

PREVALENCE AND INTENSITY OF URINARY SCHISTOSOMIASIS IN IBADAN SOUTH WEST AREA OF OYO STATE, NIGERIA

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Abstract

The prevalence and intensity of urinary schistosomiasis among school children in Ibadan South West Area of Oyo State, Nigeria were investigated using urine sedimentation method. Out of 380 urine samples collected from school children and examined, 177 (46.6%) tested positive for *Schistosoma haematobium* infection. Males had higher prevalence of 25.8% than females with 20.8%. However, prevalence of infection was not significantly ($p>0.05$) higher in the males than the females. Mean intensity of eggs in urine was 58 eggs/10 ml. Prevalence and intensity of infection in school children were found to be significantly ($p<0.05$) higher in the dry season than in the wet season. Female children in the lower primary classes (one to three) have higher prevalence of infection than males in the same classes. Males in the higher primary classes (four to six) had higher rate of infection than females in the same classes. School children of age groups 8 to 10 of the lower primary and 11 to 13 of the higher primary have significantly higher prevalence among the other age groups examined but not significantly different from each other, though age group 11-13 had a higher overall prevalence of infection (22.4%). Out of 177 cases of infection, 65 (14.8%) had haematuria. Ona stream which shares a common boundary with the school was found to harbour schistosome-infected bulinid snails. *Bulinus globosus* and *B. truncatus* snails collected on exposure to light were found to shed cercariae. The close proximity of Ona stream and the after school activities of the school children in the stream could be responsible for the high prevalence and intensity of schistosomiasis observed in the school children.

Key words: Urinary Schistosomiasis, Prevalence, Intensity, Ibadan South West.

Introduction

Schistosomiasis caused by trematodes of the genus *Schistosoma* constitutes one of the important parasitic diseases of man. It affects over 400 million people in developing countries due to poverty and ignorance with few, if any, sanitary facilities (WHO, 1984). It is endemic in many parts of the world and a major public health problem facing

humanity, with severe social and economic consequences (WHO, 1998). Many parts of Nigeria have been reported to be endemic for schistosomiasis (Edungbola *et al.*, 1987; Mafiana and Adesanya, 1994; Adeoye *et al.*, 2008). However, the urinary form is more widespread than the intestinal schistosomiasis (Asaolu and Ofoezie, 1990; Adeoye and Akabogu, 1996; Chitsulo *et al.*, 2000). Urinary schistosomiasis is transmitted by fresh water bulinid snails. WHO (1996) stated that man becomes infected by direct penetration of the skin by cercaria,

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which invades the circulatory system and at maturity the adult worms deposit eggs in the blood vessels which supply the urinary bladder (WHO, 1996) Although schistosomiasis is generally recognized as a chronic and debilitating disease of rural communities (Nmorsi *et al.*, 2001; Adamu and Abubakar 2003) infection has been reported in some urban areas (Okoli and Odaibo, 1999).

This study was carried out to determine the prevalence and intensity of urinary schistosomiasis in Ibadan South West Area of Oyo State, Nigeria.

Materials and methods

Study area

Epidemiological study was conducted among the pupils of St. Paul's Primary Anglican School, Odo-Ona in Ibadan South West Area of Oyo State between April, 2001 and March, 2003. The school of study is bounded on the west by Ona Stream and on the other sides by residential houses. The vegetation of Ibadan is of the grassland type and the area enjoys the characteristic West African monsoonal climate, marked by distinct seasonal shift in wind pattern with generally low rainfall and high humidity (Filani *et al.*, 1994).

Ethical consideration

Prior to the collection of samples, advocacy visits were made to relevant authorities such as the Ministry of Health and the Local Education Authority for approval of participation of school children in the study. Urine samples were collected from 380 randomly selected primary school children who were grouped into lower and higher primary according to their ages and classes.

Sample collection and analysis

Twenty (20) ml sterile brown sample bottles were distributed to the participating school children for urine collection between the hours of 11.00 hour and 14.00 hour when maximum egg excretion occurs (Chen and Mott, 1985). The age, sex, water contact behaviour and history of schistosomiasis treatment of the participants were recorded. Urine samples collected were immediately transported to the laboratory in black polythene bags to prevent hatching of eggs due to light penetration. Parasitological examination was carried out within 1 – 2 hours of collection. The urine sedimentation method was used. Briefly, urine samples were thoroughly mixed and 10 ml of each sample centrifuged at 2,000 rpm for 3 minutes as described by Cheesbrough (1992). The supernatant was discarded and the sediment examined by microscopy (X40) for *S. haematobium* egg deposits. The characteristic terminal spined eggs (Muller, 1975) were counted using a tally counter and intensity of infection recorded as number of eggs per 10 ml of urine. Macro- and Micro-haematumia were observed (Mott *et al.*, 1983) using reagent strips (Bio gen 959 M, Yeongdoing Pharm. Corp).

Snail intermediate host of schistosomes in the area of study were also collected, identified (Brown, 1980) and exposed to light to shed cercariae. Data obtained were statistically analyzed using t-test to determine differences between infected and non-infected as well as between age and sex of school children examined.

Results

Out of 380 school children examined, 177 (46.6%) were infected with *S. haematobium*. Of the 180 males examined, 98 (25.8 %) had higher rate of infection than 79 (20.8%) of 200 females examined. However, the prevalence of infection was not significantly ($p>0.05$) higher in the males than in the females. Table 1 shows the prevalence and intensity of infection in relation to sex in the school children examined. Mean intensity of eggs in urine was 58 eggs per 10 ml urine.

It was also observed that prevalence and intensity of infection was significantly ($p>0.05$) higher in the dry session than in the wet session (Table 2). Prevalence of urinary schistosomiasis in relation to age and sex among the school children is presented in Table 3. It revealed that female school children in the lower primary classes (Primary I, II and III) had higher prevalence of infection than males of the same group. Whereas, males of the higher primary classes had higher prevalence than females. In relation to age, school children within the ages of 8 to 10 years in the lower primary had higher prevalence while there was no record of infection in the 5 to 7 years age group. In the higher primary classes (Primary IV, V, VI), school children within the age of 11 and 13 years had significantly

($p<0.05$) higher infection than the children of age group 14 to 16 years.

Age group 11 to 13 also had higher overall prevalence of infection in the school children examined. Haematuria was observed in 65 (14.8%) of the 177 school children positive for *S. haematobium* eggs. It was observed that all the school children found to be infected with schistosomiasis never got any form of treatment for the disease. Bulinid snails (*Bulinus globosus* and *B. truncatus*) collected from Ona stream, were found to shed *Schistosoma cercariae* on exposure to light.

Discussion

A prevalence of 46.6% recorded in the school children examined indicates that schistosomiasis is an important public health problem in Ibadan South West Area of Oyo State. The school of study which shares a common boundary with Ona stream at Odo-Ona is probably the source of infection. History of schistosomiasis obtained from the school children showed that some of the children reside close to the stream and depend on the stream for washing of clothes and plates, especially during the dry months. Some of the male children confirmed their visits to the stream to play after school hours. Ona stream has been observed in this

Table 1. Prevalence and intensity of urinary schistosomiasis in relation to sex in school children in Ibadan

Sex	Number Examined	Number Infected	% Prevalence	Geometric Mean Intensity (eggs/10ml)
Males	180	98	25.8	41
Females	200	79	20.8	17
Total	380	177	46.8	58

Table 2. Seasonal prevalence and intensity of urinary Schistosomiasis in school children in Ibadan

Season of study	Males			Females			Total			Geometric Mean Intensity (eggs/10ml)
	No. Exam	No. Infect	% Prev	No. Exam	No. Infect	% Prev	No. Exam	No. Infect	% Prev	
Dry Season	115	66	57.4	110	44	40.0	225	110	48.9	30.2
Wet Season	65	32	49.2	90	35	38.9	155	67	43.2	28.4
Total	180	98	25.8	200	79	20.8	380	177	46.6	58.6

Table 3. Prevalence of urinary Schistosomiasis in relation to age and sex in school children in Ibadan

Age Group Sex	Lower Primary Classes (I - III)		Higher Primary Classes (IV – VI)		
	5 - 7	8 - 10	11 - 13	14 - 16	Total
Males	-	96 (10.3%)	69 (13.9%)	15 (1.6%)	180 (25.8%)
Females	2 (0)	106 (11.1%)	77 (8.4%)	15 (1.3%)	200 (20.8%)
Total	2 (0)	202 (21.3%)	146 (22.4%)	30 (2.9%)	300 (46.6%)

study to harbour cercariae shedding bulinid snails when exposed to light. The close proximity of Ona stream to the school and the after school activities of the school children could therefore be responsible for the high prevalence and intensity of urinary schistosomiasis observed among the children. Males were found to be more infected than the females. This reflects the greater opportunities of males to water contact (Gujral and Vaz, 2000). This trend also agrees with previous reports that boys were more infected than girls and also that intensity of infection was higher in males than in females (Okoli and Odaibo, 1999; Pukuma and Musa, 2007). Prevalence and intensity of infection were found to be higher in the dry season than in wet season. Akogun and Obadiah (1996) reported that

school children spend a large proportion of their time swimming and bathing in canals during the hot months. Also, the frequency of visits to natural sources of water may be more during the hot months, especially in areas lacking adequate and good water supply system coupled with a reduction or lack of rainfall at that particular period of the year.

During the months schistosome-infested bulinid snails become concentrated in the stream due to reduced volume of water at this season, resulting to a higher rate of infection. However, during the rainy months, there is usually an increase in the volume of water leading to the 'washing-off' of snails and dilution of water causing a lower infection rate at this season. More cases of infection were recorded in school children

between the ages of 11 and 13 years in the higher primary classes. Human contact with water at this age bracket has also been observed to be frequent (Udonsi, 1990; Uneke *et al.*, 2007) due to the youthful attitude of children at this age group.

Lack of infection in age group 5 – 7 of the school children examined in this study could be attributed to their young ages, which at this age may have reduced exposure to water bodies. The geometric mean intensities recorded in this study were high and comparable to the World Health Organization set threshold egg concentration of >50eggs per 10ml of urine by parasitological methods (WHO, 1998). This suggests a high endemicity, high risk of transmission and a high risk of developing disease complications with urinary schistosomiasis. Heavy infections could be attributed to high frequency and duration of exposure to schistosome cercariae as has been reported (Anosike *et al.*, 2003).

Many of the infected school children especially those with observed haematuria were not particularly disturbed about the noticeable symptom of infection. Some of the infected school children interviewed corroborated their lack of visit to health facilities. Ogbe (2002), noted that persons affected by schistosomiasis often do not perceive the disease as a serious health problem. Although urinary schistosomiasis is endemic in Nigeria, it is usually a neglected tropical disease according to Hotez *et al.* (2007) and King and Bertino (2008). Schistosomiasis has also been reported as a common parasitic disease of childhood in Nigeria (Bello and Edungbola (1992). Health facilities have access to chemotherapy. Visits to

health facilities by schistosome-infected persons therefore, will go a long way in reducing the scourge of this infection. WHO (2006) noted that chemotherapy with antihelminthic drugs is effective in the control of schistosomiasis.

This study has shown that urinary schistosomiasis is still actively transmitted in Odo-Ona area of Ibadan South West. The presence of bulinid snails in Ona stream and the after school activities of the school children in the stream are the probable causes of the observed high prevalence and intensity of schistosomiasis. Health education, chemotherapy and eradication of snails' intermediate host of schistosomes are possible measures for the control of urinary schistosomiasis in the area of study.

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