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Endemicity of Urinary Schistosomasis in Ogbese-Ekiti Community of Ise-Orun Local Government Area of Ekiti State, Nigeria

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Abstract. In random examination of 191 students of Ogbese-Ekiti community of Nigeria for urinary schistosomasis, 170 (89%) were found positive for *Schistosoma haematobium* eggs in their urine. The prevalence in the secondary school was 97.4%, while the prevalence in the primary school was 87.5%. The overall mean intensity of *S. haematobium* eggs/10 ml of urine in this community was 339.4. Also, 5.9% of the infected pupils excreted above 1000 eggs/10 ml of urine, while 59.8% had moderate intensity (50-499 eggs/10 ml of urine). The perentage macrohaematuria was 84. Among five aquatic snails *Bulinus* (*B*) *forskalii, Bulinus* (*B*) *globosus*, *Pila ovata*, *Potadoma moerchi* and *Melanoides tuberculata* of river Ogbese, only *B.* (*P*) *globosus* shed the characteristics cercariae of *S. haematobium.* A monthly mean of *B. globosus* in river Ogbese was 53.2 and an increase in the population density of the snail occurred between November and May, 2004. The highest infection rate of *B.* (*P*) *globosus* with *S. haematobium* occurred in the month of March.

Keywords: schistosomiasis, aquatic snail, *S. haematobium*, Ogbese-Ekiti

Introduction

Schistosomiasis is widespread in tropical Africa and considerable amount of work has been done on African schistosomiasis (Cowper and Woodword, 1961). The prevalence of the disease and the distribution of the snail intermediate hosts differ in different parts of the continent (WHO, 1980). Schistosomiasis is endemic in Nigeria (Adewumi *et al.*, 1991; Ozumba *et al.*, 1989; Edungbola, *et al*., 1988). Investigation carried out in Nigeria indicates a widespread and intensive transmission of schistosomiasis, with exceptionally high prevalence of the disease among children living where water based activities are very common (Akogun and Okin, 1993; Betterton, 1984). The status of urinary schistosomiasis in southwestern Nigeria has been the subject of many publications (Okoli and Odaibo, 1999; Mafiana and Adesanya, 1994; Cowper and Wood Ward, 1961). The status of urinary schistosomiasis in each of the Local Government Areas of Ekiti State has already been documented (Ologunde, 2004). Ogbese-Ekiti is located in Ise-Orun Local Government Area of Ekiti State and no published data is available on the status of urinary schistosomiasis in this community. This paper describes the status of urinary schistosomiasis in Ogbese community of Ise-Orun Local Government Area of Ekiti State, Nigeria.

The study area – Ogbese-Ekiti. The study area, Ekiti-State of Nigeria is situated between latitudes 7°.15′ N to 8°,10′ N and longitudes 4°.45′ E to 5°,45′ E. Osun, Kwara, Kogi and Ondo States bound Ekiti-State. Ekiti-State lies in the southern climatic belt, which is characterized by the rainy season of about eight months (March-October) and the dry season of about four months (November-February) (Barbour *et al*., 1982). Ogbese river which is the major source of water to all inhabitants of Ogbese-Ekiti is a stretch of several kilometers that runs through several communities in Ekiti, Ondo and Edo States. The river is rich in aquatic vegetation, particularly *Nymphaea lotus, Pistia stratiotes, Ludwigia octovalvi*, which alter in density from season to season. During the dry season, many pockets of water are found along the river course. Human activities in river Ogbese include swimming, fishing, washing of legs, clothes and vehicles, wading and using water for domestic purposes.

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Materials and Methods

Collection and examination of urine. Three schools (two primary and one post primary) in Ogbese-Ekiti were surveyed for urinary schistosomiasis (Table 1). Total student population of these three schools was 602. School children were randomly selected from the names in class registers to participate in the survey. Urine samples were collected from 191 school children aided by their class teachers between 10.00 and 13.00 h and the samples were labelled appropriately. In the laboratory, each of the sample was thoroughly mixed to ensure even distribution of contents. An aliquot of 10 ml of each sample was centrifuged at 2000 rpm for 5 min. The supernatant (9 ml) was decanted and the sediment was pipetted on to microscopic slides and the number of eggs were counted using hand counter. The number of eggs in 10 ml of each urine sample was calculated from the mean of results of two counts

by proportionality and recorded as number of eggs/10 ml of urine.

Snail sampling. A survey was carried out in Ogbese river to determine the types of aquatic snails present between January 2005 to August 2006. Sampling was done using a long handled sieve net, 1 mm mesh size. Snails were sampled twice a month. At each visit, the population of *B.* (P) *globosus* was determined by carefully searching for 15 minutes as described by Fashuyi (1976) and Ologunde (2004). The number of snails was recorded as average number of snails/man/15 min and the population was recorded as a mean of two collections. Only snails of a shell diameter of over 4 mm were examined for infections (Ologunde, 2004; Fashuyi, 1976; Shiff, 1964).

Water contact activities. Water contact activities were determined from questionnaire data (Okoli and Odaibo, 1999; Udonsi, 1990; Chandiwana, 1986). Each student aided by the class teacher and/or member of the survey team was asked to complete a questionnaire, for providing information concerning his/her water contact and water usage. Water contact was classed according to the extent of body immersion. Complete long term contact (swimming) was given a weightage of 5. Partial and medium term contact (clothes washing, fetching of water, fishing, washing of legs/hands and washing of plates) was given a weightage of 3 and limited and short term contacts (wading across) was given a weightage of 1. These gave the exposure index of the children to each water contact activity (Okoli and Odaibo, 1999). A total of 80 students filled the questionnaire on water contact activities in the study area.

Results and Discussion

The data on the prevalence of urinary schistosomiasis among the school children in Ogbese community are shown in Table 1. 170 (89%) of the students consisting of 107 (62%) males and 63 (38.0%) females were found to be infected with *S. haematobium*. As shown in Table 2, infection occurred evenly among different age groups with peak among the 17-20 years age group (100.0%). Chi square analysis shows that there is significant difference in the prevalence of infection between sex ($P<0.5$). The distribution of egg counts by sex (Table 3) shows a similar pattern for both sexes. Over one hundred and forty seven (86.5%) of the 170 infected school children excreted 50 or more eggs per 10 ml urine. One hundred and forty three (84.5%) infected school children had haematuria. The snail fauna of the area are predominantly *B.* (*B*) *globosus*, *B.* (*B*) *forskalii, Potadoma moerchi* and *Pila ovata*. The population and infection dynamics of *B.* (*P*) *globosus* is presented in Fig. 1. The highest number of *B.* (*P*) *globosus* was recovered in February. The water contact activities of the primary and post primary school children is presented in Table 4.

Table 1. Prevalence and mean intensity of *Schistosoma haematobium* infection among primary and secondary school pupils in Ogbese community of Ise Orun Local Government Area of Ekiti-State

Name of School	No. of pupils examined	No. of pupils infected	Prevalence (%)	Mean intensity
St. Andrew's Anglican Primary School	99	81	81.8	291.9
Ogbese Community Primary School	16	15	93.8	339.82
Ogbese Comprehensive High School	76	74	97.4	362.5
Total	191	170	89.0	339.4

Table 2. Intensity of *Schistosoma haematobium* infection by age of primary and secondary school pupils in Ogbese Community of Ise-Orun Local Government Area of Ekiti-State

Age group (years)	No. of pupils examined	No. of pupils infected	Prevalence (%)	Mean intensity
5-10	53	42	79.2	267.4
11-16	128	118	92.2	362.1
17-20	10	10	100.0	373.3
Total	191	170	89.0	339.4

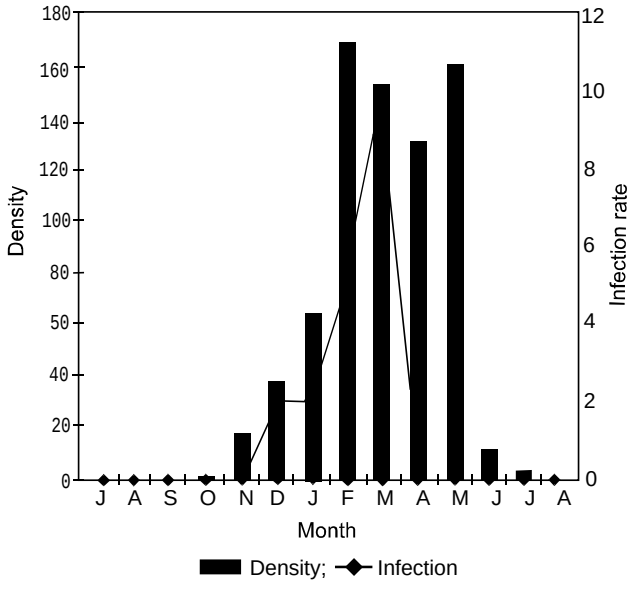

Fig. 1. Density and infection rate of *B.* (*P*) *globosus* in Ogbese river.

Table 3. Intensity of *Schistosoma haematobium* infection by sex in the primary and secondary school pupils in Ogbese Community of Ise-Orun Local Government area of Ekiti State

Sex	No. of infected pupils	Eggs intensity				<50 eggs/10 ml	Overall mean intensity
		Low intensity (1-49/10 ml)	Moderate intensity (50-499/10 ml)	High intensity (500-999/10 ml)	Above <1000/10 ml		
Male	107(62%)	13(12.1%)	57(53.3%)	29(27.1%)	8(7.4%)	94(87.9%)	388.00
Female	63(38%)	10(15.9%)	43(68.3%)	8(12.7%)	2(3.2%)	53(84.1%)	290.0
Total	170	23(13.5%)	100(59.8%)	37(21.8%)	10(5.9%)	147(86.5%)	339.4

Table 4. Water contact activities of primary and post-primary school children in Ogbese-Ekiti Community

Water contact activity	Frequency of exposure	Exposure total index	Exposure (%)	Frequency of exposure	Male exposure index	Exposure (%)	Frequency of exposure	Female exposure index	Exposure (%)
Complete and long term exposure									
Swimming	49	245	29.6	29	145	30.7	20	100	28.1
Partial and medium term exposure									
Clothes washing	45	135	16.4	23	69	14.6	22	66	18.5
Water fetching	51	153	18.5	29	57	18.4	22	66	18.5
Fishing	9	27	3.3	7	21	4.5	2	6	1.7
Washing of legs/hands	59	177	21.4	37	111	23.5	22	66	18.5
Washing plates	17	51	6.2	7	21	4.5	10	30	8.4
Short term contact									
Wading	40	40	4.8	18	18	3.8	22	22	6.2
Total exposure	270	828	100	150	472	57.0	142	359	43.0

With an overall infection rate of 89% among primary and secondary school pupils, prevalence of schistosomiasis is very high in Ogbese-Ekiti community. Extensive work had earlier been carried out by Ologunde (2004) on the status of urinary schistomiasis in each Local Government Area of Ekiti State. The prevalence rate according to that study ranged between 1.9-36.3%. Ogbese community is perhaps the only community within Nigeria especially in southwestern Nigeria with such high prevalence rate of disease in Ekiti State.

The age and sex related pattern of distribution of urinary schistosomiasis infection in man has been widely reported by various authors (Ugbomoiko, 2000; Okoli and Odaibo, 1999; Fajewonyomi and Afolabi, 1994). This study shows that prevalence and intensity of infection varied with sex and age of school children. Urinary schistosomiasis was most prevalent between the ages of 17 and 20 years (100%). Analysis of the egg output of the infected children in this study shows that all the different age groups (Table 2) were important in relation to the transmission of the disease. An overall mean intensity of 339.4 eggs/10 ml of urine is very high and accounts for the high prevalence rate. Mass chemotherapy and health education are therefore recommended as measurers of preventing and controlling the disease especially among the affected school children. It will reduce potential of transmission, reduce morbidity and minimize the risk of developing complications later in life.

Ogbese River is the only source of water available for Ogbese community. The water serves both domestic and recreational purposes. Water contact activities of the community with reference to the river is high (Table 4). And since the appropriate intermediate host and egg excretion is very high, prevalence rate will definitely be high. Only five aquatic snails were recovered from river Ogbese; among these only *B.* (*P*) *globosus* shed the characteristic cercariae of *S. haematobium.* The population and infection dynamics of *B.* (*P*) *globosus* over a period of fourteen months is presented in Fig. 1. The chance of acquiring infection is high in the month of November onwards, at the onset of the dry season and

continue to increase steadily up to the month of March at the onset of the rain. Any strategy adopted for control of the snail (intermediate host) should, therefore, be affected between November and March. Again, in the month of February the water level had greatly reduced with only few pockets of water along the river course. Focal molluscide during this month will, therefore, be one of the effective methods of controlling the snail intermediate host. Efforts should be made to reduce water contact activities through provision of alternative water supply that reduces chances of acquiring infection. The high prevalence of urinary schistosomiasis in Ogbese-Ekiti can be used to assess the success or failure rate of the Federal and State Governments primary health care programme. A more integrated approach is required to effectively control schistosomiasis in Nigeria.

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