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Prevalence of Intestinal Helminth Infection Amongst Urban and Rural Primary School Pupils in Kwale, Delta StateJemikalajah, Daniel Johnson*¹Department of Microbiology, Delta State University, Abraka, Delta State Nigeria¹

Author for Correspondence: jemikalajahjohnson2007@yahoo.com

Abstract

A prevalence of intestinal helminth infection was carried out among school children aged 5-13 years attending primary schools in the rural and urban areas of Kwale in Ndokwa West Local Government Area of Delta State. A total of 200 samples were collected from both the rural and urban areas, and examined using the formol-ether technique. Forty-one (20.50%) of the children were infected with helminth parasites. The prevalence of intestinal helminth in both areas studied was within the national average of 14-30%. The predominant parasite was *Ascaris lumbricoides* (11.50%), followed by hookworm (7.50%) and *Trichuris trichiura* (1.50%). The prevalence of helminth in the urban and rural areas was also recorded. Azunze primary school had the highest prevalence for *Ascaris lumbricoides* (4.00%) and *Trichuris trichiura* (1.00%), Iyasere primary school had the highest prevalence for hookworm (2.50%) infections. This study revealed a prevalence of intestinal helminths infections among school children nevertheless control measures such as improved personal hygiene and health education is necessary to reducing helminths infection.

Keywords: *Intestinal, Helminth, Infection, Urban, Rural, School.*

Introduction

Helminth infections are important causes of morbidity and mortality in many developing countries (Ezeamama *et al.*, 2003). About 1,471 million cases of infection with *Ascaris lumbricoides*, 1,200 million cases of infection with hookworm, and 1,049 million cases of

schistosomiasis occurs worldwide (World Health Organisation, 1997). School children in developing countries bear the greatest health burden due to helminth infections (Leonardo *et al.*, 2002; Cabrera, 1984). Among the well described morbidities associated with helminth infection in children are under-nourishment, anaemia and failure to achieve genetic potential for growth (Drake and Bundy, 2001; Stephenson *et al.*, 2000; Yip, 1996).

Helminths are intestinal parasites that reside in the human gastrointestinal tract (Marizel and Yazidanbakhsh, 2009). They represent one of the most prevalent forms of parasitic disease. Because of their high mobility and lower standards of hygiene, school age children are particularly vulnerable to these parasites (Montresor, 2002).

Today, it is estimated that approximately one-third of almost three billion people that live on less than two US dollars per day in developing regions of sub-Saharan Africa, Asia, and American are infected with one or more helminth (Hotez *et al.*, 2006). The most common helminths infection is ascariasis, trichuriasis, and hookworm, followed by schistosomiasis and lymphatic filariasis (Hotez *et al.*, 2006). The inhabitants of thousands of rural, impoverished villages throughout the tropics and subtropics are often chronically infected with several different species of parasitic worms (Hotez *et al.*, 2008).

The high prevalence of these infections is closely correlated with poverty, poor environmental

hygiene and impoverished health services (Albonico *et al.*, 1999; Montresor *et al.*, 1998). Children are particularly susceptible to the adverse effects of helminth infections due to their incomplete physical development and their greater immunological vulnerability (Montresor *et al.*, 2002).

Previous research has established that helminth infections are accompanied by reduced growth rates during childhood by impaired nutrient utilization; hookworm infections affect iron status, often to the point where anaemia develops (Crompton and Savoli, 1993). Malnutrition and parasitic infection occur concurrently where poverty ensures the persistence of poor housing, low levels of education, poor health services, inadequate sanitation, and lack of clean water (Crompton and Nesheim, 2002). This study is set to determine the prevalence of intestinal helminth infection in urban and rural primary schools of Kwale.

Materials and Methods

Study Area

This study was carried out in Kwale, the administrative headquarters of Ndokwa West Local Government Area of Delta State, Nigeria. Kwale lies between longitude 5° .00 and 6° .45E and latitude 05° 00¹N and 06° 30¹N of Delta State with a population of 114,1171 people, located in the South-South geopolitical zone of Nigeria. Kwale is a semi-urban town with the major occupation of farming, trading, civil servants and students (NPC, 2006).

Study Population

This study involved a total of 200 primary school children (100 males and 100 females) within the age of 5 – 13 years. Two primary schools each were randomly selected in the urban and rural parts of Kwale.

Inclusion Criteria

Without reference to the subject's health status as at the time of sample and data collection, this study involved primary school pupils in the selected schools aged 5-13 years.

Exclusion Criteria

Subjects below the age of 5 and above 13 were

not included. Also, no subjects outside Kwale was included or used in the study.

Ethical Consideration

Prior to the survey, the various schools were visited to discuss the objectives of the study. Written informed consent was obtained from the head teachers of the schools before stool samples were collected from them.

Research Design

This was a prospective study with a total number of (two hundred) 200 primary school pupils randomly selected and enrolled into the study.

Sample and Data Collection

A total of 200 stool samples were collected for this research work, 50 samples each from 2 schools in the urban and rural areas. All samples were transferred to the department of Medical Laboratory Service, Central Hospital, Kwale for analysis.

Sample analysis

Stool examination for intestinal parasites

Saline and iodine method, in addition to formol ether concentration method was used for the examination of stool samples for ova and cyst of intestinal parasites (Cheesbrough, 2005).

Results

Out of the 200 school children examined for intestinal parasites, an overall prevalence of 20.50% was obtained. A prevalence of 11.50% was observed for *Ascaris lumbricoides*, 7.50% for hookworm, and 1.50% for *Trichuris trichiura* in descending order respectively (Table 1).

Urban and rural distribution of helminth infection shows that Azunze primary school had the highest prevalence for *Ascaris lumbricoides* (4.00%) and *Trichuris trichiura* (1.00%), Iyasere primary school had the highest prevalence for hookworm (2.50%) infections (Table 2). The age distribution of Intestinal helminths Infections showed that children between the ages of 5-7 years had the highest prevalence of *Ascaris lumbricoides* (28.84%) and *Trichuris trichiura* (3.85%) infections while Hookworm (10.77%) was highest in the 11-13 years age group (Table 3).

Table 4 shows the gender distribution of intestinal helminth infections among the males and females. The males had a prevalence of 12.00%, 10.00% and 1.00% for *Ascaris lumbricoides*, Hookworm infections and *Trichuris trichiura* infections respectively. The females had the prevalence of 11.00%, 5.00%

and 2.00% for *Ascaris lumbricoides*, Hookworm and *Trichuris trichiura* infections respectively. The males had the highest prevalence of *Ascaris lumbricoides* (12.00%), hookworm (10.00% and females had the highest prevalence of *Trichuris trichiura* (2.00%) infections.

Table 1: Prevalence of Intestinal helminth infections among primary school children in the study

Parasite found	Number examined	Number infected	Prevalence (%)
<i>Ascaris lumbricoides</i>	200	23	11.50
Hookworm	200	15	7.50
<i>Trichuris trichiura</i>	200	3	1.50
Total	200	41	20.50

Table 2: Urban and rural distribution of intestinal helminth infections in the study

Parasite recovered	Samples examined	Rural		Urban	
		Azunze	Iyasere	Eke	Iyatu
<i>Ascaris lumbricoides</i>	200	8(4.00)	6(3.00)	4(2.00)	5(2.50)
Hookworm	200	3(1.50)	5(2.50)	3(1.50)	4(2.00)
<i>Trichuris trichiura</i>	200	2(1.00)	0(0.00)	0(0.00)	1(0.50)

Table 3: Age- related distribution of intestinal helminth infections in the study.

Age group (Years)	Number examined	Prevalence (%)					
		<i>Ascaris lumbricoides</i>		Hookworm		<i>Trichuris trichiuria</i>	
		No (%)	Positive (%)	No (%)	Positive (%)	No (%)	Positive (%)
5-7	52	15(28.84)		5(9.62)		2(3.85)	
8-10	83	4(4.82)		3(3.61)		0(0.00)	
11-13	65	4(6.15)		7(10.77)		1(1.54)	
Total	200	23(11.50)		15(7.50)		3(1.50)	

Table 4: Gender- related distribution of intestinal helminth infection in the study

Gender	Number examined	Prevalence (%)		
		(%) positive <i>Ascaris lumbricoides</i>	(%) positive Hookworm	(%) positive <i>Trichuris trichiuria</i>
Male	100	12.00	10.00	1.00
Female	100	11.00	5.00	2.00
Total	200	11.50	7.50	1.50

Discussion

Intestinal helminth infections persist and flourish wherever poverty, inadequate sanitation, improper health habits and overcrowding are entrenched. This study shows the overall prevalence of *Ascaris lumbricoides* (11.50%), hookworm (7.50%) and *Trichuris trichiura* (1.50%) infections (Table 1) among school children in urban and rural areas in Kwale, Delta State. *Ascaris lumbricoides* had the highest prevalence of 11.5%, followed by hookworm 7.50%, and *Trichuris trichiura* 1.5% in descending order respectively. The higher prevalence of *Ascaris lumbricoides* infection over that of hookworm and *Trichuris trichiura* is consistent with the reports (Adeyeba and Akinlabi, 2000; Taiwo and Agbolade, 2000) but disagrees with the findings of Nwaorgu *et al.* (1998). This high prevalence of *Ascaris lumbricoides* infection may be attributed to high level of unhygienic practices among the pupils which enhanced transmission. However, the occurrence of intestinal helminths infections in the area was not unusual because of the unsanitary practices of the inhabitants of the environment. This further buttress the fact that parasitic diseases are known to be common in semi-urban and rural areas where poverty, ignorance and low sanitary conditions are usually encountered (Ukoli, 1992).

It was observed that children between the ages of 5 and 7 had the highest prevalence of *Ascaris lumbricoides* infections (Table 3) compared with the other age groups. This may be due to the fact that at this age, their immunity to parasitic infections has not been fully developed (Stephenson *et al.*, 2000). This observation was in line with that of Angyo *et al.* (1996) who reported higher prevalence of parasitic infections in younger children. In this study, older children (11-13 years) had the highest prevalence of hookworm (Table 3). These observations confirmed the reports of Asaolu *et al.* (1992) and Mafiana *et al.* (1998) who attributed higher prevalence of hookworm infections in older children to changes in behaviour as one gets older. Although it was not statistically significant, this study also indicated that intestinal helminths infections were more common in the male than in the female subjects

(Table 4). Also, rural primary schools had a slightly higher prevalence of intestinal helminth compared to the urban primary school. (Table 2).

Conclusion

This study has revealed the prevalence of intestinal helminth infections among school children in Ndokwa West Local Government Area of Delta State. Furthermore, it was observed that the rural areas had a slightly higher prevalence of helminth infection than the urban areas.

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Conflict of interest: None

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