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EPIDEMIOLOGICAL STUDY OF URINARY SCHISTOSOMIASIS AMONG PRIMARY SCHOOL PUPILS IN EKITI STATE, NIGERIA

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The prevalence of *Schistosoma haematobium* infection was investigated among primary school pupils in Ekiti State by questionnaire survey in 601 schools between 1997 and 1998. A total of 9,551 (24.4%) were positive by the survey. 3483 (22.4%) of the girls and 6,069 (25.7%) of the boys were infected. The prevalence of this infection between girls and boys shows a significant difference ($x^2_{15} = 59.5$; $p<0.05$). Ekiti South West local government had the highest prevalence of S. *haematobium* infection of 69.0% while Ikole local government had the lowest prevalence of infection of 2.0%. Out of 1,049 pupils with clinical and laboratory examination, 280 (50.9%) of the 550 boys and 184 (36.9%) of the 499 girls were infected. Chi-square analysis shows a significant difference of S. *haematobium* infection between the girls and boys ($X^2_{11} = 86.2$; $p<0.05$). Chi square analysis showed that questionnaire survey could be used to predict the laboratory epidemiological data ($X^2_1 = 3.84$; $p<0.05$).

Key words: Schistosomiasis, Epidemiology, Infection, Bulinus globosus

INTRODUCTION

Schistosomiasis is a pathological condition caused by infection with Schistosoma parasites (1). The infection is widespread with a relatively low mortality rate but very high morbidity rate from severe debilitating illness in people all over the world (2,3). It is second to malaria in its socio-economic and public health implication while it remains about the most important of all water impounding diseases in tropical countries such as Nigeria (4).

Infection of man occurs mainly during washing of clothes or house utensils, swimming, bathing, fetching of water or other recreational activities in a body of infested water (5). The distribution and epidemiology of schistosomia-

sis has been documented in some parts of the world. Schistosoma infection is the second most prevalent tropical disease and leading cause of severe morbidity in several foci in Africa (2). Cases of *Schistosoma haematobium* infections in the dominant form are frequently encountered in schools (6,7,8), hospital and clinics in various parts of Nigeria (5,9) due to different forms of water supply, water contact and human behaviour (5,10,11).

Schwartz (12) associated the high incidence of squamous cell carcinoma of the bladder and cervix with urinary schistosomiasis. This is of great health concern. Pugh and Gilles (13) reported 13.5% prevalence of *Schistosoma haematobium* infection in the Ruwon Sanyi village area and 18.5% in Kuwungate, Kaduna, Nigeria. Ezejie and Adeserrano (11) observed over all prevalence of between 24.0% and 65% in school children in Ajara community of Badagary, Lagos. In Lagos State of Nigeria, 13.4% was reported for *Schistosoma haematobium* infection (14). Dennis *et al* (15) also reported an overall prevalence of 4.8% in school children in Liberia.

Since surveillance of diseases is an indispensable part of every successful disease control program, this study therefore aimed to investigate the epidemiology of urinary schistosomiasis among primary school pupils in Ekiti State, Nigeria.

MATERIALS AND METHODS

Study area

The study was carried out in Ekiti state of Nigeria, which was created out of the old Ondo state in October 1996. The state lies between latitude 7°N and 8°N of the equator and longitude 4°E and 5°E (Fig.1). The study area is characterized by the presence of hills and rocks in addition to numerous rivers, springs and streams and the vegetation is mainly rainforest. The main stay of economy is farming. The state is divided into 16 local government areas with 601 primary schools and 286,501 pupils (Table 1).

Visitation and Health Talk

Prior to the collection of urine samples from primary school pupils, permission was obtained from Local Government Area Primary Education Board (SPEB) chairmen, to have health talks with the teach-

ers during their weekly regular meetings holding at the secretariat on the aetiology, mode of transmission, manifestation and health implication, pathogenesis and pathology of urinary schistosomiasis. Thereafter, statistics of the number of primary schools in each local government were collected from the head-teachers.

Administration of Questionnaire

After the health talks, all the headmasters agreed to educate the pupils in preparation for questionnaire. Subsequently, questionnaires were administered with the help of the headmaster and class teachers in each of the 601 primary schools with the aim of determining the prevalence rate of schistosomiasis.Thus, the individuals studied were mainly primary school pupils.

Laboratory Examination

One school was selected from endemic areas in each local government area. Urine samples were collected from school pupils between 11.00 and 14.00 hours, a period when the eggs of *Schistosoma haematobium* are concentrated in the urine. Pupils involved in this study were randomly selected using the class register in each endemic school to avoid bias.

Examination of the urine specimens was done qualitatively by using the haematrix strips. 10 ml of the urine was collected in a specimen bottle and the strip was dipped into the urine specimen for 20-30 seconds. The tip of the strip was then observed for blue colouration and this was compared with the chart to ascertain positivity or negativity of the test (16).

Detection of intermediate host

Freshwater habitats in the different communities in all local government areas were surveyed for the presence of potential intermediate snail host especially where water contact activities were pronounced.

Data Analysis

The data generated in the study were analyzed using Chi-square analysis.

RESULTS

In this study, 601 schools were surveyed to determine the occurrence and prevalence of urinary schistosomiasis in sixteen local government areas of Ekiti State, Nigeria. Two approaches were used; a survey by questionnaire and the laboratory examination of urine

specimens collected from pupils in selected schools. A total of 39,191 pupils surveyed by questionnaire included 15,552 females and 23,639 males. Of these, 9,551 (24.4%) were positive for *S. haematobium*. 3,483 (22.4%) of girls and 6,068 (25.7%) of the boys were infected (Table 1). Chi-square analysis showed that there is a significant difference in the prevalence of *S. haematobium* infection with sex by questionnaire survey. (X^2_{15} = 59.5; $p < 0.05$).

Table 1 also shows the prevalence of *S. haematobium* by sex and local government. Pupils in Ekiti Southwest had the highest prevalence (69.9%), Ekiti East (43.3%), Ilejemeje (32.0%) and Moba (26.0%) while Ikole had the lowest prevalence of 2.0%.

For the laboratory analysis, a school each was selected from the local government areas found to be endemic based on the result of the questionnaire survey. Samples were collected from pupils in each selected school in the twelve local government areas. Of 1,049 pupils samples examined, 464 (42.2%) had eggs of *S. haematobium* in their urine. 280 (50.9%) of the 550 boys and 184 (36.9%) of the 499 girls studied had schistosoma infection as depicted in Table 2. Statistical analysis using chi-square shows that there is a significant difference in the prevalence of *S. haematobium* infection between the male and female pupils (X^2_{15}= 86.2; $p< 0.05$) by laboratory test. A test of independence using a comparative chi- square analysis between positive result of laboratory and questionnaire survey of schistosomiasis shows that there is no difference in the outcome; hence survey can be used to predict laboratory epidemiological data ($x^2_1 = 3.84$; $p<0.05$).

Table 1: Schistomiasis survey by questionnaire in Ekiti State.

S/N	LGA	Total No of School	Total No of Pupils	Total No of pupils tested	No of Male	No of Female	Total No of pupils positive (%)	No of Male positive (%)	No of female positive (%)
1.	Ise Orun	27	34.595	1640	920	720	115(7.0)	58(6.3)	57(7.9)
2.	Gboyin	28	16.781	2087	1087	1000	164(7.9)	90(8.2)	74(7.4)
3.	Ekiti S/W	48	24.155	3863	2363	1500	2674(69.2)	1374(58.1)	1300(86.7)
4.	Ado-Ekiti	58	34.595	5129	2730	2399	845(16.5)	652(23.9)	193(8.0)
5.	Ikere-Ekiti	82	20.398	2978	1588	1390	666(22.4)	316(19.9)	350(25.2)
6.	Ekiti East	22	13.112	1820	1220	600	779(42.8)	480(39.3)	299(49.8)
7.	Ekiti West	45	19.947	3053	2066	987	369(12.1)	249(12.1)	120(12.2)
8.	Emure	25	8.448	1593	1071	522	57(3.6)	30(2.8)	27(5.2)
9.	Ikole	41	24.057	3238	1950	1288	62(1.9)	31(1.6)	31(2.4)
10.	Oye	40	19.944	3085	2085	1000	91(2.9)	60(2.9)	31(3.1)
11.	Irepodun/Ifedore	31	20.360	2507	1453	1054	104(4.1)	70(4.8)	34(3.2)
12.	Efon	19	10.253	1023	623	400	123(12.0)	70(11.2)	53(13.3)
13.	Ido-Osi	41	17.167	2167	1183	984	87(4.0)	57(4.8)	30(3.0)
14.	Ilejemeje	9	4,037	607	420	187	194(32.0)	52(12.4)	142(75.9)
15.	Ijero	53	22,359	2559	1559	1000	461(18.0)	250(16.0)	211(21.1)
16.	Moba	32	17,422	1842	1321	521	479(26.0)	259(19.6)	220(42.2)
	TOTAL	601	286,501	39,191	23,639	15,52	9551(24.4)	6068(25.7)	3483(22.4)

Table 2: Prevalence of *Schistosoma haemotobiun* among primary school children determined by laboratory test in Ekiti State

S/N	LGA	No of male examined	No of male infected (%)	No of female examined	No of female infected (%)	Total no Examined	Total no infected (%)
1.	Ado-Ekiti	49	38(77.6)	41	24(58.5)	90	62(68.9)
2.	Gboyin	41	18(43.9)	44	16(36.4)	85	34(40.0)
3.	Ekiti S/W	54	51(94.4)	39	27(69.2)	93	78(83.0)
4.	Ikere-Ekiti	50	40(80.0)	40	21(52.5)	90	61(67.8)
5.	Ekiti East	56	37(66.7)	41	34(82.9)	90	71(78.9)
6.	Ekiti West	48	27(56.30)	42	34(81.1)	90	61(67.8)
7.	Emure	44	9(20.5)	39	1(2.6)	83	10(12.1)
8.	Ikole	50	4(8.0)	40	0(0.0)	90	4(4.4)
9.	Oye	39	4(35.9)	44	6(13.6)	90	10(11.1)
10.	Irepodun/Ifedore	42	14(33.3)	38	10(26.3)	80	24(30.0)
11.	Efon	39	18(46.2)	51	2(3.9)	90	20(22.2)
12.	Ise/Orun	38	20(52.6)	40	9(22.5)	78	29(37.2)
	TOTAL	550	280(50.9)	449	184(36.9)	1049	464(42.2)

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Table 3: Survey of freshwater habitats for *Bulinus globosus* in the study areas

S/N	LGA	Total No of stream in the LGA	Total No of stream positive for *Bulinus globosus (%)*
1.	Ise Orun	304	10(3.3)
2.	Gboyin	448	81(18.1)
3.	Ekiti S/W	503	72(14.3)
4.	Ado-Ekiti	745	163(21.9)
5.	Ikere-Ekiti	402	62(15.4)
6.	Ekiti East	271	10(3.7)
7.	Ekiti West	534	82(15.4)
8.	Emure	203	40(19.7)
9.	Ikole	557	71(12.7)
10.	Oye	502	80(15.9)
11.	Irepodun/Ifedore	441	70(15.9)
12.	Efon	197	52(26.4)
13.	Ido-Osi	495	72(14.5)
14.	Ilejemeje	86	19(22.1)
15.	Ijero	600	81(13.5)
16.	Moba	349	60(17.2)
	TOTAL	6,637	1025(15.4)

DISCUSSION

This study has shown that schistosomiasis is prevalent in Ekiti State, Nigeria. This is in consonance with earlier reports (17,18) that *S. haematobium* is known to be endemic throughout Nigeria. The prevalence of infection varied from one locality to the other as observed elsewhere; 24.0% (11); 26.6% and 36.8% (19), although these prevalent rates reported were however lower than the peak values of 83.0% of infection recorded in this study. The variation in the rate of infection in the different local government areas and between the sexes may suggest that there are differences in their socio-cultural background in terms of provision of potable water in individual community (20). The preva-

lence of *S. haematobium* infection is higher in males than their female counterpart in the population sampled. This confirms the activities of the boys at the active transmission sites observed in most of the local government areas especially in Ekiti Southwest local government areas where males were frequently seen participating in swimming, washing, fishing, bathing and recreating in the streams (21,22). In contrary, Edungbola *et al* (5, 23) recorded a greater participation of females in Babaena district of Kwara State, Nigeria.

It was noted that the high level of illiteracy, ignorance and conservative beliefs paved way for continuity in the transmission of the infection in the study areas. It is an old belief that when black dog urinates in the streams, which is later crossed by an individual, such individual would pass blood in his urine. In view of this, basic health education on the transmission must be the focus of prevention before any measure can be implemented. This may be followed by the provision of pipe-borne water, which actually has been the demand of the populace, even though according to their belief, water is linked with the transmission of schistosomiasis. Mass treatment of all infected individuals with the symptoms through free medi-care by Government in the three tiers would save lives and help to eradicate the disease in the area.

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