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Full Length Research Paper

Comparison of three diagnostic methods for the determination of prevalence of urinary schistosomiasis among residents and pupils of Badagry Area of Lagos State, Nigeria

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Studies on the prevalence of urinary schistosomiasis was carried out in Badagry area of Lagos State, South West Nigeria with a population of about 30,000. The study was conducted in the rainy season between May – September 2004. The detection of some schistosome snail vectors coupled with regular habit of swimming by children, and household washings by adults in local ponds and streams necessitated the investigation for schistosomiasis. Two hundred urine samples were obtained from out-patients who came to the General Hospital, Badagry, for medical check. The urine samples were examined by the visual method for haematuria, diagnostic chemical reagent strip and filtration technique. Structured questionnaires based on knowledge, attitude and practises (KAP), was used to elicit information from 200 pupils in two selected primary schools in the area. Macrohaematuria was observed in 25 (12.5%) of the urine samples, while diagnostic chemical reagent strip detected 13 (6.5%) positive cases. Filtration did not reveal the presence of eggs in any of the urine samples observed. Response obtained from the administration of questions revealed that only 8 (4.0%) knew about schistosomiasis while 192 (96.0%) did not have any idea about the disease. 96 (48.0%) did swim in rivers, 128 (64.0%) fetched water from rivers, 40 (20.0%) had itching sensation after swimming and 25 (12.5%) experienced blood in urine. Males with haematuria recorded a higher prevalence of infection (14.1%) than females (11.3%) but the difference was not statistically significant (P<0.05).

Key words: Epidemiology, urinary schistosomiasis, badagry, Nigeria.

INTRODUCTION

Schistosomiasis is one of the major parasitic diseases of man ranking second only to malaria in terms of its socio-economic and public health importance in tropical and subtropical areas (Ogbe, 2002). Over 20 million people residing in rural and agricultural areas have schistosomiasis exhibiting severe morbidity (WHO, 1999). In addition, 500-600 million people are exposed to infection amidst poverty, ignorance, poor housing, substandard hygienic practice and few if any sanitary facilities (WHO, 1984). The annual economic loss from disability and lowered production due to schistosomiasis, according to Wright (1972), is about four hundred million pounds sterling globally. In Nigeria, schistosomiasis due to *Schistosoma haematobium* and *S. mansoni* are widespread, constituting a public health problem particularly in children (Tayo, 1989; Awogun, 1990). The disease is usually related to water resources and development schemes such as irrigation projects, rice/fish farming and dams. It occurs in all the states of the federation with school children recording high infection rate (Mafe et al., 2000).

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Table 1. Prevalence of haematuria among presidents of Badagry area by sex and age.

Age (years)	Number examined		Number positive		Prevalence (%)	
	Male	Female	Male	Female	Male	Female
5-9	8	4	0	0	0.0	0.0
10-14	11	18	2	1	18.2	5.6
15-19	32	30	4	4	12.5	13.3
20-24	24	44	4	6	16.7	13.6
25-29	9	19	2	2	22.2	10.5
>30	1	0	0	0	0.0	0.0
Total	**85**	**115**	**12**	**13**	**14.1**	**11.3**
Cumulative total	**200**		**25**		**12.5%**	

In the national control programme, the age 5-19 yrs has been defined as the target population for nation wide control through the school systems, while rapid screening is based on the use of questionnaires. The control of disease due to schistosomiasis in countries in sub Saharan Africa deserves renewed attention and commitment (Ogbe, 2002). Comprehensive mapping of the disease problem is lacking except in Niger State (Mafe et al., 2000). Detailed identification of the problem areas is very pertinent. This study examined the prevalence of infection due to urinary schistosomiasis among school children and residents of Badagry Local government area of Lagos, south west Nigeria.

MATERIALS AND METHODS

Study Area

The study was conducted in Badagry, one of the well populated towns in Lagos State, South west Nigeria. It lies in latitude 6′ 25° north and longitude 2′ 53° east. It is a bicultural and multilingual town harbouring the natives called the Aworis and immigrants from neighbouring Ghana, Benin Republic and Togo. The residents are predominantly fishermen since the town is adjacent to the lagoon and Atlantic Ocean. There is great, reliance on boreholes, shallow wells, ponds and streams for their water supply.

Sample Collection

Permission was obtained from the Badagry General Hospital authority to collect urine samples from patients. A total of 200 urine samples were obtained from randomly selected out patients attending the hospital. Labeled, sterile, wide mouthed, screw capped plastic containers were distributed to the selected patients with the instruction to deposit midstream and terminal urine between the hours of 11.00 and 14.00. These were later collected and examined in the laboratory.

Urine Examination

Visual observation: Macro- and microhaematuria were detected by careful visual examination of the bottled urine specimens for the specific colour (Mafe, 1977).

Diagnostic chemical reagent strip method: A strip is dipped into each of the urine samples collected, and each strip was checked for colour change after 1 min. A positive specimen turned the yellow strip to green colour while a negative specimen did not effect colour change on the strip. To each sample was added two drops of formaldehyde and preserved by refrigeration (4℃) (Lengeler et al., 1993).

Filtration method: Using a Pasteur pipette a drop of eosin was added to each of the collected urine samples to enhance subsequent staining. After gentle agitation, 10 ml of urine was drawn from each container and filtered through a polycarbonate membrane following the standard method of filtration (WHO, 1991). Each filter was placed on a clean glass slide and then examined under a light microscope using 40X objective. Any urine sample with ova of *S. haematobium* was recorded as positive. The number of eggs per 10 ml of urine was also recorded.

Administration of questionnaires

The questionnaire was prepared using the modified methods of Lengeler et al. (1991a,b), Dawson et al. (1992) and Mafe et al. (2000). Pupils within the age group 8-12 years were co-opted into the study. The principal and teachers of each of the schools chosen gave their consent to the exercise before any step was taken. A systematic random sample was used to select 200 pupils from classes 3-6 in these schools. These classes were selected for competence in responding to the questions asked. Instructions were read out to the students and the teachers helped to fill in the names, sex and age of the pupils from the class register. The selected pupils were interviewed individually. Some of the questions were communicated in the local language for ease of understanding.

RESULTS

The visual examination of 200 urine samples for haematuria revealed 25 (12-5%) positive cases (Table 1). Ages 20-24 years had the largest number of positive cases. Of 85 male subjects examined 12 (14.1%) were positive for haematuria. Of 115 females, 13 (11.3%) were positive. The prevalence of infection between the two sexes was not statistically significant ($P<0.05$). The diagnostic chemical reagent strip detected 13 (6.5%) positive cases out of the 200 urine samples (Table 2).

Table 2. prevalence of urinary schistosomiasis by sex and age using diagnostic reagent strip among residents of Badagry area.

Age (years)	Number examined		Number positive		Prevalence (%)	
	Male	Female	Male	Female	Male	Female
5-9	8	4	0	0	0.0	0.0
10-14	11	18	1	1	9.1	5.6
15-19	32	30	3	1	9.4	3.3
20-24	24	44	2	3	8.3	6.8
25-29	9	19	1	1	11.1	5.3
> 30	1	0	0	0	0.0	0.0
Total	**85**	**115**	**7**	**6**	**8.2**	**5.2**
Cumulative total	**200**		**13**		**6.5%**	

Table 3. Response to questions on the awareness of schistosomiasis among school children in Badagry area.

S/N	Observation	Response	
		Positive (%)	Negative (%)
1.	Those that know about bilharzia, “Atosi aja”.	8 (4%)	192 (96%)
2.	Those that are suffering from the disease.	0	0
3.	Those that had abdominal pain.	12 (6%)	188 (94%)
4.	Those that experienced blood in urine.	25 (12.5%)	175 (87.5%)
5.	Those that swim in the river.	96 (48%)	104 (52%)
6.	Those that itched the body after swimming.	40 (20%)	160 (80%)
7.	Those that had fever after swimming.	32 (16%)	168 (84%)
8.	Those that collect water from river.	128 (64%)	72 (36%)

The age group 20-24 years had the largest number of positive cases. The prevalence of infection between the two sexes was also not statistically significant ($P<0.05$). The filtration method did not reveal *S. haematobium* eggs in any of the urine samples filtered. The responses to questions administered are shown in Table 3. Knowledge about the disease was very scanty, as only 4.0% of the pupils recognized it by the local name “Atosi Aja”, while 96.0% had no idea at all. Presence of blood in urine was reported by 25 (12.5%) of the pupils while 96 (48.0%) did swim regularly in nearby water bodies. Itching sensation was reported by 40 (20.0%) after swimming. A large majority of the pupils, 128 (64.0%) collected water regularly from rivers or other water bodies for household use.

DISCUSSION

A prevalence rate of 12.5% for urinary schistosomiasis was observed in this study. According to the classification of the WHO Expert Committee on the control of schistosomiasis (WHO, 1985), prevalence rates greater than 25% are moderate while those below are low. The rapid assessment indicators of morbidity used in these study, which are the visual observation for haematuria and the diagnostic chemical reagent strip gave different results. The diagnostic chemical reagent strip technique gave a prevalence of 6.5% while the visual observation for haematuria produced a prevalence of 12.5% for the same group of people. These results provide opportunity for the establishment of relationship between parameters used in rapid assessment of urinary schistosomiasis or indirect diagnosis infection. These relationships are quite useful in epidemiological studies especially when it is not feasible to examine urine specimens of everyone in the community. The absence of schistosome eggs in urine samples after filtration may be due to the presence of light infections where eggs may be very difficult to detect (Garcia and Bruckner, 1997). The concentration techniques based on nucleopore filtration for counting eggs has been used by several other worker including Mafe (1997), Ejezie and Ade-Serranno (1981), Adeoye and Akabogu (1996), Agbolade and Odaibo (1996), and Ekejindu et al. (2002).

Mafe (1997) indicated that the diagnostic chemical reagent strip test can be used to detect all infected persons who are at risk of urinogenital disease. The test is very suitable for mass screening for urinary schistosomiasis being very fast, producing immediate results and can be used by primary health care workers with minimal training. The age group 20-24 years had the highest prevalence of haematuria (14.7%) and 7.4% with the reagent strip test. Mafe (1977) noted that the visual examination of urine for macrohaematuria is influenced by factors such as fasting, consumption of concoctions

made from leaf extracts and others.

Responses to questions posed to the school pupils indicated that 25 (12.5%) in the age group 8-12 years reported the presence of blood in their urine. The reason for this is not far fetched since 96 (48.0%) of them did swim regularly in nearby water bodies and 40 (20.0%) experienced itching after swimming. This report is similar to that of Ukpai and Ezeike (2002) in Aguata, Anambra State of Nigeria where children in the age group 8-10 years had a prevalence rate of 4.3% for urinary schistosomiasis considered to be high for that locality. In Badagry area of Lagos State, fishing and farming are the major occupations, hence a higher prevalence of infection occuring in the age groups reported. There was no statistically significant difference in the prevalence of infection between sexes in this study. A similar trend was observed by Udonsi (1990) in Igwun river basin of Nigeria. Contrary to this report are those of Ekejindu et al. (2002), Ukpai and Ezeike (2002) who reported higher prevalences for males compared to females. Nnoruka et al. (2002) were of the opinion that there is no consistent pattern attributable to sex differences with respect to prevalence of infection in Nigeria. Balancing of male-female ratio at the onset of the study is an important factor in order to obtain a clearer picture. The results obtained in this study clearly establish the need for control strategies in the area. Extensive public health enlightenment programs, information about disease transmission, provision of safe recreational water sources for children and pipe borne water supply for house hold use are suggested urgent interventions.

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