION

Intestinal nematodes are members of the phylum nematoda which varies in order but with successful groups consisting of small worms which occupy essentially every habitat in which multicellular organisms can survive [Crompton, *et al* 1989]. Humans are the only significant hosts of intestinal nematode hence transmitted by faecal pollution of the soil under favourable climatic condition, the larvae develops to its infective stage in the soil [Dakul *et al*, 2003]. Infection is by swallowing infective eggs in the case of *ascaris lumbricoides*, *trichuris trichuria* or by infective larva penetrating the skin in the case of hookworm and *strongyloides stercoralis* [Gbakimo *et al*, 1994]. In children, nematode infection leads to profound alterations in intellectual, cognitive and physical growth. There are worldwide public health infection threats that affects up to one billion people in under developed nations of the tropics and

subtropics.[WHO,1987].Intestinal helminth infections are most common among school age children and tend to be high in the age group (5-15) [Albonico *et al*, 1999]. The disease is most prevalent among the lower social groups and also in children whose parents are mostly peasant farmers that are likely to come in contact with the contaminated soil while working outdoors.[Saviolil *et al*,2004]. This practice encourages the penetration of the infective larvae present in the soil and also another infection of feecal to oral. Despite chemotherapy and control measures, intestinal nematode infection rank among the most wide spread of soil transmitted intestinal parasites that affects significant proportion of the world children [Margono *et al*, 2000]. The disease can affect child development, education achievements, reproductive health and economic development. In Nigeria, the disease is considered to be more prevalent among the lower class group and peasant farmers who are likely to come in contact with the contaminated soil while working outdoors.

The parasite has a lot of side effect that can affect mental to motor development of children with potential long term consequences for productivity and wage earning potential in adulthood.The amount of blood loss depends on the intensity of infection. Intestinal obstruction, anemia, malnutrition, dysentery, fever, dehydration, vomiting, colitis cognitive and other impairments are major complication associated with soil transmitted helminthes infections [Holland *et al*,1996]. Thus, this infection seems been domesticated in the area of the research because of their constant and close contact with the soil as well acquiring infections. Poor and unhygienic water and food sources as routes of infection when ingested, illiteracy or the importance of wearing foot wears and eating or drinking untreated water and food which are obviously lacking in this area are significant factors influencing the high incidence of soil transmitted infection. This research was geared towards determining the incidence of intestinal nematodes in primary school pupils in Ezza North local Government Area, Ebonyi State Nigeria.

MATERIALS AND METHODS

Study Area

The study was conducted in Ezza North Local Government Area of Ebonyi state, an area located in the central zone of the state, south eastern Nigeria. The climate is predominantly full of rain forest with an annual rain fall of about 1600mm and average atmospheric temperature of 30°C as the two distinctive seasons. The area is traversed by a number of streams and rivers which are marked by fairly thick vegetations. Basic social amenities are lacking with no or poor proper sewage disposals system in most communities. Farming and trading are the major occupation of in habitants of this area with low educational back ground.

Study Population

Eight hundred (800) samples were examined from three (3) primary schools selected in Ezza North Llocal Government area. Of this number, 300, 450 and 50 were covered from each schools respectively but was observed that the toilet facilities of the two in one private school. Compliance of the pupils was made possible through the combined effort of the head teachers who acknowledged the impact of public health from team of researchers.

Laboratory Analysis

Faecal samples were collected from pupils of each school and analyzed differently, and those that were not analyzed the same day of collection were preserved with 10% formaline solution. Faecal sample analysis was performed using parasitological method as described by Cheesbrough, [1998]. But for this research, direct smear method were used for the identification of eggs of intestinal helminthes.

Microscopic Examination

(a) Wet mount: this is used to detect the presence of eggs, protozoa trophozoites and cysts. It can also reveal the presence of RBC, and WBCs.

(b) Iodine wet mount: it is used to stain glycogen and nuclei of the cysts.

Procedure: About 0.1g of faeces was collected with an applicator stick and emulsified on a drop of physiological saline placed on the labelled glass slide. The smear was made sufficiently thin so that the cover slip does not float on it. The preparation was then covered with clear cover slip to avoid air bubbles. The slide was then mounted and examined for parasite eggs under x10 and x40 objective of the microscope.

Statistical Analysis: Chi square test was used to test for an association between all pairs of nematode parasite infection and gender of children for each sex group. Statistical significance ($p < 0.05$) was achieved with intensity of helminthes infection as measured by the mean of (eggs per gram) count.

RESULTS

Out of eight hundred faecal samples examined, 204 had helminthes infection, these include 395 males and 405 females. There is a significant difference associated with sex on pupil infected with intestinal nematode. It was observed that 204(109 male and 95 females) children were infected among the 800 samples examined, **Table 1**. The prevalence of intestinal nematode based on age group shows that about four intestinal nematodes were isolated as followed between 4-14yrs ascaris lumbricoides 160(80.0%), trichuris trichuria 12(6.0%), strongyloides stercoralis 4(1.4%), and hookworm 28(1.4%) respectively **Table 2**. The Incidence of intestinal nematode based on occupation of pupil's parent shows that four children of occupational group were involved to investigate the prevalence of intestinal nematode in their children. It was observed that children whose parents are traders recorded higher than other three occupational groups as shown in **Table 3**. The analysis of children infected with intestinal nematodes in three primary schools shows that Mgbabor community primary school recorded high among parasites isolated at Evangel and Annunciation schools, **Table 4**.

Table 1: The Incidence Of Intestinal Nematode Based On Sex

Sex	No examined	No infected	Ascaris	Trichuris	Stongyloides	Hookworm	95% CL
Male	395	109	86(21.8%)	8(2.00)	3(0.8%)	16(4.10)	23.09-31.90
Female	405	95	74(18.3%)	4(0.99)	0(0.0)	12(2.86)	19.39-27.63

Table 2: Incidence Of Intestinal Nematode Based On Age Group

Age	No examined	No infected	Ascaris	Trichuris	Strongyloides	Hookworm
4-6	200	60(30)	60(30)	0(0.0)	0(0.0).	14(0.7)
7-9	250	64(25.6)	40(16)	6(2.4)	0(0.0)	8(0.03)
10-12	200	48(24)	35(17.5)	2(1.0)	2(1.0)	6(0.03)
13-14	150	32(21.3)	25(16.5)	4(2.6)	2(1.3)	2(0.01)
	800	204	160	12	4	28

The four intestinal nematode isolated among primary school children between (4-14yrs) includes ascaris lumbricoides, trichuris trichuria, strongyloides stercoralis, hookworm respectively.

Table 3: Prevalence Of Intestinal Nematode Based On Occupation Of Pupil's Parent

S/N	Parent's Occupation	Total Sample Examined	No Infected	%age Infection
1	Farming	350	102	29%
2	Trading	250	80	32%
3	Carpenter	150	19	12%
4	Civil servant	50	3	6%
	Total	800	204	25.5%

It was observed that the prevalence based on the parent's occupation was seen to be more on those whose parents are traders. Those whose parents are civil servants are less infected.

Table 4: Analysis Of Intestinal Nematode Infestation In School Age Children In The Three Primary Schools

Intestinal Parasites	Evangel Sch	Comm.Sch Mgbabor	Annunciation Sch
Ascaris Lumbricoides	71(76.34)	82(80.4)	7(77.7)
Trichuris Trichuria	4(4.30)	6(5.9)	2(22)
Hookworm	16(17.20)	12(0.1)	0(0.0)
Strongyloides Stercoralis	2(2.15)	2(1.96)	0(0.0)
Total	93	102	9

It was observed that Mgbabor primary school recorded high incidence which is considered with poor facilities and low environmental sanitation.

DISCUSSION

The prevalence of intestinal nematode was investigated in stool samples of eight hundred children in three primary schools; these include Evangel primary school, Mgbabor community primary school and Annunciation primary school. Of all these, hygiene among children was considered a major factor in checkmating the route of infection. It was observed that four parasitic nematodes were isolated from infected children; these include Ascaris lumbricoides, Trichuris trichuria, Strongyloides stercoralis and hookworm respectively. However, out of eight hundred samples analyzed, 204(25.5%) pupils were infected with parasitic nematode infections but were shown that 395 males and 405 females were examined, with males ranking high than females. The prevalence of intestinal nematode infection by sex of pupils revealed that out of eight hundred samples examined for these parasites, it was observed that one hundred and nine(27.69) males of 395 sampled were infected and out of four hundred and five females

sampled, only ninety five (23.59) were infected as seen in **Table 1**. This shows that the prevalence of intestinal nematode infection is high in males than their female counterpart. This could be as a result of the facts that children whose parents are peasant farmers often go to farm with their male children which were found frequently with bare feet. This may lead to more accumulation of infections than their female counterpart as they come in contact with the contaminated soil which may lead to penetration of the larvae of soil transmitted helminthes. This synchronizes with the work by Ukpai and Ugwu [2003], Hotez *et al*, [2005] and Bundy *et al*, [1995] which states that intestinal nematodes are nematode diseases that affect especially local farmers and poor people as there are traced with unhygienic environments and contaminated soil. The prevalence of intestinal nematode shows that the age range of 4-14 indicates that pupils in the age range bracket of 4-6 recorded high with 60(30.0%) while pupils in the age group of 13-14 shows low prevalence as seen in **Table 1**. This could be as a result of their activities on contaminated soil due to regular playing, poor personal hygiene as this plays a role in public health.

The incidence of more intestinal helminthes infection in lower age group as opposed in higher age group shows that advance knowledge in personal hygiene that comes with advancement in education can play a role in incidence of intestinal parasites infection. This is in conformity with the work of Kucik *et al*, [2004], Stepenson *et al*, [1993] which states that overcrowding, poor sanitation and unhygienic environment contributes to prevalence of intestinal parasites infection. The prevalence of intestinal nematode based on occupation of pupils parent shows that occupation is a factor that can influence the prevalence of intestinal helminthes. It was observed that among farming, trading, carpentry and civil service as stated in **Table 2**, pupil whose parent are farmers recorded high incidence of 102(29.0%) of intestinal nematodes while those whose parents are civil servants recorded low incidence. This is as a result of working outdoors ie walking bare footed at their farming sites which could be contaminated with high fecal deposition on the soil and other environmental pollutants as recorded by Naish *et al*, [2004] and Dakul *et al*, [2004] which states that children whose parents are educated are seem to be more aware of the dangers associated with soil transmitted parasites than those whose parent are uneducated thus reducing the incidence of public health infections or that the disease is traced abundantly with poor and uneducated people. The study on the analysis of intestinal nematode in three primary schools, Evangel primary school, Mgbabor community primary school and Annunciation primary school as shown in **Table 3**, reveals that Mgbabor primary school is recorded with high incidence of 40(28%) as this is the only public school implicated in this research which is characterized with poor or no facility like the toilet facility and no and poor environmental sanitation which are considerable factors associated with soil transmitted parasitic infections. While other schools recorded with low incidence may be as a result of standard facility and proper sanitation exercise as this might improve their health standard. This is in line with the work by WHO, [1987] which states that good sanitation is a veritable tool for a good living as this is seen to enhance health status of people in a society. Other researchers characterized intestinal nematode in school children to be related with their behavioral factors hygiene practices, lack of water supply and stated that intestinal nematode infection are disease of low economic statistics that occur in rural areas mostly and in order to reduce the infection, an antihelminthic drug albendazole are suitable for treatment Notez *et al*, [2003], Naish *et al*, [2004], Saviolil *et al*, [2004]. The period of this research was characterized with rain fall which is considered favourable with the eggs of helminthes and as this enable them to thrive more,

than any other season. This agrees with the study in Nigeria by Odikamnoru and Ike, [2004] which states that nematode infection are more verse in rainy season when the soil is still very wet and humid as this establishes that wet or damp soil favours the egg of helminthes.

CONCLUSION

However, no or less emphasis and sensitization on good personal and environmental hygiene are routes of contacting parasitic infections in this area. Absolutely, worm burden and non deworming exercise are major causes of soil transmitted infections in rural area like this, as these diseases are attributed to poor people, peasant farmers and indiscriminate disposal of feecal materials which contributes to re-infections of intestinal helminthes. Therefore I recommend that government should run to the aids of people in this area towards providing good water scheme, construct water system type of toilet (water closet) and carryout awareness on the importance of deworming exercise on children in this area.

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