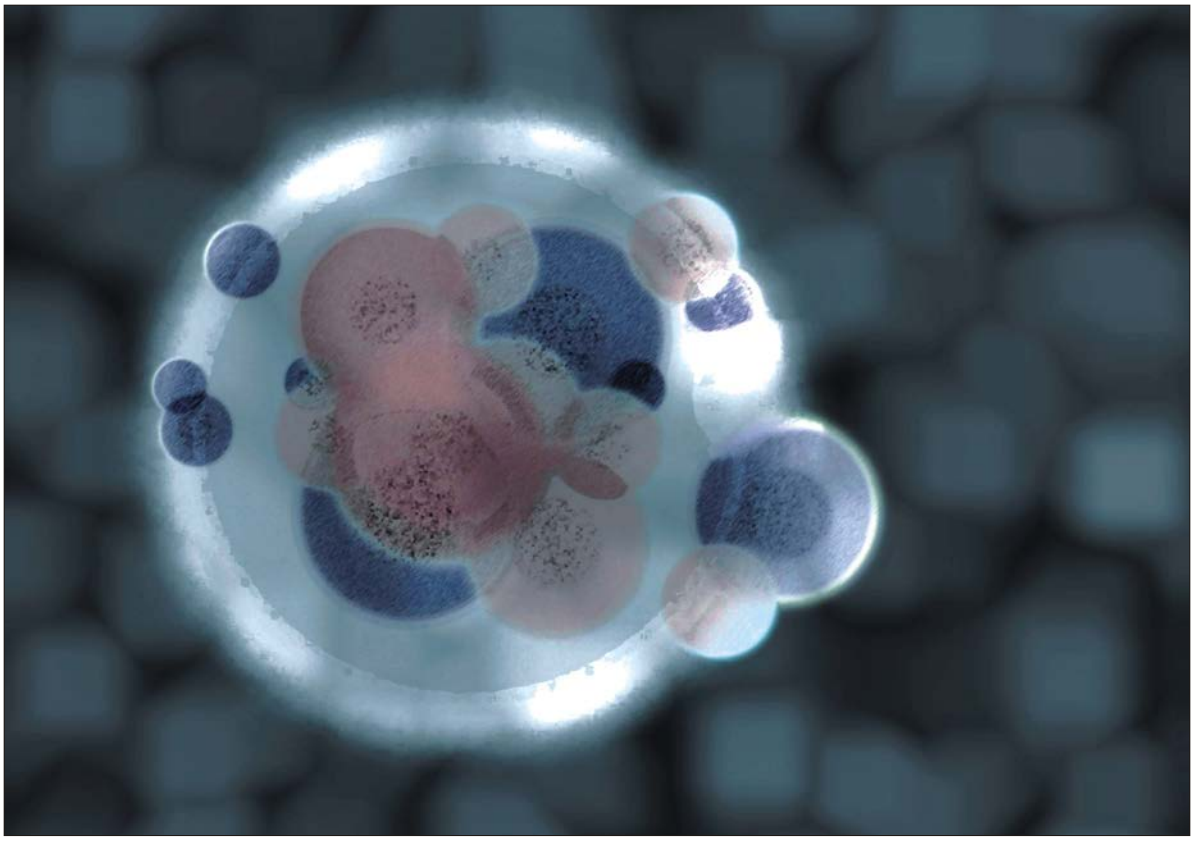

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Ascaris Worms in School-aged Female Children: A Water Based Problem in Rural Eastern Nigeria

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Abstract: A total of 500 fecal samples of school-aged females between the ages of 10-14 years were examined for the presence of eggs of *Ascaris lumbricoides* by the normal saline direct thin smear technique. The female students were from 8 different secondary schools on the rural periphery of Awka, an urban capital of Anambra State, in Eastern Nigeria. Out of 500 students examined, 65 were positive giving an overall percentage of 13. On observation of the occurrence of worms according to the ages of the female students, it was found that higher percentages of 20 and 21 occurred with the ages of 10 and 11, respectively. The incidence of the worms in girls that were 12, 13 and 14 years were 12, 6 and 6%. Incidence of infection decreased with increasing age. Education, better personal hygiene and raised environmental sanitation in schools were proffered as solutions to the occurrence of the worms. Also, adequate provision of potable water would seem to greatly reduce the risk of infection of the worms.

Key words: *Ascaris* worms, school-aged children, female children, water-based problem, rural Nigeria

INTRODUCTION

Ascaris infections continue to cause significant morbidities and mortalities in the world particularly in the tropical and subtropical areas of the world. The worldwide endemicity of ascariasis has an estimate 2 billion human cases and as many as 4 million cases mostly children being reported in the U.S each year[1]. Under conditions of poor sanitation and poor suitable living condition nearly 100% of the population may be found to harbour the parasite. The record from the World Health Organization[2] on waste management showed that fewer than 60% of the urbanities of less developed countries like Nigeria have access to adequate sanitation and merely 30% are connected to a sewage system. The record further noted that sewage is discharged but most of it that is collected (90%) is discharged without treatment. As the physical environment in and around the crowded cities deteriorates, those affected more are the urban population in developing countries[3]. Crowded living conditions in the urban areas bring with them other problems of over population, inadequate facilities for the removal of household wastes, etc. In these places, most individual and households share facilities and sometimes share a common pit toilet or bucket latrine. The prevailing situation in most towns and cities is unsatisfactory with only very few large establishments and institutions having small modern sewage treatment plants. In the light of these conditions, it is not surprising that there is a high prevalence of intestinal helminthic infections[4,5]. Nigeria is one of the tropical disease endemic areas of the world (TDR) and it is necessary to screen people of different localities so as to present some correct information vital for the National helminth control programme. It is estimated in epidemiological studies that parasitic helminths infect more than one billion people especially malnourished individuals[6]. Nigeria aims to achieve, in the new millennium, health for all. It becomes wise to emphasize the importance of improved public and private hygiene as one of the effective control of intestinal parasites. *Ascaris* control programme has been found to act as a useful tool in the introduction of primary health care programme and priorities[6]. The aim of the research was to a symptomatically examine teenage school girls for *Ascaris* worms to obtain information from that age range and within that gender to add to the epidemiological picture of the worm existing in the country.

MATERIALS AND METHODS

Study area: The secondary schools sampled were all located in and around Awka an urban center in East Central part of Nigeria. Awka town has a rural periphery

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Table 1: Occurrence of *Ascaris lumbricoides* in the female school children from the different schools

	Number of pupils examined (Ages)						No. of positive cases (Ages)						
Schools	10	11	2	13	14	Total No. examined	10	11	12	13	14	Total No. of positive cases	Overall % of positive cases
I	12	17	28	22	19	98	3	4	6	3	2	18	3.6
II	17	18	13	10	7	65	5	3	2	0	1	11	2.2
III	19	14	9	9	7	58	1	3	0	1	0	5	1.0
IV	8	10	13	15	19	65	0	1	0	0	2	3	0.6
V	11	7	8	5	3	34	3	1	2	0	0	6	2.2
VI	21	19	12	9	11	72	6	4	2	1	1	14	2.8
VII	12	7	9	8	10	46	2	2	0	1	0	5	1.0
VIII	0	8	8	22	24	62	0	3	0	0	0	3	0.6
Total	100	100	100	100	100	500	20	21	12	6	6	65	13.0

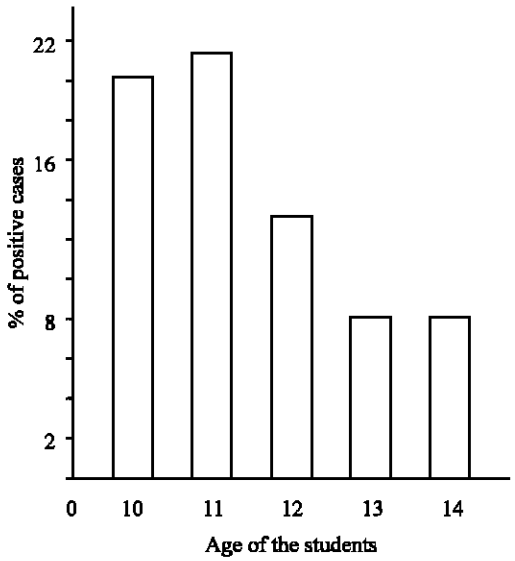

Fig. 1: The prevalence of *A. lumbricoides* in the different age groups of the female students

made up of several villages. The supply of pipe-borne water in the urban center is insufficient hence the inhabitants depended more on water purchase from nearby bole holes drilled for private use or on commercial cellophane-wrapped water or wells. The rural periphery depended on streams, small fountains and wells dug for private use.

The study population was 500 secondary school female teenagers. The schools are designated schools I, II, III, IV, V, VI, VII and VIII. The pupils were randomly selected and the study was asymptomatic. There was no attempt to select only active cases.

Sample collection: Universal bottles that had been washed free of dirt were given to the girls. First the consent of the head of each school was sought and the purpose of the project explained. Each teenager was given a universal bottle and instructed on how to collect the feces. The bottles were given one day and collected on the morning of the next. The samples were then taken to the laboratory and examined for the eggs of *Ascaris* ova, cyst, larva and worm and examined within the hour after collection.

Parasitological examination: The method of WHO[7] was followed. About 1-2 g feces were collected with an applicator stick and were put into a centrifuge tube and 10 mL of normal saline was poured into the tube. The contents were stirred thoroughly and the resulting suspension through 2 layers of wet surgical gauze into another centrifuge tube. Then was added 2 mL of 10% ether and the suspension centrifuged at 500 rpm for 3 min. The supernatant was discarded and the deposit mixed with a little quantity of saline. With a dropper, the solution was collected placed on a clean grease-free slide and covered with a cover slip. Examination was done under the low power objective (X10) and then under the X40 objective.

The search for *Ascaris* worms was said to be negative after 5 min microscopic search[8].

RESULTS AND DISCUSSION

Table 1 showed the occurrence of *Ascaris lumbricoides* in female school children of different ages in the schools studied. From the Table 1 the difference in occurrence in the different schools were highlighted. It pointed out the percentage rate of infection in each schools as well as the overall percentage of infection of a school compared to other schools. The result showed that the degree of infection decreased with increased in age. Figure 1 showed that infection in 10 and 11 year olds were 20 and 21%, respectively while the infection in 13 and 14 year olds decreased to 6% in both ages.

The results of this study indicated that the overall prevalence of *Ascaris* worms in the school-aged teenagers in Awka was high. This was in line with the high intestinal parasite condition of children of ordinary health in different parts of the country[9,10]. It also told the story of what happens in the rural areas of the world's developing countries. For example, Pierce and Ascoli[11] in Guatemala

surveyed 1-5 year old children and their results showed an *Ascaris* prevalence of 46% among rural children, 26% among poor urban children and 3% among wealthy urban children. In Nigeria, various researchers have done surveys on children from different parts of the country[12,13] and in each survey, attention was called to the relatively high prevalence rates among the country's children. The parasites spread very quickly among the young and consistently its spread had to do with poor living conditions and poor hygiene among the children[14].

A slight increase was in prevalence was noted in the 3 secondary schools located away from the urban town, i. e. Schools I, II, V. It was observed that the environments in these 3 schools were deserving of attention: defections were observed in the nearby bushes and even on the play fields. Also, their classrooms were overcrowded and the school floors were not cemented. Nwosu[15] noted that most helminthic diseases in the tropics were confined to the villages where poor sanitation and domestic hygiene as well as a general ignorance of the disease enhance the high prevalence levels in a community.

The over all prevalence rate was higher in younger children between the ages of 10- 11 years old probably because of their stage of development- they having just started secondary education and had not yet grasped the importance of hygiene and health. This was observed by Enekwechi and Azubike[13], Magambo[5] who noted in their study that even though all age groups they studied showed infection, high incidence occurred in children between the ages of 5-9 years. They attributed that to playing on polluted grounds and also walking around bare-footed. Additionally, it could also be from sucking of dirty fingers and nails, eating unwashed fruits and vegetables and drinking contaminated water hawked in transparent polythene paper.

There is no doubt that high prevalence of the parasites affects the physical well being of the school children and reduces their efficiency. In some cases, absence from schools may be due to parasitic infection considering the debilitating effects of the *Ascaris* worm.

A wide range of measures has to be adopted in the control of the worm. It is necessary to provide toilet facilities in the schools to discourage defecation in open spaces in and around the schools which tend to be the main source of infection[16].

Effective chemotherapy which will involve community-based mass treatment of active cases is a remarkable procedure for the control of intestinal parasites[16]. A school- based approach was suggested by Olsen[17] and Nwaorgu *et al.*[18]. because, according to them, it will not involve transportation to the health facility. They also agreed with the idea of using teachers for the detection of infection and for health administration.

Education of the public about sanitation, personal and environmental hygiene as suggested by Cook[16] will help reduce the infection.

Fresh human feces should not be used as fertilizer of fruits and vegetables. If this cannot be avoided, then the feces should first be composted or treated with chemical fertilizer in order to kill the parasite eggs and larvae[16]. Control of agricultural transmission route can be done by adequate treatment of sludge and night soil prior to land application.

It behooves the government of any country to provide potable water for its citizens and to make maximum efforts at improving its general health programme.

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