

## HUMAN INTESTINAL PARASITE INFECTIONS IN ISHIAGU, A LEAD MINING AREA OF ABIA STATE

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### ABSTRACT

*A survey of intestinal parasite infections in a heavy metal (Pb) mining area of Abia State (Ishiagu) was carried out using both direct wet preparation and formal/ether concentration methods. A total 512 individuals ranging from primary and secondary school children to adults were screened. Of the number sampled, 177 (34.67 %) had various intestinal parasites. The parasite prevalence were Ascaris lumbricoides (17.80 %), Hookworms (14.80%), Entamoeba histolytica (3.70 %) and Trichuris trichiura (2.3 %). Prevalence for males (35.55 %) and females (33.47%) were not significantly different ( $P < 0.05$ ). Age distribution of the infections showed a gradual increase from < 10 years (14.0%) to 11-20 years group (36.67%) and peaked at 21-30 years with 57.00 % before decreasing to the least in the > 51 years (27.02 %). This gave a significant age related infection ( $P < 0.05$ ). The findings were discussed in relation to the rural nature of the community and the activities at the head mining sites.*

**Keywords:** Parasites, Heavy metal mining, Stool specimens

### INTRODUCTION

General intestinal parasite infections are the most common infection in a community, with over 400 million people infected all over the world (WHO, 1987, Adeyeba and Akinlabi, 2002). The most implicated parasites are *Ascaris lumbricoides*, Hookworms (*Necator americanus* and *Acylostoma deodenale*); *Entamoeba histolytica* and *Entamoeba coli*. Others include *Trichuris trichiura*, *strongyloides stercoralis*, *Giardia lamblia* and *G. intestinalis* (Agi, 1997, Nikolic *et al.*, 1998; Mbanugo and Onyebuchi, 2002). Several workers attribute the high prevalence of these infections to poverty, poor personal hygiene, poor environmental care, poor health services, and lack of adequate and proper awareness of the transmission mechanisms and life-cycle patterns of these parasites (Montessor *et al.*, 1998; Adeyeba and Akinlabi, 2002; Mbanugo and Abazie, 2002).

The effects of these worm infections have been enormous. The migratory stages (larvae) and the obstructions caused by some adults create growth and mental problems especially in children. Skin rashes and discolourations are not excluded, while lack of certain essential vitamins remains a consistent effect (Ozeretskoykaya, 1982; Chan, 1994; Stolsfus *et al.*, 1996).

Much work has been done on intestinal parasite infections in Nigeria. However, the situation in Ishiagu remains unknown. In addition, the infection spectrum in a heavy metal mining and stone quarrying community has not been documented. This work therefore provides information in this direction.

### MATERIALS AND METHODS

The study area is Ishiagu, a rural community in the Guinea Savannah belt of Abia State, Nigeria. The inhabitants are predominantly farmers. Some are engaged in lead (Pb) and Zinc (Zn) mining and stone quarrying (rock blasting) activities with various companies operating in the area. Other people are involved in various forms of trading and schooling. Modern housing systems and basic infrastructures have only recently been seen in a few spots as over 80-90% of the inhabitants still live in typical rural setting.

**Specimen Collection:** Wide mouthed plastic containers with press-down covers were used to collect stool specimens from subjects of various ages, ranging from primary school children to adults in the study area. The containers were distributed a day before the collection, after educating them on the collection method. All collected containers were properly labeled. A questionnaire was used to collect information relating to age, sex, occupation etc of the subjects (Table 1).

**Examination of Specimens:** The stool specimens were collected and examined in batches. The specimens were examined using the formal/ether concentration techniques and the direct smear method with normal saline and iodine solution (Garcia and Ash, 1979; WHO, 1991). Results obtained were subjected to chi-square analysis to further test their validity statistically.

**Table 1: Research questionnaire used to study human intestinal parasite infections in Ishiagu, a lead mining area of Abia State**

This questionnaire is intended for use only for this research purpose. You are therefore to answer all the questions to the best of your knowledge and ability. The information obtained will be treated with absolute confidentiality.

Please tick the appropriate answer where necessary

Name: .....

Sex: Male Female  
 Age in years: <10 11-20 21-30  
 1 – 40 41-50 >50

Level of Education:  
 Primary School Secondary School  
 Tertiary School None of all

Occupation:  
 Lead and Zinc Mining Stone quarrying  
 Schooling Farming  
 Trading Civil Servant  
 Any other

What do you know about parasitic diseases  
 None Very Little Average  
 Above Average Very much

**RESULTS**

Out of the 512 subjects screened for intestinal parasite infections, 177 (34.6 %) were positive with various parasites. Out of 270 males examined, 96 (35.6 %) were positive while 81 (33.47 %) of the 242 females were positive (Table 2). There was no significant difference in the sex-related prevalence (P < 0.05).

**Table 2: Prevalence of intestinal parasites among the inhabitants of Ishiagu, Abia State**

Species	No examined	% infected
	<b>177</b>	<b>34.60%</b>
<i>Ascais lumbricoides</i>	91	17.8%
Hookworms	76	14.8%
<i>Trichuris trichiura</i>	12	2.3%
<i>Entamoeba histolytica</i>	19	3.71%
<b>Total</b>	<b>512</b>	<b>100</b>

Table 3, indicates that the most infected age group was the 21-30 years (57.00%), followed by 11-20 years (36.67 %). The least infected was 0 < 10 years (14.00 %) followed by > 50 years (27.02 %). Age significantly influenced the prevalence (P < 0.05) (Table 3).

Four intestinal parasites were observed in his study. These were *Ascaris lumbricoides*, *Hookworm*, *Entamoeba histolytica* and *Trichuris trichiura*. Table 2 shows these parasites and their prevalence among the 512 subjects screened.

Occupation did not influence the prevalence of infection except for the civil servants (16.90 %) who had significantly lower prevalence of infection than all the others group E.

**DISCUSSION**

This study has revealed that intestinal parasites observed in other areas are the same found in both

children and adults in the lead, zinc and stone mining area – Ishiagu (Agi 1995, Nikolic *et al*, 1998, Adeyeba and Akinlabi, 2002, Mbanugo and Abazie, 2002). The parasites encountered in this work were *Ascaris lumbricoides*, Hookworms, *Entamoeba histolytica* and *Trichuris trichiura*.

**Table 3: Prevalence of Human intestinal parasites according to age, sex and occupation of the inhabitants of Ishiagu**

		Number Examined	Number infected
<b>Sex</b>	Male	270	96(35.55)
	Female	242	81(33.47)
<b>Age in Years</b>	<10	100	14(14.0)
	11-20	120	44(36.677)
	21-30	100	57(57.00)
	31-40	95	32(33.68)
	41-50	60	20(33.33)
	>50	37	10(27.02)
<b>Occupation</b>	Mining	72	23(31.94)
	Stone quarrying	102	34(33.33)
	Schooling	134	62(46.27)
	Farming	87	30((34.48)
	Trading	4	1(25.00)
	Civil service	71	12(16.90)

The observations of these intestinal parasites in subjects in Ishiagu community were in line with happenings in other areas. However, more parasites than the four reported in this work have been observed in most areas other than heavy metal mining and rock blasting areas (Amogun, 1990; Chan, 1997; Mbanugo and Onyebuchi 2002, Adeyeba, and Akinlabi, 2002). The fewer number of parasite species reported in this work could be attributed to the fact that the wastes from these mining sites in the area could have adversely affected the survival of these parasites in the soil. The inhabitants make use of the abandoned quarry and mining pits for various purposes, which could equally, affected the parasites spectrum.

The most prevalent intestinal parasite in the area was *Ascaris lumbricoides* (17.8 %), followed by Hookworms (14.8%) while the least was *Trichuris trichiura* (2.3%). The results of this study agree with previous reports elsewhere that *Ascaris lumbricoides* and Hookworm species are the most prevalent intestinal parasites in South Eastern Nigeria (Agi, 1995; Mbanugo and Abazie, 2002; Adeyeba and Akinlabi, 2002).

A total prevalence of 34.6% intestinal parasite infections observed in the study area is similar to the 33.6% (Agi, 1995) and 30.8% (Mbanugo and Abazie 2002) but lower than the 50.4% (Adeyeba and Akinlabi, 2002) and 70.80% (Awogun, 1984) reported elsewhere in the country. These variations explain that no community is the yardstick for measurement as the prevalence of intestinal parasites is a function of many interacting factors. These factors vary in different communities and even in the same community at different periods of development. There was no significant different in the sex – related prevalence as both sexes were exposed to the same or similar sources of infection at

similar or some rate. Both sexes take part in similar activities in the same areas that could predispose them to the intestinal parasites infections.

Age-related prevalence showed that infection rate increased with age and reached the peak in 21-30 years subjects (57.00%) before decreasing with advancing age. The work force in Ishiagu, a typical rural community, constitutes of people from 21-30 years of age. These are those engaged in the farming, lead and zinc mining and stone quarrying activities outside their homes which predispose them to infections with these parasites. On the other hand, subjects of 10-20 years are mainly school children who are generally highly infected as a result of age and lack of acquired immunity (Mbanugo and Onyebuchi, 2002, Adeyeba and Akinlabi, 2002). In this 10-20 years group, those not engaged in schooling were observed scavenging at the mining and quarrying sites, which equally exposed them to infections.

Occupational prevalence of intestinal parasitic infection showed that the only significantly different group ( $P < 0.05$ ) was the civil servant which had the lowest prevalence of 16.90%, probably as a result of their being generally more educated than the rest of the community.

In conclusion, there was low prevalence of intestinal parasite infections with only few parasite species in the area, but the rural nature of the community, coupled with unhygienic practices at the various work sites expose the people to infections. There is therefore the need for provision of portable drinking water in addition to mass deworming treatment. The need for mass awareness campaign should also be emphasized in order to drastically reduce all the infections.

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