Prevalence and Intensity of Schistosoma haematobium among school children in Ajase-Ipo, Kwara State, Nigeria

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ABSTRACT :

A study was conducted to investigate the current pattern of prevalence and intensity of Schistosoma haematobium infection among school children in Ajase Ipo community, Kwara State, Nigeria. Schistosoma haematobium infections were detected using microscopy examination for schistosome eggs and macroscopically for gross haematuria and screened for microhaematuria and protenuria, using commercial reagent strip(Medi-test combi-9) in accordance with manufacturer's instruction. Out of 150 individuals who were investigated, 88(58.7%) were found infected. The sex pattern of Schistosoma haematobium infections as obtained from the study area showed that infection rate between males and females were comparable and not statistically significant (p =0.380) but is slightly higher in male (62.0%) than female (54.9%).
The study revealed that subject that spend over 60mins in water had the highest prevalence of infection (69.6%) compared to those that spend between 10- 60mins (57.14%) and less than10mins (22.20%). This is statistically significant (p<0.05). Also activities such as bathing and washing in the stream served as the predisposing factors to infection. 97.3% of individual that showed sign of haematuria were infected compared to 71.13% of infected individuals that shows sign of protenuria. The research concluded that urinary schistosomiasis is endemic in Ajase Ipo community and the use of reagent strip is an indication to the microscopy examination of eggs and positive diagnosis of the disease.

Keywords: Urinary Schistosomiasis, Prevalence, Intensity, School children, Ajase-Ipo, Nigeria.

INTRODUCTION:

Schistosomiasis is a water-borne parasitic disease that affects 200 million people and more than 750 million people are at risk [(1)]. It is a chronic debilitating disease ranked second to malaria in socio-economic and public health importance in tropical and subtropical regions [(2)]. The prevalence and epidemiology of the disease are associated to the proximity of human – water contact activities and pattern [(3)]. Clinical signs and symptoms include dysuria, haematuria, granulomatous host response and urinary egg excretion. Schistosoma haematobium is endemic in over 50 countries in Africa and the Middle East. It is also occasionally seen in Western Asia. The World Health Organization [(2)] considers it as a significant public health problem in much of Africa. WHO estimates that worldwide, 180 million people live in endemic areas and 90 million are infected with the parasites. Most of these live in Sub-Saharan Africa. Roughly 70 million persons suffer from haematuria (blood in the urine), 18 million from associated bladder wall pathology, and 10 million from hydronephrosis (an accumulation of urine in the kidney due to obstruction of the ureter). It is also estimated that 150,000 people die each year from resultant renal failure and an unknown but significant number from bladder and other genitourinary cancers [(2)]. The overall mortality rate is estimated to be at least 2 per 1,000 infected patients per year. In many places, there is a higher incidence of infection in young boys

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and women. This occurs because of increased contact with water compared to other population groups in cultures where women typically fetch water for household use and young boys often play in or near water. In some regions where men are primarily freshwater fishermen or farmers using irrigation farming, they have higher rates of schistosomiasis. These differential rates of transmission depend on cultural practices. It is important to consider them when planning treatment, prevention, and control strategies [3].

In Nigeria, both urinary and intestinal schistosomiasis caused by S. haematobium and S.mansoni, respectively are prevalent [4]. Students are often vulnerable to infection, presenting clinical symptom like haematuria, suprapubic pain, dysuria, obstructive uropathy, kidney failure and elevated risk of bladder cancer. The mortality rate due to non-functioning kidney and haematemesis from S. haematobium has been estimated and it was over 150,000 per year [5], thus indicating that urinary schistosomiasis has become a grave public health problem in sub-Saharan African and second to plasmodium in term of morbidity and mortality [2]. The general aim of this research project is to investigate the prevalence and intensity of Schistosoma haematobium infection in school children and to know the transmission pattern of the infection in Ajase Ipo Community.

MATERIALS AND METHODS

Study Area

The study was conducted in Ajase Ipo community of Irepodun local government area Kwara State, Nigeria between June and July 2013. Ajase Ipo is located at Latitude: 8° 13' 60 North and Longitude: 4° 49' 0 East as displayed on world map coordinates and short location facts. The town serves as major junction for all other major cities and towns in Kwara State, Nigeria including Ilorin (Kwara State capital), Omu-Aran, Offa and Igbaja. The vegetation type of the community is mainly guinea savannah with the climatic condition revealing a marked dry and wet season. The indigenous population is predominantly muslim's of Yoruba tribe. The inhabitants generally live a communal life, mainly peasant farmers, majority of the house in the community are adobe and the community is situated in the North Eastern part of Yoruba land in North central Nigeria and consists of other different villages such as Eleyoka, Amberi, Falokun, Araro.

The community has 12 schools which comprise of tertiary institution, secondary and primary schools and the community is endowed with one famous river called "Oshin River" that flows across the community. The river serves as the major source of water supply to the community. So individual prefer carrying out their domestic activities like washing their clothes, bathing and recreational activities (swimming) at the river in spite
the advent of borehole and well in the community.

Figure 1: Map of kwara state showing location of Ajase-Ipo community of Irepodun Local Government Area.

Samples collection

Freshly passed mid-day urine (between 10.00hr and 14.00hr) was collected with pre-labeled screw-capped plastic container. To avoid false positive results, girls of child-bearing age who had menstruated within five days before sample collection were excluded from the analysis. On returning the urine samples, their names were recorded in the questionnaire to reflect necessary information such as class, age, sex, educational status of the mother, parents' occupation etc. Afterward, the urine samples were sent to the laboratory for immediate analysis. Samples not analyzed immediately were preserved with 2 drops of 10% formalin.

In an interview based on a pre-tested and structural questionnaire in English language, individually by the designated school teacher. Relevant data were collected from individual; the questionnaire was to record the age, sex and to explore the urinary schistosomiasis-related knowledge. The questionnaire was delivered in a participatory manner, without any attempt by the interviewer to influence the responses.

Determination of haematuria and Proteinurea

Samples were immediately checked macroscopically for gross haematuria by visual examination, and also screened for microhaematuria and proteinuria, using commercial reagent strip (Medi-test combi-9; Analytic Biotechnologies, Lichtenfels, Germany), in accordance with the manufacturer's instructions. The urine samples were then transported to the laboratory at the University of Ilorin Teaching Hospital parasitology laboratory where they were analyzed microscopically.

Analysis of urine samples

Samples were analyzed using the standard sedimentation technique. Test tube were rinsed with distilled water and dried up, the test tube were filled with 10ml of urine sample, each subject with two test tubes. Test-tubes were arranged in the centrifuge with labeled subject on them, centrifuge machine was set at a speed and time (2000 rpm for 5 minutes.) to sediment the residue and supernatant which help to concentrate eggs in order to give clear microscopical examination. After centrifuging, the residual was obtained with pipette and released on a cleaned slide, the sample was mounted on the stage of the microscope. The sample was observed under the x10 objective lens of light binocular microscope for the S. haematobium eggs (2).

The intensity of infection was graded as heavy (>500 eggs/10ml), moderate (51-499 eggs/10ml) or light infection (<50eggs/10ml) respectively).

RESULTS

A total of 88 (58.7%) were infected with urinary schistosomiasis out of the 150 subjects examined. Table 1 below shows prevalence and intensity of infection stratified by sex. The infection between male and female was not statistically significant (p-value=0.380), although, the rate of infection was slightly higher in males 49(62.0%) than in female 39(54.9%). The intensity also shows 32.7% and 23.1% of the infected school children had lightly infection (1-50 eggs/10ml of urine) and moderate infection respectively. There was no significant difference between the intensity of infection between male and female p>0.05. Table 2 shows that the intensity of infection between age group and age group >16 has the highest infection rate (65.7%) and the least is (53.1%) in 13-16 age group. Table 3 shows that infected subjects with blood in their urine (haematuria) had higher infection rates of 50%, 40.5% and 6.8% while infected subjects without haematuria showed lower infection rates of 15.8%, 5.3% and 0% respectively. Table 4 shows that 97.3% of the samples that show blood in urine (haematuria) had infection while 21.05% of samples without haematuria were infected. Also it shows that 71.13% of the 97 samples examined that indicated the presence of proteinuria were infected while 35.84% of the samples that did not show the presence of proteinuria were infected. In table 5, activities such as play/bath

Sex	No Examined	No Infected	Intensity		
			Light Infection (%) Moderate	Infection (%)	Heavy infection (%)
Male	79	49(62.0)	26(33.1)	20(25.3)	3(3.79)
Female	71	39(54.9)	23(32.4)	14(19.71)	2(2.82)
Total	150	88(58.7)	49(32.7)	34(23.1)	5(3.33)

Table 1: Prevalence and Intensity of the Infection Stratified By Sex

Age Group	No Examined	No Infected	Intensity			
			No Infection (%)	Light Infection (%)	Moderate infection (%)	Heavy infection (%)
9-12	34	22(62.5)	12(37.5)	8(23.53)	12(35.29)	2(15.61)
13-16	81	43(53.1)	38 (46.9)	26(32.9)	14(17.28)	3(3.7)
>16	35	23(65.7)	12 (34.3)	15(42.91)	8(22.86)	0(0)
Total	150	88(58.7)	62(41.3)	49(32.7)	34(23.1)	5(3.33)

Table 2: Prevalence and intensity of infection in respect to age group.

Haematuria	No Uninfected (%)	Light Infection (%)	Moderate infection (%)	Heavy infection (%)	Total
YES	2 (2.70)	37(50)	30(40.54)	5(6.75)	74
No	60(78.9)	12(15.8)	4(5.26)	0(0)	76
TOTAL	62(41.3)	49(32.7)	34(23.1)	5(3.33)	150

Table 3: Intensity of infection using haematuria

Reagent strip	Infected	Not infected	Total no examined
Proteinuria Yes	69(71.13)	28(28.86)	97
No	19(35.84)	34(64.2)	53
Haematuria Yes	72(97.3)	2(2.70)	74
No	16(21.05)	60(78.9)	76

PROTEINURIA AND HAEMATURIA PRESENT (%)

Table4: Diagnostic Accuracy of Proteinuria and Microhaematuria in Urinary Schistosomiasis.

	No Infected (%)	No Uninfected (%)	No Examined
Open water contact activities			
Play/bath	28(54.9)	23(45.1)	51
Washing	56(70)	24(30.0)	80
Agricultural use	2(50)	2(50.0)	4
Fishing	0(0)	1(100.0)	1
No contact	2(14.3)	12(85.7)	14
How long you stay in river			
More than 60minutes	64(69.56)	28(30.44)	92
Between 10-60minutes	20(57.14)	15(42.86)	35
Less than 10minutes	2(22.20)	7(77.80)	9
Not at all	2(14.3)	12(85.7)	14
Main source of water			
Tap	23(57.5)	17(42.5)	40
Well	33(54.1)	28(45.9)	61
River/stream	31(66.0)	16(34.0)	47
Others	1(50.0)	1(50.0)	2
Total	88	62	150

Table5: Prevalence of infection with respect to water contact and duration in contact

and washing had high prevalence of 54.9% and 70% respectively among the infected subjects. People that stay more than 60mins in water had highest number of infected subjects 64 (69.56%) compared to those that spend less time in water. Also, people that made use of river/ stream as their main source of water had the highest rate of infection 31(66%).

DISCUSSION:

The present study has examined the prevalence pattern and intensity of Schistosoma haematobium in school children in Ajase Ipo community in Ilorin, Kwara state Nigeria. The prevalence rate of infection recorded was 58.7%. This is higher than the overall prevalence of infection among school children in Osun state 12.7% [6]. High prevalence of S.haematobium infections had been reported by some other authors in area where the infection is endemic [7, 8]. The high rate of prevalence reported in the present study may be an indication of the rate of S.haematobium transmission foci in these communities. The rivers are the main transmission foci of this community. They provided natural water source as well as serve as meeting point for schistosome parasites, their intermediate host and the people. The people depend on these rivers for their fishing occupation, bathing, swimming and other domestic needs. Infection foci have also been traced to their farms. These provide avenue for infection transmission and reinfection. However, the prevalence is lower than the prevalence rate of 98.0% reported from an Agricultural settlement near Yola, North-eastern Nigeria. This difference in the prevalence rate may be influenced by peculiar ecological characteristics, the degree of exposure of people to water bodies through some indigenous water contact activities, and presence of intermediate snail hosts in Local River. In this present study, most of the subjects that haboured eggs of S. haematobium were moderately infected (38.6%). This can easily be aggravated to heavy infection that may lead to low human performance, reduced physical and intellectual function, and infertility [9]. The infection pattern in this present study showed a typical high prevalence in the early adolescence with males having a higher rate of 62.0% prevalence than their female counterpart having 54.9% prevalence. Similar trend have been recorded before endemic settings, in Nigeria and elsewhere in Africa [10, 11] some other studies have found no significant differences in gender prevalence [12]. The high prevalence in male is due

to the fact that the males tend to go to river water on regular bases to fetch water for domestic use, play or bath, to swim and to fish unlike the females that may necessarily attach any importance to such water contact activities but rather stay close their mother at home while assisting with domestic chores.

The differences in the male and female intensities of infection may reflect the degree of sensitization and host response to the invading parasites as well as the extent of worm burden in the individual subject.

Water- contact behavior may also be linked to occupation and various socio-economic and socio- cultural factors. The major water contact activities observed in the village include bathing and swimming, washing and fetching water for domestic use am d fishing. The most important water contact activity which significantly account for 70% of the infected children and this is because people that goes to wash, there infection rate is high due to bathing after washing immediately. Generally, children of school age who visit the river fishing tend to be infected and re-infected, hence the reason for high level of mean egg count. This is corroborated by many authors. The average number of times individual visit the river water was examined and it was observed that most of the subjects tend to visit the river at least once daily for varying activities. Heamaturia is recognized as the major sign and symptom of urinary schistosomiasis. This is supported by the report of [12] who recognize haematuria and proteinuria as signs and symptoms of infection with S.haematobium. Haematuria is associated with active bladder lesions in children. The results of urinalysis and prevalence of haematuria in this study showed 97.3 % prevalence of haematuria, which is the highest, thus showing that haematuria have greater frequency of occurrence in school children who are having high mean egg intensities. Different studies have shown that increasing grades of haematuria and proteinuria correlate positively and directly with increasing egg output. [12].

In this study, the infected individuals showing haematuria and proteinuria were 97.3% and 71.13% respectively. The results were in accordance with the findings of (Ugbomoiko *et al*.,2009) using commercial reagent strip of BM-5l test, sensitivity of haematuria to infection was higher (92.4-93.5%) and sensitivity of protenuria to infection was higher using Combi -9(55.5-80.4%)

In an earlier work carried out in Ore and Eko-ende, [13] highlighted the poor living conditions of villagers, which include: poor housing, poor sanitation, lack of pipe-borne water , with intense contamination of peri-domestic areas and water bodies with prevalence of infection of 62.0% and the subject to 10-14years had both highest prevalence (83.6%) highest intensity of infection with respect to moderate or heavily infected (excreting >50 eggs /10ml urine) is 53.5%.This slightly correlates with what is recorded in our area of study (Ajase-Ipo) and in other endemic areas in Nigeria.(King, 2010). Most (70%) of the subjects appeared to have no knowledge of the transmission of *S. haematobium* .

CONCLUSION:

Schistosoma haematobium infection of Eighty eight (58.7%) out of 150 individuals is predisposed by a number of factors including presence of right species of snail intermediate host and exposure to water contaminated with the infective stage of the parasite called cercariae. Diagnosis of 150 individual are mainly based on the finding in urine the characteristics compact and elongate-egg-oval at the anterior end, tapering to distinct stout terminal spine at the posterior end and miracidia in hatching method using microscopy. Infected persons exhibiting some symptoms of schistosomiasis need immediate treatment and intensified efforts towards control of the spread of the infection or its eradication. The essence of this study is to ascertain the infection rate of Schistosoma haematobium among communal living in Ajase-Ipo community of Irepodun Local Government Area of Kwara state. It has been established from this work that, there is urinary schistosomiasis in Ajase-Ipo even though the infection rate is moderate, the pathogenicity and socio-economic importance of the disease call for treatment of already infected communal to reduce or stop the spread of the disease.

Creation of public awareness on the dangers of this disease and its mode of infection is important towards the control of schistosomiasis. The intermediate host of the parasite should be shown to the public while its signs and symptoms should be x-rayed through such awareness campaign. These will enable susceptible individuals to avoid water bodies infected with such snails and equally report to appropriate health authorities of such areas on cases found. Moreover, communal should be stopped or restricted from prolonged and unnecessary contact with open water bodies. Treatment of infected persons and provision of safe recreational water source for children and pipe-borne water supply for household use are suggested.

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