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Research Paper

PREVALENCE OF HUMAN INTESTINAL HELMINTH PARASITES AMONG PRYMARY SCHOOL CHILDREN IN IPOGUN, IFEDORE LOCAL GOVERNMENT AREA, NIGERIA

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Abstract

Study was carried out to determine the prevalence of human intestinal helminth parasite among school children in Ipogun, Ifedore Local Government Area of Ondo State. Standard parasitological procedures were used to examine the 350 stool samples collected. Overall prevalence of intestinal helminth parasites was 64.00% and the respective prevalence of parasites encountered were *Ascaris lumbricoides* (25.14%), Hookworm species (19.43%), *Trichuris trichiura* (16.00%) and *Taenia* spp (3.43%). Infection with *Ascaris* was 25.14%, followed by Hookworm species (19.43%), *Trichuris trichiura* (16.00%) and *Taenia* species (3.43%). All the different age cohorts were infected and the prevalence of *Ascaris* was 45.46% in pupils aged 5-8 years and 25.00% in pupils of 13 years old and above while in pupils of the same age groups prevalence of *Trichuris* ranged from 42.86% to 25.00%. Hookworm prevalence was 47.01% in pupils aged 9-12 years, *Teania species* was 66.67% among children in the age group 9-12 years old. Males were more infected (72.60%) than females 53.75%. Parental occupation, types of toilet and source of water were respectively found to influence the prevalence of the intestinal helminth parasitic infection among the pupils. The health implication of the findings was emphasized.

Key words: Human, Intestinal, Helminth, Parasites and Prevalence.

INTRODUCTION

Infection with human gastro-intestinal helminth infection cuts across the globe and affects people of all age, sex and occupation. In a world of 2,200 billion inhabitants, there exist over 2,000 million helminths infection with about 1.5 million Nigerians suffering from ascariasis alone while several thousands suffer from strongyloidiasis, trichuriasis, enterobiasis and hookworm infections (Anosike *et al.,* 2008). Intestinal infections is the most common parasitic infections of human in developing countries due to indiscriminate defecation around human habitation, low standard of sanitation and personal hygiene coupled with poor socio-economic conditions (WHO 2003). Some species of cestodes (*Taenia saginata* and *Taenia solium*) are known to parasitise man who consumes under-prepared meat of beef and pork. Infection with cestodes is not frequent in children living in tropical poverty striken areas of tropical regions because these children have limited access to meat which serve as source of infection (Hall, *et*

al., 2008). Intestinal cestodes infection is a serious public health concern in some communities in Africa and South Asia (Mangono *et al* (2006; Ito, *et al* 2004).

The soil-transmitted helminths (STHs), *Ancylostoma duodenale, Necator americanus*, *Ascaris lumbricoides* and *Trichuris trichiura* are among the most prevalent helminth parasites and have been known to infect almost one-sixth of the global population (Hotez, 2009). There are no data on age-associated prevalence or intensity for human *Strongyloides stercoralis*, and also from the diagnostic test used STHs present challenges of interpreting worm burden (Olsen *et al* 2009). Opara and Ndiodung *(*2003) opined that helminthes are regarded as a major source of public health and socio-economic problems especially in Nigeria and other developing countries of the world owing to their high prevalence and their effect on both nutrition and immune status of the population.

Human intestinal helminth parasites are known to cause high morbidity. The most obvious pathogenic effects are direct damages on tissues resulting from the blockage of internal organs or from the immense pressure exerted by the growing parasites. The most common target organs of infections are those of alimentary tract and sometimes circulatory system, effects of infection are predominantly found and pronouced in these organs and associated tissues (Muller, 2002). The transmission of human intestinal helminth parasites can occur in through the ingestion of contaminated vegetables, the use of contaminated water for drinking, cooking, irrigation, washing of food especially fruits, eating of undercooked food of animal origin and walking barefoot (Brooker *et al* 2006; Ukoli 1990). Poorly washed vegetables may contain eggs of nematodes such as *Ascaris, Trichuris*, and *Enterobius.* especially through the use of human faeces as manure commonly practiced by vegetable farmers (Erdogrul and Sener, 2005). The ova of helminths can be isolated, on the underneath of finger nails of primary school children (Dyke, 2000) and also on the surface of Nigerian currency (Ekejindu *et al* 2005).

The control of human intestinal helminthiasis is a constant object of public health strategies, especially where reclaimed water is used to serve human needs. The resistant cysts or eggs of these human intestinal helminths enhance their survival in the natural environment (Erdogrul and Sener,2005).Typically public-health interventions (such as the provision of clean water, community health education, observation of food hygiene, and maintenance of functioning sanitation systems) are essential to long-term control of helminths in a community (Angeles, 2005). Slum living is an increasingly common phenomenon that is creating a new urban parasitology where polyparasitism is magnified, and this will require a new way of thinking for the development and implementation of community control endeavours (Brooker *et al* 2006).

MATERIALS AND METHODS

Study Area

The study was carried out from February to April, 2015 in Ipogun a town in the Southwestern part of Nigeria, Ifedore local government area of Ondo State. It lies on latitude 7.31^{o} E and longitude of 5.08^{o} N. Only one borehole was found functioning to serve the people as other boreholes have been destroyed during road construction which links the town to Akure the state capital. There are few wells sunk are not enough to support the population and the primary source of water is the Aponmu stream (the only stream available in the village). Promiscous and indiscriminate defecation in nearby bushes and around most of the individual households were common occurrence. Conventional waters closet toilet system are not common except in houses of elites who resides in the cities. Most of the people living in the town engage in farming, carpentry, fashion and hair designers, traders with few civil servants who are teachers and public health workers in the town. There are six schools in the village comprising of five public primary schools, one public secondary school.

Informed Concept

Prior to the commencement of the study, visit was paid to head teachers of each primary school to discuss and explain the study purpose. By this, the head teaches ensured familiarization with the parents during the next Parents Teacher Association meeting. Parents were informed of the study purpose, that participation by pupils was voluntary and that information will be

confidentially treated. The school teachers also helped in the collection of data for correct information from the students.

Stool sample collection

A simple based questionnaire with the help of each class teacher was administered to each pupil so as to obtain personal data on age, sex, sanitary information, parent's occupation and other related information. Stool sample collection was carried out using the method of Fritsche *et al* (2011). Numbered specimen bottles were adminstered to each participant who were instructed to place about 10 to15gm freshly voided stool samples in the bottles. The method of Dada and Erinle (2004) was used to cross match each stool sample with the data provided on the completed questionnaire and was preserved in 10% formol-saline to prevent degradation before transporting them in a well covered plastic continer to the Department of Microbiology laboratoryof The Federal University of Technology, Akure, for analysis.

Analysis of Faecal Samples

The formol ether concentration method of Chessbrough, (2000) was used for the stool analysis. With the aid of an applicator stick, 2g of stool sample was mixed in about 10ml of 10% formal saline in a tube. The suspension was sieved into a beaker through a sieve of 0.95mn mesh size. 6ml from the sieved suspension was poured into a centrifuge tube and 3ml ether was added. The suspension was thoroughly mixed and centrifuged at 3,000rpm for 1minute. After centrifuging, the faecal debris was loosened with a glass rod and decanted carefully along with the ether and formol water leaving behind the sediment at the bottom of the tube. The tube was positioned upright to allow the fluid from the side of the tube to drain to the bottom. The bottom of the tube was then tapped to re-suspend and mix the sediment. A drop of the sediment was placed on the slide, covered with cover slip and examined under x10 and x40 objective lens for the presence of helminth ova. Any helminth ova encountered was identified using Muller,(1975).

RESULTS

Intestinal helminth parasites encountered are *Ascaris lumbricoides*, Hookworm species, *Trichuris trichiura* (Table 1). Out of the 350 pupils stool samples examined, 224(64.00%) were infected with the different intestinal helminth parasites. Pupils infected with *Ascaris lumbricoides* were 88(25.14%), followed by pupils with, Hookworm species 68(19.43.%), *Trichuris trichiura* 56(16.00%) and *Taenia* species 12(3.43%). Age related prevalence (Table 2) showed that the intestinal helminth parasites cut across the different age cohorts except for the 5-8years old who were not infecteted with *Taenia* species. Prevalence was high (76.4%) among the 5-8years old followed by 78.05% and 76.4% among the age groups 9-12 and 13-18 years old respectively. The prevalence of *Ascaris* ranged from 45.46% to 25.00% in pupils aged 5-8 and 13-18 years old respectively while *Trichuris* infection in the same age groups ranged from 42.86% to 25.00%. Hookworm infection was high (47.01%) in pupils aged 9-12 years and 32.35% in pupils of 13 years old and and above. *Teania species* was 66.67% among children in the age group 9-12 years of age and 33.33% in those of 13 years of age and above. Sex related prevalence (Table 3) intestinal helminth infection was 69(72.60) in males and 43(53.75%) in females. Infection rate for each parasite was, *Ascaris* 29.47% and 20.00% in males and females respectively while hookworm species was 22.11% males and(16.25%) in females with *Trichuris* infection rate being 16.84% in males and 15.00% in females. *Taenia* species was 4.21% and 2.50% in males and females respectively.

Prevalence related to parental occupation of the pupils is shown in Table 4. Prevalence in children of farmers was 77.33% followed by 71.19% and 29.27 in children whose parental occupation are artesian civil servants respectively.

Prevalence was 70.58% in pupils whose water source was the village stream, it was 61.77% and 45.46% respectively those who use wells and boreholes as source of water (Table 5). Prevalence of these intestinal helminth infections is higher (72.94%) in pupils defecating in the bush than in those using pit laterines (63.51%) and the lowest prevalence of 18.75% in pupils that use water closet toilets (Table 6).

Table 1: Overall prevalence of gastro-intestinal helminths in the study area

Helminth Parasites	Infected Cases	Prevalence (%)
Ascaris lumbricoides	88	25.14
Hookworm	68	19.4
Trichuris trichiura	56	16.00
Taenia spp	12	3.4
Total	224	64.0

N (Total number of pupils examined) =350

Table 2: Age related prevalence of intestinal helminth infection among the pupil Intestinal Helminth Parasite Prevalence (%)

Ages (yrs)	Number Examined	Number Infected & Prevalence (%)	Al	Hk	Tt	T spp	Total
5-8	158	116(73.42)	40(45.46)	8(11.77)	24(42.86)	0(0.00)	72 (45.56)
9-12	110	64(58.18)	26(29.55)	32(47.06)	18(32.14)	8(66.67)	84(76.4)
13-18	82	44(53.66)	22(25.00)	28(41.18)	14(25.00)	4(33.33)	64(78.05)
Total	350	224(64.00)	88(25.14)	68(19.43)	56(16.00)	12(3.43)	204(58.30)

Key: Al= *Ascaris lumbricoides,* Hk=Hookworm spp, Tt=*Trichuris trichiura*, Tspp=*Taenia spp*

Table 3: Gender related prevalence of human intestinal helminth infection Intestinal HelminthHelminth Prevalence (%)

Gender	Number Examined	Al	Hk	Tt	T spp	Total
Male	190	56(29.47)	42(22.11)	32(16.84)	8(4.21)	138(72.63)
Female	160	32(20.00)	26(16.25)	24(15.00)	4(2.50)	86(24.57)
Total	350	88(25.14)	68(19.43)	56(16.00)	12(3.43)	224(64.00%)

Key: Al. = *Ascaris lumbricoides,* Hk.= Hookworm spp., Tt=*Trichuris trichiura*, T spp.= *Taenia spp*

Table 4: Prevalence related to parental occupation

Parents Occupation	Number Examined	Number Infected	Prevalence (%)
Farmers	150	116	77.33
Artesians	118	84	71 .20
Civil servants	82	24	29.27
Total	350	224	64.00

Table5: Prevalence related source of water available.

Water Source	Number Examined	Number Infected	Prevalence (%)
Stream	170	120	70.60
Borehole	44	20	45.46
Well	136	84	61.77
Total	350	224	64.00

Table 6: Infection rate related to types of toilets.

Toilet type	Number Examined	Number Infected	Prevalence (%)
Water Closet	32	6	18.75
Bush Defecation	170	124	72.94
Pit Latrine	148	94	63.51
Total	350	224	46.7

DISCUSSION

The results obtained from this study revealed that human intestinal helminth parasitic infection is prevalent among the school age children in Ipogun town. The high prevalence observed in this study is expected and could be due probably to the fact that intestinal helminths infection is apt to occur in low socio-economic condition characterized by inadequate water supply and poor sanitary disposal of faeces.This is in line with the findings of Agwu (2001) in the east part of Nigeria.The observed prevalence of *Ascaris lumbricoides* and *Trichuris trichiura* is expected and it is in agreement with the findings of Agwu (2010), Dada and Erinle (2004) who had attributed the prevalence of these two nematodes to low level of hygiene among such studied population. Prevalence of hookworm in the studied area is in line with Ukoli (1990) Hotez and Kamath (2009) who suggested that hookworm infection will be prevalent in areas where children walk or play barefooted as do the pupils in this study area during recess periods. Furthermore, the low prevalence of *Taenia* spp observed among the study population could be that most of the pupils who were not infected have limited access to raw or undercooked meats that serve as source of infection this finding is in line with Hall *et al* (2008).

This study also revealed that the prevalence of human intestinal helminth parasites decrease with increase in age. This observation is in line with Jombo *et al* (2007) who suggested that the inverse relationship between the age and the prevalence of helminths parasites might be due to the higher level of awareness and good hygienic practice in the older age groups. On the other hand, the high prevalence among the young school age groups in this study could be due to the reason advanced by Luka *et al* (2000) that the younger age groups often spend more of their leisure time outdoors, playing and foraging in garbage dumps and eating carelessly with unwashed hands. High prevalence was observed among female pupils than male pupils and this agrees with the observations of Chukwuma *et al* (2009), Ndamokong *et al* (2000) and Luka *et al* (2000) that females are more exposed to the contaminated environments in some areas and also they assist their parents' in carrying farm loads, execute domestic chores in the house as well as visiting the stream than male children. High intestinal helminth infection observed among pupils whose parents' occupation is farming compared to pupils of parents in other occupation is expected. This could be reasons put forward by Opara and Ndiodung (2003), Akogun and Badaki (1998) that the use of excreta as manure commonly practiced by vegetable farmers is a common epedemiological factor which enhances the spread of helminth ova in soils and might aggravate the prevalence of this parasites. could be due to the poor sanitary environment in the town, indicriminate and promiscous defeacation along pathways to the farms and stream.

CONCLUSION

There is paucity of information on the status of human intestinal helminth infection in the study area because urinary schistosomiasis has ravaged the town for over a decade and all efforts were directed at treating and controlling this disease with. Consequently it is suggested that children with human intestinal helminths parasites should be treated periodically using broad spectrum antihelminth drugs or multi-agent drug combinations. Public enlightenment and emphasis on personal hygiene and cleaning of the environment should be intensified. This study has therefore provide a baseline information for future studies and investigation of the occurrence, distribution and prevalence of human intestinal helminths infection in the study town.

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