SCHISTOSOMA HAEMATOBIUM INFECTIONS IN TWO RURAL COMMUNITIES OF EDO STATE, NIGERIA

OPG Nmorsi[1], OA Egwunyenga[2] and OE Okholo[1]

[1]Department of Zoology, Ambrose Alli University, Ekpoma; [2]Department of Zoology, Delta State University, Abraka, Nigeria

Abstract. An epidemiological study of 1,136 inhabitants from two rural communities in Owan East local government area of Edo State, Nigeria was investigated to ascertain the prevalence, intensities and urinary symptoms in *Schistosoma haematobium* infections. In both communities, 371 (32.6%) of the villagers screened, excreted *S. haematobium* with a mean of 40.1 ova per 10 ml of their urine. The pattern of infection was highest among the school children, moderate among the farmers and least among the civil servants. The sensitivities of their urinary symptoms associated with this parasitic infection in these communities are 78.7% hematuria, 71.9% proteinuria, 70.4% supra public pain/discomforts and 59.6% dysuria. These foci of infections will broaden the epidemiological picture of urinary schistosomiasis in this part ot the globe.

INTRODUCTION

In the tropics, urinary schistosomiasis due to *Schistosoma haematobium* causes untold hardship as a result of the associated morbidities. High mortality rate can occur as a result of complications arising from renal insufficiency and failure (Forsyth and Bradley, 1966). Some of these morbidities include hematuria, proteinuria and dysuria. This infection are present throughout sub-Saharan Africa (Jordan *et al,* 1993) and many foci of infections occur in endemic proportions (Bradley and McCullough, 1973; Chandiwana *et al,* 1988; Shaw *el al,* 1999). In rural communities, these endemicities are mainly due to some prevailing factors like lack of portable water supply, poverty, ignorance and poor environmental conditions.

The need for meaningful control of this parasitic infection has been stressed in the tropic. For this task to be achieved, the actual epidemiological mapping of *S. haematobium* infections must be first carried out in any country. Globally, this infection had been documented in 53 countries. The global prevalence showed that over 139 million people are infected with 85% of them occurring in Atrica (Doumenge *et al,* 1987; WHO, 1999). In some parts of Nigeria, information exist in this regard (Ejezie *et al,* 1983; Osisanya *et al,* 1990; Udonsi, 1990; Adewumi *et al,* 1991; Anosike *et al,* 1992; Akonai *et al,* 1992; Arinoloa 1995; Useh and Ejezie, 1996). The uncovering of the infections in areas not previously reported (Nmorsi *et al,* 2001) are no doubt indication of the inadequacy of the information on epidemiology on this parasitic infections in Nigeria.

It is therefore hoped that the information in this present investigation which main objective is to establish the prevalence and aspects of morbidities of *S. haematobium* infection for the first time in these rural communities, will update and broaden the epidemiological picture of *S. haematobium* intections in Nigeria.

MATERIALS AND METHODS

This study took place in Ake-Ihievbu and Ihieve-Ogben; rural communities located in Owan East local government area of Edo State, Nigeria. The villages lies at 6ºN and longitude 6ºE within the rainforest belt of the state. Ake-Ihievbu has a population of 3,000 inhabitants while Ihieve-Ogben is made up of 2,500 vil-

Correspondence: Dr OPG Nmorsi, PO Box 902, Ekpoma, Edo State, Nigeria.

lagers. These villages are 10 km apart. The villagers are predominantly subsistent farmers and few of them are civil servants.

The two communities lack pipe-borne water. There are streams and pools of water of varying sizes located in these villages which serve as the sources of water for their domestic and recreational purposes. *Bulinus (Physopsis) globsus* and *B. rohifsi;* the snail intermediate hosts of *S. haematobium* abound around and within these streams and pools of water.

This investigation started by carrying out community mobilizing campaign on the significance of this study and the need for them to participate in the study. Pre-designed questionnaire on their personal data and morbidities like dysuria and supra public pain/discomfort were administered to the volunteers. These information were later analyzed. Between March 1999 and May 2000, 1,139 inhabitants comprising 702 from Ake-Ihievbu and 437 volunteers from Ihieve-Ogben participated in this study. The volunteers were asked to provide a single urine sample for examination in the wide-mouthed screw-capped 50 ml size container provided. The bottles were transported to Parasitology Laboratory of Zoology Department, Ambrose Alli University, Ekpoma for further procession. Hematuria and proteinuria were ascertained and documented using the simple reagent strips (Haemastrix® and Albustrix®, AMES Laboratories respectively). The urine samples were prepared for microscopic examination to identify the presence of *S. haematobium* ova in urine. The ova were counted and the intensity of infections were classified according to the method discribed by WHO (1983) as < 50 ova/10 ml of urine indicating light infection and ≥ 50 ova/10 ml of urine recorded as heavy infecion.

The data were subjected to statistical analyses using chi-square test.

RESULTS

Of the 702 inhabitants examined in Ake-Ihievbu, 233 (33.2%) of them excreted *S. haematobium* in their urine. In Ihieve-Oben, 138 (31.6%), out of the 437 volunteers screened passed ova in their urine. The prevalence and intensities of the *S. haematobium* infections in both communities are presented in Table 1. The overall prevalence rate of urinary schistosomiasis in both communities is 32.6%. Light infection was reported among 270 (23.7%) while 101 (8.9%) of them had heavy infection. Children had higher prevalence rate than the adults and this difference was statistically significant ($\chi^2 = 27.0$, df = 3, $p < 0.05$). Among the adults, the civil servants had relatively lower infection rates than the farmers and this difference was statistically significant using chi-square test ($\chi^2 = 4.76$, df = 3, $p < 0.05$).

Table 1
Prevalence of *S. haematobium* infection in Ake-Ihievbu and Ihieve-Ogben, Edo State, Nigeria.

No. of population examined				Infected population intensity					
				Light infection < 50 ova/10 ml urine			Heavy infection ≥ 50 ova/10 ml urine		
	M	F	Total	M	F	Total	M	F	Total
				No. (%)	No. (%)	No. (%)	No. (%)	No. (%)	No. (%)
School children	397	440	837	159 (40.1)	72 (16.4)	231	46 (11.6)	28 (6.4)	74
Adults (i) Farmer	96	147	243	16 (16.7)	17 (11.6)	33	7 (7.3)	20 (13.6)	27
(ii) Civil servant	33	26	59	3 (9.1)	3 (11.5)	6	0 (0)	0 (0)	0
Total	526	613	1,139	178 (33.8)	92 (20.9)	270 (23.7)	53 (10.1)	48 (11.6)	101(8.9)
Overall prevalant rate = 371/1,139=32.6%									

Table 2
The prevalence of *S. haematobium* and the mean intensities of infection as expressed by ova/10 ml of urine in the two communities.

	Infected population			Mean ova/10 ml of urine (=40.1)	
	Male	Female	Total	Male	Female
School children	205	100	305	69.9	58.0
Adult (i) Farmers	23	37	60	28.9	49.3
(ii) Civil servants	3	3	6	12.0	22.7
Total	231 (43.9%)	140 (22.8%)	371 (32.6%)		

Table 3
Prevalence and sensitivities of urinary symptoms found among 371 *S. haematobium* infected inhabitants in the two communities.

Urinary symptoms	Prevalence (no.)	Sensitivities (%)
Hematuria	292	78.7
Proteinuria	267	71.9
Dysuria	221	59.6
Supra public pain/discomfort	261	70.4

Table 2 shows the intensities of *S. haematobium* infections in both communities. The infected inhabitants excreted a mean of 40.1 ova/10 ml of urine. The males had higher prevalence rate of 231 (43.9%) than their female counterparts 140 (22.8%). Also this difference was statistically significant using chi-square test at (χ^2= 40.53, df = 2, $p < 0.05$). Among the children, the males had higher mean intensity of 69.9 ova/10 ml. The female farmers had comparatively higher mean intensity of 49.3 ova/10 ml than their male counterparts (12.0 ova/10 ml).

The prevalence and sensitivities of urinary symptoms found among the *S. haematobium* infected inhabitants in the two communities are presented in Table 3. The array of the symptoms as well as their sensitivities are hematuria 78.7%, proteinuria 71.9%, supra public pain/discomfort 70.4 and dysuria 59.6%. All the inhabitants with these urinary symptoms had *S. haematobium* ova in their urine. Also the urinary symptoms were not observed among the volunteers who did not have *S. haematobium* infections.

DISCUSSION

The data presented in this study extend the known foci of infections in Nigeria, since Ake-Ihievbu and Ihieve-Ogben, Edo State, are now known to be infected with *S. haematobium.* Also the results indicated that the infection is mesoendemic according to the classification of Cowper (1963). The information accord the reports of Nmorsi *et al* (2001), Anosike *et al*, (1992) in the same Zoogeographical zone. The pattern of infection in this present investigation reflects the level of exposure of the individuals in the localities apparently due to lack of pipe borne water and ignorance which compel the inhabitants to continuously visit the intected sources of water in the villages.

The mean intensity level of 40.1 ova/10 ml of urine was high when compared to the intensity level of < 12 eggs/10 ml of urine recorded in Kano, Nigeria; (Betterton *et al*, 1988); in Somalia (Koura *et al*, 1981). The high levels of intensities of infection among school children with ≥ 50 ova/10 ml of urine should be considered of strong public health considering the fact that the egg counts reflects the worm burdens which has consequences in term of morbidities on the individuals. This observation was earlier documented

(Chandiwana *et al*, 1991).

The disparity in the pattern of the infection among the individuals of different occupational groups with school children having the highest infection rate and the least inlfections occurring among civil servants is principally due to exposure. Also the acquired immunity in older individuals in a community with schistosomiasis can possibly contribute to these differences (Woolhouse *et al*, l991). Among the children, the females had relatively lower infection than their male counterparts. This observation is expected considering the fact that some socio-cultural factors like appearance of secondary sexual characters prevent these female children from visiting the infected streams and pools of water for recreational activities. This is in constrast to the adult females, who have higher water contact than their males because of their involvement in several domestic activities such as washing, fermentation of cassava tubers and even recreation. Some of the male inhabitants only visit the streams for the purpose of recreation as their farmlands are farther away from the streams.

The sensitivities of the urinary symptoms associated with *S. hematobium* infections in the two villages screened were high. The high sensitivities for hematuria and proteinuria reported in this present study conforms favorably with the earlier report of (Gundersen *et al*, 1996). The association of these symptoms with urinary schistosomiasis had been documented (Nmorsi *et al*, 2001; Ekanem *et al*, l995; Laven *et al*, 1998; Traquinho *et al*, 1998). These high sensitivities values reflect the usefulness of these urinary symptoms as morbidity indicators of *S. haematobium* in an endemic village. However, it is worth mentioning that a combination of these symptoms may be more useful as indicators of morbidities than a single variable for purpose of rapid epidemiological mapping; an invaluable instrument for meaningful control in any wide endemic zone. For instance, Traquinho *et al* (1998) found the use of combined morbidity variables as dysuria and blood in urine as more useful morbidity markers in *S. haematobium* infections. Also WHO (1993) earlier emphasized the use of reagent strips which provide data on hematuria and proteinuria in identifying cases of selected population chemotherapy.

This report is very crucial and relevant in planning control measures of schistosomiasis, as it will broaden the epidemiological picture of the disease in this part of the globe.

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