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Research Article

Urinary Schistosomiasis among School Pupils in Ilie Community, Southwestern Nigeria

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Abstract: Urinary schistosomiasis though a neglected disease is endemic in many rural communities in Nigeria and is second only to malaria. The present study was carried out to determine the current status of urinary schistosomiasis in Ilie, a rural community in Southwestern Nigeria. Urine samples were collected from 320 school pupils (4-15 years old) and examined for ova of *Schistosoma haematobium*. Out of the 320 urine samples examined, 131 (40.9%) had ova of *S. haematobium*. The prevalence of urinary schistosomiasis between the male (42.8%) and female (39.0%) participants was not significantly different ($p = 0.49$) but prevalence increased significantly with increase in age ($p = 0.002$). The overall geometric mean intensity of infection was 38.2 eggs/10 ml urine. The intensity of infection was not dependent on sex ($p = 0.79$) or age ($p = 0.69$). The overall prevalence of haematuria in this study was 26.3%. The prevalence of haematuria was independent on sex ($p = 0.72$) but varied significantly with age ($p = 0.01$). Haematuria was significantly associated with urinary schistosomiasis ($p < 0.001$, OR 37.1, 95% CI 19.4 - 71.0). This study shows that urinary schistosomiasis is quite endemic and still actively transmitted in Ilie and appropriate control measures are highlighted.
Keywords: Urinary schistosomiasis, Prevalence, Intensity, Haematuria, Pupils

INTRODUCTION

Urinary schistosomiasis is one of the most common tropical diseases which poses serious health hazard due to its associated morbidity. It affects millions of people in developing countries due to poverty and ignorance and about 112 million people are affected in sub-Saharan Africa while about 436 millions are at risk [1]. Urinary schistosomiasis is caused by *Schistosoma haematobium*; a blood fluke (trematode) transmitted by aquatic snails of the genus *Bulinus*. It causes complications such as urolithiasis, ascending urinary tract infections urethral and ureteral stricture, hydronephrosis, carcinoma of the bladder and renal failure [2, 3]. Nigeria is one of the highly endemic countries for urinary schistosomiasis with estimated 100 million at risk and 26 million infected [4]. It is widespread in Nigeria especially in rural areas [4-6] but has also been reported in urban areas [7, 8]. It remains one of the major health problems facing children and studies have shown that school age children are the most vulnerable. They usually present with the highest prevalence and intensity of the infection because they play more in infested water where they can easily contract the infection [6, 8]. Ilie is a rural community in Southwestern Nigeria which is endemic for urinary schistosomiasis. A study carried out there about a decade ago reported a prevalence of 52.3% [9]. This present study was carried out to determine the current status of urinary schistosomiasis in Ilie, a rural community in Southwestern Nigeria.

MATERIALS AND METHODS

Study area and Population

This study was carried out among pupils in primary schools in Ilie community which is in Olorunda Local Government Area of Osun State, Southwestern Nigeria. It is about 20 km from Igbona, the headquarter of Olorunda Local Government Area. It lies between longitudes 4° 32′ 0″ and 4° 34′ 0″ E and latitudes 7° 56′ 0″ and 7° 58′ 0″. Ilie is a rural community and has a dam which serves a major source of water for the people. Inhabitants of Ilie are largely Yoruba, many of whom are engaged in farming and fishing activities. A total of 320 primary school pupils (4-15 years) comprising 166 males and 154 females participated in the study. Questionnaires were administered to each pupil to obtain relevant information. The consent of the parents and guardians of the children was obtained. The permission of the community leaders and school authority was obtained before the study started. Ethical approval for this study was obtained from the Ethical Committee of the College of Health Sciences, Ladoke Akintola University of Technology, Osogbo.

Collection of urine samples and analysis

Each child was given a universal bottle for collection of urine between the hours of 11:00 and 14:00 hours. Urine samples collected were immediately transported to the laboratory for examination. Briefly each urine sample was thoroughly mixed and 10 ml was centrifuged at 1000 g for 3 minutes. The supernatant was decanted and the sediment examined under the microscope for ova of *S. haematobium*. The eggs were counted using a tally counter and intensity of infection recorded. Intensity of infection was classified as light (<50 ova/10 ml urine) and heavy (≥50 ova/10 ml urine). Also, the frequencies of haematuria among the urine samples were recorded using commercial reagent strips (Combi 9) and following the manufacturer's instructions.

Statistical Analysis

The statistical package for social sciences (SPSS version 14) was used for statistical analysis. Differences between percentages and proportions were tested by Chi-square test. Sample means were compared by Student's t test. A p-value of < 0.05 was considered to be significant.

RESULTS

The prevalence of *S. haematobium* by sex and age is given in Table 1. Of the 320 urine samples examined, 131 (40.9%) had ova of *S. haematobium*. Of the 166 males, 71 (42.8%) were positive for ova of *S. haematobium* while 60 (39.0%) of the 154 females had ova of *S. haematobium*. Although males recorded higher prevalence than females, the difference was not statistically significant (χ^2 = 0.48, df = 1, p = 0.49). With respect to age, prevalence was 27.4% in the 4-7 years age group, 41.0% in the 8-11 years age group and 51.7% in the 12-15 years age group. The prevalence of *S. haematobium* varied significantly with increase in age (χ^2 = 12.95, df = 2, p = 0.002).

The intensities of urinary schistosomiasis by sex and age among the infected school aged children are given in Table 2. The overall geometric mean intensity of the infected pupils was 38.19 eggs/10 ml urine. Of the 71 infected males, 57.7% had light infection and 42.3% had heavy infection while of the infected females, 60% and 40% had light and heavy infection respectively. There was no statistically significant difference between intensity of infection in male and female (χ^2 = 0.07, df = 1, p = 0.79). Also, the intensity of infection was not dependent on age (χ^2 = 0.74, df = 2, p = 0.69).

The overall prevalence of haematuria in this study was 26.3%. The prevalence of haematuria in male (27.1%) and female (25.3%) was not statistically significantly different (χ^2 = 0.13, df = 1, p = 0.72). However, the prevalence of haematuria varied significantly with age (χ^2 = 9.26, df = 2, p = 0.01). Further Chi-square analysis showed that the significant difference observed was between age groups 4-7 years and 12-15 years (χ^2 = 9.30, df = 1, p = 0.002). Of the 131 pupils who had urinary schistosomiasis, 77 (58.8%) had haematuria while 7 (3.7%) of the 189 pupils without urinary schistosomiasis had haematuria. There was a significant association between haematuria and schistosomiasis (χ^2 = 121.23, df = 1, p < 0.001, OR 37.07, 95% CI 19.35-71.03). This implied that subjects who had urinary schistosomiasis were 37 times more likely to have haematuria compared to those without.

Table-1: Prevalence of Urinary Schistosomiasis by Sex and Age among Study Population in Ilie, Southwestern Nigeria

	No. Examined n= 320	No. infected n=131	χ^2	p
Sex			0.48	0.49
Male	166 (51.9)	71 (42.8)		
Female	154 (48.1)	60 (39.0)		
Age			12.95	0.002
4-7	95 (29.7)	26 (27.4)		
8-11	105 (32.8)	43 (41.0)		
12-15	120 (37.5)	62 (51.7)		

Table-2: Intensity of Urinary Schistosomiasis by Sex and Age among the Infected Pupils in Ilie, Southwestern Nigeria

Subjects	No infected (%)		χ^2	p	Geometric mean intensity
	Light intensity n=77	Heavy intensity n=54			
Sex			0.07	0.79	
Male	41(57.7)	30(42.3)			38.6
Female	36(60.0)	24(40.0)			37.7
Age			0.74	0.69	
4-7	16(61.5)	10(38.5)			40.3
8-11	23(53.5)	20(46.5)			38.6
12-15	38(61.3)	24(38.7)			36.4

Table 3: Prevalence of Haematuria by Sex, Age and Schistosomiasis infection among the Study Population in Ilie, Southwestern Nigeria

	No Examined n = 320	No. with haematuria n = 84	χ^2	p
Sex			0.13	0.72
Male	166 (51.9)	45 (27.1)		
Female	154 (48.1)	39 (25.3)		
Age			9.26	0.01
4-7	95 (29.7)	15 (15.8)		
8-11	105 (32.8)	28 (26.7)		
12-15	120 (37.5)	41 (34.2)		
Schistosomiasis			121.23	<0.001
Positive	131 (40.9)	77 (58.8)		
Negative	189 (60.1)	7 (3.7)		

DISCUSSION

The overall prevalence of *S. haematobium* infection in this study was 40.9%. Urinary schistosomiasis is quite endemic and still actively transmitted in the study area. Some ten years ago, Oladejo and ofoeze [9] reported a prevalence of 52.3% in the same study area. Although there was decrease in prevalence of schistosomiasis in the current study compared to the findings of Oladejo and Ofoezie [9], a prevalence of 40.9% was still very high. This calls for concern and shows that there is no sign of any appreciable decrease of the infection in the study area. Also, it implies that appropriate measures have not been taken in the last ten years to control urinary schistosomiasis in the study area. In fact, rather than being checked, there are reports of increase in the disease in Southwestern Nigeria. For instance, Babatunde *et al*. [6] reported a prevalence of 48.2% in Akinlalu and Ogbaba communities; Ekpo *et al*. [10] reported 58.1% prevalence in Ilewo-Orile and Ugbomoiko *et al*. [11] reported 62% and 71.8% in two other communities in Southwestern Nigeria. All these reports show that urinary schistosomiasis is increasing being actively transmitted in this region.

The high prevalence of urinary schistosomiasis in this study could be associated with the availability of suitable water bodies and of infected *Bulinus* species. Majority of the inhabitants are mainly involved in such activities as farming, fishing, household chores which bring them in contact with infested water and thereby exposing them to high risk of schistosomiasis. Like in many other endemic riverine communities [12, 13], important factors contributing to transmission of schistosomiasis in this study area include, lack of knowledge, unwillingness to learn and desist from habits and beliefs that are inimical to healthy growth and development, unwholesome personal and communal hygienic conditions, lack of portable water. The fact that many inhabitants of the community and even some affected by the disease do not consider it a serious health challenge is a major drawback in the fight against the disease.

In this study, there was no significant difference in the prevalence of urinary schistosomiasis between the male and female participants which implied that infection was not dependent on sex. This is in line with the reports of some researchers [6, 14-16] but at variance with the reports of others [7, 17] who reported significantly higher prevalence in males than in females. The results of this study showed that both male and female children in the study area had equal chances of contact with infested water bodies. Where male contact with infested water was higher, boys were more infected and bear greater worm burden than girls [7, 10, 17].

This study showed that prevalence of urinary schistosomiasis increased with age. This pattern of infection is in line with the characteristics pattern of *S. haematobium* infection. The highest prevalence of 51.7% was observed in the 12-15 years age group which is in line with the reports of other previous researchers in Southwestern Nigeria [6, 7]. While females within the 12-15 years age group are more engaged in domestic chores which include fetching of water and washing of clothes, their male counterparts are mainly involved in fishing.

In this study, the eggs of *S. mansoni* were recovered from three urine samples. This shows that in addition to *S. haematobium*, *S. mansoni* is actively transmitted in the study area. Some researchers had reported similar recovery of *S. mansoni* eggs from urine samples in the past [7, 18].

In this study, the prevalence of haematuria showed no significant difference between the male and female participants. It was a reflection of the prevalence and intensity of the infection and corroborated the fact that infection rate and intensity were sex independent. *Schistosoma haematobium* was significantly associated with haematuria. This is in line with the some previous studies which reported a positive association between haematuria and presence of *S. haematobium* [19-21]. From the results of this study, a person with urinary schistosomiasis was 37 times more likely to have haematuria compared to one without. We are of the view that haematuria test can be a useful screening test for detecting infected individuals in this urinary schistosomiasis endemic area.

The control of schistosomiasis should include deliberate effort to put an effective control strategy in place. In Ilie, there is no such strategy in place at the moment. Chemotherapy with antihelminthes alone is not effective in the control of schistosomiasis even if the drug praziquantel is available. Concerted effort to find an end to this disease should not be in doubt; concrete methods and steps that would help improve preventive strategies and health education to reorientate the minds of the inhabitants about their beliefs coupled with chemotherapy would go a long way in eradicating this neglected disease.

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