The Zoologist Vol. 1 (4) 92-99 (2006)

URINARY SCHISTOSOMIASIS AMONG SCHOOL PUPILS IN ONDO AND EKITI STATES, NIGERIA

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Abstract

This paper reports on the prevalence of schistosome infection among school pupils in Ondo and Ekiti States of Nigeria. Urine samples were collected randomly from the school pupils and taken to the laboratory for analysis. A total of 6,943 pupils were examined. 2,022 (29.1%) (95% C.I 0.28 – 0.30) were infected. 1495 (36.2%) (95% C.0.34 – 0.38) of 4133 males and 527 (18.8%) (95% C. I 0.18 – 0.20) of 2810 females were infected. Out of the six communities studied, Odigbo community showed peak prevalence of infection of 56.1% (95% C. I 0.53 – 0.60). There was a significant difference in the prevalence of infection among male and female pupils, ($P<0.05$, $x^2_5 = 15.8$). The peak prevalence of infection 38.8%, (95% C. I 0.37 – 0.41) was found in the 6-8 years age group. Similarly, the peak geometric mean intensity of infection of 5.2 eggs/10ml of urine was recorded among the age group of 6-8 years. The active transmission sites were predominantly visited by the 6-8 years age group and they were more involved in the various human water contact activities in the study area. The 6-8 years age group is most important in relation to the transmission of schistomiasis in Ondo and Ekiti States.

Key Words: Schistosomiasis, prevalence, school pupils, Ondo and Ekiti States.

Introduction

Schistosomiasis is endemic in Nigeria, particularly in rural areas (Cowper, 1973, Lemma 1973, Cline *et al* 1989, Ogbe and Olojo 1989, Ndifon, 1991, Ako-Nai *et al*, 1992, Useh and Ajezie 1994 and 1996, Adomeh, 1998 and Okoli and Odaibo, 1999). The perception of the schistosomiasis is still based on some traditional beliefs in most towns and villages in the study area; for example, urinating blood with urine is believed to be "Urine of Black dog." Therefore the presence of freshwater snails in the freshwater bodies is of no concern to the users. Due to the wide spread report of heamaturia (blood in urine) among school pupils in various communities in the study area, and lack of earlier detailed report on the disease in literature since the report of Cowper (1963) over three decades ago, it was therefore considered necessary to investigate the status of schistosomiasis in Ondo and Ekiti States, Nigeria.

Materials and Methods

The study area is situated between Latitude 5°N – 8°N and Longitude 4°E -6°E in Ondo State and Ekiti State. Ondo State is bounded by Ogun, Osun, Kogi, Edo, Ekiti and Delta States and also by the Atlantic Ocean, while Ekiti State is bounded by Osun, Kwara, Kogi and Ondo State (Fig. 1). The two states lie in the southern climatic belt which is characterized by a rainy season of about eight months (March - October) and a dry season of about four months (November - February) although with some noticeable variation in rainfall from year to year.

The population figures of the studied communities are shown in Table I.

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Table I: The population figures of Nigeria, former Ondo State and five communities of the study Area:

NAME	MALE	FEMALE	TOTAL
Nigeria	44,544,531	43,969,970	88,514,501
Old Ondo State	1,958,928	1,925,557	3,884,485
Ado-Ekiti Community	78,130	71,342	149,472
Ikere-Ekiti Community	9,054	30,203	59,257
Itaogbolu Including Akure Community	161,467	151,458	316,925
Ilara and Ipogan Communities	51,004	51,134	102,138
Odigbo Community	77,319	73,647	150,698

(Sources: Nigeria Population Commission, Census News, 1991)

In these communities, potable water supply is inadequate and major parts still depend largely on natural sources of water for both agricultural and domestic purposes.

Survey Procedure

Primary and Secondary pupils were selected for the study because they form a more stable and organized group and they are representative of households in the communities studied.

Prior to the collection of urine samples, all the Area Education Officers (secretary), all the school Headmasters and Principals and Primary Health Care co-ordinator in each Local Government Area involved were contacted for permission, co-operation and the necessary briefing regarding the purpose and relevance of the study. Health education meetings were also held with the pupils and teachers.

Thereafter, with the assistance of the class teacher, the children were interviewed to obtain background information. Such information includes sex, age, source of water supply, type of contact activities and whether or not they had experienced haematuria. Fifty schools (34 primary and 16 secondary) in Ondo and Ekiti State (Fig. 1) were surveyed for urinary schistosomiasis. In each school, the class register was used to select the subjects (the sampling unit).

Every fourth pupil, according to the serial number in the class register, was selected after a random selection of first pupil. Pupils who were absent were omitted. Urine samples were collected from 6,943 school children between 1000h and 1400h and 10ml of each sample was taken after thorough mixing and centrifuged at 2,000 rpm with a bench centrifuge for 2 minutes. The supernatant fluid (8-9ml) was decanted and egg count of the sediment was made using counting chamber (improved Neubeuer counting chamber with ruled area of 9mm^2 and depth of 0.1mm). Some of the urine samples collected from far distances were fixed using 10% formalin in the field to avoid cloudiness of the urine before laboratory analysis.

Twenty – four major water contact sites in the study area were searched for freshwater snails using 2mm mesh size scoops with long handles. Snails found were taken to the laboratory for identification and individual snails were screened for infection by exposure to sunlight.

To determine the differences in the infection rates among school pupils in relation to age group and sex in the study area, analysis of variance was used to determine differences in the infection rates among the school pupils in relation to sex.

Results

The prevalence and intensity of *Schistosoma haematobium* infections among school children from 50 schools in the communities studied are shown in Table 2. A total number of 6,943 pupils out of 22,868 pupils were examined for Schistosome infections in the six communities in Ondo and Ekiti States. Two thousand and twenty two (29.1%, 95% C I 0.28 – 0.30) of the number examined were found to be infected with *Schistosoma haematobium*. A total of 4,133 male pupils were examined and 1495 (36.2%, 95% C I 0.81 – 0.20) of 2810 of females examined were infected. The overall prevalence of infection with *Schistosoma haematobium* in the six communities varied and ranged from 13.3% in Ikere Ekiti to 56.1% (95% C I 0.53 – 0.60) in Odigbo. Chi-square analysis showed a significant difference in the prevalence of *S. haematobium* infection between males and females in the six communities ($x^2_5 = 15.08$, $P<0.05$). More males and females were infected.

An over-all prevalence of 14.7% macrohaematuria was recorded among the school children examined. The prevalence of macrohaematuria among the pupils was 21.2%, while the prevalence of macrohaematuria among female pupils was 5.1%. The prevalence of macrohaematuria in the six communities varied and ranged from 6.9% in Ikere-Ekiti community to 27.0% in Ilara community.

Table 2 shows an overall geometric mean intensity of 3.5 eggs/ml of urine recorded in the six communities. The geometric mean intensity ranged from 1.7 eggs/10ml of urine in Ikere-Ekiti community to 10.1 eggs/10ml of urine in Odigbo community.

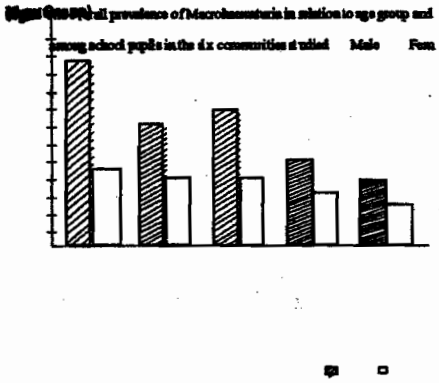
Fig. 2 shows the overall prevalence, intensity and percentage of macrohaematuria infection in relation to age group and sex among school pupils in the six communities studied varied.

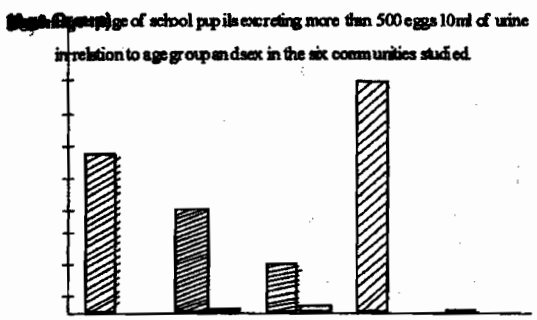
The highest prevalence of 38.8% (95% C I 0.37-0.41) was observed in the Age group 6-8 years. Among this age group, the prevalence of infection among male pupils in 52.0% (95% C I 0.49-0.55) the prevalence among female pupils is 22.9% (95% C I 0.20-0.26). The lowest prevalence of 17.9% (95% C. I 0.14-0.22) was recorded for the age group 18-20 year. The prevalence of 20.3% (95% C. I 0.15-0.25) was observed for male pupils and the prevalence of 11.7% (95% C. I 0.06-0.18) was recorded for female pupils in the age group. Analysis of variance shows that there is a significant difference in the prevalence of infection among the age groups and sex ($P<0.05$, 1,4=26.59).

The geometric mean intensity of *S.haematobium* eggs/10ml of urine in relation to age group and sex varied. The peak geometric mean intensity of 5.2 eggs/10ml of urine was recorded in the age group 6-8 year. Among this age group, male had geometric mean intensity of 10.8 eggs/10ml of urine while females had geometric mean intensity of 2.2 eggs/10ml of urine. The lowest geometric mean intensity (1.2 egg/10ml (urine) was recorded in the age group 18-20 year. Male in this age group had geometric mean intensity of 2.8 eggs/10ml of urine and female had geometric intensity of 1.5 eggs/10ml of urine.

The percentage of school pupils excreting more than 500 eggs/10ml of urine in relation to sex in the six communities studied varied. Table 3 shows that, 4.6% (95% C. I 0.04-0.52) of the males excreted more than 500 eggs/10ml of urine while 0.1% (95% C. I 0.0-0.006) of the females excreted more than 500 eggs/10ml of urine. The excretion of 500 eggs/10ml of urine was more prevalent 12.1% (95% C. I 0.09-0.15) among male pupils in Ita-ogbolu community, while lowest percentage of 0.1% (95% C. I 0.0-0.06) was recorded among male pupils in Ado-Ekiti community. The percentage of school pupils excreting more than 500 eggs/10ml of urine in relation to age group in the six communities varied. The age group 15-17 years had the highest percentage

(4.9%, 95% C. I 0.04-0.06) of pupils excreting more than 500 eggs/10ml of urine. Among this age group, figure 3 shows that the highest percentage of infection for male pupils was 7.8% (95% C. I 0.006 – 0.10).





Discussion

This study shows that *S. haematobium* is actively transmitted in Ondo and Ekiti States. The overall prevalence and intensity of infections are higher than those previously reported in this region by Cowper (1963) and in other areas (Akinkugbe, 1962; Istifanus *et al* 1965, Edungbola *et al* 1987, Akogun, 1990), and lower than the reports of Gilles et al (1965) in Ibadan, Betterton *et al* (1998) in Kano State and Ogbe and Olojo (1989) in Abeokuta.

The moderately high prevalence of schistosome infection recorded in this study may be due to absolute dependence on natural water sources in the area by the communities in the study area. In Odigbo community where the highest prevalence of schistosome infection was recorded, the entire population in this community was observed to depend mainly on the Oigbara stream for most of their domestic activities.

The higher prevalence of schistosome infection (36.2%) observed in male pupils than female pupils (29.1%) in this study conforms to the patterns of prevalence of schistosome infections reported in most endemic areas and it reflects greater chances of male pupils participating in water contact activities.

The age related pattern of schistosome infection in which the peak prevalence (38.8%) was observed in the age group 6-8 years in this study disagrees with the previous patterns of *S. haematobium* infections in which the age groups 9-15 (Gilles *et al* (1995); 11-13 years (Edungbola *et al* (1987); and 11-16 years (Istifanus *et al* 1990) had the highest prevalence of infections.

The observed high geometric mean intensities of *S. haematobium* eggs/10ml of urine among male pupils may be due to their active participation in more recreational activities in the water bodies than their female counterparts. The egg output among the pupils examined reached a peak (10.8 eggs/10ml urine) in the age group 6-8 years; hence the age group (6-8 years) is most important in relation to the transmission of schistosomiasis in Ondo and Ekiti States.

The prevalence of macrohaematuria among the pupils in this study, reached a peak (18.8%) in the age group 6-8 years. This is higher than the 9.5% macrohaematuria prevalence observed by Abayomi *et al* (1971) and lower than the finding of 23.4% of Ejezie and Ade-serrano (1981) and Edungbola *et al* (1987) of 26.2%. In conclusion, the status of schistosome infection is high in the six communities studied in Ondo and Ekiti States.

Table 2: Prevalence, intensity and percentage macrohaematuria of *S. haematobium* infections in relation to sex among school pupils in the six communities studied

Community	Male			Female			Total			G.M. I. of eggs/10ml of urine	Prevalence of macrohaematuria (%)
	No. Exam	No. (%) Infected	95% C. I.	No. Exami	No. (%) Infected	95% C. I.	No. Examined	No. (%) Infected	95% C. I.		
Ado-Ekiti	1747	470(26.9)	(0.25-0.29)	1013	105(10.2)	(0.08-0.12)	2778	575(20.7)	(0.19-0.23)	2.5	10.1
Ikere-Ekiti	782	156(19.9)	(0.17-0.23)	710	43(6.1)	(0.04-0.08)	1492	199(13.3)	(0.11-0.15)	1.7	6.9
Itaogbolu	413	172(41.6)	(0.34-0.47)	331	91(27.5)	(0.23-0.78)	744	263(35.4)	(0.32-0.38)	6.0	20.0
Ilara	531	284(53.5)	(0.50-0.58)	335	121(36.1)	(0.31-0.41)	866	405(46.8)	(0.44-0.50)	8.0	27.0
Ipogun	267	157(58.8)	(0.53-0.65)	154	63(40.9)	(0.33-0.49)	421	220(52.3)	(0.47-0.57)	8.9	22.3
Odigbo	393	256(65.1)	(0.60-0.70)	249	104(41.8)	(0.36-0.48)	624	360(56.1)	(0.53-0.60)	10.1	25.4
Total	**4133**	**1495(36.2)**	**(0.34-0.38)**	**2810**	**527(18.8)**	**(0.18-0.20)**	**6943**	**2022(29.1)**	**(0.28-0.30)**	**3.5**	**14.7**

Chi-square analysis shows that there is a significant difference in the prevalence of *S. haematobium* infection between males and female in the six communities $X^2_5 = 15.08$ $P<0.05$

C. I 95% confidence interval
GMI = Geometric mean intensity.

Table 3: Percentage of school pupils excreting more than 500 eggs/10ml of urine in relation to sex in the six communities studied.

Community	Male			Female			Total			No. % with>500eggs/10ml of urine			
	No. Examined	No. (%) prevalence	95% C. I.	No. Examined	No. (%) prevalence	95% C. I.	No. Examined	No. (%) prevalence	95% C. I.	male	95% C. I.	Female	95% C. I.
Ado-Ekiti	1747	470(26.9)	(0.25-0.29)	1013	105(10.2)	(0.08-0.12)	2778	575(20.7)	(0.19-0.23)	2(0.1)	(0.0-006)	0(0.0)	(0.0-0.0)
Ikere-Ekiti	782	156(19.9)	(0.17-0.23)	710	43(6.1)	(0.04-0.08)	1492	199(13.3)	(0.11-0.15)	57(3.8)	(0.03-0.05)	0(0.0)	(0.0-0.0)
Itaogbolu	413	172(41.6)	(0.34-0.47)	331	91(27.5)	(0.23-0.78)	744	263(35.4)	(0.32-0.38)	50(12.1)	0.09-0.15)	4(1.3)	(0.003-0.2)
Ilara	531	284(53.5)	(0.50-0.58)	335	121(36.1)	(0.31-0.41)	866	405(46.8)	(0.44-0.50)	40(7.5)	(0.06-0.10)	0(0.0)	(0.0-0.0)
Ipogun	267	157(58.8)	(0.53-0.65)	154	63(40.9)	(0.33-0.49)	421	220(52.3)	(0.47-0.57)	24(2.3)	0.02-0.08)	0(0.0)	(0.0-0.0)
Odigbo	393	256(65.1)	(0.60-0.70)	249	104(41.8)	(0.36-0.48)	624	360(56.1)	(0.53-0.60)	25(6.4)	0.04-0.08)	0(0.0)	
Total	4133	1495(36.2)	(0.34-0.38)	2810	527(18.8)	(0.18-0.20)	6943	2022(29.1)	(0.28-0.30)	188(4.6)	(0.04-0.52)	4(0.1)	0.0-0.006)

C. I. 95% confidence interval

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