

Prevalence Of Bacteriuria Among Pupils With Urinary Schistosomiasis In Osogbo

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Abstract

Objectives: This study is designed to determine the prevalence of urinary schistosomiasis and concomitant bacteriuria among pupils in Osogbo with a view to produce a data base for effective control plan.

Methods: The current status of Urinary Schistosomiasis and infections by other Urinary pathogens was assessed between October, 2004 and March 2005 among primary school children in Olorunda Local Government area of Osun State. Urine samples were collected from pupils in primaries 1 to 6 for this study and were analyzed by simple centrifugational concentration method and urine culture as described.

Results: Of 523 pupils examined for eggs of *Schistosoma haematobium* in their urine, 166 (31.7%) were infested - 102 (36.6%) males and 64 (26.2%) females. Egg count per 10ml of urine in males was (44.8 eggs/10ml Urine) and that of female pupils was (39.7 eggs/10ml Urine). 54.2% of infested pupils had one bacteria pathogen or the other with *Escherichia Coli* occurring more than others. The antibiogram of the isolates revealed that ceftriaxone, cephalaxine, peflacin and augmentin were the most effective drugs in treatment of urinary pathogens among the pupils.

Conclusions: *Schistosoma haematobium* is still being actively transmitted in Osogbo. Clinicians should request for urine Microscopy, Culture and Sensitivity (M/C/S) rather than only urine microscopy in suspected cases of urinary schistosomiasis because of high secondary bacteria infection.

Introduction

The association between schistosomal and bacterial infection could result from a relationship (Possibly symbiotic) in which the bacteria either become fixed on the surface of the worms in clearly defined places¹ or colonize the caecum of the parasite^{2,16}. It is universally accepted that schistosomiasis produces inflammatory changes from acute to chronic stage in the bladder and it is therefore reasonable to expect pyuria in a population with endemic infestation.^{3,18}

Other conditions include nephro-typhoid characterized by fever, oedema, marked albuminuria, haematuria and Bacteriuria^{3,4,8}. Hancy⁷ defined bacteriuria as the presence of bacteria in urine and the presence of 10⁵ organisms of pure culture per ml of recently voided urine are indications of urinary tract infection. The children at great risk of kidney damages are infants and young children of school age⁸. Febrile urinary tract

infections in children are more often asymptomatic and frequently recurrent^{8,10-11}.

Although, urinary schistosomiasis is endemic in Nigeria, it is usually a neglected common parasitic disease of childhood.^{8,9}. Surveillance for urinary schistosomiasis is important in establishing endemicity and in the planning of control operations. In Osun State of Nigeria, many areas are not yet surveilled while some which have been surveilled contained no information on the socio-economic factors that may have influence on the prevalence of the disease in the community. To the best of our knowledge, this work will be the first to investigate the relationship between urinary schistosomiasis and bacteriuria in this local government. The study is undertaken to determine the prevalence of schistosomiasis and concomitant bacteriuria among pupils in the local government with a view to producing a data base for effective control plan.

The study was carried out in Osogbo, the capital of Osun State. Osogbo is in the tropical rain forest belt, about 210 kilometers from Lagos. It lies on latitude 4°N of the equator and longitude 7.34°E. Three schools out of the seven primary schools in the district were selected by balloting. Saint James Primary and NUD Primary School Ilie are in rural area and AUD Primary School Sabo Osogbo in urban area of Olorunda local government. The area is marked by two seasons: rainy season, which starts from April and terminates in October and dry season, which prevails between October and March.

Sample collection

Subjects in the study population were assigned for sample collection with the active support of staff and students of the three Schools. Written permission was given through the Local Education Authority to seek parent's consent and pupil's consent to include them in the study. 523 pupils were randomly selected from total population of 1,253 students of the three schools used for this study. However, those who declined consent were excluded from the study. A pair of terminal stream and mid stream urine samples was collected into sterile universal containers from 523 pupils from the three schools 115 from Saint James, 124 from NUD and 284 from AUD School respectively. In addition to samples, information collected included age, sex, water source, stream water usage, time in school and symptoms of infection such as Macro haematuria using standard questionnaire.

Laboratory processing of samples:

The method described and modified by Colle *et al*⁵ was employed in processing the urine samples before microscopic examination with X10 and X40 objectives¹². Pus cells and red blood cells in samples were noted.

All the pyuric samples that contain schistosome eggs were cultured on sheep blood agar, CLED (Cystein Lactose Electrolyte Deficient) agar and macconkey agar plates respectively, using the method described by Cowan and Steel⁶. All bacteria isolated were characterized by using the standard methods described by Pekarski¹². Stokes¹³⁻¹⁴ disc diffusion agar method was employed for Antibiogram of Isolates obtained. The antibiotics used include

cotrimoxazole (25ug), amoxicillin (25ug), tetracycline (30ug), nalidixic acid (30ug) gentamycin (10ug), erythromycin (5ug) and nitrofurantoin (300ug).

Data Analysis: The data analysis was done using X² (Chi square) and (Student) (t) test to determine level of significance between variables and Pset at 5%.

Results

The prevalence and intensity of *Schistosoma haematobium* among pupils from the three schools are represented in Table 1. Of 523 urine samples which were examined, 166 (31.7%) were infested with *S. haematobium*. The result show that 102 (36.6%) males and 64 (26.2%) females were infested. Arithmetic mean egg count per 10ml of urine in males was (44.8 egg/s 10ml urine and that of female pupils was 39.7 eggs/10ml urine). (Table 1). All the 166 samples (31.7%) that were infested with *S. haematobium* also had pus cells in the urine (pyuria), but only 90 (54.2%) yielded more than 10⁵ colony of bacteria. 90 out of 166 (54.2%) yielded growth of > 10 colony of one bacterium or the other (Table2). *Escherichia coli* account for highest frequency of 44 isolates (26.5%), followed by *Staphylococcus aureus* 35 isolates (21.1%), while *Klebsiella* species and *Proteus* species yielded 4 isolates each (2.4%), *Candida albicans* accounts for 1.8% of the isolates. (Table2)

A greater percentage of samples from pupils in the rural areas yielded bacteria isolates compared to those from urban areas 56.3% and 47.4% respectively. However this was not statistically significant (p=0.157). (Table3).

Antibiogram of bacteria Isolates as shown in Table 4 revealed that ceftriaxone, peflacin, ceftriaxone and ofloxacin are most effective against most of the urinary tract pathogens isolated in this study. Gentamycin showed moderate to high activities while the pathogens were resistant to tetracycline, nalidixic acid and erythromycin.

TABLE 1: Ova/Egg Findings in The 523 Samples According To Sexes

Sex	No Examined	No Infected	% Infected	Amec*
Male	279	102	36.6	44.8
Female	244	64	26.2	39.7
Total	523	166	31.7	43.3

*amec- arithmetic mean egg count.

Table 2: Distribution Of Urinary Tract Pathogens In The Specimens Positive For Schistosome Ova By Sex

Bacterial and Fungal Pathogens Isolated	Male Total Positive for OVA=102 No positive for Pathogens (%)	Females Total Positive for OVA=64 No Positive for Pathogens (%)	Male & Females Total Positive for OVA=166 No Positive for Pathogens (%)
Escherichia Coli	16(15.7)	28(43.8)	44(26.5)
Staphyrococcus Aureus	22(21.6)	13(20.3)	35(21.1)
Klebsiella Aerogene	2(2.0)	2(3.1)	4(2.4)
Proteus Species	3(3.0)	1(1.0)	4(2.4)
Candida Albicans	0(0.0)	3(4.6)	3(1.8)
Total	43(42.2)	47(73.4)	90(54.2)

Table 3: Distribution of urinary schistosomiasis and concomitant bacteriuria by urban and rural settings

Setting or Location	No of Children Examined	No (%) Positive For Schistosome OVA	No of OVA Positive Specimen also Positive for Bacteriuria	% of OVA Positive Specimen also Positive for Bacteriuria
Urban	284	38(13.4)*	18	47.4
Rural	239	128(53.6)*	72	56.3
Total	523	166(31.7)*	90	54.2

* The figures in brackets are parentage

Table 4 Antibiotic susceptibility pattern of bacterial isolates

Antibacterial	Percentage sensitivity			
	E coli	Kleb. Spp	Staph. Aureus	Proteus spp
Ofloxacin	100	85	86	100
Peflacin	100	72	85	100
Ceftriaxone	100	100	100	100
Gentamycin	80	81	76	60
Amoxycillin	18	40	98	75
Cephalexin	98	97	100	100
Cotrimoxazole	0	20	62	0
Tetracycline	0	0	18	7
Nalidixic acid	0	0	10	0
Nitrofurantoin	25	0	50	80
Erythromycin	0	0	42	0

DISCUSSION

The problem of Schistosomiasis in Nigeria especially among rural school children is serious. This study has shown that 31.7% of the primary school children examined in Olorunda Local Government are infected with *Schistosoma haematobium* with 13.4% and 53.6% prevalence rate in the urban and rural area of the local government respectively. This is lower than the rates reported from other communities in southwestern Nigeria, for example, 57.5% prevalence rate from Ibadan by Adeyeba and Ojeaga¹, and 66.4%, 76.2%, and 76.8% in three contiguous communities in South West Nigeria by Adewumi¹⁵. However, the result is in accordance with the finding of Akufongwe⁴ who reported prevalence of 22.4% in some primary schools in Jos, 2.9% at Abattoir area and 49.9% in Faringada and Student village area, in Plateau State. Mafe²³ also reported a rate of 17.4% in Ibadan though this is higher than the 13.4% prevalence obtained from Osogbo township a similar urban community in south-western Nigeria. Nmorsi *et al.*,¹⁷ reported 0.55% prevalence of urinary Schistosomiasis among pupils in Apata and Laranto areas in Jos, Plateau State¹⁷. Agbolade *et al.*,² also reported a prevalence of 7.5% in some villages of Ijebu North, Ogun State². The differences in the rates may be due to geographical and behavior

factors.

The higher prevalence rate observed among males in the present study conforms to pattern found in most endemic areas and reflects the greater exposure of males. From previous studies, generally, males are significantly more infested^{2,4,17}. They are more involved in occupational activities like paddling of canoes, irrigational farming and fishing than their female counterparts¹⁹⁻²¹. In Osogbo for instance, there is continuous flow of pipe borne water for only 2 or 3 days in a week, therefore people have to depend on alternative source of water like streams, wells and ponds for the remaining days of the week. This fact favours increased contact with sources of infestation, and hence transmission of the disease. The school children in the rural communities were more infested than those in the urban area. This could be due to presence of bodies of infested water in the rural community upon which people are dependent for domestic use. Indiscriminate urination and defecation into the stream water by persons harbouring schistosome eggs is common among rural dwellers, thereby propagating the infestation. In a survey by Amoo and Hassan⁶, over 53

percent of those infested in a rural area practiced indiscriminate sewage disposal system (Shotput) and use of night soil in their irrigation farming. This favours the transmission of Schistosomiasis²⁴.

This work shows that all the 166 subjects infested had pus cells in their urine. This is an indication of inflammatory lesion on the bladder caused by *S. haematobium*. Eggs deposited in the tissue could give rise to inflammation and granuloma formation leading to possible subsequent urinary tract infection. Some earlier workers had implicated pyuria with urinary tract infection^{8,9,22}.

Some authors had implicated *Escherichia coli*^{1,8,22} as the most frequently encountered bacterial organism in urinary tract infection which in keeping with our present finding.

This is closely followed by *Staphylococcus aureus* among subjects primarily infested with urinary schistosomiasis in this work. These organisms could easily get to the inflamed bladder tissue through endogenous route as they are both normal flora of intestinal tract and skin respectively^{21,22}.

Isolation of *Candida albicans* from female students in the rural area may be due to their poor hygiene and use of under wears for more than three days without changing them as well as poor toilet habits among the rural dwellers²⁴.

In all, 54.4% of the subjects with urinary schistosome yielded one or more bacterial isolates. Previous studies had shown the predilection of schistosome infested bladder to bacterial infection. For example, Mostafa *et al.*,²² showed that 36-66% of hospitalized subjects with schistosomiasis were found to have bacterial infection in the urinary tract²², and Adeyeba and Ojeaga¹ also reported a rate of 75.4% for bacteriuria among pupils infested with *S. haematobium* in Ibadan. Many of these patients are asymptomatic. This poses a significant public health problem, because patients can develop chronic renal diseases.

In conclusion, a significant percentage of school pupils with urinary schistosomiasis also had significant bacteriuria. We advocate that students or subjects with urinary schistosomiasis should also be screened for bacteriuria, and treated appropriately.

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