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*I); *Entamoeba histolytica* and *Entamoeba coli*. Others include *Trichiuris 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 (Montressor *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 (Ozeretskovskaya, 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
	177	**34.60%**
Ascais lumbricodes	91	17.8%
Hookworms	76	14.8%
Trichuris trichiura	12	2.3%
Entaemoeba histolytica	19	3.71%
Total	512	100

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 Akirilabi, 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
Sex	Male	270	96(35.55)
	Female	242	81(33.47)
Age in	<10	100	14(14.0)
Years	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)
Occupation	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 blastering 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 yeas 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.

REFERENCES

ADEYEBA, O. A. and AKINLABI, A. M. (2002). Intestinal Parasitic infections among school children in rural community, South Nigerian. *Nigerian Journal of Parasitology, 23*: 11 – 18.

ADEDOYIN, M. A., AWOGUN, I. A. and TIM, J. (1990). Prevalence of intestinal parasites in relationship in diarrhoea among school children in Ilorin, Nigeria. *West African Journal of Medicine, 9(2):* 83 – 89.

AGI, P. I. (1995). Pattern of Infection of Intestinal Parasites in Sagbama Community in Niger Delta, Nigeria. *West African Journal of Medicine, 14(1):* 39 – 42.

AGI, P. I. (1997). Comparative Infections in two rural communities in then Niger Delta, Nigeria. *West African Journal of Medicine, 16(4);* 232 – 236.

AWOGUN, I. A. (1984). The Prevalence of Intestinal parasitic infections in children living in Ilorin, Kwara State, Nigeria. *West African Journal of Medicine, 4(1):* 16 – 21.

CHAN, M. S. (1994). The evaluation potential global morbidity attributable to intestinal infections. *Parasitology, 109*; 373 – 387.

MBANUGO, J. I. and ABAZIE, O. C. (2002). A Comparative Study of Intestinal parasitic Infections of Pregnant and Non Pregnant Women in Nkpor, Anambra State. *Nigerian Journal of Parasitology, 23:* 19 – 26.

MBANUGO, J. I. and ONYEBUCHI, C. J. (2002). Prevalence of Intestinal Parasites in Ezinifite Community in Aguata LGA of Anambra State. *Nigerian Journal of Parasitology, 23:* 27 – 34.

MONSTRESSOR, A., CRUMPTON, D. W. T., DUNDY, D. A., HALL, P. and SAVIOLI, C. (1998). *Guidelines for the evaluation of soil-transmitted Hemithiasis and Schistosiamiasis at Community Level.* A guide for managers of control programmes, World Health Organization, Geneva.

NDUKA F. O., NWAUGO, V. O. and NJOKU, A. J. (2001). Prevalence of Paragonomiasis in school children in some areas of South Eastern Nigeria. *Journal of Health and Veterinary. Science. 2(2): 120 – 125..*

NIKOLIC, A., DJURKOVIC, O and BOBIC, B. (1998). Intestinal Parasitic infections in Serbia. *Srpski Arhizua Celukumpo Lekarsivo, 126(1-2): 1 – 5.*

NWAUGO, V. O., NDUKA .F. O. and NWOKE, B. E. B. (2002). Aspect of Urinary Schistosomiasis among quarry pit water users in Umuchieze Abia State. *Nigerian Society of Microbiology Annual Conference. Uyo, 14 - 17th July, Nigeria.*

OZERESTSKOVSKAYA, N. N. (1982). Intestinal Parasitic infection. *Scandinavian Journal of Infectious Diseases, Supplementary 36:* 46-51.

STOLZFUS, R. J., ALBONICO, M., CHWAYA, H. M., SARVIOLI, L., TIELSH, J., SCHULZE, K., YIP, R. and HEMOQUANT, H. H. (1996). Determination of hookworm related drug loss an its role in iron deficiency in African Children. *American Journal of Tropical Medicine and Hygiene, 55(4).* 399 – 404.

WHO (1987). Prevention and Control of Intestinal Parasitic Infections. Report of WHO Expert Committee. *Technical Report Series. 749*. World Health Organization, Geneva.

WHO (1991). *Basic Laboratory Method in Medical Parasitology.* World Health Organization, Geneva.