

Research Paper

Prevalence of parasitic helminthes in stools of children aged 4-12 years in Ahaba Imenyi community of Abia state Nigeria.

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ABSTRACT

Human intestinal helminthiasis is a serious disease occurring most commonly among school age children living in poor hygienic environments, as well as in less developed hygienic habits. It is caused by parasitic helminths, which are worm-like parasites. Generally, infected individuals have the parasite eggs or cysts or both in their faeces. This study was to determine the prevalence of parasitic helminths in faecal samples of children aged 4-12 years. A series of sample collections for stool was carried out in Ahaba Imenyi, a rural community in Isuikwato Local Government Area of Abia State, Nigeria. Samples from two hundred children of age cohort 4-12 years were examined for presence of eggs or/and cysts of helminths using direct and formol-ether concentration techniques. The proportion of overall infected stool samples was 90 (45.00%). When ranked by proportion, parasitic helminth loads were as follows: *Ascaris lumbricoides* (66.67%), *Trichuris Trichiura* (20.00%) Hookworm (10.00%), and *Schistosoma mansoni* (3.33%). There were no significant difference between prevalence of parasitic helminths and gender ($P>0.05$). Association between helminths and age-groups was significant. Highest prevalence rate was observed among the children whose mothers were farmers 50(55.56%). Statistical analysis indicates significance ($P<0.05$) in helminth species prevalence with *Ascaris lumbricoides* 60(66.67%) predominating. We conclude that the parasitic helminths burden amongst the children of Ahaba Imenyi during the period of this study was significant and is of great public health concern. Regular deworming exercise with appropriate and effective antihelminthics will improve the health status of children in the study area.

Keywords: Parasitic Helminths, *Ascaris lumbricoides*, *Trichuris trichiura*, Hookworm, *Schistosoma mansoni*, Faeces.

INTRODUCTION

Helminth is a general term meaning "worm", parasitic worms are often referred to as parasitic helminths. They are worm-like invertebrates that live and feed off living hosts, receiving nourishment and protection while disrupting their hosts' nutrient absorption, causing weakness and disease generally referred to as "helminthiasis". Adult helminths can live inside the gastrointestinal tracts and tissues of humans as well as other animals. Those that live inside the intestine are referred to as "intestinal parasitic helminths" while "tissue parasitic helminths" are those found in the tissues. Parasitic helminths often find their way into an animal host through contaminated food or water, soil, mosquito bites, and even sexual acts.

Parasitic helminths that infect humans belong to three helminths groups: cestodes or flukes, e.g. schistosomes, trematodes (referred to as "tapeworms") and nematodes (referred to as "roundworms"). Helminths are characterized by elongated, flat or round bodies: flukes and tapeworms are flat-bodies and are referred to as "flatworms" or "platyhelminths", nematodes have round bodies and are referred to as "roundworms" (Castro, 1996). Consumption of poorly washed raw food, such as vegetables, previously contaminated with eggs of nematodes such as *Ascaris*, *Trichuris* and *Enterobius*, may introduce the parasites into the human host. Uncooked and poorly cooked meats may transmit tapeworms, while hookworms, *Strongyloides* and Schistosomes can penetrate the host's skin from the soil.

Human intestinal parasitic helminths are more frequently encountered during schooling age, most likely linked to relatively less developed hygienic habits. The gastrointestinal tract of a child living in poverty in a less developed hygienic environment is likely to be parasitized with at least one parasitic helminth, and in many cases multiple helminths

(Bethony *et al.*, 2004). *Ascaris lumbricoides*, *Trichuris trichiura* and *schistosoma* species, together with hookworm, infest a quarter of the world's population (Brooker, *et al.*, 2004). School-age children are particularly vulnerable to intestinal helminths because of their high mobility and low standards of hygiene. Children may also be particularly susceptible to the adverse effects of intestinal helminth infections. When burden in children is pronounced, intestinal parasitic helminths might cause serious health conditions and problems notably diarrhoea, malnutrition, malabsorption, mental retardation and even death (WHO 2002).

Symptomatic conditions associated with intestinal helminth infections include intestinal obstruction, insomnia, vomiting, weakness, and stomach pains (Wikipedia). While the natural movement of helminths and their attachment to the intestine may be generally uncomfortable for their hosts (Watkins and Pollitt 1997), the juveniles (eggs, larvae, cysts) of the worms and in some species their adults are usually found in their hosts' faeces (Vanderberg, 2007). Parasitic intestinal helminths are a public health concern in Nigeria. The studies on the prevalence of intestinal parasitic helminths have been carried out within limited areas in parts of the country. Little work has been done in Abia state while no work has been done in Isuikwuato local Government area of the state. We present here the case study in Ahaba Imenyi, a rural community in Isuikwuato local Government Area of Abia State, southeast zone of Nigeria.

MATERIALS AND METHOD

This study was performed in Ahaba Imenyi, which is a rural community located in Isuikwuato Local Government Area of Abia State, Nigeria.

Study Area: Ahaba Imenyi (7°23'E, 4°48'N) has a tropical climate where atmospheric temperature is around 22-25°C. It has two distinct seasons: dry season (late October to March) and wet season (early April to late October). Ahaba Imenyi is traversed by a number of streams which are sources of both drinking and domestic water for the community. Basic social amenities are inadequate while proper sewage disposal system is completely lacking in the area. Educational background of inhabitants of the study area is low, peasant farming and petty trading being the major occupation of the people. Sanitary conditions are poor in large parts of the community.

Ethical Clearance: Permission to carry out the present research work was obtained from Ahaba Imenyi community and town union heads after having a town-hall meeting with inhabitants during which all about the study was explained.

Collection of samples: Stool samples of 200 children aged 4-12 years (90 males and 110 females) were obtained at their parents' homes through parents' consent from May to August, 2013. The following parameters were recorded through questionnaires to evaluate the associations of socio-economic factors with infection rates: gender, age and occupation status of mother of subject.

Microscopy: Stool samples were analyzed on the same day of collection. The faecal samples were first examined through direct smear or saline-iodine method. Thereafter, formol-ether concentration method was performed to enhance detections of scanty parasites.

Statistical Analysis: The association between any two types of variables in this study was examined through chi-square test. Data were evaluated by SPSS for windows (version 12.0) and all statistics were set to the significance level of $p < 0.05$.

RESULTS

In total, 200 stool samples of 200 children of age range 4-12 years were examined, 90 of them (45.00%) were positive for parasitic helminths. Four helminth species were identified: *Ascaris lumbricoides*, 60 (66.67%), *Trichuris trichiura* 18 (20.00%), Hookworm 9 (10.00%) and *Schistosoma mansoni* 3 (3.33%), Table 1.

Table 1: Distribution of Positive Cases According to Helminth Species.

Helminth Species	No. of positive stool samples	Percentage (%)
<i>Ascaris lumbricoides</i>	60	66.67
<i>Trichuris trichiura</i>	18	20.00
Hookworm	09	10.00
<i>Schistosoma mansoni</i>	03	3.33
Total +ve count	90	45.00

Out of the 90 positive cases, 50 (55.56%) and 40(44.44%) were males and females respectively (table2). Statistical analysis showed that there was no significant association between helminths prevalence and gender ($X^2_{cal} = 0.54$, $X^2_{tab} = 3.84$, $df = 1$, $p > 0.05$)

Table 2: Positive Cases According To Gender

Gender	No. of samples infected	Helminth species positive case			
		<i>Ascaris</i>	<i>Trichuris</i>	Hookworm	<i>Schistosoma</i>
Male	50(55.56%)	34(37.73%)	10(11.11%)	8(3.33%)	2(2.22%)
Female	40(44.44%)	26(23.64%)	8(7.27%)	5(4.55%)	1(0.91%)

The result demonstrated unstable prevalence rates among age-groups of the children, there was a statistical significant difference between helminths prevalence and age-cohorts ($x^2_{cal} = 5.299$, $x^2_{tab} = 3.84$, $df = 1$, $p < 0.05$). Table 3 shows the distribution of helminth burden among school children age-groups 4-6, 7-9 and 10-12 years. Whereas the highest positive count was observed among the stools of children of age-bracket 4-6 years [52(57.78%)], age group 10-12 years had least positive count [9(10.00%)].

Table 3: Positive cases according to age-group

Age-group (in years)	No. of samples infected	Helminth Species Positive Count.			
		<i>Ascaris</i>	<i>Trichuris</i>	Hookworm	<i>Schistosoma</i> .
4-6	52(57.78%)	52(57.78%)	3(3.00%)	4(4.00%)	0(0.00%)
7-9	29(32.22%)	5(7.14%)	8(11.43%)	3(4.29%)	1(1.43%)
10-12	9(10.00%)	3(7.50%)	7(17.50%)	2(5.00%)	2(5.00%)

Result showed that highest positive count 50(55.56%) was recorded among the children whose mothers were farmers. Table 4 shows the association between helminths positive counts and occupation status: farming, trading, entrepreneurship, and public service, of subjects' mothers. The association was statistically significant ($p < 0.05$).

Table 4: Positive cases according to occupation status of children mothers

Occupation of mother	No. Of stools Examined	No. Of +ve stools	Percentage (%)
Farming	90(45.00%)	50	55.56
Trading	80(40.00%)	33	36.67
Entrepreneurship	20(10.00%)	5	5.56
Public service	10(5.00%)	2	2.22
Totals	200	45.00%	

DISCUSSION

The prevalence of parasitic helminths in the faeces of children aged 4-12 years living in Ahaba Imenyi, a rural community located in south-eastern Nigeria, was determined. Poor hygienic environment as well as the poor hygienic habits of children living in rural areas of Abia State were the factors that attracted this study. 90(45.00%) stool samples collected from 90 children were positive for parasitic helminths. The prevalence rate observed in this study may be considered to be moderately high and it implicates and confirms the poor standard of hygiene in the study area. This result is, however, similar to the finding of Odikamnor and Ike (2004) from a similar study in Ebonyi State.

Four parasitic helminth species belonging to two helminth groups: nematodes- *Ascaris lumbricoides*, *Trichuris trichiura*, and Hookworm; Cestodes – *Schistosoma mansoni* (table 1) were identified. These helminth species are common and well documented in both rural and urban setting of Nigeria, for examples Ekekeh *et al.*, (1996), Luka *et al.*, (2000), Fagus (2002), Ukpai *et al.*, (2003), Odikamnor and Ikeh (2004) and Uhwo *et al.*, (2011). This result is in support of the opinion of Brooker *et al.*, (2004) that many individuals harbour helminth infections, including *Ascaris lumbricoides*, *Trichuris trichiura* and *Schistosoma* species, which together with hookworm, infect a quarter of the world's population.

Prevalence of the parasitic helminths by species (Table 1) showed that *Ascaris lumbricoides* predominated 60(66.67%) while *Schistosoma mansoni* had the lowest prevalence rate 3(3.33%). The predominance of *A. lumbricoides* may be due to the fact that the study took place during the wet season characterized with abundant rainfall as wet soil is considered favourable to the eggs of the nematode species. This result agrees with the finding of Odikamnor and Ikeh (2004) and with opinion that *Ascaris* infections are more verse in rainy (i.e. Wet) season when the soil is very wet than in dry season when the soil is dry and the atmosphere is less humid.

Out of the 90 infected stools (or children), 50 (55.56%) were males while 40(44.44%) were females (Table 2). Although the result seems as parasitic helminths positive cases were higher among the males than the females, statistical analysis did not establish any significant difference between helminths prevalence and gender during the period of the present study. The fact that children aged 4-12 years are generally associated with poor standard of personal hygiene irrespective of gender, supports the stable prevalence rates between gender as demonstrated by the result. Moreover, the result is justified by the fact that hygiene among the children was considered a major factor in determining the prevalence of the parasitic helminths coupled with the fact that children aged 4-12 years are known for living in less developed hygienic habits irrespective of gender.

There was a significant association between prevalence of parasitic helminths and age-cohorts of the subjects. The highest positive stool count of 52(57.78%) was recorded among children of age group 4-6 years while the least count 9(10.00%) was recorded in the age group 10-12 years (table3). From the result, it implies that the children in Ahaba Imenyi Community became less infected by gastrointestinal helminths as they progressed chronologically. The discrepancy in prevalence rates reveals that advancement in age and probably in education enhances personal hygiene of children and can play a role in prevalence of parasitic helminths in faeces.

A significant association was observed between helminths positive count and one of the socio-economic factors-occupation statuses of mothers of the children whose faeces were examined. Four mother occupation status categories were involved in the present study (farming, trading, entrepreneurship and public service). Prevalence rate was highest in the stools of the children whose mothers are farmers 50(55.56%) while the least rate 2(2.22%) was observed among public servants' children (table4). This result is in agreement with the finding of Uhwo *et al.*, (2011) as well as synchronizes with the work by Ukpai Ukpai *et al.*, (2003) and Hotez *et al.*, (2003), which reported that intestinal nematodes are helminths that infect especially local farmers as they are traced with unhygienic environments and contaminated soil.

It also conforms with the report by Naish *et al.*, (2004) which states that children whose parents are educated (here as many be applied to public servants) seem to be more aware of the dangers associated with gastrointestinal parasitic helminths than those whose parents are uneducated (here as may be applied to peasant farmers), hence, the least prevalence rate among the children whose mothers are public servants.

CONCLUSION

We conclude that the prevalence of gastrointestinal parasitic helminths in the faeces of the children, hence amongst the children living in Ahaba Imenyi is moderately significant and should be considered public health concern. Poor personal hygienic habits and poor hygienic environments in which the children live are the routes of contracting parasitic helminth infections in the study community. Therefore, we recommend that deworming exercises as well as emphasis and sensitization campaigns on good personal and environmental hygiene be carried out simultaneously and on regular short intervals to prevent the study area from becoming parasitic intestinal helminths endemic.

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